



Reflections on Canadian Incomes

Selected papers presented at the
Conference on Canadian Incomes
May 10-12, 1979
Winnipeg, Manitoba

Economic Council of Canada

REFLECTIONS ON CANADIAN INCOMES

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INTRODUCTION

In May 1979, the Conference on Canadian Incomes was held in Winnipeg, Manitoba. It was sponsored by the Economic Council of Canada and was attended by about 120 people. The majority of those who attended were researchers in economics or sociology, coming largely from Canadian or American universities, or from government departments or agencies. But also present at the Conference was a good representation of people concerned with policy and program formulation and administration, and these people came from all three levels of government. In addition, the sessions were open to the press, and a number of journalists availed themselves of the opportunity.

The purposes of the Conference were threefold: to assess the present levels of knowledge and directions of activity in incomes research in Canada, to indicate some of the policy implications that derive from this knowledge, and to suggest in what directions future research efforts should be directed. The presence of invited foreign colleagues gave additional scope and depth to the deliberations on these points.

The papers in this volume were selected from those presented at the Conference and from the background papers prepared for the Conference. They were selected with an eye to providing an informative overview of the state of incomes research in Canada -- the first purpose noted above. The other papers that were available at the Conference are catalogued towards the end of this volume.

A number of the papers in this volume also address, in varying degrees, relevant policy issues and possible future avenues of research. These two aspects were specifically treated during a panel discussion on the last morning of the Conference. The panelists were Dr. Sylvia Ostry, Chairman of the Economic Council; Professor Dorothy Wedderburn, Imperial College of London; Professor James Morgan, University of Michigan; Professor John Vanderkamp, University of Guelph; and Professor John Porter, Carleton University. The discussion also included participation from the floor.

A number of policy problems and implications received attention and some of these are mentioned briefly below:

- It was noted, to begin with, that the concept of a negative income tax was very popular in Canada about four or five years ago, but that a certain disenchantment with this idea has set in (this might be contrasted with the United States where this concept and the related concept of a credit income tax is again becoming more popular in intellectual and even governmental circles). While it was hoped initially that a negative income tax might be a mechanism to do away with the plethora of social programs and replace them with a single program, it soon became clear that there was significant vested interest in most of the existing programs and that it might prove to be difficult politically to do away with very many of these programs. Further, there was a concern that in catering to everyone, a negative income tax scheme might not serve anyone very satisfactorily. People's needs simply vary too much to be met through a single mechanism. In addition, a negative income tax scheme could create worrisome work disincentive effects, and the assumption of simple, low-cost administration might not prove fully justified. Thus, it was suggested that it might be wise to limit ourselves at present to considering possible improvements to existing programs, rather than opting for some grand overall negative income tax scheme.

- The Conference focussed on two types of earnings disparities: male-female disparities, and interlinguistic disparities in the Quebec context. With respect to former, it was suggested that the process of reducing these disparities would likely be a long one. Economic conditions are presently unfavourable and, in such circumstances, it will be harder for women to improve their present situation than in a booming economy. Nonetheless, it is essential to work towards improvement. A useful perspective from which to attack this problem may be by focussing our attention on increasing job opportunities for the young women, on making more information available to all new entrants on the implications of various career choices, and on encouraging certain direct and specific organizational initiatives that favourably affect the labour market situation of women.

On the question of linguistic disparities, it would seem clear that the employment income disparities between the linguistic groups in Montreal have diminished rapidly. It was suggested that any further actions should await such a time as the effects of the present language legislation in Quebec become clearer.

- The material discussed at the Conference seemed to suggest (see the paper by Jenny Podoluk) that the two groups in the society most prone to poverty were the old people who live alone and single-parent families. The possibility that more might be done for the latter through adjustments to the tax system was raised during the panel discussion. It was felt that steps could be taken to direct more benefits to single-parent families without necessarily increasing the rate of marriage break-up.

- It was noted that there is a potential trend towards letting the universities set their own tuition fee schedules. This is, perhaps, an unfortunate trend. It puts more of the burden of the costs on the individual, thus tending to make postsecondary education more accessible to students from better-off families than those from poorer families. This, in turn, could result in a reduction in the rate of social mobility and lead to a hardening of class divisions in Canada.

- No conference would be complete without pleas concerning data. In fact, three particular pleas emerged from the discussions at the Conference. First, there was a plea for the more intensive use of such existing data sources as the 1973 Highly Qualified Manpower Survey, the Canadian National Mobility Survey, the Survey of Consumer Finances Assets and Debts Survey, and others. Secondly, there was a hope expressed that the present climate of restraint on government spending would not seriously affect those surveys gathering incomes-related information. It was felt that in a period of economic uncertainty and inflation that the collection of good time series information on incomes was vital. Finally, there was a plea for new or improved data in relation to incomes. In particular, retrospective or longitudinal incomes data would permit more incomes research to be carried out from a life-cycle perspective.

As indicated above, a number of directions for possible future research were noted as well during the panel discussion. The following are indicative:

- Any examination of the distribution of income and of the role and impact of transfers raises a very fundamental question: how much equality do we really wish to attain through income transfers and other mechanisms. It was noted that public policy has seldom explicitly attempted to reduce the income or wealth of those at the top of the pyramid. Many of the papers presented imply that the objective of greater equality in the

distribution of income and wealth is an appropriate one. But there is no elucidation of how much equality should be considered desirable or why. This is not really surprising. The determination of how much equality we actually want is an extremely complex question and the resolution of it is rooted in very difficult judgements about what the underlying values of the society are. Nonetheless, any progress in the resolution of this question will lead to a firmer base upon which to formulate policies with respect to social security programs and other matters related to incomes.

- We need to do research on the distribution of income at a more disaggregated level, in order to come closer to determining what is really going on. It was noted that the magnitude of intrafamily transfers is much greater than government transfers and only research at a more disaggregated level is going to enable us to learn more about these sorts of factors.

- It is important to learn more about the process by which people accumulate wealth. What proportion comes through inheritance and what through capital gains and savings? It is also important to learn what people do with newly accumulated wealth.

- A significant part of the incomes disparities that exist between certain groups remain unexplained, for example, those between men and women, those between linguistic groups, those between groups with different university degrees, and so on. While there has been some progress in the determination of the causes behind the disparities, this matter deserves a lot more careful attention.

From the discussions at the Conference, it was clear that there is much support, in principle, for more and improved policy research in the area of incomes. Three prerequisite needs were noted. First, there is a need for more co-operation between social scientists. Social science research is presently taking place in what some consider an externally hostile environment with respect to funding. Positive efforts to create co-operation within and between the various social science disciplines is essential. Secondly, there needs to be more competition of ideas and approaches (this need not be inconsistent with improved co-operation within any given effort). In order to investigate particular questions, one should launch at least two competing approaches and achieve from differing perspectives a proper indication of the outcomes. This would tend to provide better results than simply undertaking one investigation. Moreover, in those cases in which alternative approaches provide similar responses, the credibility of these results is likely to be improved in the eyes of decision-makers, relative to those cases where only one approach is employed. Thirdly, there needs to be more communication of the results of the various research efforts concerned with incomes. Knowing what others are doing, the problems they are encountering, and so on, may help save duplication of effort. Communications need to be improved, as well, between policy makers and researchers, if policy research is to be enhanced. The interests of policy makers tend to be timely, while those of researchers tend to be timeless. This can lead to a sort of communications gap between the two groups, a gap that very much needs to be closed.

D.W. Henderson
D.M. Paproski
J.C. Rowley
Maureen Gauvin

DISTRIBUTION

The following papers examine the effects of certain factors on the distribution of income in Canada which, if anything, has tended to become less equal over the past two decades. Taxation, governmental provisions of goods and services, and transfer payments affect income distribution either deliberately or as a side-effect and, in general, the basic redistributive character of public sector activities might be presumed to lead to decreased income inequality. If such is the case, and given that income distribution has changed very little since the 1950's, it was suggested that attention should be addressed to the question of why earned income has become less equal. Have the labour supply effects of government programs had a proportionately greater negative impact on lower income earners? Studies of the extent to which social and demographic shifts have had an impact on the distribution of income are important, but it was generally agreed that labour market and employment policies which affect earned income must be assigned research priority. This is necessary if employment approaches, as well as those involving income transfers, are to be effectively used to assure that income upgrading at the lower income levels is achieved without widespread disincentives to work effort.

Among the important research issues which have a potential to assist in the development of an appropriate balance of earned and transfer income policies are those which relate to lifetime income attainments and accumulation and lifetime expenditure on consumption patterns. Further improvement in the understanding of the political processes which affect tax and transfer programs on the one hand, and employment policies and programs on the other, is also required.

ANALYSING POSTWAR CHANGES IN
CANADIAN INCOME DISTRIBUTION

by
Neil MacLeod and Keith Horner*

1. INTRODUCTION

Summary measures of income inequality among family units in Canada have exhibited considerable stability since the early 1950's despite major structural changes in the population and the economy. This fact has inspired several investigations of the effects of these structural changes on the income distribution. One aim of these studies has been to determine the redistributive effect of income security programs and of other government expenditures and taxes. See, for example, Gillespie (1976, 1978), Health and Welfare (1977), MacLeod (1977), Henderson and Rowley (1978a), Cloutier (1978). A second has been to examine the nature and effects of other structural changes which may have offset the effects of government actions on the level of income inequality. Here see Podoluk (1968), Horner and MacLeod (1975), Henderson and Rowley (1977, 1978b). A point of some interest in this connection is whether the changes which have produced greater inequality have been largely independent of redistributive government measures (e.g., age structure shifts) or whether they might have causal connections with the government measures (e.g., family structure and labour force activity trends). As examples here, studies by Grubel, Maki and Sax (1975), and Green and Cousineau (1977) have examined the connections between Unemployment Insurance and labour supply. Many studies have investigated the labour supply effects of income transfers in general.

This paper follows Horner and MacLeod, and Henderson and Rowley (1978b) in assessing the distributional effects of various shifts in the structure of the population and the economy. In particular it examines trends in family composition, the labour force participation of different family members, and changes in earnings differentials among sex-specific occupational classes.

The analysis is based on comparisons of characteristics of the population of family units in Canada in 1954 and 1975. Thus secular trends are investigated, but cyclical or other fluctuations are not. The method of analysis is an elaboration of the methods used in the two papers noted above and has been described in Love and Wolfson (1976) and applied to somewhat different ends in Danziger, Haveman, and Smolensky (1977). It involves two types of operation on the 1975 income distribution to simulate particular characteristics of the 1954 family population and income distribution. The first type of operation is the standardization of the 1975 population frequency distribution to reflect the relative size of various sub-populations in 1954. This permits estimates to be made of the level of inequality that would have been observed in 1975, other things equal, had the relative size of the sub-populations not changed since 1954. This kind of standardization can be used to investigate the distributional effects of structural changes such as the growth in the relative number of unattached individuals in the family unit population or the growth in the relative number of husband-wife families where both spouses work. The second type of operation is the standardization of 1975 family incomes to

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reflect the relative levels of incomes from various sources that obtained in 1954. This form of standardization provides a means of approaching questions such as trends in occupational or male/female wage differentials. The method can also be used to examine the distributional effects of changes in the generosity of government income transfers in relation to average earnings levels. A basic principle underlying the approach adopted in this paper is that a study of the distributional effect of changes in the structure of society should consider jointly shifts in the composition of the population and shifts in the composition of incomes. For example, an analysis of the distributional effects of an increase in female labour supply may be misleading if it does not also consider changes in relative earnings levels (both between and among males and females) that accompany the labour supply increases.

The outline of the rest of the paper is as follows. Section 2 elaborates the method of analysis and identifies the main data sources; Section 3 presents an analysis of changes in family composition; Section 4 proceeds to an analysis of trends in labour force participation rates; Section 5 analyses changes in earnings differentials by sex and occupation; Section 6 provides a summary and concluding comments.

2 DATA AND METHODS

Data

The primary source of the data employed in the paper is the public use, micro-data tape of Statistics Canada's 1976 Survey of Consumer Finances "Economic Families, 1975 Incomes". This survey, with a sample size of about 26,000 usable responses, provides data on the composition of economic family units and 16 different components of the incomes of individual family members. [1] In addition it provides information on the age, sex, education, occupation and labour force activity of family members aged 14 or over. Not all of this detail is provided on the public use tape.

The information from the public use tape upon which the analysis of this paper is based includes:

- total family money income before taxes;
- a classification of family units by family composition;
- the presence or nonpresence of earned income for family heads, spouses, and other family members;
- the level of earnings of heads and spouses;
- the occupation of heads and spouses.

Information was obtained from three additional data sources. Income distributions for, and relative numbers of, family units classified by family composition were obtained for 1954 from the publication "Income Distributions, Selected Years, 1951-1965" (Statistics Canada, 1969). Published and unpublished data from Statistics Canada's Labour Force Survey were used to obtain labour force participation rates by marital status for 1954 and 1975. Finally, average earnings levels by sex and occupation from the 1951 and 1961 Censuses of Canada were used to estimate 1954 relative earnings levels.

Finally, it must be noted that there is a problem of noncomparability between the 1954 and 1975 survey data. Prior to 1965 the survey was based only on a nonfarm sample. Thus slightly different populations are represented and therefore the results are possibly biased. However it is expected that the bias is small, given the evidence in the "overlap" year, 1965, found in data sources (Statistics Canada, 1969 and 1971).

Method of Analysis

The level of income inequality among family units is measured here by the Gini coefficient and supplemented by the reporting of the income shares of population quintiles. In calculating inequality levels, no correction is made to family incomes for differences in income needs corresponding to differences in family size. The Gini coefficient is employed because its wide usage in similar studies and its relationship to simple income shares statistics makes it easy to interpret. The Gini values observed for family unit populations in most industrialized countries lie in the range 0.3 to 0.45 with higher values indicating greater inequality. Since other summary inequality measures differ from the Gini in the weighting they give to income differences at various income levels in the distribution, the relative significance attributed here to different structural changes in the population could be altered if other measures were used. However where inequality changes have been measured using the Theil-Bernouilli and Coefficient of Variation measures as well as the Gini (e.g., Love and Wolfson (1976) and Henderson and Rowley (1978b)) fairly close agreement of results has been found among the different measures.

Terminology in standardization analysis is sometimes ambiguous so some clarification is in order. Taking the example of family composition from 1954 to 1975 in Section 3 we refer to the year for which the income distributions within each family type are used as the base year. Applying the relative mean incomes or relative numbers of each type from a second year to the distribution in the base year we call standardizing to the levels of relative means/numbers in the second year.

The steps taken in effecting the standardization experiments of Sections 3, 4, and 5 will be detailed in those sections since slight variations in the method were introduced for reasons of data availability or computational convenience. In general terms, the procedure used to simulate the effects of a change in the composition of the population is as follows:

- (1) For the base year, 1975, obtain a frequency matrix or cross-tabulation of r rows and s columns where each column gives the number of family units in each of r income classes for a particular category of the population. The column totals therefore give the total numbers of family units in each category.
- (2) Obtain a corresponding matrix of the mean incomes for these $r \times s$ population-income groups. From these two sets of $r \times s$ numbers, the 1975 level of inequality can be calculated directly.

For the analysis in Section 3 there were 5 columns (family categories) while in section 4 there were 34 (family/labour force categories) -- which can be collapsed to be equivalent to the 5 columns of Section 3. For each category in Section 3, 11 income classes were used to be format-consistent with the published 1954 data. In Section 4, 19 income classes were used for each category.

- (3) Estimate from other data the numbers of family units by population category for 1954. Calculate the ratios of these s numbers to the column totals from (1).
- (4) Multiply each element in the frequency matrix by the ratio appropriate to its column to obtain a new frequency matrix which corresponds to the 1954 distribution of family units over the s population categories but retains the 1975 distribution of family units by income class within each population category.

- (5) Use this new frequency matrix and the unchanged matrix of income means to calculate new values of inequality measures which provide an estimate of the level of inequality which would have been observed in 1975 had the population composition not changed since 1954.

Note that the s population categories could be defined according to a single characteristic such as age of head or according to a combination of characteristics such as age, family type, number of earners and so on. If the latter, then different experiments are possible where the frequencies are adjusted to 1954 values for one or more characteristics at a time. Standardizing to 1954 population shares for a family characteristic both singly and in combination with other characteristics, the interactive effects of different structural changes on inequality can be explored. Of course, increasing the number of characteristics to be jointly investigated soon introduces problems of data availability, computational cost, and statistical reliability of some within-category income distributions.

The procedure used to simulate changes in the relative levels of income components, or relative income levels within an income component, follows that described above except that the 1954 data is used to adjust the income means rather than the population frequencies.

In interpreting the results obtained by these methods, it should be recalled that they identify only the direct effects of observed structural changes. Thus possibly important indirect effects may be ignored. Also, a given structural change may actually result from a prior structural change. Changes in occupational earnings differentials, for example, are almost certainly related to changes in labour force participation rates.

3. CHANGES IN FAMILY COMPOSITION

Rapid change in the size and composition of families has been an important feature of the post-war period, and particularly of the past ten years. Because of the importance of these changes and because of the importance of differentiating among family types in defining other family characteristics such as number of earners, these changes are considered first.

While more detailed categorizations could be derived from the Survey of Consumer Finances (SCF) public use tapes, this paper adopts the partitioning of family units into five family types which is presented in SCF publications. Using this categorization permits the direct comparison of income means and Gini Coefficients for 1954 and 1975 for the five family types. The five family composition categories include unattached individuals, married couples only, married couples with single children only, married couples with children and/or other relatives (other couples), and all other families. The population proportions, relative mean incomes, and within-group Gini Coefficients for 1954 and 1975 are presented in Table 1.

The greatest changes in family composition from 1954 to 1975 include an increase in the relative number of unattached individuals from 20.2 per cent to 28.0 per cent of all family units and a decrease in the relative number of couples with single children from 47.1 per cent to 40.5 per cent. There were also more couples living alone (18.7 per cent to 20.6 per cent) and fewer families in the "other couples" and "other families" categories (4.0 per cent to 2.9 per cent and 10.0 per cent to 7.9 per cent respectively). [2]

Apart from "other families", all of the family types experienced increases in their average incomes over the period relative to the mean for all family units. The income increase

was largest for "couples with single children" which already had a relatively high average income in 1954.

The final columns of Table 1 show that the level of inequality rose from .371 to .383 for the population as a whole while within-group inequality declined for each of the family type sub-populations. This immediately suggests that the changes in the relative numbers and/or mean income levels of the different family types must have operated to increase the level of inequality in the total population. Two avenues for these effects are readily apparent. First, the shifts in family composition resulted in an increase in the relative numbers of unattached individuals, a low income group with the highest level of within-group inequality. Second, the disparity among group mean incomes increased between 1954 and 1975. The estimated effects of these changes on inequality are shown in Table 2.

First note that the increase in the Gini by .012 between 1954 and 1975 is supported by a substantial decline in the income shares of the bottom 40 per cent of family units (amounting to 1.7 per cent of total income) and a corresponding increase in the income shares of the top 40 per cent. The results of the standardization experiments indicate that the change in family composition (population proportions) contributed most to this increase in inequality. The increasing disparity among group mean incomes was also a contributing factor while the trend in inequality within the five family types tended to reduce the overall level of inequality. The findings conform to the inferences drawn from Table 1.

This analysis may be used to illustrate three points of a methodological nature.

First, this method of analysis suffers from an index number problem. This is suggested by the fact that the three contributions changing inequality together explain a Gini increase of .017 rather than the observed increase of .012. The reason is that the estimated effects of the changes in population proportions and group mean incomes are not independent of the level of within-group inequality in the base year. Thus the observed inequality change would only be exactly explained by the standardizations if the Gini coefficients for each of the five sub-populations were the same in 1975 as in 1954. [3]

Second, and more important, considerable care must be exercised in attributing causality in this type of analysis. In this case the change in family composition is itself explained in part by a change in the age structure of the population. In a previous study (Horner and MacLeod, 1975) it was estimated that age structure changes were largely responsible for the increasing proportion of unattached individuals. (A joint examination of the distributional effects of changes in age structure and family composition was not attempted here because the necessary data was not available for 1954.)

Third, the relationship of these results to the subsequent analysis of Sections 4 and 5 should be indicated. From Table 1 it is apparent that the partitioning of the population by type of family unit is a powerful one in the sense that it converts a substantial portion of the income inequality into income disparities between groups. This is demonstrated not only by the disparities among group mean incomes but by the low values of several of the within-group Gini's when compared to the value of the Gini for all family units. In addition, there were significant changes in the relative income levels of the five groups over the post-war period. Thus the information in Table 1 invites a search for further structural changes that would explain the differences in income growth rates among the five types of family units and the decline in within-group inequality. Sections 4 and 5 examine two of those structural changes.

4. EFFECTS OF CHANGING LABOUR FORCE PATTERNS

Trends in Labour Force Participation Rates

From 1954 to 1975 the labour force participation of women rose from 23.7 per cent to 40.9 per cent and in no year in between did it drop (see Table 3). Moreover when the figures are broken down by marital status different trends emerge. The rate for single women was actually lower in 1975 (51.9 per cent) than in 1954 (53.8 per cent) which, as Table A.1 in the Appendix shows, included a fairly steady decline from 1954 to 1970 when the rate was only 47.5 per cent and an increase since then. Married women, on the other hand increased their participation to such an extent that by 1975 their rate was almost three times greater than it was in 1954 (13.3 per cent to 38.4 per cent). Widows and divorced/separated women also participated in the labour force to a greater extent in 1975 than in 1954 but the increase from 25.0 per cent to 30.4 per cent was neither as great nor as steady as was the increase for married women.

While the rate for women was going up, the rate for men was dropping although the magnitude of the change was much less. The over-all rate for men went down steadily from 82.2 per cent in 1954 to 76.1 per cent in 1971 and then increased to 77.2 per cent by 1975. These changes reflect a fairly substantive drop for single men from 74.4 per cent in 1954 to 57.1 per cent in 1969 and an increase to 62.9 per cent by 1975, a very small change for married men from 88.2 per cent to 86.3 per cent over the whole period, and fluctuations for other men resulting in an increase from 47.3 per cent in 1954 to 54.7 per cent in 1975.

As historical data do not allow a breakdown of labour force statistics by both marital status and age/sex, a more thorough disaggregation of the figures in Table 3 is not possible. However trends in labour force participation by age group are important and therefore it is useful to see what they have been before analyzing their effects on income inequality. These figures are shown in Table A.3 in the Appendix and are discussed below.

The labour force participation rate for men declined in all age groups. Most significant was the drop in the rate for those over 65; by 1975 (17.4 per cent) it was only slightly more than half as great as in 1954 (33.2 per cent). The declining retirement age also shows up in a fairly significant decline in the rate for men aged 55-64, from 85.6 per cent in 1954 to 80.0 per cent in 1975. Also of note is the drop for the youngest group, from 68.5 per cent to 63.7 per cent which is largely a reflection of young people staying in school longer. The rates for the other two groups also went down, but to a much lesser extent.

Just as the decrease in the labour force participation rate for men was uniform across age groups, so was the increase in the rate for women. The rate for the youngest group went from 39.6 per cent to 48.7 per cent, from 3.7 per cent to 4.4 per cent for the oldest group, and more than doubled for each of the three intermediate age groups; the greatest increase occurred for those between the ages of 25 and 44. Of course, this is not surprising given the figures for married women presented earlier given the high proportion of married women in this age group.

Effects of Changes in Labour Force
Patterns on Income Inequality

Although they are obviously related, the number of persons reporting some earnings in a given year does not correspond to the number classified as in the labour force, even assuming full employment. The major reason for this is the fact that the labour force participation rate, based on Statistics Canada's

Labour Force Survey, in any year is the average of the participation rates for each of the twelve months in that year. Thus, someone who works the first six months of a year and then leaves the labour force, and someone who enters the labour force mid-year and works until the end of the year are each counted as separate earners although they "average out" to only one labour force participant. As an "earnings rate", defined as the proportion of persons who had some earnings is unavailable for 1954, it will be assumed that the number of people with earnings and the number classified as being in the labour force were in the same proportion in 1954 as in 1975. This allows proxy 1954 earnings rate to be calculated using participation rate for that year.

Total Effect of Changes

The net effect of all labour force changes on the level of income inequality for five family categories and all units combined are shown in Table 4. Inequality measured by the Gini in the distribution for unattached individuals has not changed, but it dropped for all four other types of families. Although changing labour force patterns have lowered the income share of the poorest 20 per cent of the "Couples Alone" category, the share going to the richest 20 per cent of such families dropped by a greater amount and the three intermediate quintiles all gained. For the other three family categories the income shares of the lower quintiles went up and those of the higher quintiles went down because of changing labour force patterns.

It is important to identify which individuals (male or female, married or otherwise) have contributed most to the effect of changes in participation rates. Such a "breakdown" will be presented later, but it is worthwhile first to summarize the effects estimated here. The changes in labour force patterns have partially offset the inequality increasing effects of changes in family composition. Although both factors change in a way that reduced the income share of the lowest quintile, in most other respects they were opposing forces. However family composition is still the dominant factor and the combined or joint effect (which is not simply the sum of the individual effects) of both has been to increase inequality. (see Table 5)

Effect of Changes in Participation by Sex and Marital Status

Table 6 shows the results of simulating changes in the labour force participation rate of unmarried women on the distribution of income for unattached individuals and other family units and indirectly on the distribution of income for all units.

Recall that the labour force participation rate for single women went from 53.8 per cent in 1954 to 51.9 per cent in 1975 and for other unmarried women from 25.0 per cent to 30.4 per cent over the same period. These result in small changes in the mean incomes of both unattached individuals and other noncouples. The values of the Gini coefficient have been changed from 0.432 to 0.429 for unattached individuals and from 0.382 to 0.375 for other noncouples. The changes in the mean income and the Gini coefficients for the two categories result in a slight drop in the value of the Gini coefficient for the over-all distribution; thus changes in the labour force patterns of unmarried women "account for" only a small part of the changes in over-all inequality induced by all changes in labour force patterns.

The effects of changes in the labour force participation rate for unmarried men, shown in Table 7, are assessed in a similar manner. The labour force participation rate for single men dropped from 74.4 per cent to 62.9 per cent from 1954 to 1975 and increased from 47.3 per cent to 54.7 per cent for other

unmarried men over the same period. This has resulted in a decrease from \$6,710 to \$6,585 in the mean income of unattached individuals and a slight decrease from \$10,438 to \$10,429 for other nonhusband-wife families. It also results in changes in within-group inequality for unattached individuals (measured by the Gini coefficient) from 0.426 to 0.429. The mean income changes and within-group inequality changes lead to an increase in the value of the Gini coefficient for the overall distribution of 0.002 (from 0.380 to 0.382). Thus changes in this labour force participation rate have tended to increase inequality in the income distribution slightly.

As Table 8 shows, inequality has been affected by the increased labour force participation of married women to a far greater extent than by the change for other groups. For those couples who lived alone, the increase in labour force participation of wives has actually reduced the income share of the poorest 20 per cent of such families from 6.5 per cent to 6.2 per cent but it has also decreased the share of the richest 20 per cent from 42.3 per cent to 39.2 per cent. At the same time the shares going to all three intermediate quintiles increased and the net result of these changes is to reduce the level of inequality (as measured by the Gini Coefficient) from 0.361 (the value it would have been in 1975 had the participation rate for married women been the same as in 1954) to 0.332.

The changes for couples with children and other couples have been even stronger since for both groups the bottom quintile has also "benefitted" from the increase in the participation of wives in the labour force. Inequality (again measured by the Gini) would have been higher at 0.289 instead of 0.271 for couples with single children and 0.278 instead of 0.256 for other couples had the participation rate not increased. The net result on the distribution for all family units has also been to reduce inequality -- the value of the Gini is 0.382 and it would have been 0.391 without the increased participation of wives.

It is worth expanding on these results. It has suggested that working wives come from higher income husband-wife families and thus increase the income spread among such families. The analysis presented here shows that this is not true. The increase in the number of working wives has significantly reduced income inequality among husband-wife families. It has also been suggested that, whatever the impact has been on husband-wife families, the increased gap between the average income of husband-wife families and other family units has more than offset any positive influences within husband-wife families. The analysis also shows that this is not the case. The net effect of the increased labour force participation of married women on the distribution of income for all family units has been to reduce the level of inequality.

The very slight decrease in the labour force participation rate for married men from 1954 to 1975 results in a very slight increase in inequality. As Table 9 shows, the values of the Gini coefficient would have been lower by from .002 to .006 for all three relevant family types (and for all family units) had the participation of married men in the labour force been as high in 1975 as it was in 1954. The quintile shares remain virtually unchanged.

Given the very small change in the participation rate for married men it is perhaps surprising that any changes in inequality were witnessed at all. It seems clear that on a per family basis a change in the labour force participation of any family member (contributing significantly to family income) will affect income inequality. It is the subject of a future paper to estimate such "per capita" effects for different family members, and, combined with projections of labour force participation rates, to forecast future changes in income inequality induced by changes in labour force participation.

It must be mentioned that not all changing labour force patterns have been analyzed here. Due to data constraints the labour market activity of children of heads of families, and that of other adults who are part of the same economic family as the head, could not be determined. Thus the analysis is only partial. However, there is evidence that inclusion of children and other adults would not have greatly affected the results. As Table 10 shows the relative number of income recipients who were children hardly changed (17 per cent to 16 per cent) from 1954 to 1975 and the relative number of other adult income recipients was small in both years, although it did drop. Note that this table deals with income recipients (a larger category than income earners); however it is doubtful that similar figures for earners, if they were available, would show a different trend.

5. EFFECT OF CHANGES IN EARNINGS DIFFERENTIALS ON INCOME INEQUALITY

Changes in Earnings Differentials

The ways in which earnings differentials between sex-specific occupations have affected income inequality are assessed in a slightly different way than were factors previously dealt with. First average annual earnings are estimated for occupations by sex for 1954 and 1975. These figures are then expressed as a ratio of the overall average annual earnings in their respective years. Then the ratios for 1954 are expressed as ratios of the ratios for 1975. This final set of ratios is used in the simulation model. If this ratio for, say, male doctors is greater than 1.0 then their earnings relative to the average earnings were greater in 1954 than in 1975, or in other words their relative position has deteriorated. To assess the impact this change has had on the income distribution the 1975 earnings of (using the same example) all male doctors are increased according to this ratio. Similarly the earnings for men and women in other occupations are adjusted according to the corresponding ratio for that sex-specific occupation. Subsequently family incomes are changed and changes in inequality in the distribution of family income due to changes in earnings differentials can be estimated.

The problems with obtaining consistent occupational classifications over time have been documented by Meltz and Stager (1979). The major problem results from the change in the occupational classification from the 1961 to the 1971 Census. The tradeoff in making comparisons over the time period under investigation in this paper is between the number of occupations considered and the consistency of comparisons over time. As it was decided that the latter should be given a higher priority than the former, occupations for each sex are classified into only three groups: (1) managerial and professional ("high white collar"); (2) sales, service, and clerical ("low white collar"); and (3) farming, processing, product fabrication, construction, and transport ("blue collar"). Therefore, following the methodology outlined above, six ratios are calculated; they are shown in Table 11.

As the table shows, women in high white collar occupations have gained the most since their relative earnings were 6.5 per cent lower in 1954 than in 1975. Men in blue collar jobs have gained almost as much -- their relative earnings were 6.1 per cent lower in the earlier year. The other four groups were "losers", especially the two other female categories: women in blue collar and low white collar occupations made respectively 19.0 per cent and 12.8 per cent more relative to average earnings in 1954 than in 1975. Men in high and low white collar occupations also earned relatively more in the earlier year but the differences were much smaller than for the two female groups.

Impact of Earnings Differentials on Income Inequality

The ways in which these changes affected income inequality are shown in Table 12. For unattached individuals the 1975 average income was \$6,585 compared to the \$6,659 it would have been if earnings differentials had not changed since 1954; the income shares of the two lowest quintiles would not have changed in 1975 had men and women in occupational groups described above received the same relative earnings as they did in 1954. However those in the third and fourth quintiles received less in 1975 and those in the highest quintile more than they would have if the earnings differentials had not changed. The net result of the change in the earnings differentials structure has been an increase in income inequality, according to the value of the Gini coefficient.

The results for all three categories of husband-wife families have been the opposite. The share of income of the lowest quintile for couples without dependents has not been affected, but the shares of the next two quintiles in 1975 were higher while those of the two richest quintiles were lower than they would have been with 1954 earnings differentials. The value of the Gini coefficient would have been 0.334 instead of 0.332 and their average income would have been \$14,196 instead of \$14,114. For couples with single children the average income has been virtually unaffected. The income shares of the three lowest quintiles are greater than, and those of the two highest quintiles less than, the corresponding shares in the scenario of unchanged earnings differentials. Naturally, the value of the Gini coefficient is also lower, by .004, indicating a slightly lower level of inequality. The changes for other couples were smaller and the interpretation of the changes is not as straightforward since both the lowest and highest quintiles have "lost" at the expense of the second and third because earnings differentials have changed.

The results for other family units were more similar to those for unattached individuals than to those for husband-wife families. Although the income share of the lowest quintile was higher in 1975 because earnings differentials changed, that of the richest was higher by a greater amount. The middle quintile's share is lower because of the change while the shares of the other two quintiles were not affected. The value of the Gini coefficient at 0.376 was higher by 0.003 than it would have been with unchanging earnings differentials.

It is not surprising, given the offsetting influences of changes in earning differentials on inequality for husband-wife families versus those on other units, that the over-all level of inequality, for all family units, has not changed. Both the second and the highest quintiles have a lower share of total income as a result but the shares going to the third and fourth quintiles have increased while the bottom quintile's position has remained very little.

It appears therefore, that changes in earnings differentials between sex/occupational groups have had little effect on the over-all level of inequality. However they have slightly reduced the level of inequality for all three categories of husband-wife families and increased the level for unattached individuals and other nonhusband-wife families.

6. CONCLUSION

From 1954 to 1975 the level of inequality in the income distribution in Canada went up slightly. The effects of changes in three potential explanatory factors -- family composition, labour force participation and earnings differentials -- have been estimated in the paper. Changes in family composition

(mainly an increase in the relative number of unattached individuals and a decrease in the relative number of couples with children) have themselves increased inequality. However this effect has been partially offset by the inequality-reducing influence of changes in labour force patterns. The dominant shift has been towards a higher rate of labour force participation by married women and this has been a significant force in reducing income inequality. Changes in relative earnings among very broadly defined sex-specific occupational classes have tended to slightly reduce income inequality within all three categories of husband-wife families but have also tended to slightly increase it within the two categories of nonhusband-wife families, resulting in no net effect.

The partial nature of this analysis of income distribution trends must be noted. No consideration has been given here to the distributional effects of increasing government transfers to persons. A previous analysis (Horner and MacLeod, 1975) suggests that the increase in transfers acted to reduce inequality substantially over the period (i.e., a 6 per cent reduction in the Gini). Another trend not considered here is the trend to higher unemployment rates, which has probably increased the level of inequality. If this trend is assumed to be partly a consequence of the increasing generosity of the Unemployment Insurance program then a joint examination of rising unemployment and the growth of transfers is indicated. Finally, a closer look at the labour force participation rate changes of older males, together with an examination of the growth of government transfers to the elderly, would be valuable.

Table 1

Changes in Income Inequality Related Aspects of Family Composition, 1954-75

Family Type	Population Proportions		Relative Mean Incomes		Within-Group Gini	
	1954	1975	1954	1975	1954	1975
Unattached Individuals	.202	.280	.452	.478	.432	.426
Couples	.187	.206	.999	1.027	.343	.332
Couples with Children	.471	.405	1.183	1.356	.295	.276
Other Couples	.040	.029	1.463	1.537	.297	.261
Other Families	.100	.079	.897	.758	.387	.352
All Family Units	1.000	1.000	1.000	1.000	.371	.383

Source: Statistics Canada (1969, p.35) and Statistics Canada, 1976 Survey of Consumer Finances micro data tape "Economic Families, 1975 Incomes". Calculations by N. MacLeod, National Health and Welfare.

Table 2

Effect of Changes in Family Composition on Income Inequality, 1954-1975

Actual Distributions	Quintile Income Shares					Gini Coefficient
	1	2	3	4	5	
(1) 1954	4.5	12.0	18.0	23.9	41.7	.371
(2) 1975	4.1	10.7	18.0	25.4	41.8	.383
<u>Standardizations of 1975 to 1954 levels</u>						
(3) Population proportions	4.6	11.7	18.2	24.8	40.7	.364
(4) Group mean incomes	4.3	11.0	18.1	25.2	41.4	.377
(5) Within family group inequality	3.8	10.9	17.7	24.7	42.9	.391
<u>Effect of Changes on Inequality, 1954-1975</u>						<u>Change in Gini</u>
Population Proportions, (2)-(3)						.019
Group mean incomes, (2)-(4)						.006
Within family group inequality (2)-(5)						-.008

Source: As for Table 1.

Table 3

Labour Force Participation by Sex and Marital Status, 1954-1975

	Labour Force Participation Rate			
	Males		Females	
	1954	1975	1954	1975
	(Per cent)			
	82.2	77.2	23.7	40.9
Single	74.4	62.9	53.8	51.9
Married	88.2	86.2	13.3	38.4
Other	47.3	54.7	25.0	30.4

Source: Statistics Canada, The Labour Force, Catalogue No. 71-001, December, 1975. Figures for 1954 are estimates calculated by the authors using unpublished data from Statistics Canada.

Table 4

Effect of Changes in Labour Force Participation Rates (by Marital Status) on Income Inequality for Selected Family Categories and All Units

		Income Share by Quintile					Mean Income (Dollars)	Gini Coefficient
		Lowest	Second	Third	Fourth	Highest		
Unattached Individuals	(1)	4.1	8.7	15.4	25.6	46.1	6,642	0.429
	(2)	4.1	8.8	15.4	25.6	46.1	6,585	0.429
Couples Alone	(1)	6.5	10.8	16.9	24.1	41.7	12,230	0.357
	(2)	6.2	11.8	18.1	24.7	39.2	14,113	0.332
Couples and Single Children	(1)	7.6	13.9	18.2	23.4	37.0	17,424	0.287
	(2)	8.0	14.1	18.6	23.2	36.2	18,506	0.271
Other Couples	(1)	7.9	13.6	18.2	24.9	35.4	19,447	0.274
	(2)	8.1	14.3	18.8	26.1	32.7	20,856	0.256
Other Families	(1)	5.5	10.5	16.4	24.4	43.3	10,310	0.382
	(2)	5.6	10.7	16.6	24.3	42.8	10,429	0.376
All Family Units	(1)	4.1	10.5	17.4	25.0	42.9	12,903	0.389
	(2)	4.0	10.7	17.8	25.5	42.0	13,687	0.382

Note: Rows marked (1) represent 1975 distributions with 1954 participation rates and rows marked (2) represent the 1975 distribution; thus the changes from (1) to (2) are due to changes in labour force participation rates from 1954 to 1975.

Source: See Tables 2 and 3.

Table 5

Effect of Changes in Labour Force Participation Rates and Family Composition on Income Inequality

	Change in Income Share by Quintile					Change in Gini
	Lowest	Second	Third	Fourth	Highest	
Family Composition	-0.5	-1.0	-0.2	+0.6	+1.1	+0.019
Labour Force Participation	-0.1	+0.2	+0.4	+0.5	-0.9	-0.007
Combined Effect	-0.4	-0.4	+0.3	+0.8	-0.2	+0.008

Table 6

Effects on Income Inequality of Changes in Labour Force Patterns of Unmarried Women

	Unattached Individuals		Other Non Husband-Wife Families		All Family Units	
	(1)	(2)	(1)	(2)	(1)	(2)
Bottom Quintile	4.1	4.1	5.5	5.6	3.9	4.0
Second	8.8	8.8	10.5	10.7	10.6	10.7
Third	15.2	15.4	16.3	16.6	17.8	17.8
Fourth	25.6	25.6	24.4	24.3	25.6	25.5
Top Quintile	46.4	46.1	43.3	42.8	42.1	42.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean Income (Dollars)	6,516	6,585	10,302	10,429	13,658	13,687
Gini Coefficient	.432	.429	.382	.376	.384	.382

Source: Statistics Canada, 1976 Survey of Consumer Finances, Economic Family micro data tape. Calculations by N. MacLeod, National Health and Welfare.

Note: Columns marked (1) represent results from the actual 1975 distributions that would have obtained had the participation rates in 1975 been what they were in 1954; columns marked (2) represent results from the actual 1975 distributions.

Table 7

Effects on Income Inequality of Changes in Labour Force Patterns of Unmarried Men

	Unattached Individuals		Other Non Husband-Wife Families		All Family Units	
	(1)	(2)	(1)	(2)	(1)	(2)
Bottom Quintile	4.1	4.1	5.6	5.6	4.1	4.0
Second	8.7	8.8	10.7	10.7	10.8	10.7
Third	15.7	15.4	16.6	16.6	17.8	17.8
Fourth	25.7	25.6	24.3	24.3	25.5	25.5
Top Quintile	45.8	46.1	42.8	42.8	41.9	42.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean Income (Dollars)	6,710	6,585	10,438	10,429	13,722	13,687
Gini Coefficient	.426	.429	.376	.376	.380	.382

Source: See Table 6.

Note: For the difference between columns (1) and (2) see Table 6 (replacing unmarried women with unmarried men in that note).

Table 8

Effects on Income Inequality of Changes in Labour Force Patterns of Married Women

	Couples Alone		Couples and Single Children		Other Couples		All Family Units	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Bottom Quintile	6.5	6.2	7.4	8.0	7.8	8.1	4.1	4.0
Second	10.7	11.8	13.9	14.1	13.5	14.3	10.5	10.7
Third	16.5	18.1	18.2	18.6	18.2	18.8	17.3	17.8
Fourth	24.1	24.7	23.5	23.2	24.8	26.1	25.1	25.5
Top Quintile	42.3	39.2	37.1	36.2	35.8	32.7	43.1	42.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean Income (Dollars)	11,890	14,114	17,344	18,506	19,242	20,855	12,755	13,687
Gini Coefficient	.361	.332	.289	.271	.278	.256	.391	.382

Source: See Table 6.

Note: For the difference between columns (1) and (2) see note to Table 6 (replacing unmarried women with married women in that note).

Table 9

Effects on Income Inequality of Changes in Labour Force Patterns of Married Men

	Couples Alone		Couples and Single Children		Other Couples		All Family Units	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Bottom Quintile	6.3	6.2	8.1	8.0	8.3	8.1	4.0	4.0
Second	12.1	11.8	14.1	14.1	14.4	14.3	10.8	10.7
Third	18.3	18.1	18.5	18.6	18.8	18.8	17.8	17.8
Fourth	24.6	24.7	23.1	23.2	26.2	26.1	25.5	25.5
Top Quintile	38.6	39.2	36.1	36.2	32.4	32.7	41.8	42.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean Income (Dollars)	14,424	14,114	18,573	18,506	21,024	20,856	13,802	13,686
Gini Coefficient	.326	.332	.269	.271	.252	.256	.380	.382

Source: See Table 6.

Note: For the difference between columns (1) and (2) see note to Table 6 (replacing unmarried women with married men).

Table 10

Distribution of Income Recipients By Relationship to Family Head, 1954-75

Relationship to Head	1954	1975
Male head	55	46
Female head	9	11
Wife	13	24
Son, Daughter*	17	16
Parents* and/or other relatives	6	3
Total	100	100

* includes in-laws.

Source: Statistics Canada, Incomes of Non-farm Families and Individuals in Canada, Selected Years, 1951-1965, Catalogue No. 13-529.Statistics Canada, Income Distributions by Size in Canada, 1975, Catalogue No. 13-207.

Table 11

Changes in Relative Earnings, by Occupation and Sex, 1954-75

Class	(1)	(2)	(3)
	1954 Relative Earnings	1975 Relative Earnings	(1)-(2)
Male:			
High White Collar	1.781	1.721	1.035
Low White Collar	1.089	1.066	1.022
Blue Collar	1.021	1.087	0.939
Female:			
High White Collar	0.832	0.890	0.935
Low White Collar	0.590	0.523	1.128
Blue Collar	0.608	0.511	1.190

Source: 1951, 1961 Census of Canada
1975 Survey of Consumer Finances.

Calculations by N. MacLeod, National Health and Welfare.

Table 12
Effects of Changes in Earnings Differentials on Income Inequality, By Family Category 1954-1975

	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Highest Quintile	Mean Income	Gini Coefficient
Unattached Individuals	(1) 4.1	8.8	15.7	25.9	45.5	6659	.425
	(2) 4.1	8.8	15.4	25.6	46.1	6585	.429
Couples Only	(1) 6.2	11.7	18.0	24.8	39.3	14196	.334
	(2) 6.2	11.8	18.1	24.7	39.2	14114	.332
Couples with Single children	(1) 7.9	13.9	18.5	23.3	36.4	18497	.275
	(2) 8.0	14.1	18.6	23.2	36.2	18506	.271
Other Couples	(1) 8.2	14.2	18.7	26.1	32.7	20793	.256
	(2) 8.1	14.3	18.8	26.1	32.6	20855	.255
Other Families	(1) 5.5	10.7	16.9	24.3	42.5	10566	.373
	(2) 5.6	10.7	16.6	24.3	42.8	10429	.376
All Units	(1) 4.0	10.8	17.6	25.4	42.1	13730	.383
	(2) 4.0	10.7	17.8	25.5	42.0	13687	.382

Source: Statistics Canada, 1976 Survey of Consumer Finances, Economic Family Micro Data Tape. Calculations by N. MacLeod, National Health and Welfare. Also see Table 11 (Source).

Note: Rows marked (1) reflect the 1975 distribution of income if earnings differentials between the sex-occupation classes had not changed since 1954; rows marked (2) represent the actual 1975 income distribution. Thus the differences can be attributed to changes in earnings differentials from 1954 to 1975.

Footnotes

- 1 An economic family unit is an unattached individual or a family consisting of individuals related by blood, marriage, or adoption and living in the same dwelling unit.
- 2 It should be noted that the relative decline in the number of "other families" masks an important trend in family structure, the increase in female headed single parent families. These families now account for about two-thirds of "other families," and the effect of their rising number can be observed in the sharp drop in the relative income of this group, from 0.897 to 0.758 of the overall mean income. The distributional effects of the growth of single parent families are examined in MacLeod (1977).
- 3 When 1954 is used as the base year the three contributions to changing inequality become: population proportions, .016; group mean incomes, .005; and within-group inequality, -.001.

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APPENDIX A

Table A.1

Labour Force Participation Rates of Women By Marital Status, 1954-1975

Year	Labour Force Participation Rate (Per Cent)			
	Marital Status			
	All	Single	Married	Other
*1954	23.7	53.8	13.3	25.0
*1955	23.9	52.6	13.9	24.8
*1956	24.9	53.0	15.1	25.5
*1957	25.8	53.1	16.2	26.2
1958	26.2	52.2	17.1	26.3
1959	26.7	51.5	18.0	26.0
1960	27.9	52.3	19.1	27.3
1961	28.7	51.2	20.8	27.4
1962	29.0	50.3	21.6	26.8
1963	29.6	49.0	22.6	27.7
1964	30.5	48.3	24.1	27.9
1965	31.3	48.7	25.2	27.6
1966	32.8	49.7	26.8	28.0
1967	33.8	49.6	28.3	28.9
1968	34.4	48.7	29.6	28.4
1969	35.2	48.6	31.2	27.4
1970	35.5	47.5	32.0	27.8
1971	36.5	48.3	33.0	28.3
1972	37.1	48.9	33.9	28.3
1973	38.7	50.5	35.5	29.3
1974	39.7	51.9	36.7	29.5
1975	40.9	51.9	38.4	30.4

Source: Statistics Canada, The Labour Force, Catalogue No. 71-001, December 1975.

Statistics Canada, Unpublished data (1958-70 rates by marital status).

* Figures by marital status, 1954-57 are estimates calculated by N. MacLeod, National Health and Welfare.

APPENDIX A

Table A.2

Labour Force Participation Rates of Men By Marital Status, 1954-1975

Year	Labour Force Participation Rate (Per Cent)			
	Marital Status			
	All	Single	Married	Other
*1954	82.2	74.4	88.2	47.3
*1955	82.1	72.9	88.7	46.8
*1956	82.2	71.7	89.3	46.6
*1957	82.3	70.4	90.0	46.2
1958	81.7	68.5	89.8	45.7
1959	81.0	66.4	89.6	43.7
1960	80.7	65.9	89.6	45.2
1961	79.8	63.6	89.4	44.9
1962	79.1	61.4	89.1	43.0
1963	78.5	60.7	88.8	42.8
1964	78.1	59.4	88.9	43.6
1965	77.9	59.0	88.7	42.7
1966	77.8	58.8	88.7	43.8
1967	77.5	58.4	88.4	44.1
1968	77.0	57.8	88.3	43.8
1969	76.6	57.1	87.9	45.4
1970	76.4	57.2	87.6	47.9
1971	76.1	57.8	87.1	49.1
1972	76.2	58.5	86.8	48.9
1973	76.8	60.9	86.6	51.3
1974	77.3	62.7	86.5	53.5
1975	77.2	62.9	86.2	54.7

Source: See Table 4.1(a).

APPENDIX A

Table A.3

Labour Force Participation Rates By Age and Sex, 1954-1975

	Male	Female	Male	Female
	1954		1975	
14-24	68.5	39.6	63.7	48.7
25-44	97.3	23.3	96.8	49.4
45-54	95.5	21.1	93.8	43.6
55-64	85.6	13.9	80.0	28.8
65 and over	33.2	3.7	17.4	4.4

Source: Statistics Canada, The Labour Force, Catalogue No. 71-001,
December 1975.

APPENDIX B

B.1 ESTIMATES OF LABOUR FORCE PARTICIPATION RATES BY MARITAL STATUS AND SEX, 1954

Unpublished figures for labour force participation rates by sex and marital status back to 1958 were provided to the authors by Statistics Canada. To arrive at estimates for 1954, the average annual rate of change from 1958-1962 in the labour force size within each sex/marital status class was calculated. This annual growth rate was then applied to generate estimates for 1954-1957, i.e., it was assumed the annual growth rate was the same from 1954-57 as for 1958-62. In each year the results were adjusted so that they sum to the (known) size of the total labour force. The same method was used to calculate population sized by sex-marital status and the participation rates were then calculated in the usual way.

B.2 ESTIMATES OF EARNINGS RATES, BY OCCUPATION AND SEX, 1954

The average annual earnings for sex/occupation classes were calculated for 1954 using figures from the 1951 and 1961 Census. Simple linear interpolation was used; thus if for a particular class the average annual earnings in 1951 were y' and in 1961 they were y'' then the estimate \hat{y} for the 1954 average annual earnings is defined as:

$$\hat{y} = y' + \frac{1954-1951}{1961-1951} \cdot (y'' - y')$$

or simply as $\hat{y} = 0.7y' + 0.3y''$. The number of persons in each class was estimated similarly.

TAXES, EXPENDITURES AND THE REDISTRIBUTION OF INCOME
IN CANADA, 1951 - 1977

by

W. Irwin Gillespie*

"It is not the easy things
but the difficult things
that are beautiful."
Ancient Greek saying [1]

1. INTRODUCTION

The distribution of income in Canada became considerably less unequal between 1930 and 1951 (Goldberg and Podoluk, 1957) and remained virtually unchanged between 1951 and 1977 (Horner and MacLeod, 1975; and Love and Wolfson, 1976). These well known observations are often bypassed by the speculation that a distribution of income measure which allowed for the effects of government taxes, transfers and expenditures would demonstrate a continuing reduction in inequality during the postwar period.

To what extent do government budgets redistribute income among households? What would be the effect on the distribution of income of substituting an increase in the personal income tax for a decrease in the manufacturers' sales tax? What would be the effect on the distribution of income of increasing the federal old age security pension rather than increasing the pension exemption under the personal income tax? Have government budgets become more redistributive over time?

After the effect of government budgets is allowed for, how close is the distribution of income among households in the community to that distribution of income which is "desired" by members of the community, on ethical or other grounds? Would the substitution of a decrease in government expenditures on education for a decrease in expenditures on health care nudge the distribution of income closer to the "desired" distribution of income? Has the effect of government budgets on the distribution of income through time been to alter the distribution of income closer to the "desired" distribution?

If you have more than a passing interest in the answers to these positive and normative questions you will eventually be drawn to fiscal incidence studies. After consideration of the methodology and results you may conclude -- as some have -- that the methodology does not make sense or the results do not answer the questions, or the questions asked are the wrong ones, or the questions cannot be answered. Alternatively you may conclude as I have -- that the methodology, rudimentary and constrained as it may be, generates results that shed some light on the queries posed above. You may even conclude that it is worthwhile to devote some time to the further refinement and improvement of the methodology -- at the same time being aware of its limitations.

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This paper has four objectives. First, the fiscal incidence results for Canada in 1951 are presented. Second, the changing patterns of fiscal incidence and post-government income during the 1951-1977 period are examined. Third, some of the more controversial methodological problems are discussed. Fourth, several areas of further research are suggested. A concluding section summarizes the main findings of the paper.

2. THE REDISTRIBUTION OF INCOME IN CANADA, 1951

Fiscal incidence in Canada -- the effects of the taxes, transfers and expenditures of all government budgets on the distribution of income among households -- has been explored in Gillespie (1966, 1976 and 1977), Johnson (1968), and Dodge (1975). Tax incidence -- the effects of all government taxes on the distribution of income among households -- has been examined in Goffman (1962) and Maslove (1972). The detailed methodology can be found in these sources, and need not be repeated here. Part 4 of this paper will explore those aspects of the methodology that are pertinent to an understanding of the problems and limitations of the approach.

The available studies provide us with estimates of fiscal incidence in Canada for the years 1961 (Gillespie), 1969 (Gillespie) and 1970 (Dodge). Johnson's results are for Ontario in 1961. This paper extends the fiscal incidence methodology back to 1951, the earliest year for which comprehensive money income data by size classes of income are available (D.B.S., 1952 and 1954). The crucial consumer expenditure data (D.B.S. 1953) can be extrapolated from 1948 to 1951. Thus it is possible to carry out a fiscal incidence study for 1951. [2]

Tax, Expenditure and Fiscal Incidence, 1951

The estimates of tax incidence are derived by allocating tax payments at all three levels of government according to the standard hypotheses concerning the incidence of such taxes by factor shares or consumer outlays, and then by the distribution of such items by size classes of income. The standard shifting hypotheses are found in Gillespie (1979, and 1976: 441-443). The distribution of tax payments is expressed as a percentage of the distribution of income in order to effect the pattern of effective tax rates of Table 1. [3]

The estimates of expenditure incidence are derived in a similar fashion, although the distributional hypotheses used, in addition to consumer outlays or factor incomes, include other beneficiary group classifications. All government expenditures are included -- transfer payments, specific expenditures and general (collective consumption) expenditures. The estimates of fiscal incidence are derived by subtracting the distribution of effective tax rates from the distribution of effective expenditure rates. A positive value for any effective fiscal incidence rate indicates that families [4] in the income bracket are net gainers from the redistributive mechanism of government budgets. A negative value indicates families in the income bracket are net contributors to this redistributive mechanism.

The empirical findings are summarized in Table 1. The total tax incidence (line 10) is regressive over the lower income brackets (up to an income level of \$2,000), proportional over a middle range (from \$2,000 to \$5,000), progressive up to \$10,000 and mildly regressive beyond \$10,000. This total tax pattern is comprised of a federal component which follows the same general incidence pattern, a provincial component which is regressive over the lower income brackets and virtually proportional beyond, and a local tax component which exhibits a similar incidence pattern to the provincial pattern. The regressivity over the lower income brackets affected one-third of Canadian families in 1951.

The total expenditure incidence (line 11) is regressive (favorable to the lower-income families) throughout the measured income scale, and it is most sharply regressive over the lowest two income brackets. This total expenditure incidence pattern is comprised of a federal component which is regressive over the lower income brackets and virtually proportional beyond, and provincial and municipal components which are regressive throughout the measured income scale.

Total fiscal incidence (line 12) is positive and regressive up to an income level of \$3,000, and negative beyond, with the incidence pattern regressive up to an income level of \$10,000 and proportional beyond. It may be of some interest that: (1) the lowest-income families are net gainers to a substantial degree, relative to families in the next highest income bracket; and (2) the highest-income families are net contributors to the same degree as are families in the \$5,000 - \$9,999 income brackets.

On the whole, then, Canadian government budgets in 1951 were broadly redistributive from those families with incomes in excess of \$3,000 to those families with lower incomes. Median family income in 1951 was slightly less than \$3,000.

3. THE REDISTRIBUTION OF INCOME AND COMMAND OVER RESOURCES, 1951-1977

Fiscal incidence estimates for 1951, 1961 and 1969 permit a comparison of changes in fiscal redistribution of income through time to be made. In addition, some partial estimates (Gillespie, 1978) permit more qualified conclusions to be drawn about the 1970-1977 period. This section presents and briefly discusses the evidence on redistribution of income over this 26-year period.

It is well known that the substantial increase in money incomes and average real income between 1951 and 1969 did not significantly alter the distribution of money income among families (Horner and MacLeod, 1975; and Love and Wolfson, 1976). One question of interest is whether the distribution of post-government income changed significantly.

Given the increase in money incomes, it is preferable to substitute a Lorenz measure of fiscal incidence (described in Gillespie, 1977: Appendix C) for the effective rates measure employed in Table 1. For a given percentage distribution of families in each year, the percentage of broad income, adjusted broad income and fiscal incidence is derived. This results in several indicators which can be used to shed light on the changing pattern of redistribution of income through time. The discussion in this paper is restricted to: (i) the change in fiscal incidence through time; and (ii) the change in final command over resources through time.

The Changing Pattern of Redistribution, 1951-1969

Fiscal incidence results for the total government sector from 1951 through 1969 are presented in Table 2. The Lorenz curve methodology results in similar findings to the effective rates methodology (compare column (2), Table 2 and line (12), Table 1): there is redistribution from highest-income families to lowest-income families during any one year. Specifically, in 1951 the richest five per cent of families were net contributors -- to the extent of 1.7 per cent of total community income -- and the poorest 22 per cent of families were net gainers -- to the extent of 1.6 per cent of total community income. It is worth noting that upper-middle-income families were substantial contributors as well -- especially by 1969.

The overtime results are presented for the two subperiods, 1951-1961 and 1961-1969. The changing pattern of redistribution

by the fiscal system during the 1950s [column (5)] resulted in increasing relative gains to lower-middle-income families financed by reduced gains to middle-income families and increasing relative net contributions from highest-income families. These results are not easily summarized in terms of income inequality, and Gini coefficients would undoubtedly mask some of the interesting details. The changing pattern of redistribution by the fiscal system during the 1960s [column (6)] resulted in increasing relative gains of the lowest-income and highest-income families financed by increasing relative net contributions from middle- and upper-middle-income families.

Given the uneven proportion of families within each Lorenz group, it is not a straightforward matter to consider the results of Panel A in terms of individual families throughout the measured income scale. To focus on individual families, or 'representative' families in each income group the Panel A results are converted into shares of income gained or contributed by one percentile of families within each group, and the results are presented in Panel B. The general conclusions are similar for both sets of results, except for relative comparisons of the highest-income families. During the 1950s the increasing contributions of a representative percentile of highest-income families relative to a representative percentile of upper-middle-income families was almost ten times as much. During the 1960s the gain to a representative percentile of highest-income families (through reduced contributions) was at least four times the gain to a representative percentile of lowest-income families.

The Changing Pattern of Command Over Resources,
1951-1969

The fiscal incidence results focus attention on the net redistributive effect of government budgets. For some purposes this focus is appropriate. However, for some questions (see the first page of this paper) it is necessary to examine the distribution of income after all budgetary effects have been allowed for. Thus, attention is directed to the distribution of adjusted broad income which is the conceptual counterpart of a distribution of final command over resources (encompassing private and public command).

The distribution of command over resources from 1951 through 1969 is presented in Table 3. The main conclusions can be summarized briefly. First, if government budgets could be said to have emerged for the first time in 1951 (an assumption which takes some liberty with history), then the distribution of command over resources changed in favour of the lowest-, lower-middle- and middle-income families at the expense of upper-middle- and highest-income families.

Second, during the 1950s [column (4)] the largest relative gains in command over resources were experienced by the lower-middle- and middle-income families (with the poorest families experiencing virtually no gain). The relative reductions in command over resources were experienced by the upper-middle and highest-income families.

A comparison of the command over resources measure with the fiscal incidence measure permits one to focus attention on the combined impact of the market and government budgets (Table 3, column 4) as distinct from the separate impact of government budgets (Table 2, column 5) on the distribution of income. Such a comparison suggests that government budgets were redistributing relatively more income away from highest-income families during the same time that the market was altering factor incomes against such families: during the 1950s the change in fiscal incidence was -1.5 per cent of total income, whereas the change in command over resources, which encompasses market and budgetary forces, was -4.5 per cent. In addition, the market was altering factor

incomes against the poorest families, virtually offsetting their gains from fiscal redistribution.

Third, the 1960s [column (5)] witnessed a substantial reversal of fortunes. The largest relative gain in command over resources was experienced by highest-income families (a combination of reduced contribution to the fiscal redistribution system and an improved factor income). The increased gain of the lowest-income families was mostly a result of fiscal redistribution. The largest relative reductions in command over resources was experienced by middle-income families. Interestingly enough, those who gained substantially relative to others during the 1950s lost relative to others during the 1960s.

The 1970s

It is not possible to effect a similar comparison in the changing pattern of fiscal redistribution beyond 1969, in the absence of a comprehensive fiscal incidence study for a later date. Gillespie (1977 and 1978) provided some information on the extent to which federal budgetary policies alone have influenced the distribution of income. The empirical evidence for the 1970-1977 period demonstrates that federal budgets have not substantially altered the economic position of lowest-income families relative to highest-income families (Gillespie, 1978: especially 19 and 49-51). Rather, it seems that federal budgets have provided larger benefits for the latter compared with the former -- although both have gained -- financed primarily by lower-middle- and upper-middle-income families.

These results for the 1970-77 period should be treated with caution, given the use of the effective rates measure of fiscal incidence and the necessity to relate the budgetary changes to the distribution of adjusted broad income in 1969. The findings are consistent with the conclusion that the federal component of the fiscal redistributive mechanism during the 1970s seems not very much different than the change in fiscal incidence during the 1960s [column (6) Table 2]. When one adds the by now well-known fact that the share of money income (including transfer payments) of the lowest quintile dropped in the 1970s compared with the 1950s and 1960s, it is quite likely that the final command over resources of the lowest-income families deteriorated relative to other families during the 1970s.

4. METHODOLOGICAL PROBLEMS

Some Preliminary Issues

Given the objectives of fiscal incidence analysis, the estimating model must have a number of crucial characteristics. First, it must have both positive and normative content. One must be able to introduce a budgetary policy change and derive and measure the effect of that change on the distribution of income among families. In addition one must be able to evaluate the effects of any proposed change in terms that are pertinent for normative policy purposes; that is, the impact should be in units or terms that are meaningful with respect to values or beliefs about the "desired" distribution of income among families.

The fiscal incidence model used to generate the findings presented in the previous pages of this paper is capable of providing some information in aid of answering numerous positive and normative questions along the lines of those on the first page. The empirical results encompass tax, expenditure and fiscal incidence estimates. The tax and expenditure incidence estimates are available for each separate category of tax and expenditure (Gillespie, 1979) as well as for total taxes and total expenditures. The incidence results are derived for families (a measure which includes families and unattached

individuals) grouped by income brackets. The use of grouped data is dictated by the original income and consumer expenditure data for 1951, 1961 and partly for 1969. [5] The level of aggregation is national [except for 1969, where the results were developed on a regional basis in Gillespie (1977) and employed in Gillespie and Kerr (1977)].

The indicator of welfare is income -- a comprehensive concept of income along the Haig-Simons definition. [6] Consequently the welfare indicator allows for all uses of income -- saving and consumption -- rather than focussing on just one use, consumption. In addition, the welfare indicator, with several minor exceptions, is measurable, which enhances its value and usefulness for policy purposes. This is in contrast to indicators of welfare which might be based on a utility concept (which cannot be quantified) or a consumer surplus concept (which is not calculable when demand curves are not revealed willingly -- which is the circumstances of many collective consumption goods).

Second, the time period of analysis has to be consistent with the data that are needed for quantification and with the normative content of the model. The absence of data on a weekly or a lifetime basis eliminates fiscal incidence estimates on a weekly or lifetime basis. If members of the community define their normative objectives with respect to the sharing of the community's resources on a weekly (or lifetime) basis then the model should be capable of providing results that are relevant for this norm [on a weekly (or lifetime) basis].

The findings in the earlier sections are based on a period of analysis of one year. To a great extent this period is dictated by the availability of data on an annual basis: taxes, transfers, government expenditures on goods and services and the distribution of income (and income components) across family units. One necessary source of data -- the distribution of consumption expenditures (in total, and for the bundle of goods making up the family's shopping basket) is only available periodically, (approximately every 10 years) each time on an annual basis. There do not exist, at present, relevant data on a weekly or on a lifetime basis.

Third, for many of the positive, predictive questions it is sufficient that proposed changes in budgetary policies be analysed and measured. For the main positive question -- the effect of the budget on the distribution of income -- and all normative questions a more comprehensive approach is needed. By comprehensive I mean that both sides of the budget -- all taxes and all expenditures -- must be accounted for in the analysis. This comprehensive total budget approach is necessary in order to measure the actual postbudget distribution of income among families.

The level of analysis underlying the fiscal incidence model used in this paper is comprehensive rather than marginal. This comprehensive approach generates several problems, to which I will return below. But the approach also assures one major benefit: it provides -- given all the qualifications of the methodology -- a picture of the distribution of income with the existing total government budgets. Some such knowledge of the existing state of affairs is necessary before one can calculate to what extent any proposed public policy instrument would alter the existing distribution of income in the direction of the desired distribution of income. Given the distribution of income with the total government budget (the command over resources measure), it is, of course, possible to estimate the distributive impact of any proposed change in budgetary instruments. [See Gillespie (1978) for one such attempt.]

Finally, the model must presume some theory of the state consequent upon the emergence of government. The emergence of the state from an exchange economy results in two major in-

fluences on the distribution of income. The state replaces a part of the private exchange economy as an employer of resources and thus affects in some manner the distribution of factor incomes. The state provides government goods to families and thus generates a flow of benefits to families. It is the manner in which the distribution of factor incomes is changed that depends upon the presumed theory of the state.

The emergence of a government that is the result of many competing interest groups, no one of which has significant monopoly power to alter relative factor prices in its favour, results in no appreciable change in the original distribution of factor income. Some labour and capital is now employed by the government sector rather than the private exchange economy, but relative factor prices have remained steady and thus the distribution of factor income has not altered. The effects of this liberal-pluralist state are also consistent with one neoclassical economic model, referred to below. [7]

The emergence of a government that is the result of one interest group with a strong monopoly power -- obtained through conquest, exploitation or the vote -- can result in state purchases of goods and services produced by the members of the monopoly interest group, thus bidding up relative prices of the owners of capital (labour); the price of capital (labour) rises relative to the price of labour (capital), and the original distribution of factor income changes in favour of capital (labour). In this radical (conservative) view of the state the original distribution of income becomes more unequal (equal).

The theory of the state presumed to exist in most fiscal incidence studies (the exception is Peppard, 1976) is a liberal-pluralist view of the state. Thus the original distribution of factor income is not altered by the emergence of a political entity called government. The radical alternative has been argued in Michelson (1970), Gordon (1972), Grubb (1971), Sawers and Wachtel (1975), and Peppard (1976). It is an alternative which, if accepted, would lead one to reject the results of the earlier part of this paper as overstating the measured redistribution to lowest-income families.

The Purpose of Fiscal Incidence Studies

The positive and normative questions on the first page have as their target variable the distribution of income among families within a political jurisdiction. It is my judgment that the distribution of income among families -- even when the data have to be presented in a very aggregate form -- is an interesting and policy-relevant variable. It may not be the most important variable considered by policy makers but information on its magnitude could be one input in the decision making process.

Bird and Slack (1978:83-85) argue that fiscal incidence studies are not relevant for these purposes, in part because the "standard of equity in these studies is ... determined rather arbitrarily". They add that there is little interest in reducing inequality in the distribution of income in Canada [8] and "what policy-makers really want (whether they know it or not) is a rather different kind of quantification exercise" (emphasis original) -- an exercise focussing on the wealth of the rich and characteristics other than income of the poor.

There are two issues involved in this critical view of the purpose of fiscal incidence studies: the normative standard of equity and the level of disaggregation of the quantification exercise. The only standard of equity built into a fiscal incidence analysis is income as a measure of welfare. A fiscal incidence study, with all of its inherent conceptual and empirical problems, indicates very approximately the effect of government budgets on the distribution of income among families.

The results permit policy-makers to draw conclusions based on their own normative view of the sharing of the community's resources among families. If Bird and Slack are correct in hypothesizing that there is no interest in reducing income inequality in Canada then there will be no political interest in fiscal incidence studies and they will continue to gather dust in academic libraries. (And, presumably, policy-makers will not have to be lectured on what information they really want.) But whether or not there is any nonacademic interest in income inequality, fiscal incidence studies are relevant for the purpose of determining broad changes in income inequality among families.

The second issue -- the level of disaggregation of the results -- has been recognized as a legitimate difficulty (Gillespie 1963:348-361; 1966:175-177; and Johnson 1968:62 and 72-73). It might be ideal to derive the results for individual family units where such microinformation as age, employment status, family status, family size and location could be used to provide more detailed information about the distributive effects of budgetary policy. Researchers have correctly noted that fiscal incidence results by age, (Bird and Slack, 1978:79, 83), family size (De Wulf, 1975:99), employment status (Peacock 1974: 155-156) and geographical location (Bird and Slack, 1978:85), would provide useful information for the policy-maker. Whether or not these other characteristics are more relevant than income for policy-makers (as suggested by Bird and Slack, loc cit) is a matter of judgment for policy-makers to decide.

The availability of all pertinent data on a household basis will make it possible eventually to estimate fiscal incidence for a range of variables other than income. [9] Gillespie (1977) does include a very tentative set of fiscal incidence estimates for the five regions in Canada, results which provide some information for the geographical location variable as well as the income variable.

The Time Period of Analysis

It has been suggested or implied that current annual income is an inappropriate measure of welfare because the time period of analysis is too short (De Wulf, 1975:100; Bird and Slack, 1978: 69-72; Reuber, 1978:524-525; Paglin, 1975). It has been suggested that lifetime incomes should be the crucial income variable and taxes and expenditures should be linked to a lifetime horizon as well. The academic fascination with lifetime models has not been coupled with suitable data for testing of or use in such models. In addition the equity implications of such models are far from clear. While Bird and Slack (1978:69-70) and Health and Welfare Canada (1977) are somewhat skeptical of the welfare connotations of the lifetime concept, there is no detailed discussion of the normative issues involved in a current or a lifetime income concept.

One of the main purposes of measuring the distribution and redistribution of income (aside from idle curiosity) is normative: to provide members of the community with an approximate idea of what the distributions and redistributions are, in order to permit comparisons with what members of the community believe the distributions and redistributions ought to be. Thus, what is crucial is the normative model -- the set of ethical beliefs -- held by the members of the community.

Given this crucial consideration, it is necessary to focus attention on the possibility of subsurvival or low income and consumption levels by some members of the community, and the range of plausible responses by other members of the community. It is possible to demonstrate that as one progresses from a polar model of equal expected lifetime incomes (with equal resource endowments, steady state, perfect markets, perfect certainty and

foresight, willingness to borrow and save) to a more realistic model of unequal lifetime and current incomes and consumption flows (with unequal resource endowments, imperfect markets, growing system, uncertainty, debt aversion, low savings propensities), the number of members with subsurvival and very low incomes (and consumption levels) increases (Gillespie, 1979a). The other members of the community need not respond to this fact. This decision is a nonethical alternative, since it implies that members of a community would not initiate some ameliorative, redistributive activity for those fellow members who had insufficient current incomes to survive.

Alternatively, the members of the community could respond, in some manner, to the existence of very low and subsurvival consumption levels of some members. This decision is an ethical alternative, since it posits a community of members where there is some view about how the resources of the community (its members' current and lifetime incomes) ought to be distributed among the members.

There are many ethical models which could account for the views which the members of very different communities have with respect to the ethically "desired" distribution of income. These different ethical models may have different implications for the usefulness of data -- in a normative sense -- on a current or lifetime basis. This is not the place to explore each such ethical model in detail. However, it may be helpful to enumerate briefly several ethical models which are consistent with the use of data which are current or annual, rather than weekly or lifetime.

The "equal sharing" ethical model is one such case where a set of beliefs of the members of the community leads to the posing of normative questions on an annual rather than a lifetime basis. Because a member of the community exists he or she ought to share equally with every other member of the community in the current resources of the community. Equal sharing of current incomes would result in equal sharing of lifetime incomes, but the normative focus of the community would be on current incomes. Thus the empirical evidence on the distribution of incomes which is relevant for answering normative questions is evidence on a current basis. Such a community would be prepared to redirect resources to an elderly member to bring his current command over resources up to "equal shares" even though the member may not have saved as much as he could have during the working years.

The community which adopts an "equal sharing" ethical model would also choose the line of equality in the Lorenz-Gini as a standard of equality. For such a community fiscal incidence methodology using current data is appropriate.

The "each according to his needs" ethical model is a second case wherein some definitions of "needs" can result in posing normative questions on a current rather than a lifetime basis. If needs are defined as minimum consumption needs, then such ethical views of the members of the community would lead to the adoption of a standard (or norm) of equality which reflected a sharing of the resources of the community up to the level of minimum consumption needs. [10] A proxy variable for such a norm might be a set of "poverty income levels." It follows that the members of such a community would be primarily interested in the distribution of current income in relation to the distribution of current minimum consumption needs, rather than the distribution of lifetime incomes and needs. For such a community fiscal incidence methodology using current data is appropriate.

There may be other ethical models which would lead members of a community to focus a normative thrust on lifetime measures of income, rather than current measures of income. It is sufficient to demonstrate that at least two ethical models --

those underlying the Lorenz-Gini measure and the poverty-line indicator -- lead to a concern with current income rather than lifetime income. Consequently there is a normative case for retaining fiscal incidence studies on a current basis. There is also a very practical case: adequate data on a lifetime basis are not now available and will not be available for the foreseeable future. [11]

Comprehensive Analysis
or Marginal Changes?

Some researchers have questioned the methodology of analysing the general equilibrium impact of the entire budget on the distribution of income and then assuming that the prebudget distribution of factor income does not change when a government is introduced into an exchange economy. This concern has led some to argue that only marginal changes in budgetary programs or taxes should be analysed and estimated (De Wulf, 1975:97, 105-106, 110; Bird and Slack, 1978:74, 85-86; and Reynolds and Smolensky, 1977:24), and that the attempt to measure the redistributive impact of the total budget should be eschewed (Meerman, 1978). Others, while recognizing the usefulness of some partial analysis which would focus attention on a particular government program or tax, argue that a comprehensive approach including a total budget estimation is needed (Peacock, 1974: 156, and Reuber, 1978:525).

A fiscal incidence study involves the comparison of a distribution of income "before" taxes, transfers and government expenditures with a distribution of income "after" such taxes, transfers and expenditures. This procedure necessitates the adoption of some comparison distribution of income (or some counterfactual) to measure the "before" distribution. The debate revolves around the appropriate counterfactual.

Reynolds and Smolensky (1977) are most detailed in their analysis which leads them to reject the 'no government' counterfactual on conceptual grounds and focus their attention on changes in the postgovernment income distribution through time. Two issues are involved here -- the comprehensive nature of the analysis and the alleged nonallowance for any general equilibrium feedback effects.

Reynolds and Smolensky consider four counterfactuals but analyse in depth the case I ('no-government') counterfactual and the case II counterfactual (the comparison or primary distribution of income is defined "as that arising from the private sector plus the allocative activities of the public sector (including recipient benefits from efficient transfers)" (Reynolds and Smolensky, 1977:17). Thus, in case II, all taxes and benefits from government goods and services which are a part of the government's efficient allocation activities would be treated as part of the counterfactual and not as part of redistributive activities.

They argue that the comprehensive view of case I can be rejected because of the asymmetry of treatment of private and public allocative activities (1977:20). They note that if the steel industry were to disappear it would affect the incomes of factory owners but these effects are not included in the measure of income redistribution, but rather are left in the primary distribution. On the other hand, output of nuclear submarines does get included in the case I redistribution because it is demanded by the government sector. This asymmetry does not arise in case II. Therefore

if the allocative function of government is viewed only as a use of income by individuals to buy collectively consumed goods and services which are paid for at 'market' prices, there seems to be no compelling reason

to include the distributional effects of merely allocating resources to the public sector, but to exclude the effects of allocating resources to particular uses in the private sector (loc cit.)

There is an asymmetrical treatment and, contrary to Reynolds and Smolensky, there is a compelling reason to treat the private and public sectors differently. In the private sector the consumer uses his income to purchase varying quantities of private goods such that, at the margin, the benefits and costs are equated. In the government sector, short of marginal benefits taxation, while the collectivity is in equilibrium, all consumer-voters other than the median voters are out of equilibrium: either marginal benefits exceed marginal costs or marginal costs exceed marginal benefits. In such a circumstance, where all consumer-voters must consume the equilibrium quantity of collective-consumption goods, many consumer-voters cannot "use" their income to equate benefits with costs (taxes) at the margin. Therefore there is some redistribution of income, even for goods that are provided for allocative purposes. Consequently it is theoretically correct to attempt to measure it in the redistribution of income dimension and to exclude it from the comparison distribution of income. This is what the case I counterfactual does.

In short, the zero government counterfactual turns out to be the preferable conceptual experiment, and a comprehensive analysis is appropriate. [12]

The second issue is the alleged nonallowance for any general equilibrium feedback effects when a government sector is introduced into an exchange economy. Critics have noted the assumption of a fixed pregovernment factor income distribution and they have inferred that the analysis is not general and does not allow for feedback effects on factor income (De Wulf, 1975:97; Bid and Slack, 1978:74; Peacock, 1974:153; Reuber, 1978:515, 517, 518; Meerman, 1978:300-301, 305, 309; and Reynolds and Smolensky, 1977:25, 39, 87-88 and 92). Such an inference is wide of the mark, since most fiscal incidence studies contain a rudimentary general equilibrium engine which allows for some feedback effects on behavioural responses.

The assumption of a fixed distribution of factor income is the outcome of a general equilibrium model wherein the government sector which emerges has a "neutral" budget incidence effect on primary factor incomes (Musgrave, 1958:347-364; and Gillespie, 1966:1-11). It is not being argued that the emergence of a government sector has no effect on the income sources side of a household's income. Rather, it is being argued that in a competitive setting with similar factor intensities, unitary elasticity of substitution of factors, and similar production techniques in the private and public sector the eventual state of equilibrium will be defined by no change in income. The result, built into fiscal incidence studies as an operational assumption, cannot be rejected summarily, but rather is an element to be determined by empirical testing. This is not to deny the difficulty of trying to test such an hypothesis (Williamson, (1976) contains some fragmentary results that are not inconsistent with the "neutral" budget incidence effect), but to raise a note of caution about overemphasizing the limitations of the assumed constancy in the distribution of factor income.

Other elements of analysis in fiscal incidence studies are the result of general equilibrium analysis where the effects are allowed to work their way through the system (and in some instances affect the original distribution of income). The shifting assumptions for all sales and excise taxes are based on a general equilibrium analysis that allows for behavioural reactions on the income sources and income uses side of a household's budget (Musgrave, 1958:350-359, and 374-382; Gillespie, 1966:40-51; Gillespie, 1977:76-83). The point was made clear in

Musgrave's early reply to the critics (Musgrave, 1964) but it seems to have been missed in the more recent critical literature (De Wulf, 1975:98). The shifting assumptions for the corporate profits tax, admittedly ad hoc in terms of the numerical breakdown between consumption and profits, are premised on a general equilibrium analysis that incorporates some of the multisector income sources effects (Harberger, 1962) and some of the multisector income uses effects that emerge from the models which predict some shifting to consumers (Asimakopulos and Burbidge, 1974; Dusansky and Tanner, 1974; and Musgrave, 1976:419-425, and Spencer, 1969). Feedback effects on the primary distribution of income are allowed for in this case, as they are in the case of backward-shifted social security taxes and the share of most taxes borne by profit receivers.

In summary, fiscal incidence studies do contain a rudimentary general equilibrium analysis and the broad income counterfactual of Gillespie, Johnson and Dodge does include the feedback of behavioural responses to some taxes and expenditures. The empirical results are not a description of impact incidence (Reynolds and Smolensky, 1977:87; Bird and Slack, 1978; and Reuber, 1978:517) but, given the shifting hypotheses utilized, a rough approximation of the eventual effects on the overall distribution of income.

The Allocation of Taxes and Public Expenditures

There are conceptual and practical difficulties in the allocation of taxes and the benefits of government expenditures to households throughout the distribution of income. In the face of theoretical controversies over tax shifting (the corporate profits tax and the real property tax) which are unresolved even after extensive empirical evidence exists, the researcher is left in the uneasy position of choosing among competing assumptions on the basis of his own judgment and conducting a sensitivity analysis. Gillespie (1966 and 1977) chose this course of action and allowed for variation in shifting assumptions for a number of taxes, one at a time. The general pattern of tax incidence results did not vary with the alternative experiments. Furthermore fiscal incidence studies provide the interested reader with sufficient data to substitute almost any preferred shifting assumption.

The renewed debate over the incidence of the real property tax (Mieszkowski, 1972; Aaron, 1974; and Bird and Slack, 1978) has led to some concern that the tax is much more progressive in its distribution than is demonstrated in orthodox fiscal incidence studies. Bird and Slack (1978:60-64), after reviewing a number of alternative theoretical methods of allocation for Ontario, conclude that while the property tax may be more progressive over the upper income classes it is still regressive over lower income classes. Gillespie (1977) did not incorporate an alternative assumption that would take account of the "new view" of the property tax incidence. This defect has been corrected in the sensitivity experiments, discussed below.

The sensitivity analyses of existing fiscal incidence studies have been carried out for each tax separately. A more comprehensive sensitivity analysis may be required wherein the shifting assumptions for a group of taxes are varied to be consistent with a particular view of the rudimentary general equilibrium framework. [13] For example, it is conceivable that all taxes applied to capital have a progressive bias by being entirely borne by capital (corporate income tax, real property tax and natural resource taxes). Thus an appropriate sensitivity analysis would allocate all such taxes to capital income and estimate a revised set of fiscal incidence results.

To allow for this possibility a comprehensive sensitivity analysis was carried out for 1951, 1961 and 1969. If one adopts

a package of tax hypotheses with a more progressive bias, the fiscal incidence estimates differ little from the standard case: there is greater redistribution for any one year but the over time results are similar, except that the middle-income group experiences a greater increase in its contribution share during the 1950s but becomes a recipient during the 1960s. If one adopts a package of tax hypotheses with a more regressive bias, the fiscal incidence estimates are virtually identical to the standard case (for any given year the highest-income group is a much smaller contributor than the upper-middle-income group). [14]

While there is some controversy in the area of tax incidence assumptions, the researcher is on firmer grounds there than in the allocation of government expenditures. The severe and limiting problems on the expenditure side of fiscal incidence studies are grounds for careful specification of the benefit shifting hypotheses and cautious interpretation of the results. The development of such benefit shifting hypotheses can be found in Dodge (1975) and Gillespie (1977) for those expenditures for which beneficiary groups can be clearly designated. There is some concern over using "costs incurred on behalf of" households rather than "marginal evaluation of benefits" by households as a method of allocation for these specific expenditures (De Wulf, 1975:79; Aaron and McGuire, 1970) since it requires an assumption of efficient government provision of goods. On the other hand, Meerman (1978:308) has recently argued that the cost allocation method for specific expenditures is preferable to a benefits received allocation method.

In addition, Peacock has correctly called attention to the neglect of some collective consumption attributes associated with specific expenditures (Peacock, 1974:158-159), such as education. Aaron and McGuire (1970) and Gillespie and LaBelle (1978) attempted to rectify this problem by allocating certain fractions of such specific goods benefits to the general expenditures category. This procedure is, admittedly, arbitrary since the division between external and specific benefits is not known; but it has the advantage of providing a range of alternative estimates.

The major controversy in the allocation of the benefits of government expenditures is in the area of the general expenditures -- those which approximate the textbook examples of collective consumption goods. Most fiscal incidence studies adopt a number of alternative assumptions about the distribution of these expenditures, each one linked in some specific manner to the expected distribution of benefits.

Such an approach has been criticised as ad hoc and only implicitly recognizing the need to utilize some kind of utility function (Aaron and McGuire, 1970; De Wulf, 1975:81-82; and Meerman, 1978:307). The alternative proposed by Aaron and McGuire has turned out to be less rigorous and more ad hoc than originally surmised (see, for example, Brennan, 1976 and Gillespie, 1977:201-208; and Peacock, 1974). Brennan has been most trenchant in advancing an alternative approach which predicts that the benefits of general expenditures should be allocated on a per family basis (a basis which is identical to Gillespie's alternative assumption A).

Gillespie and LaBelle (1978) utilized the Aaron-McGuire methodology for a low quantity of public goods and a high quantity of public goods -- two cases suggested by Aaron and McGuire. The 1969 fiscal incidence results and the change in fiscal incidence between 1961 and 1969 were not appreciably different than the standard case results for the low public goods case (wherein externalities associated with specific expenditures are assumed to exist) the 1969 fiscal incidence results differed from the standard case: the fiscal system redistributed incomes

away from middle-income families to lowest-income and highest-income families. The over time results did not change so dramatically, but did underline the increasing net gain to the highest-income families, financed primarily by an increasing contribution rate of middle-income families.

In summary, the Gillespie and LaBelle findings, utilizing the Aaron-McGuire methodology, illustrate the sensitivity of the estimates to the assumed degree of externalities associated with specific public expenditures.

5. FURTHER RESEARCH

The lack of data eliminates the feasibility of a fiscal incidence study for a year prior to 1951. Thus, further work for earlier periods will necessitate alternative methodologies. A fiscal incidence study for a year later than 1969 has been hampered to date by the lack of comprehensive consumer expenditure data.

Fiscal incidence studies provide little information on variables other than income. The comprehensive survey of consumer expenditures carried out in the winter of 1979 could provide the occasion to utilize microdata files to estimate fiscal incidence for locational, occupational, age and other variables. Such results might assist in accounting for the extensive redirecting of tax dollars that takes place without substantially altering the distribution of income by income class.

The findings of this paper and other related work [15] raise several interesting questions that could be pursued in future research projects. First, what explains the reduction in income inequality during 1930 - 1951 and the virtual constancy in income inequality during 1951 - 1977?

Second, what explanatory model can account for the redistribution of incomes effected by government budgets at one point in time (see Table 1)? Are the results consistent with Director's Law (Stigler, 1970), pareto-optimal income redistribution (Hochman and Rogers, 1969), specific egalitarianism (Tobin, 1970), efficient humanitarianism (Musgrave, 1968), radical redistribution (Sawers and Wachtel, 1975) or some other theoretical model?

Third, it would seem that those families who experienced reduced relative shares of command over resources during the 1950s became the recipients of significantly increased relative shares of such command during the 1960s (see Table 3). What explanatory model can account for this observed pattern?

Fourth, the changing pattern of fiscal incidence through time (see Table 2) was accompanied by two institutional changes that merit closer examination. Some selective benefit programs that were almost exclusively directed to lowest-income families (such as old age security pensions) became universal in nature, thus losing much of their ability to affect relative incomes. In addition, benefits to families came to be increasingly supplied through the tax side of the budget, where they improve the incomes of upper- middle- and highest-income families relatively more than the incomes of the lowest-income families (Maslove, 1979). Why?

Finally, fiscal incidence studies attempt to determine the effect of taxes, transfers and government expenditures on the distribution of income; they do not measure the impact of regulatory policies on the distribution of income. It would be worthwhile investigating to what extent the findings of Tables 2 and 3 would be altered if regulatory policies were allowed for.

6. CONCLUSIONS

The major conclusions of the paper can be summarized briefly.

On the whole Canadian government budgets in 1951 were broadly redistributive from those families with incomes in excess of \$3,000 to those families with lower incomes. Median family income in 1951 was slightly less than \$3,000.

Between 1951 and 1969 the command over resources of lowest-, lower-middle- and middle-income families rose relative to the command over resources of the upper-middle- and highest-income families. Within this time space it would seem that those families who gained substantially relative to others during the 1950s experienced a reversal of fortunes during the 1960s. During the 1970s it is quite likely that the command over resources of the lowest-income families deteriorated relative to other families.

Several methodological problems underlying fiscal studies were discussed. It was concluded that: (1) so long as income is a relevant variable for policy-makers, fiscal incidence studies can be a useful input; (2) for practical and normative reasons fiscal incidence studies should be retained on a current rather than a lifetime basis; (3) it is preferable to adopt, as the comparison primary distribution of income, the distribution of factor income in the absence of any government; and (4) sensitivity analyses of the effects of alternate tax or expenditure shifting hypotheses ought to be carried out for groups of taxes or expenditures, not just for each instrument separately.

Table 1

Fiscal Incidence, by Level of Government, Canada 1951: Broad Income Base

Line Item	Family Money Income Class (Percentages)										TOTAL
	Under \$1000	\$1000 -1999	\$2000 -2999	\$3000 -3999	\$4000 -4999	\$5000 -9999	\$10,000 & over				
<u>Federal</u>											
1	Effective Tax Rate	27.4	22.6	18.6	20.0	20.2	26.1	23.1	21.2		
2	Effective Expenditure Rate	47.0	25.2	18.5	17.8	16.9	17.0	16.7	17.8		
3	Fiscal Incidence	+19.6	+2.6	-0.1	-2.2	-3.3	-9.1	-6.4	-3.4		
<u>Provincial</u>											
4	Effective Tax Rate	11.4	7.6	5.9	6.4	6.0	6.5	6.4	6.2		
5	Effective Exp. Rate	58.4	8.2	6.4	5.9	4.9	4.3	2.4	6.0		
6	Fiscal Incidence	+47.0	+0.6	+0.5	-0.5	-1.1	-2.2	-4.0	-0.2		
<u>Municipal</u>											
7	Effective Tax Rate	9.4	4.9	3.8	3.3	3.2	3.1	2.7	3.3		
8	Effective Exp. Rate	7.7	5.8	5.3	5.0	3.9	3.2	1.9	4.0		
9	Fiscal Incidence	-1.7	+0.9	+1.5	+1.7	+0.7	+0.1	-0.8	+0.7		
<u>All Levels</u>											
10	Effective Tax Rate	47.9	34.9	28.3	29.8	29.4	35.7	32.1	30.7		
11	Effective Exp. Rate	113.1	39.1	30.1	28.7	25.8	24.5	21.0	27.9		
12	Fiscal Incidence	+65.2	+4.2	+1.8	-1.1	-4.4	-11.2	-11.1	-2.8		
<u>Distribution of Families</u>											
13		16.5	18.4	22.4	19.3	9.6	12.2	1.7	100.0		

Source: Gillespie (1979)

Note: Details may not add to totals owing to rounding; preliminary results.

Table 2
Fiscal Incidence in Canada, Total Government Sector, 1951-69, Using the Lorenz Curve Methodology

Line	Lorenz Grouping (Income Class)	Family Units in Lorenz Group (1)	Fiscal Incidence		Change in Fiscal Incidence	
			1951 (2)	1961 (3)	1951-61 (4)	1961-69 (5)
(Percentages)						
Panel A - Share of Total Income Redistributed within Each Lorenz Grouping						
1	Group One (Lowest)	21.7	1.6	2.6	3.6	+1.0
2	Group Two (Lower-Middle)	25.5	0.8	2.6	2.9	+1.8
3	Group Three (Middle)	25.5	0.6	0.1	-0.2	-0.3
4	Group Four (Upper-Middle)	22.2	-1.4	-2.1	-4.0	-1.9
5	Group Five (Highest)	5.0	-1.7	-3.2	-2.2	+1.0
6	Total	100.0	0.0	0.0	0.0	0.0
Panel B - Share of Total Income Redistributed for a Percentile of Family Units within each Lorenz Grouping						
7	Group One (Lowest)	1.0	.074	.120	.166	+.046
8	Group Two (Lower-Middle)	1.0	.031	.102	.114	+.071
9	Group Three (Middle)	1.0	.024	.004	-.008	-.012
10	Group Four (Upper-Middle)	1.0	-.063	-.095	-.180	-.086
11	Group Five (Highest)	1.0	-.340	-.640	-.440	+.200
12	Total	1.0	0.0	0.0	0.0	0.0

Source: Gillespie (1979)
Note: Preliminary results

Table 3
Command Over Resources in Canada, 1951-69

Line	Income Class (1)	Family Units in Lorenz Group (2)	Pregovernment* Income: 1951 (3)	Command over Resources: 1951 Postgovernment Income (4)	Change in Command over Resources 1951-61 (5)	Command over Resources 1969 (6)
Panel A Command over Resources within each Lorenz Grouping						
1	Lowest	21.7	4.1	5.7	+0.1	+1.1
2	Lower-Middle	25.5	14.2	15.0	+3.4	-0.6
3	Middle	25.5	23.2	23.7	+4.0	-2.2
4	Upper-Middle	22.2	36.1	34.7	-3.0	+0.4
5	Highest	5.0	22.6	20.9	-4.5	+1.5
6	Total	100.0	100.0	0.0	0.0	100.0
Panel B Command over Resources for a Percentile of Family Units within each Lorenz Grouping						
7	Lowest	1.0	.189	.263	+0.005	+0.051
8	Lower-Middle	1.0	.557	.583	+0.133	-0.024
9	Middle	1.0	.906	.929	+0.157	-0.086
10	Upper-Middle	1.0	1.626	1.563	-0.135	+0.018
11	Highest	1.0	4.520	4.180	-0.900	+0.300
12	Total	1.0	1.0	1.0	0.0	0.0

Source: Gillespie (1979)

Note: Details may not add to totals owing to rounding; preliminary results.

* Pregovernment income is identical to broad income, and postgovernment income is identical to adjusted broad income (see Gillespie (1979) for details).

Footnotes

- 1 With gratitude to Hugh Dalton (1929:15) through Alan Peacock (1974: 166).
- 2 See Gillespie (1979) for a detailed description of the methodology. The data limitations for the 1951 study were considerable. The consumer expenditure data, in addition to being extrapolated from 1948 to 1951 had to be adjusted for the open-ended highest income class to render it comparable with the income classes of the income data. In addition, the Lorenz distribution of farm income from the 1961 study was employed, along with the amount of farm income in 1951, to generate the farm income component of the 1951 distribution of income. A number of other adjustments were made as well.
- 3 Fiscal incidence methodology results in two alternative income concepts against which tax, expenditure and fiscal redistributions are compared. Income in the absence of a public sector is designated as broad income, Y , and the fiscal incidence experiment is derived as $(B + R - T)/Y$ where B , R and T are government expenditures on goods and services, transfer payments, and tax payments respectively. Tax incidence is $-T/Y$ and expenditure incidence is $(B + R)/Y$. Income in an economy that includes the public sector is designated as adjusted broad income, $Y + B + R - T$ and the fiscal incidence experiment is derived as $(B + R - T)/(Y + B + R - T)$.

The findings in part 2 of this paper are presented for the broad income base; see Gillespie (1979) for comparable results using the adjusted broad income base.
- 4 Throughout this paper "families" is used to designate the "family units" of Gillespie (1976); in other words "families" include families and unattached individuals, as defined by Statistics Canada (1972:14).
- 5 Family income data for 1969 from Statistics Canada (1972) are available on a microunit basis as well as on a grouped basis. However, the data from Statistics Canada (1973) on consumer expenditures were not available on a microunit basis at the time when the empirical work underlying Gillespie (1977) was initiated. In addition, so far as I know, no merged file of income and consumer expenditure data on a microunit basis exists.
- 6 For a precise definition of the income concepts used, see Gillespie (1979, 1976: 444, and 1977: Part II).
- 7 There are other economic models which would be consistent with this liberal-pluralist view of the state. It is also possible that under certain conditions of initial factor supply and given a less liberal liberal-pluralist view of the state, there might be some effect on the original distribution of factor incomes. These refinements are beyond the scope of this paper.
- 8 This same view surfaced during the Conference on Canadian Incomes, most noticeably in the comments of John Porter and John Vanderkamp.
- 9 However, the data requirements will be formidable (see note 5).
- 10 There are several issues in connection with the minimum consumption needs standard which merit further analysis but which are beyond the scope of this paper. First, the minimum consumption needs ethical model is premised upon an ex post equity standard rather than an ex ante equity standard (Pauly and Willett, 1972), and there may be some circumstances in which the latter standard is more appropriate. Second, the minimum consumption needs ethical model would require detailed information on the consumption "needs" of those families who are included among the lowest-income brackets (for a limited move in this direction, see Podoluk, 1979).

- 11 For an imaginative attempt to examine the retirement income system within a lifetime model, see Michael Wolfson's paper delivered at the Conference on Canadian Incomes (Wolfson, 1979). It is worth noting that the assumptions and methodology of such a study are every bit as bold as those underlying a fiscal incidence study. See also, Irvine (1979).
- 12 The argument is developed here on the income uses side of the household's budget for a nonmarginal benefit taxation case. If the income sources side is the focus, then there is no asymmetrical treatment since the case I counterfactual holds the distribution of factor income constant for a change in the steel industry or the nuclear submarine industry. If one assumes a marginal benefit taxation case it is irrelevant whether case I or case II is adopted as the theoretical counterfactual, since in both cases efficient collective goods provision implies a distribution of net fiscal incidence amounts of zero for every consumer-voter.
- 13 I am indebted to Walter Hettich for drawing this point to my attention.
- 14 These observations are based on results not presented here but found in Gillespie (1979) as experiments 1 and 5 respectively. Experiment 1 allocates the corporation income tax entirely to shareowners, sales and excise taxes to factory owners, the property tax on structures to owners and all royalties to owners. Experiment 5 allocates the corporation income tax, sales and excises, the property on structures, employer's share of social security taxes and royalties and resource rentals all to consumers.
- 15 See, for example, the attempt of Anam, Noordeh and Rahman (1979) to determine the redistribution impact of Ontario's post-secondary educational system. In addition, Ozo-Eson (1979) has derived some empirical evidence on the radical critique of fiscal incidence studies (see the argument on p. 11 of this paper); Dumont-Roy and Faltacas (1979) have combined the Aaron-McGuire utility function approach with the regional results of Gillespie (1977) in order to determine the net redistribution effect in each of the five Canadian regions of federal taxing and spending decisions; and McGuire and Wurts (1979) estimated the redistributive effect of the Conservative proposal for mortgage interest and property tax deductions under alternative financing assumptions.

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THE LIFETIME IMPACT OF THE RETIREMENT INCOME SYSTEM,
A QUANTITATIVE ANALYSIS

by

Michael C. Wolfson*

1. INTRODUCTION

The purpose of this paper is to present an analysis of the lifetime impact of the main elements of Canada's retirement income system. There are three main questions to which this analysis is directed: how redistributive is the system; will it generate adequate levels of consumption during retirement; and what are the incentives to personal saving for retirement? A lifetime perspective is valuable for such an analysis. Typically, individuals and families make provisions for their retirement during their working years and then draw upon these provisions after they have withdrawn from the work force. Thus, a comprehensive analysis should examine both the working and retirement phases in conjunction with one another.

In order to analyse the retirement income system from this perspective, a fairly simple model of the typical life cycle for economic activity of a single age cohort has been developed. This age cohort will be represented by a set of "typical" families. The point of view being considered is what 18 year olds today can expect from the current retirement income system under idealized conditions of long run stable growth and under the assumption that the retirement income system is mature and unchanging.

2. STRUCTURE OF THE MODEL

A. Overview of the Retirement Income System

The retirement income system in Canada has a number of distinct elements. There are the federal transfer programs which are conditional on age, the Old Age Security Pension (OAS), and the Guaranteed Income Supplement (GIS) which is also conditional on income. Then there are the national compulsory earnings related pensions, the Canada and Quebec Pension Plans (CPP). Employer sponsored pension plans constitute another element, as do individual saving initiatives. Finally, there is a range of provisions in the personal income tax system that is more or less directly related to pensions, retirement, and/or saving for retirement. The main elements that will be examined explicitly are the following: OAS, GIS, CPP (both contributions and benefits), personal saving, and the personal income tax system. Items not considered explicitly include provincial 'top-up' transfers or tax credits, subsidized housing, health insurance, and employer sponsored pension plans.

B. Life Cycle Demographic Pattern

The model assumes the following 'stylized' pattern for the lifetime demographic structure of a typical family. A single male enters the labor force at age 18 in 1977. He marries a woman of age 23 when he is age 25, has one child at age 26 and a second at age 28. His children leave home when they become 18. He retires at age 65 (in 2024) and dies at age 72. His wife

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survives him for another 8 years (until 2040). The specific figures are parameters of the model and can easily be varied. They have been motivated by the demographic data given in Perspective Canada II (1977, Chapter 2). In order to assess the impact of the retirement income system on a single age cohort, a set of such typical families will be examined. All of these families are assumed to follow identical demographic patterns, specifically the one just set out. The basic distinguishing features for families will be their lifetime income, tax, transfer, and consumption profiles.

A more sophisticated analysis that includes realistic demographic transitions is of course feasible -- for example, using Monte Carlo techniques as in Orcutt et al. (1976), and Pesando and the Rea (1977) or the methodology developed in Wolfson (1977). However, for the purposes of this analysis, the simpler approach that has been adopted probably strikes a reasonable balance among the competing concerns over cost, understandability, availability of data, flexibility, and robustness of conclusions.

C. Life Cycle Earnings Profiles

In general, there are three main sources of income for families and individuals: earnings, investment income, and transfers. In the model, the earnings patterns have been taken as input; investment income results from personal savings based on the given earnings profiles; and transfers are explicitly simulated in the cases of OAS, GIS, CPP, and family allowances. The lifetime earnings profiles have been derived from 1974 cross-sectional data on male CPP contributors. [1] Within each of a sequence of five-year age intervals, the earnings distribution has been divided into deciles, and within each age-decile category average earnings have been estimated. Graph 1 displays these age-earnings profiles. Note that the top decile group has been subdivided into two 5 per cent groups (vingtiles). These age-earnings profiles are based on the assumption that a person in the first decile at the beginning of his life remains in the first decile throughout his life, similarly for each other decile and vingtile. Two additional age-earnings profiles have been included in the model: the mean and median profiles from the same CPP data source. The basic focus in the choice of these earnings profiles is on the vertical aspect, stressing the spread or dispersion of the lifetime earnings distribution. One further adjustment made to the profiles takes account of real economic growth. A person 25 years old in 1977 is assumed to earn in 1987 what a 35 year old earned in 1977 inflated by the assumed growth in average real wages over the intervening ten years. The specific growth factor is discussed below.

The set of earnings profiles provides the starting point of the model. In conjunction with a saving function, saving and investment income profiles can be generated. Then, income taxes and transfer payments can be modelled and a lifetime consumption profile determined. Finally, given this collection of profiles for each "typical" family in the age cohort, a set of specially designed statistics and indicators can be computed as the basis for the assessment of lifetime impact that is the objective of the analysis.

D. Personal Saving

The model has a simple saving function, based on a set of exogenously given parameters. These parameters include the age at which the family begins saving, a saving rate for earned income and another for investment income during the pre-retirement period. A pattern of drawing down these savings after retirement is also fixed. It can be made equivalent to a joint and survivor life annuity. In addition to the option of not saving at all, the model can simulate six alternative saving

strategies representing the main types of portfolio characteristics available. The main differences stemming from these alternative saving strategies is in their treatment by the personal income tax system. A constant pre-tax yield is assumed, independent of the portfolio strategy. In this way, the analysis can focus on the differences in the tax treatment of various types of saving while abstracting from the capital market factors that in practice cause the yields on various types of portfolios to differ.

E. Macro-Economic Assumptions

The model assumes constant exponential growth. The main parameters characterizing the macro-economic assumptions and the basic values that have been used for them in the simulations are: the real pre-tax yield on savings 3.5 per cent, the real growth rate of average wages and salaries 2.0 per cent, and the rate of price inflation 0. The real yield and real growth rate of wages are not out of line with past experience. Various program elements and tax provisions in the model can be either unindexed, or indexed to changes in prices or wages. In general, these growth variables can be used to generate a range of indexing scenarios. For example, a 'legislated world' would assume the current indexing provisions (though a zero rate of price inflation implies that everything is at least price indexed). This scenario, however, has not been generally used because over the time horizon of the model, it has some rather extreme implications. Real wage growth would ultimately push even the bottom decile into the top income tax bracket so long as the income tax system remained only price indexed. Similarly, OAS benefits would be continually shrinking in relation to CPP benefits. To avoid this situation, the basic growth scenario that will be used is the 'relative world' where almost everything is wage indexed. Levels of exemptions and the rate brackets in the income tax system and OAS benefits remain unchanged in relation to average wages for successive age cohorts. However, the capital income base of the tax system (e.g., interest income) has not been explicitly indexed, though it is implicitly indexed to prices when the rate of price inflation is assumed to be zero.

F. The Discount Rate

In order to value the lifetime profiles of income, transfers, and consumption generated by the model, a constant discount rate equal to the growth rate of average wages will be used. Three obvious alternatives for the constant discount rate are zero (the rate of price inflation), the growth rate of average wages, and the pre-tax yield. From a social policy perspective it seems most appropriate to adopt the rate that embodies a notion of social relativities, namely the growth rate of average wages. This discount rate reflects the assumption that, for example, an individual is equally happy with a given level of OAS benefits from year to year so long as they remain a constant proportion of average wages. [2]

G. Description of the Model's Program Elements

1. It is assumed that all CPP contributions are borne by the employee. The current rate is 3.6 per cent of earnings between the basic exemption (YBE) and maximum pensionable earnings (YMPE), though 'full cost' contribution rates will generally be assumed. YMPE is assumed to be \$13,200 in 1977, the actual level of the industrial composite wage, and YBE is set at 10 per cent of average wages. Thus, the transitional arrangements are being ignored. Both the YMPE and YBE are wage indexed.

2. CPP benefits are computed according to the present formula, which equates benefits with a fraction of adjusted career average earnings. The earnings in the best 85 per cent of

the earning years are expressed as a fraction of the YMPE in the respective years and these fractions are averaged to compute adjusted career average earnings. The pension benefit is then 25 per cent of the average of the last three years' YMPE times adjusted career average earnings. Benefits are wage indexed in the model, though in fact they are price indexed.

3. The Old Age Security pension (OAS) is a flat rate demogrant. Benefits are credited after age 64 to the husband, and after age 66 (when the wife turns 65) to both spouses. They are wage indexed. Basic Guaranteed Income Supplement (GIS) benefits are reduced (income tested) at a rate of 50 per cent for income from earnings, CPP benefits, investment, and Registered Retirement Savings Plan (RRSP) withdrawals. Spouse's Allowance (a part of the GIS program) is paid during the first two years of retirement. GIS benefits are also wage indexed.

4. Essentially, all the basic features of the 1977 income tax are included except that the dividend gross up and tax credit is set at the 1978 level. Assessed income comprises earnings, family allowance (assumed to be wage indexed), OAS, CPP benefits, investment income, and RRSP withdrawals. RRSP and CPP contributions are deductible, as are the basic personal exemptions. Personal exemptions and the rate brackets are wage indexed, as are the RRSP limit, the standard medical and charitable deduction, and the 9 per cent federal basic tax reduction. Also included are the 3 per cent employment expense deduction, deductible unemployment insurance contributions, and transferability of the age exemption, the \$1000 interest and pension income deductions. Provincial income tax is computed as 44 per cent of federal basic tax.

H. Measures of Lifetime Impact

Given the program elements and data inputs, the model generates lifetime variables for each of the thirteen hypothetical families (nine deciles, two vingtiles, mean, and median). A list of these basic variables is available from the author.

1. Redistributive Impact. The longer paper of which this is a shortened version, discusses at some length the general redistributive impact of the retirement income system. [3] For purposes of that discussion, a number of indicators and measures were developed. These indicators as well as the results on distributional impact are not discussed here. The main exceptions are that the adequacy measure defined below also reveals one facet of distributional effects, and that the general results are summarized in the concluding section.

2. Adequacy. The usual approach to measuring the adequacy of a given income is to compare it to a poverty line standard such as those produced by the Canadian Council on Social Development or Statistics Canada. This measure omits a very important perspective, namely that of 'continuity of consumption'. From this perspective, the central question is how postretirement consumption compares to pre-retirement consumption. This comparison can be easily expressed by the ratio of these two variables in annualized form. This ratio will be used as the basic indicator of retirement consumption adequacy. Although this ratio is simply computed, the underlying concept is not straightforward. Several assumptions are implicit. Three concern the discount rate, the particular pre-retirement years whose consumption is considered, and the particular post-retirement years considered. With respect to the first of these, a discount rate equal to the growth rate of average wages has been used. Then the ratios presented below are based on consumption in all pre- and post-retirement years.

A further issue here concerns variations in family size over the life cycle. Clearly, \$10,000 of consumption for an individual makes him better off than a family of four also with \$10,000 of consumption. One way to take account of this is to adjust consumption explicitly in relation to family size. Two approaches to this issue have been incorporated in the model. With the first "absolute adjustment", in every year that two adults are present, consumption is reduced by \$1,200 (wage indexed), and consumption is further reduced by \$600 (also wage indexed) for every child. These figures are roughly based on current differentials in welfare benefits by family size. Continuity of consumption ratios are then computed after these absolute adjustments have been made. With the second "relative family size adjustment", consumption is first expressed in 'per equivalent adult unit' (EAU) terms. A single individual is considered as one EAU, while a couple with no children is considered as 1.67 EAUs. Each child then counts as an additional 0.33 EAU. These figures are the same as those used by the Canadian Council on Social Development in the construction of their poverty lines. Thus, for example, during that portion of the family's life cycle when the couple has both children at home, consumption would be divided by 2.33 before computing the continuity of consumption ratio. Both the absolute and relative family size adjustments may lead to significantly different changes to the 'raw' continuity of consumption ratio. Nevertheless, some adjustment is important from a social policy perspective.

3. Returns to Saving. A major feature of the retirement income system in Canada today is that personal saving for retirement is encouraged. A fundamental question concerns how much net return there is to saving. The most obvious measure in this case is the real after-tax, after-transfer rate of return. This is computed in the model as the internal rate of return to the difference in two alternative lifetime consumption streams, one with some type of saving and the other retained from a previous simulation run of the model similar in every respect except that there was no saving. To the extent that the tax and transfer treatment of saving varies by income class, this will be reflected in different net rates of return. The distributional impact of different saving provisions will also be revealed by different levels of the present value of lifetime consumption (CONS), shares of CONS, and continuity of consumption ratios by decile and vingtile.

3. SIMULATION RESULTS

A. Redistributive Impact and Adequacy

It is impossible to reproduce here the full details of the simulation experiments. The main outputs of a base simulation, an alternative involving price indexing, and a further run concerned with the splitting of incomes between husband and wife in two-earner families have been tabulated and are available in the longer version of this paper. These results clarify some important aspects of redistributive impacts and adequacy. They are summarized in the concluding section of the paper.

B. Returns to Saving

1. Portfolio Strategies. In exploring these strategies, no account is taken of behavioural responses to various tax incentives, nor of the possibility of different before-tax rates of return for different types of saving portfolios. The basic concern is with the income tax and transfer treatment of alternative forms of saving. In almost all cases, the same rate of saving and before tax yield will be assumed. The husband begins saving 5 per cent of his (before tax) earnings at age 18 when he enters the labour force. All of the yield is immediately reinvested or held, in the case of accrued capital gains

independently of any tax consequences. The wife does no saving on her own account. This saving pattern continues up to retirement. At that point, saving ceases and dis-saving begins. The pattern of dis-saving is as if a two-thirds joint and survivor annuity were purchased with the husband's accumulated wealth. Finally, we assume the tax treatment of investment income and saving is the same postretirement as it is pre-retirement.

Six alternative saving scenarios have been simulated: Bank saving (Bank); House saving (HOUSE or HOUSE & RHOSP); Dividends (DIVDN); Realized capital gains (RCG); Accrued capital gains (ACG); and RRSP. Given these saving scenarios, Graphs 2 to 5 display successively four sets of variables as a function of lifetime earnings: the real rate of return, the relative and absolute family size adjusted measures for continuity of consumption, and the percentage increase in average annual real lifetime consumption. In all cases, it might be noted, the 5 per cent saving rate out of earnings and the accumulation of all investment income results, at the point of retirement, in an amount of accumulated wealth equal to about 3.25 times average annual preretirement earnings, a rather high figure. Data for 1970 given in Wolfson (1979) indicate that mean wealth just before retirement was about 2.5 times pre-retirement mean income. The corresponding ratio for median income and wealth (which is much less likely to be affected by inheritances and gifts inter-vivos, and is therefore more likely to reflect lifecycle saving only) was about 1.75.

2. Rates of Return. Graph 2 presents the real after tax and transfer rates of return for the alternative saving strategies. For the bottom half of the income spectrum, a house is apparently the most attractive investment while, for the upper half of the income spectrum, RRSPs dominate. Bank saving is the least attractive way to save except for the bottom two deciles, where RRSPs are even poorer. The tax treatment of dividends is somewhat better than that of accrued capital gains in the second through sixth deciles. The tax-transfer treatment of saving in a house, from the rate of return perspective, is distributionally neutral except for the RHOSP provisions, which in fact appear somewhat redistributive above the first two deciles. The reason is that the RHOSP is essentially a \$10,000 lifetime income tax deduction; and deductions are relatively redistributive or progressive because their value, which is proportional to the taxpayer's marginal tax rate, increases less than proportionately with income. Of course this analysis ignores the fact that the proportion of taxpayers actually making use of the RHOSP provisions increases with income. Similarly, no account is taken of the greater difficulties low income families face in buying a house.

RRSP saving has the most pronounced distributional "tilt." For the top vingtile, the after-tax and transfer yield on RRSP saving is more than one full percentage point above the pre-tax yield as pre-retirement tax savings from deductability are much larger than the taxes finally payable post-retirement, in turn a result of both the tax deferral advantages and the lower marginal rates of tax typical after retirement. Accrued capital gains also appear regressive and, for the upper deciles, the after-tax and transfer yield provides over 90 per cent of the pre-tax real yield. Dividends are regressive for the first three deciles, mainly because the dividend tax credit is not refundable, and mildly progressive thereafter. The other two saving strategies (BANK and RCG) have somewhat progressive tax-transfer treatments.

It should perhaps be noted that the bottom deciles, even though they may be subject to tax rates over 50 per cent during retirement from GIS, are still able to attain net yields on saving on most portfolios that are comparable to those of higher income groups. The reason, simply, is that the GIS 'tax back' applies only during a fraction of a lifetime, and only to the

yield from saving. The capital portion of dis-saving during retirement has no effect on GIS benefits, except in the case of RRSPs. Thus, generally the GIS income testing does not appear to pose a significant financial disincentive to saving for retirement.

3. Effects on Consumption. The impact of personal saving on continuity of consumption is shown in Graphs 3 and 4. (The curve labelled BANK* is discussed below.) The main observation, not surprisingly, is that saving results in an upward shift in the continuity of consumption curve. This upward shift is close to parallel so the distributional differences in the tax-transfer treatment of saving just described in terms of rates of return are small relative to the distributional tilt of the basic taxes and transfers themselves. Nevertheless, there is some reduction in redistributive impact apparent when there is saving. Despite the range of real net rates of return shown in Graph 2, all of the saving strategies have very similar results for continuity of consumption except RRSPs. They have a smaller impact in raising the continuity of consumption ratios because their income tax treatment is such that the "benefit" of tax deductability causes pre-retirement consumption to fall less while the "cost" of taxing the capital portion of dis-saving causes post-retirement consumption to increase less.

The continuity of consumption ratio is greater than one for the bottom seven deciles in Graph 3 if they save 5 per cent of their earnings and all of their investment income from age 18 to age 64 (other than in a RRSP). Hence, for these income groups, lower rates of personal saving would suffice to assure comparable levels of consumption both pre- and post-retirement. The curve labelled BANK* shows the continuity of consumption situation under the alternative assumptions that 5 per cent of investment income is saved rather than 100 per cent, and that saving starts at age 30 rather than at age 18, with real yields being fully taxable. It is still being assumed that 5 per cent of earnings are saved. These saving assumptions result in accumulated wealth at retirement equal to about 1.5 times average annual pre-retirement earnings, a more realistic figure. In this case, saving is not sufficient to provide continuity of consumption for the top six deciles.

Graph 4 where the absolute family size adjustment has been displayed, fewer families achieve continuity of consumption. The reason for the differences between the two kinds of adjustments may be illustrated by the fact that under the relative adjustment, pre-retirement income is divided by 2.33 when both children are at home, rather than reduced by \$2400 as with the absolute adjustment. Clearly, the absolute adjustment has a smaller impact as compared with the relative alternative at higher levels of consumption. The differences between the two graphs suggest that an assessment of the adequacy of the retirement income system will be fairly sensitive to the method of family size adjustment.

The fact that RRSP saving generates lower continuity of consumption ratios than the other saving strategies does not necessarily imply that RRSP saving is a poor choice. On the contrary, Graph 2 showed that for higher income families, RRSP saving offered the highest net rate of return. As already noted, RRSP saving has the dual effect of deferring tax on income saved and then lowering the tax rate applicable to that income. Graph 5 shows similarly that RRSP saving results in a significant increase in lifetime consumption over the alternative of no saving, particularly for the top two vingtiles. In general, saving should be expected to increase lifetime consumption since the discount rate is lower than the yield on deferred consumption. The general picture that emerges from Graph 5 regarding the best forms of saving is almost identical to that derived from Graph 2. House saving is most attractive except at

the top of the income spectrum where RRSP saving dominates. For investments in shares, lower-middle income investors should prefer eligible Canadian dividends while high income investors should accrue capital gains. Bank saving is not attractive for anyone, and RRSPs appear particularly unattractive for low income families.

4. Inflation. The analysis so far has generally assumed zero inflation. However, a major concern at the present time is with the impact of inflation on saving. One main aspect of this concern is the income tax and transfer treatment of nominal as well as real yields on saving. Other important aspects include the effects of inflation on personal saving rates and on before-tax yields. Only the first of these aspects will be considered here. It is a straightforward matter to simulate the after-tax and transfer yields for alternative saving strategies with a given rate of price inflation. Results, with and without a 5 per cent rate of inflation (but the same real yield, real growth rate of average wages, and real discount rate), are shown in Graphs 6 and 7. BANK and RRSP saving are considered in Graph 6. The picture that emerges from this graph is that real net yields on RRSP saving are almost completely unaffected by inflation, as compared to those for BANK saving which are significantly reduced.

These results should not be surprising. To the extent that inflation is reflected in higher nominal yields, nominal interest payments become a blend of real interest payments and repayments of capital. The income tax base includes the whole of these nominal yields. Despite the general reliance on the 'relative world' indexing scenario in the model, the income base of the income tax system (as opposed to the rate structure) has not been assumed to be indexed explicitly. (It has been done implicitly by assuming zero price inflation.) Thus, at a 5 per cent assumed rate of price inflation, repayments of capital are included in taxable income in the case of BANK saving. In turn, income taxes on this form of saving are increased and real net yields are reduced. With RRSPs, however, the capital portion of dis-saving post-retirement is taxable in any case, while pre-retirement the yield is not taxable. As a result, inflation related changes in the blend of real yields and capital repayments should have no effect at all on the real net return to RRSP saving. In fact, the only reasons there are any differences at all between the two sets of simulated rates of return for RRSP saving are, first, that inflation has some effect on the level of CPP benefits and hence on post-retirement income tax brackets and marginal tax rates. Second, the dis-saving is assumed to be analogous to an annuity where the payments are constant in nominal terms. As a result, real dis-saving is shifted earlier in the post-retirement period with inflation.

One other factor examined in Graph 6 is the \$1,000 interest deduction. Three alternatives have been considered in the case of BANK saving: one where the \$1,000 amount is not indexed (the current situation), one where it is price indexed, and one where it is assumed to be wage indexed. As one would expect, the greater the extent to which the \$1,000 deduction is indexed, the higher the real net yields. Still, the \$1,000 deduction, even if it is wage indexed, does not raise real net yields to the levels that would be obtained if the income tax base were itself indexed. In this latter case, inflation would have no effect at all on real net yields. However, the \$1,000 deduction is more progressive distributionally than full price indexation of the income base. This is indicated in Graph 6 by the fact that the curve BANK-e for example has a more pronounced downward slope than the curve BANK-a, or BANK-b for that matter.

In Graph 7, the impact of 5 per cent inflation on eligible Canadian dividends (DIVDN), realized capital gains (RCG) and accrued capital gains (ACG) saving is displayed. No \$1000

deduction is assumed. (The tax-transfer treatment of HOUSE saving ignoring RHOSPs, since the yield is tax exempt, is unaffected by inflation.) The main observation is that the real net yields on accrued capital gains throughout the income spectrum and on eligible Canadian dividends in the lower middle income ranges are not very strongly affected by inflation. However, inflation does have a significant impact on the real net yields from saving in the form of realized capital gains in all but the bottom decile, and from eligible Canadian dividends at the extremes of the income spectrum. As a result of these observations, it appears that the best forms of saving, from the point of view of higher real after-tax and transfer rates of return, are in a house for the lower and middle income ranges, and in RRSPs for the upper income ranges. These forms of saving are virtually unaffected by inflation, at least regarding their treatment by the tax system. For upper income families who are constrained by the RRSP contribution limits, the next best form of saving is accrued capital gains, which are also relatively unaffected by inflation. For families in the lowest deciles, HOUSE saving may not be a feasible alternative. In that case, the alternatives are not very attractive. BANK and RRSP saving which are probably the most accessible are also the least attractive in terms of real net yields. However, even without any saving these families can expect post-retirement consumption that is higher than their pre-retirement levels of consumption.

4. CONCLUSION

(1) Under the given assumptions, the retirement income system can be expected to be substantially redistributive. The shares of lifetime consumption of the lowest lifetime income groups are significantly greater than their shares of 'market income' (earnings), and vice versa for the highest income groups. GIS has the greatest redistributive impact in lifetime terms while CPP has the least. Nevertheless, CPP benefits and contributions are still somewhat redistributive, in the sense that their impact is to lower lifetime income inequality. These conclusions also hold when taxes and transfers are price indexed, as at present, rather than wage indexed.

(2) The main indicator for the adequacy of post-retirement consumption did not involve comparisons with a poverty line index. Rather, the focus was on the continuity of consumption. Few individuals can expect to achieve continuity of consumption by relying only on the public programs. For the poorest 10 or 20 per cent of the population, average post-retirement consumption levels could well exceed average pre-retirement consumption levels. For the upper 50 to 70 per cent of the population, however, average post-retirement consumption levels could well be 25-50 per cent below corresponding pre-retirement levels if no other provisions for retirement are made. If OAS and GIS benefits remain price indexed rather than maintaining their current position relative to average wages and salaries, almost all of the age cohort that are 18 in 1977 could well expect average post-retirement consumption levels of less than half their average pre-retirement consumption.

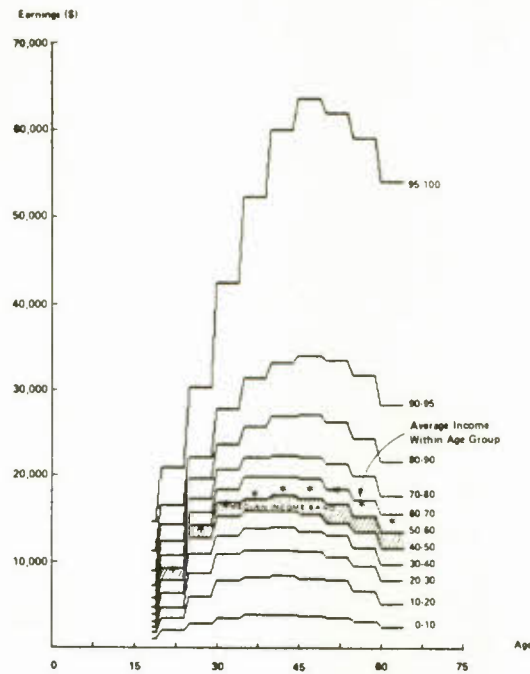
(3) In terms of the after tax and transfer rate of return, the most attractive form of saving for the bottom half of the population was in an owner occupied house, while for the top 10 or 20 per cent the RRSP was most attractive. In fact the top income groups were able to achieve after tax rates of return that exceeded the before tax rates using RRSPs. However, RRSPs were the least attractive form of saving for the poorest fifth of the population. Saving in the form of bank deposits (or other interest bearing vehicles) was the least attractive form for the rest of the population. Aside from the case of RRSP saving, the income testing of GIS benefits did not appear to constitute a significant financial disincentive to saving from the lifetime perspective. These conclusions applied whether or not the effect

of inflation on the tax and transfer treatment of savings and investment income was taken into account. In fact from the tax treatment point of view, the real after tax yield on savings in an owner occupied house or RRSP was virtually unaffected by inflation.

(4) From the perspective of redistributive impact, the tax-transfer treatment of RRSPs had the most pronounced redistributive pattern in favour of the upper income groups, while bank deposits and their equivalents had an opposite redistributive pattern. Nevertheless, the magnitude of these redistributive effects is small relative to those of OAS, GIS, and CPP.

Graph 1

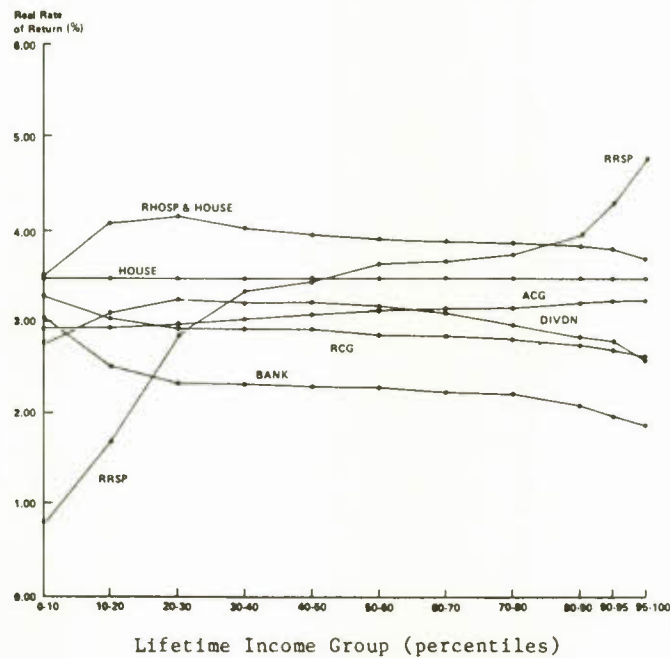
Male Age-Earnings Profiles for Average Earnings and Quantile Groups (Percent, Nine Deciles, and Top Two Vingtiles), by Five Year Age Group, 1977



Note: All earnings inflated by change in industrial composite wage from 1974 to 1977.

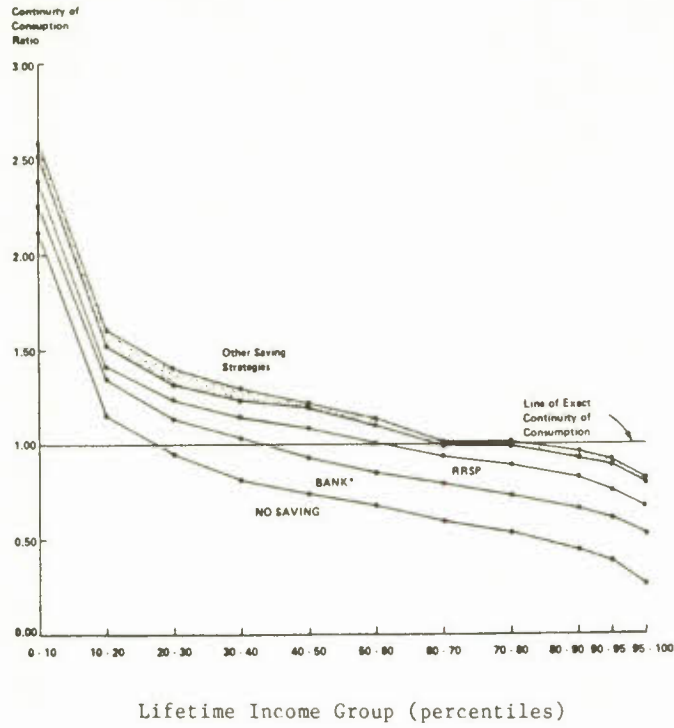
Graph 2

Real After Tax and Transfer Rates of Return for Alternative Saving Strategies



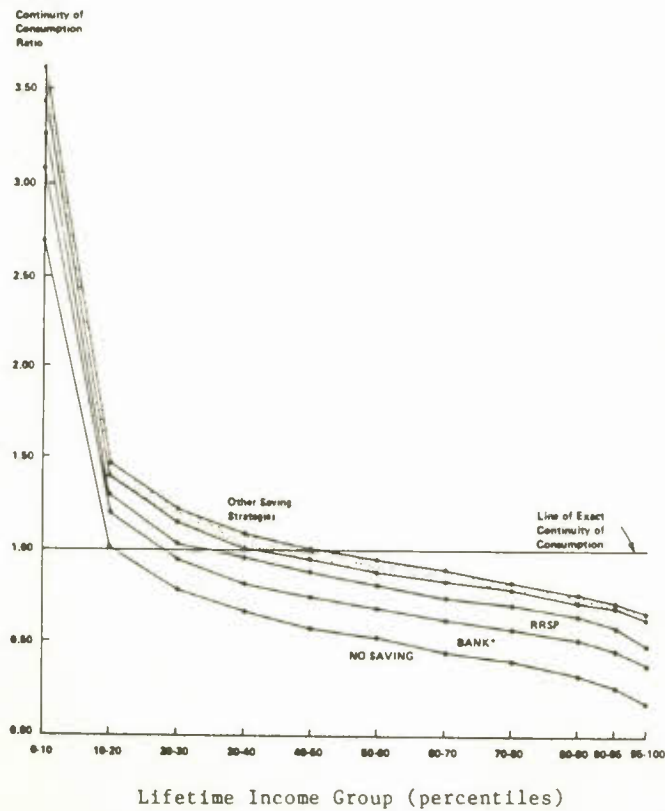
Graph 3

Relative Family Size Adjusted Continuity of Consumption for Alternative Saving Strategies



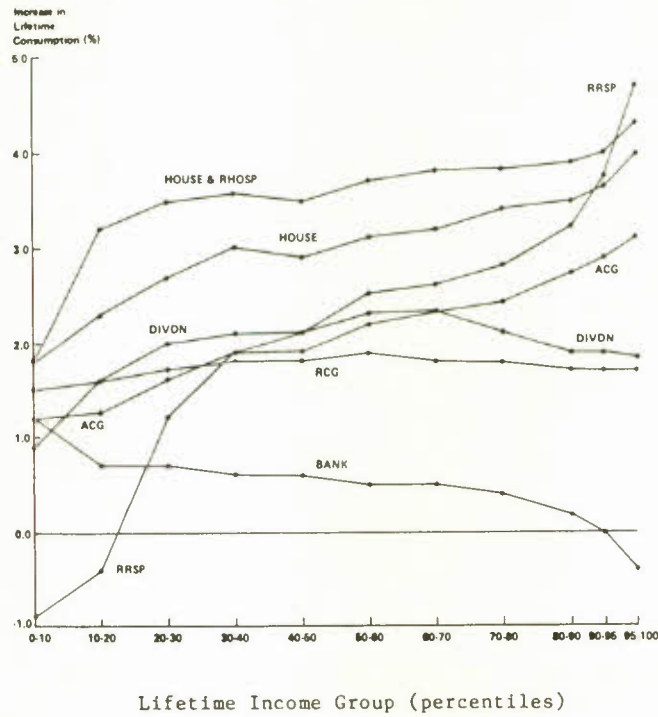
Graph 4

Absolute Family Size Adjusted Continuity of Consumption for Alternative Saving Strategies



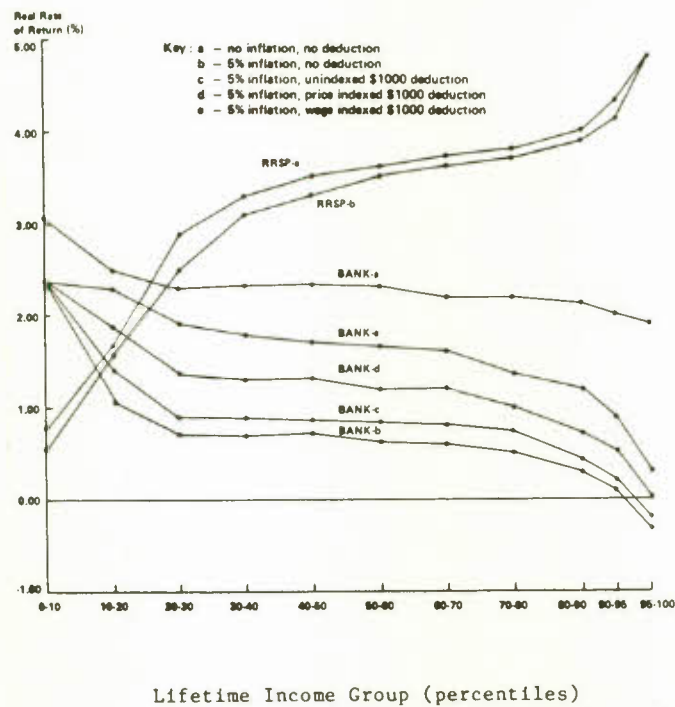
Graph 5

Increase in Lifetime Consumption for Alternative Saving Strategies



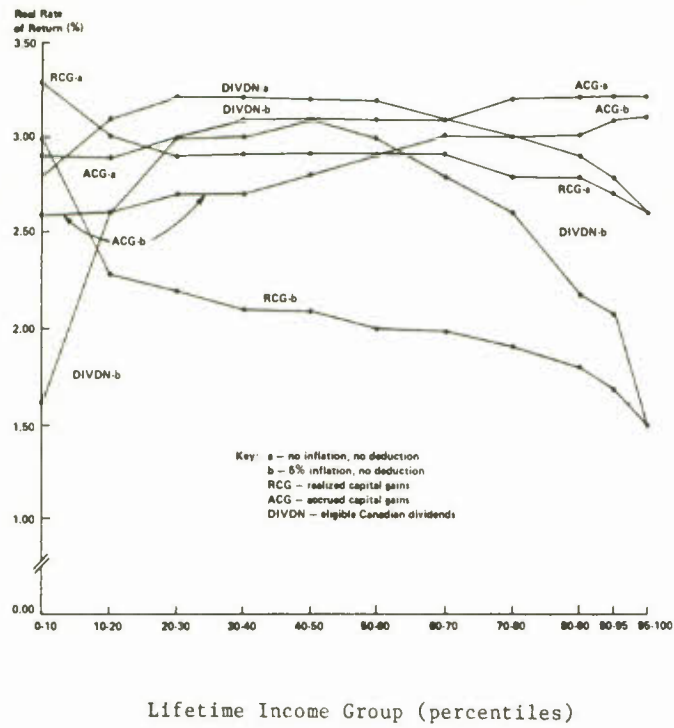
Graph 6

Effect of Inflation and \$1000 Interest Deduction on Real After Tax and Transfer Rates of Return for Bank and RRSP Saving



Graph 7

Effect of Inflation on Real After Tax and Transfer Rates of Return for Three Alternative Saving Strategies



Footnotes

- 1 National Health and Welfare, Canada Pension Plan Contribution 1974, Table 13. Female earnings data were not used because expected changes in female labour force participation patterns make projections of female lifetime earnings profiles hazardous. The model therefore assumes that family lifetime earnings are exactly equal to male lifetime earnings as derived.
- 2 It should be noted that the use of a constant discount factor implies no account is being taken of declining marginal utility of consumption and that inter-temporal additive separability is being assumed, neither of which are reasonable assumptions.
- 3 The longer version of this paper is Appendix 5 to the federal government's Pension Task Force Report. Copies of the appendix are available from the author.

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SOCIOECONOMIC CHARACTERISTICS AND
THE DISTRIBUTION OF EMPLOYMENT INCOME
AMONG CANADIAN FAMILIES,
1967-1975

by

D. W. Henderson and J. C. R. Rowley*

The evolving patterns of Canadian family incomes in recent years have been discussed in three of our earlier papers (Henderson and Rowley, 1977: 1978a, b) and in particular references cited by us. Despite these discussions, there seem ample bases for the provision of a further account especially if this involves an adjustment of focus to employment income of the family units rather than their total income.[1] An obvious justification is that any important story can always stand the retelling. There are also interesting disparities between measures based on total income and those based on its primary component. Analyses of these disparities stress the countervailing influence of transfers and the growth of inequality in the distribution of employment income among family units. Our account has three sections. A description of socioeconomic and demographic shifts that have affected families with at least one earner since 1967 is followed by a presentation of Gini coefficients partially standardized for certain of these shifts. This presentation is accompanied by information concerning participation rates and unemployment rates. The final section considers average incomes for sub-groups of Canadian families.

Structural Changes in Family Composition

Four significant dimensions of family units are readily explored if we assume that the samples assembled for the Surveys of Consumer Finances are suitable representations of the underlying populations at two-year intervals in the period from 1967 to 1975. These are the size of family units, the age and education of family heads, and the number of earners (both male and female) in these families. The changes in these dimensions can be tabulated for the 5 years. Table 1 records the distribution of families with employment income by their size. Although the entries indicate that the proportion of unattached individuals and two-person families grew substantially to form over 44 per cent of all units with earners, this growth is still less pronounced than that revealed earlier by us (HR 1978b) for the full population including families without earners. The growth in smaller families was concentrated in more recent years so it seems likely that this trend persisted beyond 1975.

The distribution of families with employment income according to the age of their heads is shown for six age classes in Table 2. The chief development since 1967 with respect to this classification is the relatively rapid growth of families with heads aged from 25 to 34 years. In proportional terms, families with young heads (aged less than 35) rose from less than a third of the population of families with at least one earner in 1967 to form more than 40 per cent in 1975. Three primary factors underlying this trend should be noted. First, the number of all female-headed families with younger heads rose relative to the all number of male-headed families. Then, within this shift, there occurred a rapid growth of unattached females relative to the total number of families. Finally, changes in past patterns

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of labour force participation rates must also have been influential throughout the decade.

Two other features of these data should be acknowledged. The column of entries for 1975 is far more "peaked" at the 25-34 age class than would appear in the corresponding data for the population of all families including those without earners. Entries in Table 2 for older age categories also clearly demonstrate the well-recognized "greening" of family heads that developed during the decade.

The implications of these developments for the evolution of aggregate measures of employment income inequality are easy to discern but they tend to be mutually offsetting so the overall impact is unclear. Inequality of employment income among families with heads aged between 25 and 34 and with at least one earner was much smaller throughout the decade following 1967 than the overall inequality of employment income among all families with at least one earner (Chart 1). On the other hand, the inequality of employment income among families with very young heads, aged less than 25, has generally been close to that recorded for all family units (this is true also for total income and all family units HR 1978a). Within this framework of widely separated and distinct layers of employment income inequality for age classes, the two younger categories share one common feature. Specifically, within the two groups, employment income inequality as measured by the Gini coefficient rose from 1967 to 1971 at higher rates than were experienced by other age classes. A further difficulty for the assembly of an aggregate measure of overall inequality for all family units with employment income is the problem of weights for age-specific measures. The weights are confounded by significant adjustments that are associated with other characteristics of families; most notably family size and sex of head.

The entries in Table 3 illustrate the growth of educational attainment of family heads for those families with earnings. By 1975, over a third of these heads had received at least some university or post-secondary training. This proportion may be compared to the figure of only about 14 per cent in 1967. To the extent that additional years of schooling were associated with higher levels of earnings, this adjustment should have markedly affected the structure of earnings and the attendant levels of overall inequality of employment income with uneven access to education. The particular impact of increased educational attainment on aggregate measures of inequality is again unclear. As we have demonstrated for total incomes and all family units (HR 1977), Gini coefficients for employment income for sub-groups of families with at least one earner, separated by the educational levels of their heads, are only partially ordered. Layers of inequality exist in the sense, for example, that throughout the period since 1967, Gini coefficients for groups having heads with elementary education were consistently higher than the coefficients for all other groups (Chart 2). For the next two lowest levels of attainment, layers of inequality were generally ordered so more education of heads was associated with less within-group employment income inequality. This ordering does not extend to groups with some university or post-secondary education. Families with heads who have completed a degree and with at least one earner represent a group with more inequality of employment income and with volatile levels of inequality. They were especially affected by the depressed labour market conditions of 1971 and by the partially improved economic environment since then.

Turning to the fourth table, we approach more directly some sources of discrepancies between the results of analyses of total income and those based solely on employment income. Entries in the table record the distribution of earners, altogether and by

sex, among families with at least one earner. The traditional picture of the nuclear family has a primary male earner with a spouse having a markedly low attachment to the labour force. A pronounced shift away from this picture is apparent from the table. If we temporarily set the sex distinction aside, the primary adjustment affecting the number of earners in families is a relatively simple one whereby single-earner families were replaced by two-earner families. By 1975, over a third of the family units having at least one earner had two earners and almost half of these families had multiple earners. Given the general decline in family size experienced during this period, it is clear that the role of employment income in determining total family income has increased in significance. This shift is especially notable as quasi-Lorenz curves (HR 1978a) suggest that employment income is more unevenly distributed over all family units than total income with government transfers acting as a countervailing influence.[2]

The proportion of families with employment income and without male earners increased from about 13 per cent in 1967 to 15 per cent in 1975, while the proportion of families with employment income and without female earners declined from more than 55 per cent to less than 44 per cent. From tabulations not shown here, we know that unattached female earners, as might have been expected, formed between 2/3 and 3/4 of family units without male earners (depending on the year). In contrast, the distribution of family units without female earners was quite widely spread across different levels of family size.

These shifts in the composition of Canadian families have been presented to establish the basic problem affecting the interpretation of intertemporal changes in the distribution of family incomes, and of family employment incomes, particularly. We need to adjust the data to eliminate, wherever possible, the confounding effects of the underlying socioeconomic and demographic characteristics of families. Such elimination may perhaps be feasible within controlled experimentation but it is infeasible in most practical situations. One partial alternative is to seek decomposable measures of inequality as we attempted earlier (HR 1978a). Another alternative is explored in the next section while our use of like-with-like comparisons in the final section illustrates yet another approach to the derivation of meaningful intertemporal analysis.

Standardization for Structural Change

The Gini coefficient is the most widely accepted aggregate measure of income inequality despite many attempts to derive more tractable indices. This acceptability probably stems both from its familiarity and from a convenient geometric interpretation that is based on the Lorenz curve. We shall use the Gini coefficient to demonstrate the consequences of partially standardizing data for changes in the compositional characteristics of family units that were noted above. The method of standardization is described in an earlier paper (HR 1978b). In essence, it seeks to adjust the distribution of family units so particular characteristics of these units in all years resemble those occurring in single reference year 1973. The adjustment is partial since it cannot eliminate many of the dynamic linkages that lead to feedback whereby influential changes in incomes themselves affect levels of family characteristics. Such incompleteness seems inevitable in view of our ignorance of these dynamic processes. Berridge's comment that "largely as a result of fluctuations in the economic prosperity of wage-earners, there are pronounced cycles of suicide, crime, prostitution, pauperism, marriages, migration, and social phenomena" (1923, pp. 43-44) is clearly an exaggeration but these processes are significant and we must acknowledge their presence even if we cannot adequately model them.

Some of our standardized Gini coefficients are presented in Charts 3, 4 and 5. A more complete listing is provided in Appendix A. Chart 3 illustrates the evolution of coefficients from 1967 to 1975 for unstandardized data and also for data separately adjusted for changes in family size, age of family head, and for changes in both size and age of head. Chart 4 deals with the adjustments associated with changes in the number of male earners, the number of female earners, and with changes in the numbers of both male and female earners. Chart 5 shows the effect of standardizing simultaneously for age and education of head, family unit size, and number of male and female earners. All of these Gini coefficients are based on the distribution of employment income and they ignore families without earners. They may be compared with other coefficients, based on the distribution of total income and all family units, that were released earlier (HR 1978b). In the earlier report, we found that partial standardizations for changes in the characteristics of families (age and education of head, family unit size, and number of male and female earners) reduced the apparent shift toward greater levels of inequality during the period extending until 1971. The overall results are reproduced in Chart 6. The impression of the evolving Gini coefficients is a partial clockwise rotation about the fulcrum of the reference year 1973, the converse of what is observed for employment income and families with earners (Chart 5). To what can we attribute these apparently divergent results? Chart 7 considers total income for family units with at least one earner working part of the year. The counter clockwise rotation is less pronounced than when employment income alone is considered for these families. However, a major factor leading to the observed clockwise rotation for the standardizations involving all family units and total income (Chart 6) is apparent when we consider the total income of those family units with no earners. As can be seen in Chart 8, the standardizations produce a clockwise rotation for the years previous to 1971. Major structural demographic changes among family units with no earners have clearly had an impact on the evolution of the distribution of total income among all family units.

In considering total income and all family units, standardizations for two particular sets of factors were associated with more pronounced rotations; namely, family size and number of earners in families. It is clear from Charts 3 and 4 that somewhat different results appear when the narrower definition is adopted for income and families without earners are omitted from the sample. Such differences must stem directly from the impact of transfers and from the heightened significance of recent developments in Canadian labour markets.

Values for the unstandardized Gini coefficients of employment income rose from .3543 in 1967 to .3639 in 1971, declined to .3606 in 1973, before rising again to .3635 in 1975. The pronounced growth of income inequality since 1973 is not immediately apparent from data for total income. It can, however, be discerned from our decomposition of these data into the constituent elements associated with different types of income (HR 1978a, Table 1). This decomposition indicates a marked growth in the contribution of employment income to an increase in the aggregate index for total income and, also, a decline in the countervailing influence of government transfers. Shifts in the employment component accurately portray the pattern now revealed for the revised sample. This pattern is also recaptured by unemployment rates. Tables 5 and 6 record annual unemployment rates for various groups during the period under review. Rates for men and women within various age categories and for teenagers are shown in Table 5, while the entries in Table 6 concern rates for groups based on exclusions of particular sub-groups (part-time job seekers, teenagers, the elderly, and those individuals experiencing only unemployment of short-term duration), for household heads and for married men of prime age. With two exceptions,

these unemployment rates follow similar patterns, in a qualitative or directional sense, to that revealed for the unadjusted Gini coefficients of employment income. The two exceptions arose for women of all ages and those aged between 20 and 24 due to the nondecline (continued rise in one case) of their unemployment rates in 1973. The probable cause of these discrepancies to the overall pattern is the rapid increase of female participation in labour markets. Entries in Table 7 illustrate the rapidity of this increase especially since 1971.

Returning to Chart 3, we see that in contrast to earlier results for total income, standardization of family employment income for changes in family size has far less impact than standardization for changes in the age of family heads. A more striking difference is the counter-clockwise rotation of two of the new curves for standardized coefficients. This suggests a much more severe shift toward inequality of employment income than is apparent in the unadjusted coefficients. A similar picture emerges from the more complex patterns presented in Chart 4. There standardization for changes in the number of male earners yields a much flatter curve but this flattening is an insufficient counterbalance to the counter-clockwise rotation of the standardization for changes in the number of female earners. The composite standardization for changes in the numbers of both male and female earners reveals a severe shift toward inequality of employment income.[3] Two technical questions arise here. First, why do the rotations associated with changes in the number of earners occur in different directions for male and female earners? Second, why are the standardizations for changes in the number of female earners especially influential in the levels of Gini coefficients?

There are two obvious starting points in the search for suitable explanations. One takes the participation rates from Table 7 and considers their consequences in the light of the restriction of the population to family units having at least one earner. Since female participation rates have changed far more than those rates for men, the rise of unattached female earners may have been a major influence on changes in the basic population. The second starting point explores the information contained in Tables 5 and 6. In particular, it recognizes the two discrepancies between changes in the level of women's unemployment rates and the intertemporal evolution of Gini coefficients noted earlier for 1973, the reference year underlying all of our standardizations. Any choice of reference year involves certain well-recognized hazards. Our situation is hardly an exception. The experiences of unemployment by female earners (as reflected in unemployment rates) for 1973 relative to other years are different from those of male earners. Standardizations using this particular reference year may thus be unduly affected by this choice.

The number of earners, whether male or female, is only one dimension of labour force experiences of family members. It cannot provide an adequate representation for the effects of either the incidence or the duration of unemployment among earners unless supplemented by additional information. Tables 8 and 9 provide some additional information for male and female earners in three age categories. Their entries describe the distribution of unemployment by its duration in each of the five years considered in other tables. Unfortunately, there seem to be few further sources of information cross-classifying unemployment duration with the socioeconomic and demographic characteristics of families. These two tables indicate a pronounced shift toward unemployment of longer duration in 1971 and 1975 for both men and women. The development is shown by values that decline with movement across early rows in the tables and values that increase with movement across later ones. For example, among very young males, 43 per cent of those unemployed in 1967 were unemployed for under one month. This

value compares with 27.9 per cent in 1971 and 29.9 per cent four years later. The comparative figures for very young females were 45.0, 28.9 and 30.0 per cent. Such drift is perhaps a major contributing factor for the rise in inequality of employment income. Similar intertemporal shifts, differing for age categories, also partially explain the relative large impact of the standardization for changes in the ages of family heads.

Two other features of the tables should be noted. First, after 1967, the aggregate unemployment rate has been about 40 per cent higher than the rate for household heads. As the average number of earners per family has remained more stable than the average family size, the implied unemployment rate for secondary earners has grown quite apart from changes associated with the intertemporal variability of the aggregate rate. Our standardizations use only headcount adjustments that treat all earners symmetrically. Different directions of rotations for the standardizations may be due to disparities in the relative fallibility of simple headcount measures of family labour market experiences. Second, if a trend is fitted through the values of unemployment rates for men, the actual value of this rate for 1973 is markedly below the alternative value suggested by the trend. A similar conclusion is not apparent for the women's overall unemployment rate. This difference is one aspect of the lower variability of the rates for women relative to those for men from 1971 to 1975. It may be a factor in the heightened peak for the 1971 Gini coefficient for employment incomes standardized for changes in the number of male earners. It may also be a factor in the overall flattening outside this year for the standardization.

Like-With-Like Comparisons

Any single aggregate measure of inequality such as the Gini coefficient is necessarily disturbed by substantial changes in the characteristics of the population that it seeks to summarize. A single measure is, however, convenient for many purposes especially political ones. We should ask whether this convenience is overstressed in research. Perhaps in this context the losses associated with aggregation and its attendant simplicity are too much and should be replaced or supplemented with techniques having greater complexity but resulting in lower levels of distortion. One approach that we have considered involves crosstabulations of average employment incomes in various years for sub-groups of the population delineated by levels of socioeconomic and demographic characteristics. Tables 10-12 represent the output of this approach. Entries in these tables record levels and changes of the average employment incomes for families of various size and with heads aged in six categories.[4] Tables 10 and 11 deal with average employment incomes for the terminal years 1967 and 1975, while the final table contains the percentage per annum increase of average employment incomes for the sub-groups between these years.

If we use families of size 3 with heads aged between 35 and 44 as an example, we see that such families received average employment incomes of \$7,516 in 1967. The corresponding figure for 1975 is \$15,513 which represents a rate of growth in employment income of about 9.5 per cent per annum. Overall, the fastest rates of growth of employment income tended to occur among those family units with heads aged 35-54 years, and among larger family units (Table 12). The latter is what one would expect as a result of the growth in the proportion of multiple earner families.

Such like-with-like comparisons avoid some of the difficulties that afflict single aggregate measures when changes in family size and the age-structure of heads occur in a population. The cost involved in this approach is represented by the need to

consider simultaneously 36 statistics, one for each cell in a table, for each year rather than one. Clearly this cell problem is a severe restriction on the number of categories for each classification and on the number of classifications that can be considered jointly. There are, however, some advantages for the approach to compensate for this problem. Most notably, it permits the identification of sub-groups in special need and demonstrates the relative participation of groups in sharing the monetary benefits that stem from intertemporal changes in the levels of employment income. The political concomitant is the design of specific policies to deal with the special needs revealed by suitable cross-tabulations. A lengthier illustration of likewith-like comparisons is provided elsewhere for the Conference's attention (HR 1979).

Concluding Comments

We work in an environment with limitations on the availability of adequate data. Most of us must settle for the use of secondary results or the use of output from surveys with relatively-fixed format never entirely appropriate for the demands of research in specific areas. It seems probable that our esoteric demands are unlikely, within the foreseeable future, to be rewarded with the provision of additional sources of information.[5] In Canada, our richest source of data describing the distribution of incomes is the sequence of Surveys of Consumer Finances. This source needs to be systematically "mined" as we have attempted with our decompositions and standardizations. It must also be reconciled with extraneous information as we have sought to illustrate here using unemployment rates.

Table 1

Distribution of Family Units with One or More Earners Working at Least Part of the Year, Canada, 1967-1975

Size	1967	1969	1971	1973	1975
	(per cent)				
1	19.6	19.7	19.7	20.2	21.5
2	18.9	20.3	20.8	21.9	23.0
3	15.9	16.5	17.3	16.9	16.7
4	17.5	17.5	18.0	18.8	19.8
5	12.4	12.3	11.8	11.5	10.9
6 or more	15.7	13.8	12.5	10.7	8.1

Source: Surveys of Consumer Finances, Statistics Canada.

Table 2

Distribution of Family Units with One or More Earners Working at Least Part of the Year, by Age of Head, Canada, 1967-1975

Age of Head	1967	1969	1971	1973	1975
	(per cent)				
less than 25	10.3	10.4	11.6	11.7	12.2
25-34	21.8	23.5	24.1	25.5	28.1
35-44	23.7	23.2	22.3	21.6	21.2
45-54	20.7	20.1	20.4	19.8	18.5
55-64	15.5	15.2	15.0	14.7	13.8
65 or more	7.9	7.6	6.5	6.7	6.2

Source: Surveys of Consumer Finances, Statistics Canada.

Table 3

Distribution of Family Units with One or More Earners Working at Least Part of the Year, by Education of Head, Canada, 1967-1975

Education of Head	1967	1969	1971	1973	1975
	(per cent)				
Elementary	37.6	33.1	30.0	27.8	25.3
Some secondary	29.0	28.5	28.3	28.9	25.2
Complete secondary	19.4	20.6	17.6	17.4	15.7
Some university or post-secondary	6.2	7.9	15.3	17.1	21.7
University degree	7.7	9.9	8.8	8.9	12.1

Source: Surveys of Consumer Finances, Statistics Canada.

Table 4

Distribution of Family Units with One or More Earners Working at Least Part of the Year, by Number of Earners, Canada, 1967-1975

Numbers of Earners	1967	1969	1971	1973	1975
(per cent)					
<u>Male Earners</u>					
0	12.6	13.0	12.7	14.2	15.0
1	74.7	74.1	74.7	71.7	72.7
2	10.3	9.9	10.1	10.9	9.5
3 or more	2.4	3.0	2.6	3.2	2.8
<u>Female Earners</u>					
0	55.2	51.4	50.5	46.9	43.9
1	39.9	43.0	44.1	47.0	50.2
2	4.2	4.9	4.7	5.1	5.1
3 or more	0.7	0.7	0.8	1.1	0.8
<u>All Earners</u>					
1	60.4	57.3	56.6	54.1	53.1
2	29.4	31.7	32.4	33.3	35.3
3	7.3	7.5	7.5	8.5	7.8
4 or more	2.9	3.6	3.5	4.1	3.9

Source: Surveys of Consumer Finances, Statistics Canada.

Table 5

Annual Unemployment Rates, by Sex and Age Groups, Canada, 1967-1975

Rates	1967	1969	1971	1973	1975
(per cent)					
Men - all ages	4.6	5.2	7.0	5.9	7.4
aged 14-19	10.9	12.3	16.3	12.9	16.1
aged 20-24	6.1	7.5	11.3	10.0	12.7
aged 25-54	3.5	3.8	5.2	4.1	5.3
Women - all ages	3.0	3.6	5.1	5.1	6.4
aged 14-19	7.3	8.9	12.4	10.8	13.5
aged 20-24	3.2	3.7	6.1	6.5	8.6
Teenagers	9.3	10.8	14.6	12.0	15.0

Source: Labour Force Survey (Old), Statistics Canada.

Table 6

Annual Unemployment Rates, Special Groups, Canada, 1967-1975

	1967	1969	1971	1973	1975
	(per cent)				
Aggregate - all	4.1	4.7	6.4	5.6	7.1
- excluding part-time job seekers	3.6	4.1	5.7	5.0	6.4
- excluding teenagers and those aged at least 65	3.5	4.0	5.5	4.8	6.5
- excluding short duration unemployment	2.5	3.1	4.8	4.0	5.1
Household heads	3.2	3.4	4.6	4.0	5.1
Married men, age 25-54 yrs.	3.0	3.2	4.3	3.3	3.7

Source: Labour Force Survey (Old), Statistics Canada, Special Tabulation for Economic Council of Canada.

Table 7

Participation rates, by Sex, Canada, 1967-1975

	1967	1969	1971	1973	1975
	(per cent)				
Male	77.5	76.6	76.1	76.8	77.2
Female	33.8	35.2	36.5	38.7	40.9
All	55.5	55.8	56.1	57.5	58.8

Source: Labour Force Survey (Old), Statistics Canada.

Table 8

Distribution of Female Unemployment within Age Groups,
by Duration of Unemployment, Canada, 1967-1975

Duration	Age	1967	1969	1971	1973	1975
	(years)					
Under 1 month	15-24	45.0	41.2	28.9	33.3	30.0
	25-44	44.4	36.0	23.1	28.6	30.4
	45 and more	33.3	35.3	30.4	25.0	28.1
1-3 months	15-24	37.5	39.2	37.4	39.1	39.2
	25-44	33.3	32.0	33.3	32.7	34.8
	45 and more	33.3	29.4	30.4	29.2	28.1
4-6 months	15-24	12.5	11.8	15.7	17.2	19.2
	25-44	*	16.0	20.5	22.5	21.7
	45 and more	*	*	17.4	20.8	18.8
Over 6 months	15-24	*	9.8	16.9	10.3	11.7
	25-44	*	20.0	18.0	16.3	14.5
	45 and more	*	*	21.7	20.8	21.9

*Insufficient observation

Source: Labour Force Survey (Old), Statistics Canada, Special Tabulation
for Economic Council of Canada.

Table 9

Distribution of Male Unemployment within Age Groups,
by Duration of Unemployment, Canada, 1967-1975

Duration	Age	1967	1969	1971	1973	1975
	(years)					
Under 1 month	15-24	43.0	36.4	27.9	32.3	29.9
	25-44	40.0	34.7	26.3	36.8	29.1
	45 and more	31.4	26.3	21.8	22.2	25.3
1-3 months	15-24	38.4	37.4	36.4	38.1	38.8
	25-44	36.5	35.8	33.8	34.2	36.1
	45 and more	32.9	28.8	27.7	29.6	31.3
4-6 months	15-24	12.8	15.9	18.8	18.7	20.1
	25-44	15.3	15.8	19.6	19.7	20.9
	45 and more	18.6	18.8	21.8	22.2	22.2
Over 6 months	15-24	7.0	11.2	17.0	11.0	11.2
	25-44	9.4	13.7	21.1	17.1	14.6
	45 and more	17.1	25.0	28.7	24.7	21.2

Source: Labour Force Survey (Old), Statistics Canada, Special Tabulation
for Economic Council of Canada.

Table 10

Average Total Employment Income of Family Units Having One or More Earners Working at Least Part of the Year by Size of Family Unit and Age of Head of Family Unit, Canada, 1967
(Dollars)

Age of Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
Less than 25	2,843	6,920	5,630	5,360	*	*	4,328 (64.9)
25-34	4,927	8,564	7,109	6,949	7,118	6,502	6,823 (102.3)
35-44	5,019	7,484	7,516	8,077	8,155	7,270	7,427 (111.3)
45-54	4,470	7,109	7,750	8,881	8,988	8,679	7,772 (116.5)
55-64	3,733	6,161	7,766	8,684	8,679	9,028	6,615 (99.2)
65 or more	2,276	3,758	5,315	6,837	8,091	7,419	4,289 (64.3)
Average for Column	3,848 (57.7)**	6,411 (96.1)	7,136 (107.0)	7,845 (117.6)	8,078 (121.1)	7,619 (114.2)	6,672 (100.0)

*Insufficient observations.

**Average employment income of family units with one or more earners working at least part of the year by size of family unit and by age of head, as a percentage of the average employment income of all such units.

Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Table 11

Average Total Employment Income of Family Units Having One or More Earners Working at Least Part of the Year by Size of Family Unit and Age of Head of Family Unit, Canada, 1975
(Dollars)

Age of Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
Less than 25	5,581	12,591	10,268	10,642	*	*	8,333 (58.8)
25-34	9,858	16,824	14,239	15,250	14,714	16,635	14,114 (99.5)
35-44	11,323	15,212	15,513	17,392	19,061	17,610	16,731 (118.0)
45-54	8,986	15,970	17,673	19,777	20,339	20,504	17,525 (123.6)
55-64	7,046	12,855	16,695	18,737	19,524	20,979	13,865 (97.8)
65 or more	4,032	7,608	10,576	12,357	*	11,533	8,014 (56.5)
Average for Column	7,900 (55.7)**	13,709 (96.7)	14,983 (105.6)	16,937 (119.4)	18,271 (128.8)	18,324 (129.2)	14,183 (100.0)

*Insufficient observations.

**Average employment income of family units with one or more earners working at least part of the year by size of family unit and by age of head, as a percentage of the average employment income of all such units.

Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Table 12
 Percentage Per Annum Increase Over the Period 1967 to 1975 in the Average Total Employment
 Income of Family Units Having One or More Earners Working at Least Part of the Year,
 by Size of Family Unit and Age of Family Unit, Canada

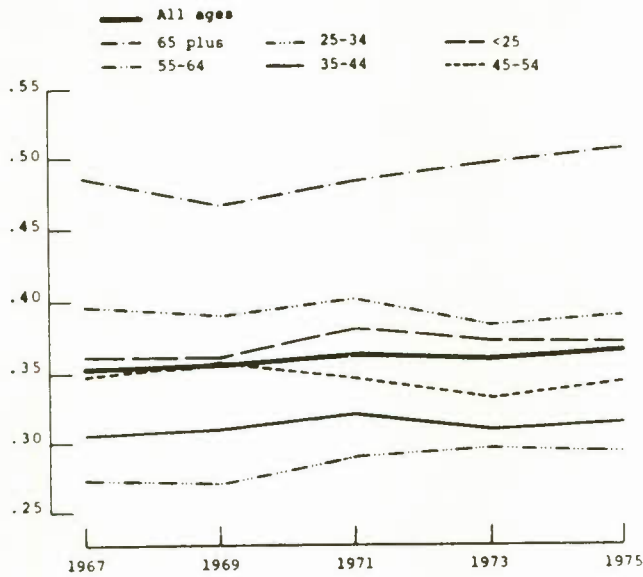
Age of Head	Size of Family Unit						Average Percentage	
	1	2	3	4	5	6 or more	Per Annum Increase by Age of Head	Per Annum Increase by Age of Head
Less than 25	8.8	7.8	7.8	9.0	*	*	8.5	
25-34	9.1	8.8	9.1	10.3	9.5	12.5	9.5	
35-44	10.7	9.3	9.5	10.1	11.2	11.7	10.7	
45-54	9.1	10.7	10.9	10.5	10.8	11.4	10.7	
55-64	8.3	9.6	10.0	10.1	10.7	11.1	9.7	
65 or more	7.4	9.2	9.0	7.7	*	5.7	8.1	
Average Percentage Per Annum Increase by Size of Family Unit	9.4	10.0	9.7	10.1	10.7	11.6	9.9	

*Insufficient observations.

Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 1

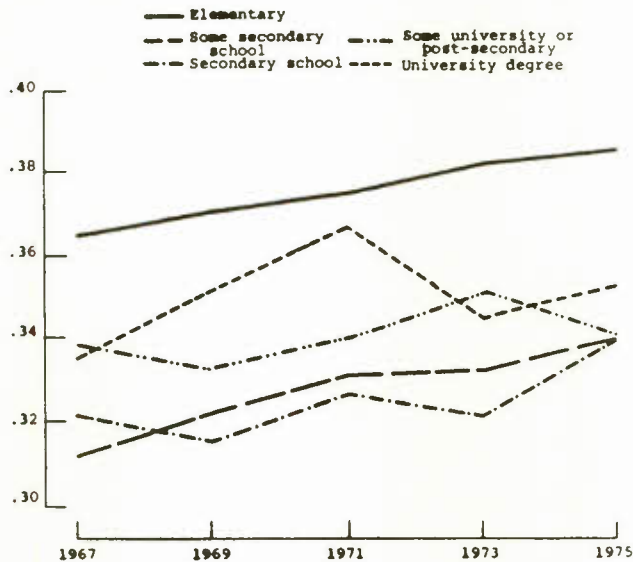
Gini Coefficients for Family Units with One or More Earners Working at Least Part of the Year Ranked by Employment Income, by Age of Head, Canada, 1967-1975



Source: Surveys of Consumer Finances and estimates by the authors.

Chart 2

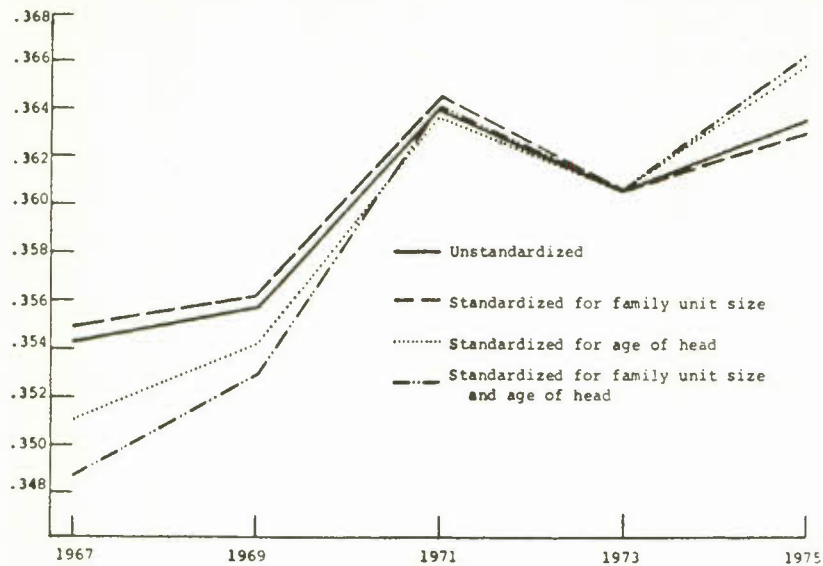
Gini Coefficients for Family Units with One or More Earners Working at Least Part of the Year Ranked by Employment Income, by Education of Head, Canada, 1967-1975



Source: Surveys of Consumer Finances and estimates by the authors.

Chart 3

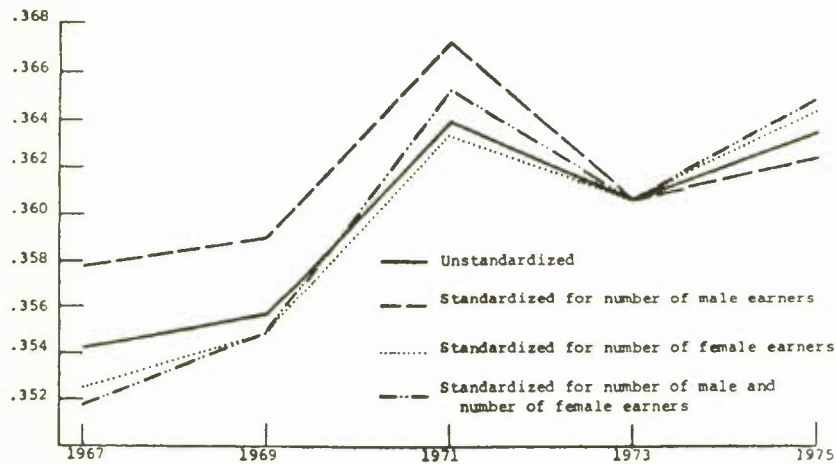
Gini Coefficients for Employment Income and Family Units with at Least One Earner Working Part of the Year -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 4

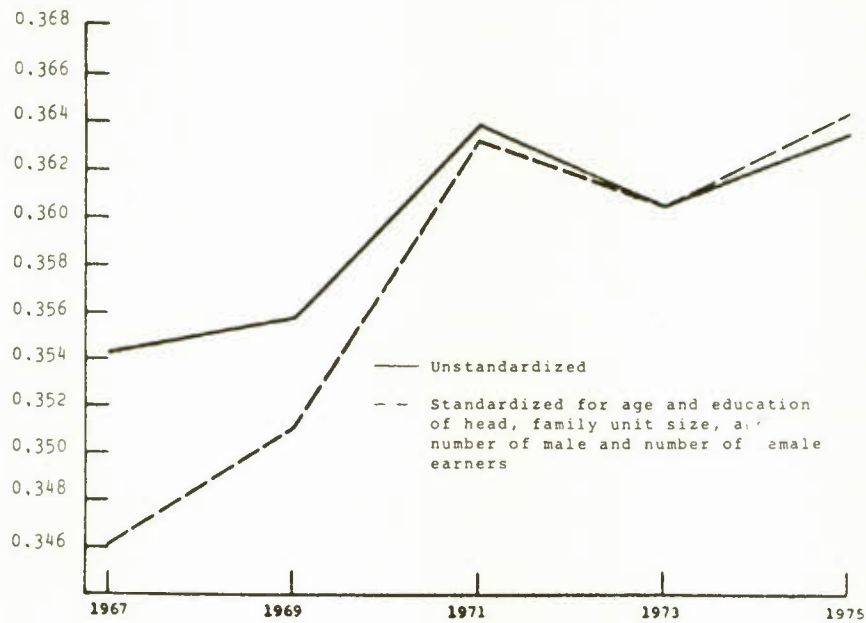
Gini Coefficients for Employment Income and Family Units with at Least One Earner Working Part of the Year -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 5

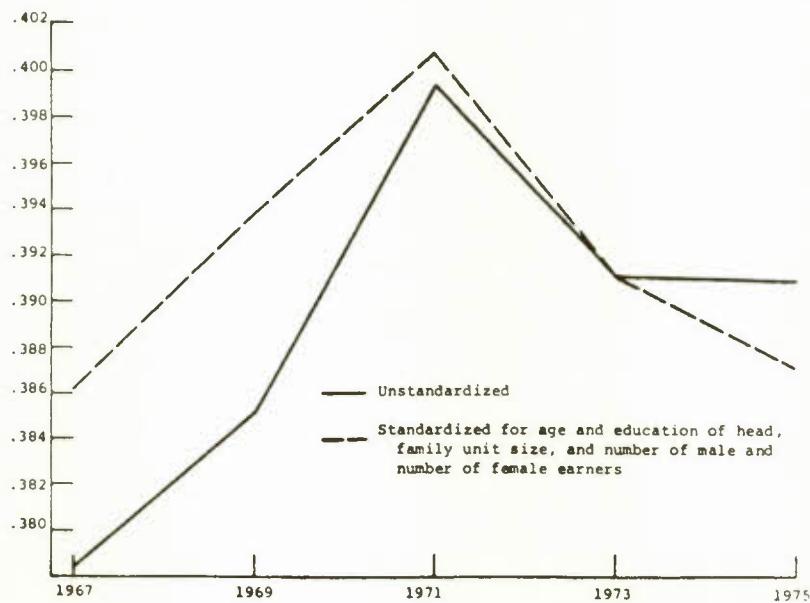
Gini Coefficients for Employment Income and Family Units with at Least One Earner Working Part of the Year -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 6

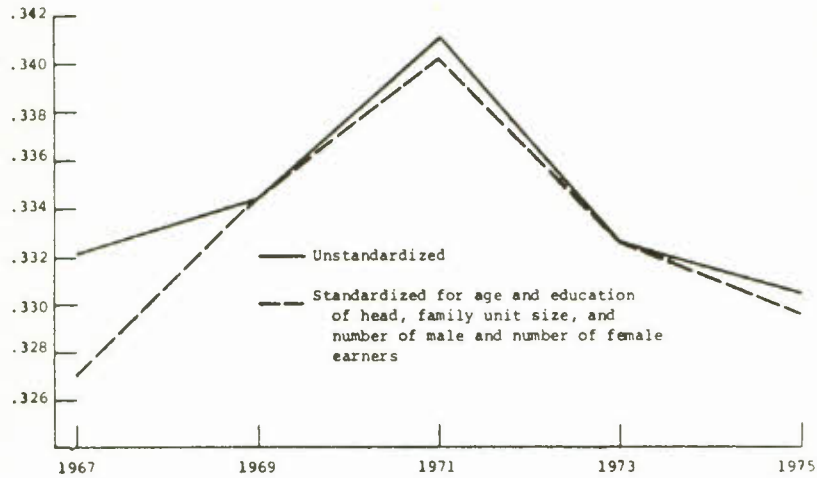
Gini Coefficients for Total Income and all Family Units -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 7

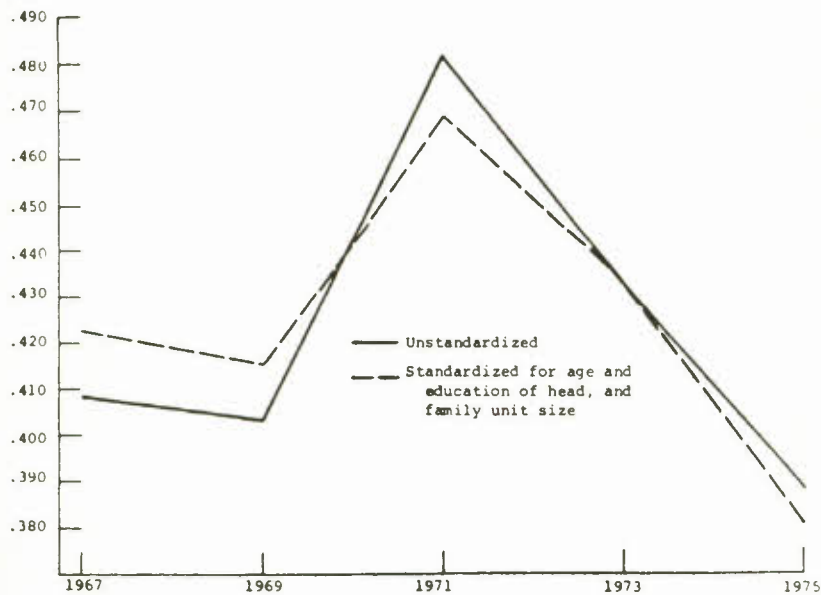
Gini Coefficients for Total Income and all Family Units with at Least One Earner Working Part of the Year -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Chart 8

Gini Coefficients for Total Income and Family Units with No Earners -- Unstandardized and Standardized to 1973 for Certain Structural Changes in the Canadian Population, 1967-1975



Source: Surveys of Consumer Finances, Statistics Canada, and estimates by the authors.

Footnotes

- 1 A family unit refers here to both economic families and unattached individuals; that is, in the case of families, persons sharing a common dwelling unit and related by blood, marriage or adoption. We use the term "family" in this sense throughout this paper. Our income concept is pre-tax money income going to the family unit. In contrast to our earlier papers, we restrict attention to the population of family units with one or more earners working part of given years.
- 2 The greater inequality of employment income arises when all families are ordered by their total incomes than when those with earners are ordered by employment income.
- 3 Rotations in standardizations for changes in family characteristics are not additive. For example, a Gini coefficient based on data standardized for changes in two attributes cannot be readily expressed as a weighted average of separate Gini coefficients based on one-attribute standardizations.
- 4 These data are provided only as the basis for illustration. Many more cross-tabulations or different classifications were completed. We hope to find a suitable method for making these other data available.
- 5 Perhaps the Manitoba experiments will cause us to revise this pessimistic view.

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APPENDIX A

Gini Coefficients for Employment Income and Family Units Having at Least one Earner -- Standardized to 1973 for Certain Structural Changes in the Canadian Population Between 1967 and 1975 -- and the Corresponding Proportions of Employment Income Going to Each Decile of These Family Units. [1]

Year	Gini Coefficient	Percentage of Employment Income by Decile									
		Lowest	2nd	3rd	4th	5th	6th	7th	8th	9th	Highest
<u>1. Unstandardized</u>											
1967	.3543	1.07	3.70	5.54	7.03	8.35	9.67	11.18	13.07	15.80	24.59
1969	.3557	1.30	3.61	5.37	6.87	8.28	9.68	11.21	13.10	15.81	24.76
1971	.3639	1.10	3.40	5.28	6.85	8.33	9.73	11.28	13.09	15.71	25.21
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3635	1.03	3.40	5.25	6.82	8.28	9.77	11.38	13.29	15.99	24.79
<u>2. Standardized for Family Unit Size</u>											
1967	.3549	1.06	3.66	5.52	7.01	8.37	9.69	11.22	13.12	15.84	24.53
1969	.3562	1.30	3.58	5.35	6.87	8.28	9.71	11.23	13.14	15.83	24.70
1971	.3645	1.08	3.38	5.27	6.84	8.33	9.74	11.30	13.12	15.73	25.21
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3629	1.04	3.43	5.27	6.83	8.28	9.76	11.36	13.26	15.95	24.82
<u>3. Standardized for Age of Head</u>											
1967	.3510	1.11	3.77	5.59	7.06	8.38	9.68	11.18	13.07	15.75	24.40
1969	.3544	1.33	3.64	5.39	6.90	8.29	9.70	11.21	13.09	15.77	24.68
1971	.3636	1.09	3.41	5.29	6.85	8.33	9.74	11.29	13.10	15.71	25.20
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3657	1.01	3.37	5.21	6.79	8.26	9.75	11.37	13.30	16.03	24.91
<u>4. Standardized for Family Unit Size and Age of Head</u>											
1967	.3487	1.14	3.79	5.61	7.08	8.40	9.71	11.22	13.11	15.75	24.19
1969	.3529	1.34	3.66	5.42	6.91	8.31	9.71	11.23	13.11	15.77	24.55
1971	.3640	1.08	3.39	5.29	6.85	8.34	9.75	11.30	13.12	15.72	25.16
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3661	1.01	3.37	5.21	6.79	8.24	9.73	11.35	13.28	16.02	25.00
<u>5. Standardized for Number of Earners</u>											
1967	.3481	1.16	3.82	5.62	7.08	8.38	9.69	11.21	13.10	15.73	24.20
1969	.3527	1.35	3.67	5.42	6.91	8.31	9.69	11.22	13.08	15.76	24.58
1971	.3619	1.11	3.45	5.32	6.87	8.34	9.74	11.27	13.08	15.68	25.13
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3656	1.01	3.37	5.21	6.79	8.25	9.74	11.37	13.30	16.04	24.90
<u>6. Unstandardized for Number of Earners and Age of Head</u>											
1967	.3463	1.16	3.83	5.64	7.11	8.41	9.73	11.24	13.14	15.74	24.00
1969	.3519	1.36	3.68	5.42	6.92	8.32	9.71	11.23	13.10	15.77	24.49
1971	.3620	1.11	3.44	5.32	6.87	8.34	9.75	11.28	13.10	15.71	25.10
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3667	1.00	3.36	5.20	6.78	8.24	9.73	11.35	13.29	16.05	25.00
<u>7. Standardized for Number of Male Earners</u>											
1967	.3578	1.04	3.64	5.48	6.96	8.31	9.64	11.18	13.12	15.89	24.74
1969	.3589	1.28	3.57	5.33	6.84	8.26	9.68	11.22	13.13	15.85	24.85
1971	.3672	0.85	3.35	5.22	6.79	8.28	9.71	11.28	13.29	15.78	25.61
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3624	1.04	3.43	5.27	6.84	8.29	9.76	11.37	13.28	15.98	24.75
<u>8. Standardized for Number of Female Earners</u>											
1967	.3525	1.07	3.70	5.53	7.03	8.38	9.72	11.26	13.19	15.85	24.28
1969	.3549	1.30	3.61	5.37	6.89	8.30	9.72	11.25	13.13	15.81	24.62
1971	.3633	1.09	3.41	5.29	6.85	8.33	9.75	11.29	13.12	15.72	25.14
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3643	1.03	3.40	5.26	6.82	8.27	9.75	11.35	13.27	16.00	24.86

Year	Gini Coefficient	Percentage of Employment Income by Decile									
		Lowest	2nd	3rd	4th	5th	6th	7th	8th	9th	Highest
<u>9. Standardized for Number of Male and Number of Female Earners</u>											
1967	.3518	1.09	3.72	5.54	7.03	8.37	9.71	11.25	13.18	15.83	24.27
1969	.3549	1.31	3.61	5.37	6.88	8.30	9.72	11.26	13.14	15.82	24.60
1971	.3652	1.08	3.38	5.25	6.82	8.31	9.73	11.29	13.29	15.77	25.24
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3648	1.03	3.39	5.23	6.80	8.26	9.74	11.35	13.28	16.02	24.89
<u>10. Standardized for Family Unit Size and Number of Male Earners</u>											
1967	.3581	1.03	3.60	5.46	6.96	8.32	9.66	11.22	13.16	15.93	24.66
1969	.3587	1.27	3.53	5.30	6.83	8.26	9.70	11.25	13.18	15.90	24.79
1971	.3676	1.04	3.33	5.21	6.79	8.29	9.72	11.30	13.15	15.81	25.36
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3629	1.04	3.43	5.27	6.83	8.28	9.75	11.35	13.26	15.95	24.83
<u>11. Standardized for Family Unit Size and Number of Female Earners</u>											
1967	.3527	1.06	3.67	5.52	7.02	8.39	9.73	11.29	13.21	15.88	24.23
1969	.3555	1.29	3.58	5.35	6.88	8.30	9.73	11.27	13.17	15.85	24.58
1971	.3640	1.08	3.38	5.27	6.84	8.33	9.76	11.32	13.14	15.75	25.13
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3644	1.03	3.41	5.25	6.82	8.26	9.73	11.33	13.25	15.97	24.95
<u>12. Unstandardized for Family Unit Size and Number of Male and Number of Female Earners</u>											
1967	.3546	1.05	3.64	5.49	7.26	8.62	9.80	11.38	13.37	16.14	23.26
1969	.3567	1.28	3.56	5.32	6.85	8.28	9.72	11.29	13.20	15.91	24.59
1971	.3665	1.05	3.32	5.21	6.79	8.30	9.73	11.31	13.17	15.80	25.32
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3652	1.02	3.40	5.24	6.80	8.25	9.73	11.33	13.26	15.98	24.98
<u>13. Standardized for Education of Head</u>											
1967	.3525	1.13	3.74	5.56	7.02	8.34	9.67	11.17	13.08	15.77	24.51
1969	.3528	1.34	3.65	5.42	6.93	8.33	9.70	11.22	13.07	15.74	24.59
1971	.3630	1.10	3.42	5.31	6.86	8.33	9.74	11.28	13.09	15.68	25.19
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3623	1.02	3.41	5.26	6.84	8.31	9.79	11.41	13.32	16.03	24.60
<u>14. Standardized for Family Unit Size and Education of Head</u>											
1967	.3495	1.15	3.78	5.60	7.06	8.38	9.71	11.21	13.10	15.75	24.27
1969	.3534	1.34	3.63	5.41	6.92	8.32	9.71	11.22	13.08	15.74	24.63
1971	.3637	1.09	3.40	5.29	6.85	8.33	9.74	11.29	13.11	15.70	25.19
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3633	1.02	3.41	5.26	6.83	8.29	9.77	11.38	13.29	16.01	24.74
<u>15. Standardized for Age and Education of Head, Family Unit Size, and Number of Male and Number of Female Earners</u>											
1967	.3461	1.15	3.79	5.60	7.09	8.43	9.78	11.31	13.21	15.84	23.79
1969	.3510	1.34	3.67	5.46	6.95	8.32	9.73	11.25	13.11	15.75	24.41
1971	.3632	1.07	3.39	5.28	6.84	8.34	9.77	11.34	13.18	15.82	24.97
1973	.3606	1.04	3.49	5.23	6.85	8.29	9.78	11.40	13.36	16.03	24.53
1975	.3644	1.00	3.38	5.25	6.83	8.28	9.76	11.37	13.28	16.01	24.83

1 These deciles are created from all family units with at least one earner, ranked in order of employment income.

Source: Surveys of Consumer Finances.

APPENDIX B

Sample Sizes for Surveys of Consumer Finances, Canada, 1967-75

Population	1967	1969	1971	1973	1975
All families	22,278	9,800	23,723	25,964	26,593
All families with at least one earner	19,174	8,323	19,440	21,359	21,729
All families with at least one earner working at least 20 weeks	18,255	7,891	18,253	20,065	20,311

SOCIAL SECURITY

The socio-economic well-being of the population at the lower end of the income distribution is addressed by policies and programs that seek to provide an adequate and sustained base income level. The equity and efficiency aspects of the existing array of programs and of a single, comprehensive "minimum annual income" alternative are addressed by the following papers.

Discussants and delegates called for more comprehensive examination of costs (taxes, work disincentives and administration) and benefits (by age, sex and family size) over various time periods to assure that income and substitution effects of program alternatives truly capture important adjustment lags and changes in aspirations, attitudes and personal income goals. Clearly, the interpretation of the socio-economic impact of social security programs, those in-place and experiments alike, begs the questions of socio-political attitudes towards income adequacy; tax and expenditure "progressivity" and administrative efficiency; and the interrelationship between income transfers and the general availability of employment and earnings opportunities. Income support programs through transfer mechanisms are only "second best" solutions; policies that effect adequate employment and earnings for the nondependent population are preferred.

SOME REGIONAL ASPECTS OF THE DISTRIBUTION
OF BENEFITS AND COSTS OF SOCIAL SECURITY IN
CANADA, 1971 AND 1975

by

J. E. Cloutier*

INTRODUCTION

The social security system in Canada has grown rapidly in size and scope over the past two decades. In 1961 social security transfers [1] amounted to approximately \$2 billion, while by 1975 they had increased to roughly \$11 billion; an annual compound growth rate of 13.5 per cent. The result has been an increase in social security transfers as a per cent of GNP from 4.9 per cent in 1961 to 7.1 per cent in 1975. Yet, the effectiveness of social security programs in redistributing income has been increasingly questioned because of the growing inequality [2] of total income [3] over the same period. While income redistribution is not the only objective, nor necessarily the primary objective of individual social security programs, it remains a fundamental objective of the social security system.

In a previous paper [4] an assessment of the redistributive properties of the benefits and costs [5] of some social security programs was presented, for the period 1971 to 1975, for Canada. This paper is to provide a regional breakdown of those results with respect to the effects on economic families [6], for 1971 and 1975. The two years analyzed span a period during which there were major changes in the Family and Youth Allowances program, the Unemployment Insurance program, and the personal income tax system, and more minor changes in some of the other programs. It was also a period that included varying economic conditions; strong growth, and recession, high inflation, and rising unemployment.

The results presented provide a picture of the distributive impact of the benefits and costs of programs, and for the total social security system, both among regions and within regions. For examining the impact of programs among regions two types of tables are presented; the first being the size distribution of benefit and cost elements among regions, and the second being the distribution of the benefits and costs among each of the Canadian after-tax income quintiles among the regions. To examine the distributive impact within each of the regions, after-tax income quintiles for each of the regions are used. In Table 1 the distribution of economic family units across regions for each of the Canadian after-tax income quintiles is given for 1971 and 1975. In Table 2 total family income before tax is presented for 1971 and 1975 both as the distribution of each Canadian quintile across economic regions, and as a distribution within each region by regional after-tax income quintile. Tables in the appendix provide average total family income before tax on both the Canadian and the regional quintile basis.

In Table 1 we observe that the changes in concentration of economic families across regions by Canadian quintile have been modest from 1971 to 1975. In both years, in relation to regional totals, the Atlantic, Quebec, and Prairie regions are over-represented in the lower quintiles and under-represented in the upper quintiles, while the opposite is true for Ontario. In British Columbia both the lowest and the highest quintiles are over-represented, in addition to having the largest increase in total concentration of economic family units.

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In Table 2 we see that income shares by region and by quintile have changed only moderately between the two years. The income shares in the Atlantic, Prairie, and British Columbia regions have increased while those of Quebec and Ontario have decreased. In relation to the proportion of family units within regions, however, the Atlantic, Quebec, and Prairie regions have income shares below the national average, while Ontario and British Columbia have above average shares. The within-region total income distributions all appear to have become less regressive from 1971 to 1975, except for the Prairie region, when families are ordered by after-tax income.

With this brief background on the overall results of economic and demographic changes between 1971 and 1975 we now turn to the analysis of the costs and benefits of the total social security system.

The Total Social Security System

The diversity of the social security system and the size of different programs in 1975 can be seen in Table 3. Included in the list of programs are demogrants, income-tested supplements, savings related pensions, a social insurance plan, and social assistance or welfare.

Many studies on income distribution treat only the distribution of benefits of social security. Yet, the impact upon families of social security programs is determined not only by who receives the benefits, but also by who bears the costs. Some of the programs are contributory, and all programs except C/QPP require major funding from government revenues, and hence from personal income tax. Of equal interest, then, should be the distribution of the costs that can be allocated to families.

In presenting the results for the total social security system it is first necessary to point out that the costs that have been allocated to families do not represent the entire costs of social security to those families. The allocated costs represent the direct costs borne by families in the form of premiums and allocations of federal and provincial income taxes used to support social security programs. [7] Table 4 gives the size of the different cost components that have been allocated to families as a percentage of total benefits paid under social security for the two years studies, by region.

From Table 4 it is clear that the costs allocated to families relative to benefits received have declined significantly from 1971 to 1975. While both benefits and direct costs have increased, benefits have done so at a substantially greater rate due to: changes in the Family Allowances program, and the Unemployment Insurance program; nearly universal indexing of social security benefits during rapid inflation; and an increasing unemployment rate. Direct costs, on the other hand, have increased more slowly reflecting the lower rate of increase in the federal income tax allocation, due in part to the indexing of the personal income tax system for inflation.

An interesting aspect of Table 4 is the variation of the importance of different cost components across regions, particularly between Quebec and the other regions. The federal income tax allocation has its least importance in Quebec, while the provincial income tax allocation has its greatest importance. This is just a reflection of the different fiscal arrangements the federal government has with different provinces, particularly Quebec. In a stable system these differences, while important to the provinces, need not have any great differential impact upon similar families within different regions. However, when marginal changes upon federally financed programs are contemplated, similar families in different regions generally will not be equally affected due to the differential impact of federal financing.

Finally, we may observe the variations in benefit/cost ratios from one region to the next. In 1971, the highest benefit/cost ratio was in the Atlantic region, followed by Quebec, Prairie, B.C., and Ontario regions in descending order. From 1971 to 1975 the benefit/cost ratio increased in all except the Prairie region, so that in 1975 the regions by descending order of benefit/cost ratio were: Atlantic, Quebec, B.C., Ontario, and lowest for the Prairie region where the increase in benefits was lower than the increase in costs paid by families from 1971 to 1975.

The distributions of total benefits paid to families and total direct costs paid by families ordered by total income after tax are shown, by quintile and region, in Table 5. Clearly, the distribution of total benefits are progressive within all regions in both years. The distributions become less progressive, in all regions, from 1971 to 1975 with the share of the lowest quintile declining, except for the Prairie region, and that of the upper quintile increasing. The direct costs allocated to families are also progressively distributed in all regions in both years. At the national level there has been a slight shift in the distribution of costs towards greater progressivity, however, only two regions have clearly more progressive cost distributions in 1975, Ontario and the Prairie region.

At the national level, and in all regions except the Prairie region, when both benefits and direct costs are considered, the total social security system has become less progressive from 1971 to 1975 due to two factors: the benefits have become less progressive, and the benefit/cost ratio has increased.

An Analysis of Five Individual Social Security Programs [8]

The individual programs evaluated in this section include the Old Age Security program, the Guaranteed Income Supplement, Family and Youth Allowances, the Canada and Quebec Pension Plans, and Unemployment Insurance.

Old Age Security [9]

In 1951, the Old Age Security Act was passed and became effective in January 1952. The act provided flat-rate benefits for everyone who met age and residency requirements. Over the years, both age and residency requirements have been modified so that at present the age requirement is 65 years of age, and the residency requirement is relatively flexible.

In 1975 there were approximately 1.9 million Old Age Security pensioners, representing about 8 per cent of the total population. This was a growth from 640 thousand pensioners in 1952, representing 4.4 per cent of the population. The increase has been gradual, steepening in the years 1966 to 1970, the period during which the qualification age was lowered by one year every year from 70 years to 65 years.

The benefit rates have also undergone significant changes since 1952. During the period since 1971 benefits have gone from being adjusted annually by changes in the Consumer Price Index, to being adjusted quarterly. The annual benefit rates for the years covered by the analysis have risen from \$960 in 1971 to \$1,496 in 1975. The total benefits paid under OAS were \$1.6 billion in the 1970-71 fiscal year, and \$2.6 billion in the 1974-75 fiscal year.

The distributions of the benefit and cost components, by region, as a percentage of total OAS benefits paid are given in Table 6. Both elements of total cost, the income tax paid on benefits and the federal income tax allocation, while greater in absolute amount, have declined relative to benefits from 1971 to 1975. The decline in income tax paid on benefits from 1971 to

1975 is what one would expect to see when an indexed income tax system is applied to incomes that are only partially indexed during an inflationary period. While most government transfers have been indexed, other income received by families whose head was 65 years of age or older has been eroded by inflation, so that in 1975 these families, representing a larger proportion of all families than in 1971, received a smaller proportion of total after-tax income. The income tax allocation, which comes from all family units, also declined, at least partially as the result of the indexed personal income tax system.

In 1971 the benefit/cost ratio was highest for the Atlantic region, followed by the Prairie, Quebec, B.C., and Ontario regions in descending order. From 1971 to 1975 the benefit/cost ratios increased in all regions, but at a significantly slower rate in the Prairie region, with the result that in 1975 Quebec and the Prairie region had changed positions in benefit/cost ratio ordering. A significant factor in this change was the fairly steep decline in the marginal tax rate on benefits in Quebec and the modest decline in the marginal tax rate of pensioners in the Prairie region. By 1975 the marginal tax rate on pensioners in the Prairie region was the second highest, slightly lower than that in Ontario, and slightly higher than the B.C. rate.

The distributions of before-tax benefits and total costs, by region and quintile, are given in Table 7. From the table it is clear that the OAS program, both in benefits and cost and within all regions, was progressive in both years. In the Atlantic region, Quebec and Ontario the distribution of total benefits become more progressive, not because of any major changes in the program but rather as the result of a greater concentration in the lowest quintile of families whose head was 65 years of age or older. In the Prairie region and B.C. the share of benefits going to the upper three quintiles increased. The cost distributions within all regions became more progressive from 1971 to 1975, but particularly so in the Prairie region.

Guaranteed Income Supplement

The Guaranteed Income Supplement program became operative in January 1967. It was established by an amendment to the Old Age Security Act and the two programs together are intended to guarantee that the income of pensioners from all sources will not fall below specified levels. The two programs are presented separately for two reasons: first, the benefits paid under GIS are nontaxable while those paid under OAS are taxable; second, GIS is a program applicable only to those below a certain income level, while OAS applies to all persons 65 years and over who meet the residency requirements.

In determining if a pensioner qualifies for GIS benefits, the government considers the income of both pensioner and spouse. If the income received exceeds the OAS pension, then the supplement is reduced by \$1.00 for every full \$2.00 of excess. Since 1971, the benefit rate has been slightly higher for single pensioners and pensioners in one-pensioner families than for husbands and wives both receiving OAS pensions. The benefit levels are indexed and have been since April 1971. At that time the indexation was tied to the Consumer Price Index with a 2 per cent ceiling. In April 1973 the indexing was changed to allow escalation by the full increase in the CPI, and in October 1973 the indexing was changed from an annual to a quarterly basis. The monthly benefits paid have increased from \$33.61 per pensioner at the full rate in 1971 to \$84.21 per single pensioner or \$149.58 for a two-pensioner family at the full rate in January of 1975. The total benefits paid under GIS have increased from \$526 million in 1971-72 to \$837 million in fiscal 1974-75.

The number of pensioners receiving partial or full supplementation increased from 860,000 in 1971 to 1,082,000 in 1975. This represents an increase in the number of pensioners receiving supplementation from roughly 50 per cent in 1971 to over 56 per cent in 1975. The number of pensioners receiving full supplementation has dropped but this has been more than offset by the increase in the number receiving partial supplementation.

The analysis of GIS is relatively simple since the only cost item involved is an allocation of federal income tax. The distributions of the benefit and costs, by region, as a percentage of total GIS benefits paid are given in Table 8. Once again we see the decline in costs allocated to families relative to the benefits paid to them; this time, however, as the result in relative decline of the federal income tax allocation only. The share of benefits paid to families in the Prairie region has declined considerably from 1971 to 1975, while Ontario's share has declined slightly. At the same time, the OAS demogrant share in Ontario has increased, and that in the Prairie region decreased at about one third of the rate of decrease of the GIS supplement, indicating an increase in other income to pensioners in these two regions over the period 1971 to 1975.

The benefit/cost ratio, in 1971, is highest for the Atlantic region, which is followed in declining size of benefit/cost ratio by the Quebec, Prairie, B.C., and Ontario regions. Quebec's high benefit/cost ratio is due in part to the relatively low federal taxes paid by families in Quebec as the result of different fiscal arrangements with the federal government. From 1971 to 1975 the benefit/cost ratio increased in all regions except the Prairie region, however, the ordering of regions by benefit/cost ratio did not change.

In Table 9 the distributions of benefits and costs, by quintile and region, are given. The benefits are highly progressive in all regions in both years, and are more progressive than the comparable OAS distributions. This is an expected result since GIS is income tested. The distributional shifts from 1971 to 1975 are, in total, progressive although this result is not of uniform strength across regions. The distributions of cost are clearly progressive in both years and for all regions, and became more so from 1971 to 1975. Again, the cost distributions of GIS are more progressive than the comparable OAS distributions. This is a result of GIS being entirely funded by a federal income tax allocation, and not a mixture of a marginal tax (paid by benefit recipients only) and a federal income tax allocation as is the case for OAS.

Family and Youth Allowance

The Family and Youth Allowances programs underwent significant changes in 1973 when a new Act was proclaimed and became effective in January 1974. Under the old Act the age of eligibility for Family Allowances was less than 16 years of age. A Youth Allowances program paid benefits for dependent children 16 and 17 years of age, except in Quebec which had its own Schooling Allowances program. The benefits paid were not taxed, nor indexed, and increased only occasionally. The rate structure depended on the age of the child and initially, prior to 1949, on the number of children in the family. In October 1973 the rate was changed to a flat rate for all children until the termination of the old Act in December 1973.

Under the new Act of 1973 allowances are paid on behalf of all dependent children less than 18 years of age. The benefits increased substantially and became taxable. At the same time they were indexed to increase annually by the full increment in the Consumer Price Index. The taxation of benefits was implemented by making them taxable benefits for the parent who claimed the tax exemption for the child, thus ensuring that in

all but a few cases they would be taxed at the highest individual marginal rate within the family. The provinces were allowed to vary payments to their requirements, based upon age and number of children, with prior agreement of the federal government, and provided the average payment remained the same as the uniform federal rate. Alberta varied its allowance payments by age of child, while Quebec varied its payments by age of child and number of children.

Under the new Act provinces were also allowed to pay supplements to the new Family Allowances. Supplements, which are nontaxable, were paid by Prince Edward Island and Quebec, commencing in 1974. More recently, in 1979, the monthly benefit rate has been reduced and an income tested refundable tax credit has been introduced to provide greater benefits to low income families with children.

In 1971 the number of families receiving Family and Youth Allowances was approximately 3.5 million on behalf of slightly more than 7.5 million children, while in 1975, 3.4 million families received benefits on behalf of 7.3 million children, a slight decline. The total benefits paid in 1971-72 fiscal year amounted to \$639.2 million and increased to \$1,798.7 million in the 1974-75 fiscal year, reflecting the substantial increase in benefit rates over the period. The percentage of costs to total benefits received, by region, is given in Table 10.

Unlike other programs reviewed in this paper, in this case we see that there has been a substantial increase in costs paid by families relative to benefits received from 1971 to 1975. This has been the result of making Family Allowance taxable under the new Act since, as with other programs, there has been a relative decline in the income tax allocation. The costs have increased in all regions, while the income tax allocation has increased in Quebec and the Prairie region, remained unchanged in the Atlantic region, and declined in Ontario and B.C. The marginal tax rate on benefits is highest in Ontario, followed by B.C., Quebec, the Prairie region, and the Atlantic region in descending magnitude, ranging from 29.9 per cent to 23.4 per cent.

Between 1971 and 1975 there has been one dramatic shift in the share of benefits; the share going to Quebec has declined from 33.8 per cent to 24.6 per cent, a reduction of slightly more than 27 per cent. The benefit/cost ratio in 1971 was highest in the Atlantic region, and followed in descending order by Quebec, the Prairie region, B.C. and Ontario. By 1975, Ontario and B.C. had changed places, although the most dramatic reduction in benefit/cost ratio occurred in Quebec as the end result of rapidly declining birthrate.

The distributions of benefits and costs of Family and Youth Allowances, by region and quintile, are given in Table 11. The benefits are distributed in a regressive manner in all regions in both years, and generally became more regressive from 1971 to 1975. The costs were distributed progressively in all regions in both years, however, they became less progressive from 1971 to 1975 due to the shift in the manner of financing. Overall, the Family and Youth Allowances became more progressive from 1971 to 1975, even though both benefits and costs moved perversely, due to the substantial increase of costs relative to benefits as a result of benefits becoming taxable.

Canada and Quebec Pension Plans

The Canada and Quebec Pension Plans together constitute a social insurance program providing retirement, survivors' and disability pensions. Contributions and benefits are both subject to annual adjustments, the former for changes in wage levels, and the latter for increases in consumer prices, initially with a 2 per cent ceiling but unrestricted as of January 1974.

The plans were established in 1965, and since then have covered almost the entire labour force on a compulsory basis. Contributions began in January 1966. Retirement pensions were first paid in January 1967, survivors' pensions and benefits in February 1968, and disability benefits in February 1970.

Contributors are those between the ages of 18 and 70 who earn more than the basic exemption. Contributions are based on earnings from employment and self-employment up to an annual maximum pensionable earnings level, adjusted annually to reflect changes in average earnings levels. The rate of contribution for employees, 1.8 per cent, is matched by their employers, while the self-employed contribute at 3.6 per cent of their annual pensionable earnings.

Retirement pensions are payable on application to all eligible contributors. The amount is based on the contributor's average monthly pensionable earnings and the number of years over which contributions were made. The full pension has been payable only from January 1976. During the period from January 1967, when retirement plans were first paid at a level of 2.5 per cent of adjusted pensionable earnings [10], to January 1976 there was a transition in the rate of pension payments; the entitlement was raised by 2.5 percentage points each year and reached 25.0 per cent of adjusted pensionable earnings in 1976. The minimum age at which pensions were payable was reduced from 68 years in 1967 to 65 by 1970.

In 1971, 331,486 persons received pensions or benefits from one of the two plans. This represented an equivalent of about 4.0 per cent of the labour force. In 1975, 821,572 persons, or an equivalent of 8.3 per cent of the labour force, received benefits. The total benefits paid in the 1971-72 fiscal year amounted to \$189.6 million, while in fiscal 1975-76 the amount was \$753.1 million. On the contributions side, in 1971, there were 8,808,200 contributors and a total of \$1,112 million in employee and employer contributions. By 1975 the contributions were approximately \$1,968 million for both plans.

As can be seen from the above figures, contributions, during the period 1971 to 1975, exceeded benefits paid and there was a significant contribution to the pension plan funds. This was true for both plans. While much controversy about these pension plans centers on questions of indexing, funding, and impact on the private sector, this presentation shall be concerned mainly with the income distribution effects of the plans. The existence of funds to support these programs means that no money was transferred from government general revenues to cover any of the benefits paid under the plans, and hence no income tax allocation was made in respect of either program. The distribution of the benefit and cost elements, by region, is given in Table 12.

There are a number of interesting features in Table 12; however, in examining this table two points should be kept in mind. First, the percentage shares of benefits and costs are presented on the sum of the benefits of both programs as a base, even though the operation of the two programs is separate. Second, both benefits and costs have increased from 1971 to 1975, and the decline in costs, clearly indicated by the dramatic changes in the percentages in the table, is relative only to the rapidly increasing benefit payments. The costs paid by families exceeds the benefits paid to them, in all regions, in both years.

From 1971 to 1975, the benefits paid under QPP have increased less rapidly than those paid under CPP, so that by 1975, the benefit share of the total paid to Quebec families has declined from 1971, while the shares in other regions, except the Atlantic, have risen. The marginal tax rate on benefits of 17.3 per cent in B.C. was the highest of all regions in 1971, declining successively in Ontario, the Prairie region, the Atlantic

region, to a low of 11.5 per cent in Quebec. By 1975 the highest marginal tax rate on benefits was 11.4 per cent in the Prairie region, declining successively in Ontario, B.C., the Atlantic region, to a low of 6.5 per cent in Quebec. The marginal tax rates on benefits, in all regions, and in both years, while having declined substantially from 1971 to 1975, remain significantly above the comparable marginal tax rates on OAS benefits.

All cost elements in all regions have declined substantially from 1971 to 1975 relative to total benefits paid. The marginal tax rates averaged across contributors, unlike the marginal tax rates averaged across beneficiaries, increased in all regions from 1971 to 1975. In 1971, the marginal tax rate averaged across contributors was highest in B.C. at 27.8 per cent, and declined successively in the Prairie region, Ontario, Quebec, to a low of 25.5 per cent in the Atlantic region. In 1975 the highest marginal tax rate occurred in Quebec, 32.4 per cent, and declined successively in B.C., Ontario, the Prairie region, to a low of 30.1 per cent in the Atlantic region.

The benefit/cost ratios have all increased substantially from 1971 to 1975. In 1971 the ratio was highest in the Atlantic region, followed in descending order by Quebec, Ontario, B.C., and the Prairie region. By 1975 the ratio was highest in the Atlantic region, followed by Ontario, B.C., the Prairie region, and lowest in Quebec. Thus, while Quebec had the lowest marginal tax rate on benefits, and the highest marginal tax savings on contributions, of all regions in 1975, it had the lowest benefit/cost ratio due to the less rapid increase in QPP benefits.

The distributions of benefits and costs of the CPP and QPP, by region and by quintile are given in Table 13. The distribution of benefits is progressive in all regions in both years despite the low share of benefits to the first quintile in the Atlantic region, and Quebec, and the high share of benefits in the fifth quintile in these regions in 1971. From 1971 to 1975 the distribution of benefits within regions became more progressive with the exception of the Prairie region. Total costs were also progressive in all regions in both years; however, there was only a slight increase in progressivity within regions from 1971 to 1975, with the exception of the Atlantic region which became slightly less progressive. Overall, when both benefits and cost are considered, the two programs were highly progressive in all regions in both 1971 and 1975.

Unemployment Insurance

The last of the five programs to be presented is the Unemployment Insurance program. The first year analysed, 1971, came under the old Act, while 1975 came under the new Act which became effective in 1972.

Coverage under the old Act protected mainly middle and low income workers, who constituted approximately 80 per cent of paid workers in the labour force. Just before the new plan came into effect, unemployment insurance was available to employees earning less than \$7,800 a year, or whose wages were calculated hourly or on a piece rate, regardless of their annual income, except for specified groups such as teachers, the armed forces, professional athletes, domestics, most hospital workers, and public servants, who were excluded. The new Act made coverage almost universal. Regular members of the civilian labour force for whom there exists an employer-employee relationship and the armed forces are included irrespective of their annual earnings. Coverage, contributions, and benefit entitlements cease at age 70, or when the Canada or Quebec Pension Plan retirement pension becomes payable.

In order to claim regular Unemployment Insurance benefits it was necessary for an individual to be unemployed, capable and available for work, and unable to find suitable employment. Additionally, under the old Act it was necessary to have made 30 weekly contributions in the previous two years, eight of which had to be made in the previous year. The new Act considerably reduced the base qualification period to a minimum of eight weeks of insurable employment in the previous 52 weeks. In 1977, this was changed again to a variable 10 to 14 weeks from eight, and in 1978 the qualification period was further adjusted. Under the old Act benefits were related to the claimant's labour force attachment in the two years before the claim, with the basic formula being one week of benefits for every two weeks of insurable employment. Under the new Act a three phase system of an initial benefit period, a labour force extended period, and a regionally extended benefit period has been introduced. Benefits are determined depending upon a claimant's labour force attachment up to a maximum, and on the basis of the appropriate regional unemployment rate as compared to the national rate. The rate of benefits is a function of average weekly insurable earnings, initially two-thirds but recently adjusted to 60 per cent, with a maximum entitlement. The new Act also provides for sickness benefits, maternity benefits, retirement benefits, fishing benefits and Adult Occupational Training Act payments.

Until 1972, employees and employers paid equal shares in contributions based upon weekly earnings up to a maximum level. In 1971, a maximum contribution of \$1.40 was payable by both employees and employers on a maximum of \$100 weekly earnings. The new Act raised the maximum insurable earnings to \$150 a week and indexed the level by an annual Earnings Index. The contribution rate for employees is adjusted annually taking into account benefits paid and changes in average income. The rate for employers is 1.4 times the employee rate. To phase in the new plan, a system of preferential rates was used for contributors under the new plan who would not have been covered under the old. In 1973 the preferential rate was 60 per cent of the regular contribution rate, and in 1974 it was 80 per cent. In 1975 the preferential rate vanished and all contributions were at the same rate up to the maximum level.

The final major change between the two Acts was to regard benefits paid as income subject to tax under the new Act, while the contributions became tax deductible.

In the 1971-72 fiscal year, the total benefits paid under the Unemployment Insurance program amounted to \$1,147.4 million, while the contributions from employees and employers amounted to \$569.3 million. In 1975, benefits had increased to \$3,159.3 million, and contributions to \$1,948.8 million -- substantial increases in both benefits and contributions.

The analysis of Unemployment Insurance involves the most cost components of any of the programs considered since there are contributions, employer contributions, taxes, and an income tax allocation all to be considered. The percentage distribution of these items, by region, as a per cent of total benefits paid is given in Table 14.

There were a number of changes from 1971 to 1975 that are quite striking. The most striking is the reduction by over one-half of the share of total before-tax benefits going to the Prairie region. The benefit shares of other regions, except Quebec, have increased, most notably in B.C. Just as striking, while not revealed in the table, is the fact that despite the decrease in benefit share to the Prairie region, the dollar amount of benefits to that region increased substantially from 1971 to 1975 (by about 60 per cent). In 1975, the benefits paid were taxable, resulting in marginal tax rates on benefits ranging from 19.1 per cent in B.C. to 14.4 per cent in Quebec. While

these tax rates are below those found in the Family Allowances program, they are higher than the 1975 marginal tax rates on benefits for C/QPP. On an after-tax basis, the only region with an increase in benefit share is B.C.

From 1971 to 1975 there has been a substantial change in the costs allocated to families due to changes from the old Act to the new Act. Employee contributions, as a per cent of total benefits paid, increased in all regions, on a before-tax basis between 1971 and 1975. However, because of tax deductibility of contributions in 1975, the after-tax contributions of employees has declined due to the income tax savings being larger than the increase in contributions. The marginal tax rates applicable to contributions range from a high of 31.8 per cent in Quebec, to a low of 28.9 per cent in the Atlantic region. Employer contributions have also increased from being equal to employee contributions under the old Act, in 1971, to 1.4 times employee contributions under the new Act, in 1975. The contributions are entirely shifted to employee earnings in both years, and the income tax that would have been paid had these contributions been actually received by the employees as earnings are deducted from the contributions. The resulting after-tax cost of employer contributions to employees increased from 1971 to 1975. In this program, as in all others, the income tax allocation in all regions has declined, relative to benefits, from 1971 to 1975. The result of all these changes has been to increase the costs paid by families, relative to benefits received by them, in all regions except Ontario and B.C., from 1971 to 1975.

In 1971 the benefit/cost ratio was highest in the Atlantic region, and declined successively in Quebec, B.C., the Prairie region, and Ontario. From 1971 to 1975 the benefit/cost ratio decreased in all regions, except Ontario and B.C. and decreased dramatically in the Prairie region leaving that region with the lowest benefit/cost ratio.

The distributions of total before-tax benefits and total costs, by quintile and region, are given in Table 15. Total benefits, within all regions, and for both years, are regressively distributed, and are more regressive in 1975, under the new Act, than they were in 1971, under the old Act. In all regions except B.C., the share of the first quintile has dropped, in 1975, while in all regions, the share of the upper quintile has increased.

The distributions of total costs are progressive, within all regions, and for both years; however, they are less progressive in 1975 than they were in 1971 due to changes from the old Act to the new Act. [11] When both benefits and costs are considered, the program is progressive in all regions, and for both years. The increase in the regressivity of benefits, and the decline in the progressivity of costs is partially off-set in all regions, except Ontario and B.C. by the relative increase in costs to benefits.

CONCLUSION

The operation of the social security system between the years 1971 and 1975 appears to have become less progressive in terms of total benefits paid, both for Canada and within each region. When individual programs are evaluated, only two have become systematically less progressive with respect to total benefits; the Family and Youth Allowances program with the introduction of the new Act in 1974, and the Unemployment Insurance program with the introduction of the new Act in 1972. The remaining three programs evaluated have become more progressive with respect to total benefits over the period. While these results do not hold with equal strength within all regions, they are by-and-large the general rule. The major reason for the decline in progressivity of total benefits for the

entire social security system, both for Canada and within the regions, is to be found in the changing proportion of resources allocated to the different programs. While all programs grew over the period studied, the most progressively redistributive ones did so at a much lower rate than either the Family and Youth Allowances program or the Unemployment Insurance program, both of which display regressive total benefits on a total income after tax ordering. In 1971, the Family and Youth Allowances program took 11.8 per cent of the total social security budget, while in 1975 it accounted for 16.3 per cent. The Unemployment Insurance program grew from 17.0 per cent of the social security budget in 1971 to 26.1 per cent in 1975. The change in regional share of total benefits can also be partially explained by these differential program growth rates. From 1971 to 1975 the Quebec share of Family and Youth Allowances benefits dropped from 33.8 per cent to 24.6 per cent while total social security benefits decreased from 29.5 per cent to 27.6 per cent. In the Prairie region, Unemployment Insurance benefits dropped from a share of 13.0 per cent to 6.0 per cent while the share of total social security benefits decreased from 15.9 per cent to 13.0 per cent.

The distributions of the direct costs of the total social security system, for Canada and within all regions, have changed very little from 1971 to 1975. They are progressive in both years; however, the direct costs relative to total benefits have declined in Canada and all regions, due mostly to a decline in the income tax allocation. Since the financing side of the social security system is more progressive than the benefits side, the relative decline of the financing side, combined with a decrease in progressivity of the benefits side, has made the total social security system less progressive in 1975 than it was in 1971.

When individual programs are considered, the marginal costs of all programs, in all regions, have been affected by a decline in the income tax allocation from government general revenues. At the same time, programs with taxable benefits have had these benefits taxed at a lower marginal rate. This, along with the slightly more progressive incidences of the federal income tax, has caused a slight increase in the progressivity of cost of the three pension and supplement programs. Along with an increase in progressivity of costs, however, there has been an increase in the ratio of benefits to costs in these programs.

The most radical changes on the cost side have been in the Family and Youth Allowances program and the Unemployment Insurance program. In both programs benefits have been made taxable, while in the Unemployment Insurance program, contributions have been made tax deductible. These changes have had two effects on the costs allocated to families. First, the marginal tax on benefits added to the cost side has made the distributions of costs less progressive within all regions and for Canada. Second, the inclusion of this additional cost has caused a decrease in the ratio of benefits to costs, in all regions, for both programs, with the notable exceptions of the Unemployment Insurance program in Ontario and B.C.

The changes in the form of financing for both the Family Allowances and Unemployment Insurance programs also had an effect on regional cost shares in the face of changing benefit shares. By making program benefits taxable, an element of cost has been added that is directly variable with changes in benefit levels. The remaining costs, while not fixed, are much less sensitive to benefit level changes. Thus one could make the argument that a region which experienced a decline in benefit share, ceteris paribus, would have a lower cost share under the new financing arrangement than under the old. It could be argued, then, that Quebec, where the benefit share of Family Allowances declined between 1971 and 1975, had a lower cost share in 1975 than it would have had under the old Act; while the cost share of

Unemployment Insurance in the Prairie region in 1975 under the new Act is similarly lower than it would have been under the old Unemployment Insurance Act. (In actual operation there are a host of other factors that affect cost shares when benefit shares change, including: changes in income shares, related income tax provisions such as dependent child exemptions which are larger than benefits, differences between marginal taxes on benefits and marginal tax savings on program contributions, etc.) From 1971 to 1975, the Unemployment Insurance benefit share of the Prairie region declined from 13.0 per cent to 6.0 per cent and the cost share declined from 14.0 per cent to 13.5 per cent; while in Quebec, the benefit share of Family and Youth Allowances declined from 33.8 per cent to 24.6 per cent, but the cost share increased from 20.2 per cent to 22.9 per cent.

On a net benefits basis, when both benefits and costs are considered, all programs were found to be progressive in both years except for Family and Youth Allowances in 1971, which was slightly regressive. The progressivity of Family and Youth Allowances with respect to net benefits increased substantially after the revision of the Act, which was not the case for the 1971 revision of the Unemployment Insurance Act. Despite this, Family and Youth Allowances remain less progressive than Unemployment Insurance, and both are less progressive than any of the other three pension and supplement programs.

Table 1

Distribution of Economic Family Units Within Canada by
Total Income After Tax Quintiles¹ Across Economic Regions,
1971 and 1975

Quintile	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
	(per cent)											
First	2.0	1.8	5.4	5.6	6.1	6.4	4.1	3.7	2.4	2.5	20.0	20.0
Second	2.4	2.1	5.8	5.6	6.1	6.7	3.8	3.4	1.9	2.2	20.0	20.0
Third	1.8	1.9	5.9	5.8	6.9	6.9	3.3	3.2	2.1	2.2	20.0	20.0
Fourth	1.3	1.4	5.0	5.3	8.4	7.9	2.9	3.0	2.4	2.4	20.0	20.0
Fifth	0.9	1.0	4.7	4.2	9.2	9.0	2.7	3.0	2.5	2.8	20.0	20.0
Total	8.4	8.2	26.8	26.5	36.7	36.9	16.8	16.3	11.3	12.1	100.0	100.0

1 All economic family units are ordered by total income after tax and are then divided into five quintiles each containing 20 per cent of all Canadian families. The first quintile contains the Canadian family units with the lowest after-tax incomes, while the fifth quintile contains the 20 per cent of Canadian families with the highest after-tax incomes.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 2

Distribution of Total Family Income Across All Economic Family Units by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
	(per cent)											
<u>Canadian Quintile</u>												
First	0.4	0.4	0.9	1.1	1.1	1.3	0.8	0.7	0.4	0.5	3.7	4.0
Second	1.2	1.1	3.1	3.0	3.3	3.6	2.0	1.8	1.0	1.2	10.6	10.7
Third	1.5	1.6	5.2	5.1	6.1	6.1	2.9	2.8	1.9	2.0	17.6	17.7
Fourth	1.6	1.8	6.2	6.5	10.5	9.9	3.7	3.8	3.0	3.1	24.9	25.1
Fifth	1.8	2.0	10.4	9.0	19.9	19.2	5.6	6.7	5.4	5.7	43.2	42.5
Total	6.5	6.9	25.8	24.7	40.9	40.1	15.0	15.8	11.7	12.5	100.0	100.0
<u>Regional Quintile</u>												
First	4.3	4.6	3.7	4.0	3.9	4.2	3.6	3.5	3.3	4.0	3.7	4.0
Second	10.7	11.1	10.8	10.8	11.6	11.1	10.0	10.0	10.1	10.5	10.6	10.7
Third	17.1	17.7	17.3	17.9	18.3	18.0	17.2	17.1	18.0	17.8	17.6	17.7
Fourth	25.2	25.0	24.4	24.9	24.6	25.2	25.4	25.1	24.8	25.4	24.9	25.1
Fifth	42.7	41.6	43.8	42.4	41.6	41.5	43.8	44.3	43.8	42.3	43.2	42.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 The regional after-tax income quintiles are constructed by ordering all economic family units within a region by total income after tax and then dividing them into five quintiles each containing 20 per cent of all families within the region.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 3

Distribution of Social Security Transfers by
Major Program, Canada, 1975

	(per cent)
Unemployment Insurance (UI)	26.1
Old Age Security (OAS)	21.6
Family and Youth Allowances (FYA)	16.3
Canada Assistance Plan (CAP)	14.0
Guaranteed Income Supplement (GIS)	7.0
Canada and Quebec Pension Plans (C/QPP)	6.0
Other ¹	9.0
Total Social Security Transfers	100.0

1 Other includes Workmen's Compensation, pensions and assistance to veterans and the indigenous population, assistance to blind persons, assistance to disabled persons, and unemployment assistance. Many of these items commenced being integrated into the CAP program in 1966.

Source: Statistics Canada (National Accounts) and estimates by the author.

Table 4

Size Distribution of Benefits and Costs of Social Security as a Per Cent of Total Benefits Paid, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
	(per cent)											
Total Benefits Paid to Families	11.8	12.4	29.5	27.6	31.4	33.9	15.9	13.0	11.4	13.1	100.0	100.0
Contributions Paid by Families ¹ (C/QPP & UI)	1.2	1.2	4.5	4.4	6.8	6.6	2.6	2.6	1.8	1.9	17.0	16.7
Federal Income Tax ² Allocation	2.2	1.6	8.3	5.1	19.0	12.8	6.2	4.9	5.5	4.0	41.2	28.5
Provincial Income Tax ² Allocation	0.1	0.2	3.6	2.2	1.1	1.5	0.5	0.6	0.4	0.7	5.7	5.1
Total Direct Costs Paid by Families ³	3.5	3.0	16.5	11.7	26.9	20.8	9.3	8.1	7.6	6.6	63.9	50.3

1 The contributions paid for C/QPP and UI have been calculated for each family using the program rules. Employer contributions are not included.

2 The income tax allocations have been calculated by applying the ratio of the respective government's expenditure on social security to total expenditure to the federal and provincial income taxes paid by the family. The ratios were calculated using Statistics Canada data (Federal and Provincial Government Finance).

3 Total direct costs is the sum of the contributions and the income tax allocations.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 5

Distribution of Total Benefits¹ and Total Costs¹ of Social Security Across all Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits By Canadian Quintile												
First	3.0	2.4	7.2	6.8	7.0	7.4	4.8	3.6	3.0	3.2	25.0	23.4
Second	4.2	3.8	8.3	7.2	7.9	7.7	5.0	3.4	3.4	3.1	28.9	25.2
Third	2.2	2.8	6.0	4.9	5.2	6.0	2.5	2.1	1.7	2.3	17.5	18.1
Fourth	1.3	1.9	3.9	4.5	5.5	5.9	1.8	1.9	1.7	2.1	14.2	16.3
Fifth	<u>1.1</u>	<u>1.5</u>	<u>4.1</u>	<u>4.2</u>	<u>5.8</u>	<u>6.9</u>	<u>1.8</u>	<u>2.0</u>	<u>1.6</u>	<u>2.4</u>	<u>14.4</u>	<u>17.0</u>
Total	11.8	12.4	29.5	27.6	31.4	33.9	15.9	13.0	11.4	13.1	100.0	100.0
Total Benefits By Regional Quintile												
First	19.8	17.4	24.3	22.6	29.1	25.5	24.0	24.7	24.4	23.3	25.0	23.4
Second	28.5	24.9	26.7	25.8	25.5	23.0	31.2	26.3	33.3	26.0	28.9	25.2
Third	20.2	21.0	18.6	16.8	15.7	18.5	17.3	17.1	14.7	18.7	17.5	18.1
Fourth	16.0	18.1	14.6	16.6	14.6	16.5	13.7	15.4	14.6	15.3	14.2	16.3
Fifth	<u>15.5</u>	<u>18.6</u>	<u>15.8</u>	<u>18.2</u>	<u>15.1</u>	<u>16.5</u>	<u>13.8</u>	<u>16.5</u>	<u>13.0</u>	<u>16.7</u>	<u>14.4</u>	<u>17.0</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs By Canadian Quintile												
First	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1	1.0	0.8
Second	0.7	0.6	2.4	2.0	2.6	2.5	1.5	1.3	0.7	0.9	7.9	7.3
Third	1.3	1.4	4.8	4.7	5.8	5.7	2.8	2.7	1.8	1.9	16.5	16.5
Fourth	1.5	1.7	6.2	6.4	10.5	10.4	3.7	4.0	3.0	3.3	24.8	25.8
Fifth	<u>1.9</u>	<u>2.2</u>	<u>12.2</u>	<u>9.9</u>	<u>22.9</u>	<u>22.6</u>	<u>6.4</u>	<u>8.0</u>	<u>6.4</u>	<u>6.9</u>	<u>49.8</u>	<u>49.6</u>
Total	5.5	6.0	25.8	23.2	42.1	41.5	14.6	16.2	12.0	13.1	100.0	100.0
Total Costs By Regional Quintile												
First	0.8	0.8	0.9	0.7	1.4	1.0	0.9	0.7	0.7	0.7	1.0	0.8
Second	6.1	6.3	8.0	7.4	9.7	8.2	6.5	6.4	6.8	7.1	7.9	7.3
Third	15.6	16.1	15.9	17.2	17.2	16.9	16.3	15.8	17.1	16.6	16.5	16.5
Fourth	26.7	26.8	24.4	25.6	24.3	25.8	25.9	25.4	24.0	26.6	24.8	25.8
Fifth	<u>50.8</u>	<u>50.0</u>	<u>50.8</u>	<u>49.1</u>	<u>47.4</u>	<u>48.1</u>	<u>50.4</u>	<u>51.7</u>	<u>51.4</u>	<u>49.0</u>	<u>49.8</u>	<u>49.6</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Both benefits and costs are on a before-tax basis. Total costs include only the direct costs.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 6

Size Distribution of Benefits and Costs of Old Age Security Pensions as a Per Cent of Total Before-Tax Benefits Paid, for the Economic Regions and Canada, 1971 and 1975.

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Before-Tax Benefits Paid to Families	10.1	9.8	23.6	23.9	35.1	36.5	18.5	17.5	12.7	12.3	100.0	100.0
Total After-Tax Benefits Paid to Families	9.7	9.6	22.2	23.2	32.2	34.6	17.3	16.6	11.8	11.8	93.3	95.8
Income Tax Paid on Benefits ¹	0.4	0.2	1.3	0.7	2.9	1.9	1.2	0.9	0.9	0.6	6.7	4.2
Income Tax Allocation ²	2.4	2.1	9.2	6.6	20.9	16.3	6.8	6.3	6.0	5.1	45.4	36.4
Total Costs Paid by Families ³	2.8	2.3	10.6	7.3	23.8	18.2	8.0	7.2	6.9	5.6	52.0	40.6

1 The marginal income tax rate averaged across all individuals who received OAS pensions may be calculated by dividing the income tax paid on benefits by total before-tax benefits.

2 The income tax allocation is entirely from federal income tax.

3 Total costs is the sum of the income tax paid on benefits and the income tax allocation.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 7

Distribution of Total Before-Tax Benefits and Total Costs of Old Age Security Pensions Across All Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits By Canadian Quintile												
First	3.5	3.6	7.5	9.5	11.3	13.3	7.1	6.8	4.6	4.8	34.0	38.0
Second	3.6	3.1	7.3	7.7	10.1	11.1	6.9	5.7	4.7	3.7	32.6	31.2
Third	1.2	1.3	3.5	2.8	4.8	5.6	2.0	2.2	1.4	1.7	12.9	13.6
Fourth	1.0	1.0	2.5	1.9	4.0	3.3	1.2	1.2	0.9	0.9	9.5	8.3
Fifth	0.8	0.8	2.8	2.0	4.9	3.2	1.3	1.6	1.1	1.2	11.0	8.9
Total	10.1	9.8	23.6	23.9	35.1	36.5	18.5	17.5	12.7	12.3	100.0	100.0
Total Benefits By Regional Quintile												
First	28.4	33.3	31.5	37.1	42.0	41.0	31.4	34.9	33.4	37.7	34.0	38.0
Second	32.6	29.3	29.6	33.5	25.7	29.9	38.5	33.4	41.1	31.9	32.6	31.2
Third	14.0	13.3	13.2	11.2	11.0	13.8	13.9	14.1	10.5	14.1	12.9	13.6
Fourth	11.4	11.5	12.1	8.6	9.1	7.8	7.6	7.9	6.5	6.8	9.5	8.3
Fifth	13.6	12.6	13.6	9.6	12.2	7.5	8.6	9.7	8.5	9.5	11.0	8.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs By Canadian Quintile												
First	0.1	0.0	0.3	0.0	0.6	0.1	0.3	0.1	0.2	0.0	1.6	0.2
Second	0.7	0.4	1.9	1.2	3.3	2.6	1.7	1.1	1.1	0.8	8.7	6.2
Third	1.1	1.3	3.5	3.5	6.0	6.2	2.7	2.7	1.9	2.0	15.3	15.6
Fourth	1.4	1.6	4.7	4.7	10.4	10.5	3.6	4.0	2.9	3.3	23.0	24.2
Fifth	2.0	2.4	9.9	8.5	25.4	25.5	7.1	9.7	7.1	7.8	51.4	53.8
Total	5.3	5.7	20.3	17.9	45.7	44.9	15.4	17.6	13.2	13.9	100.0	100.0
Total Costs By Regional Quintile												
First	0.8	0.2	1.6	0.1	2.3	0.5	1.0	0.1	1.2	0.2	1.6	0.2
Second	7.2	4.1	8.4	5.3	10.6	8.3	7.8	4.9	9.4	6.2	8.7	6.2
Third	14.0	14.2	14.7	16.4	15.7	16.1	15.8	14.2	15.9	15.7	15.3	15.6
Fourth	24.0	25.8	23.3	24.5	22.4	24.5	23.5	23.8	21.7	25.4	23.0	24.2
Fifth	54.0	55.7	52.0	53.7	49.0	50.6	51.9	57.0	51.8	52.5	51.4	53.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 8

Size Distribution of Benefits and Costs¹ of the Guaranteed Income Supplement as a Per Cent of Total Benefits Paid, for the Economic Regions and Canada 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
	(per cent)											
Total Benefits Paid to Families	14.2	15.0	28.8	31.3	25.8	25.3	19.3	16.0	11.9	12.4	100.0	100.0
Income Tax ₂ Allocation	2.8	2.6	10.7	8.2	24.3	20.4	7.9	7.9	7.0	6.3	52.7	45.5

1 The costs in the case of the Guaranteed Income Supplement consist only of a federal income tax allocation.

2 The federal income tax allocation reflects the distribution of federal income taxes paid by region.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 9

Distribution of the Total Benefits and Total Costs of the Guaranteed Income Supplement Across all Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits By Canadian Quintile												
First	5.8	6.3	11.1	13.9	11.4	12.6	9.4	8.0	6.1	6.8	43.8	47.6
Second	4.7	4.6	9.9	10.9	7.9	7.7	7.5	5.7	4.4	3.9	34.2	32.9
Third	1.6	1.7	3.2	2.1	1.7	1.7	1.1	1.1	0.5	0.5	8.2	7.0
Fourth	1.2	1.4	1.9	2.2	2.6	1.2	0.7	0.6	0.2	0.3	6.6	5.7
Fifth	0.9	1.0	2.7	2.2	2.2	2.1	0.6	0.6	0.7	0.9	7.2	6.8
Total	14.2	15.0	28.8	31.3	25.8	25.3	19.3	16.0	11.9	12.4	100.0	100.0
Total Benefits By Regional Quintile												
First	34.0	38.1	38.3	41.1	61.1	53.8	42.3	45.9	47.5	53.6	43.8	47.6
Second	32.9	31.5	33.5	37.3	16.3	28.2	41.3	38.4	40.6	33.4	34.2	32.9
Third	10.7	8.8	10.1	6.0	8.6	6.6	7.9	8.0	4.1	3.9	8.2	7.0
Fourth	10.7	10.2	7.4	8.3	6.9	4.8	4.4	3.4	1.7	2.7	6.6	5.7
Fifth	11.7	11.4	10.7	7.3	7.1	6.6	4.1	4.3	6.1	6.4	7.2	6.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs By Canadian Quintile												
First	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.0	0.5	0.2
Second	0.5	0.4	1.5	1.1	2.2	1.9	1.2	0.9	0.6	0.7	5.9	4.8
Third	1.1	1.2	3.4	3.2	5.6	5.3	2.5	2.4	1.8	1.8	14.4	14.0
Fourth	1.5	1.7	4.8	4.9	10.9	10.7	3.8	4.0	3.1	3.4	24.1	24.7
Fifth	2.1	2.5	10.5	8.9	27.3	26.9	7.5	9.9	7.7	8.0	55.1	56.3
Total	5.2	5.8	20.3	18.1	46.2	44.9	15.1	17.3	13.3	13.9	100.0	100.0
Total Costs By Regional Quintile												
First	0.3	0.2	0.5	0.2	0.9	0.4	0.4	0.1	0.3	0.2	0.5	0.2
Second	4.2	3.5	6.2	4.7	7.8	6.0	4.6	3.8	5.4	5.0	5.9	4.8
Third	12.3	13.0	14.0	14.7	15.6	14.9	13.7	12.8	15.2	14.7	14.4	14.0
Fourth	25.5	25.9	23.8	24.4	23.5	25.2	24.9	23.9	22.9	26.0	24.1	24.7
Fifth	57.7	57.4	55.5	56.0	52.2	53.5	56.4	59.4	56.2	54.1	55.1	56.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 10

Size Distribution of Benefits and Costs of Family and Youth Allowances as a Per Cent of Total Before-Tax Benefits Paid, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
Total Before-Tax Benefits Paid To Families ¹	9.9	10.7	33.8	24.6	31.7	37.8	15.3	16.5	9.3	10.4	100.0	100.0
Total After-Tax Benefits Paid To Families	9.9	8.1	33.8	17.7	31.7	26.5	15.3	11.9	9.3	7.3	100.0	71.6
Income Tax Paid On Benefits ²	0	2.5	0	6.9	0	11.3	0	4.5	0	3.1	0	28.4
Income Tax Allocation ³	1.9	1.9	7.5	7.6	17.1	15.1	5.6	5.8	4.9	4.7	37.1	35.0
Total Costs Paid By Families ⁴	1.9	4.4	7.5	14.5	17.1	26.4	5.6	10.3	4.9	7.8	37.1	63.4

1 Total benefits includes the supplements paid by Quebec and Prince Edward Island in 1975. These supplements were non-taxable.

2 In 1971 benefits were not taxable. In 1975 the marginal income tax rate averaged across all individuals who declared benefits as taxable income may be calculated by dividing the income tax paid on benefits by total before-tax benefits.

3 In addition to the federal income tax allocation there is a provincial income tax allocation for Quebec and Prince Edward Island due to their supplements.

4 Total costs is the sum of the income tax paid on benefits and the income tax allocation.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 11

Distribution of Total Before-Tax Benefits and Total Costs of Family and Youth Allowances Across All Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits By Canadian Quintile												
First	0.9	0.8	2.2	1.3	1.7	1.6	1.6	1.5	0.4	0.5	6.8	5.7
Second	2.7	2.4	6.1	3.5	2.9	3.6	2.5	2.2	0.8	1.0	15.0	12.6
Third	2.7	3.2	9.3	6.2	6.3	7.0	3.6	3.5	1.8	2.0	23.7	21.9
Fourth	2.1	2.4	8.0	6.9	9.5	10.9	3.7	4.4	3.1	3.0	26.4	27.6
Fifth	1.5	1.9	8.2	6.7	11.3	14.7	3.9	4.9	3.2	3.9	28.1	32.2
Total	9.9	10.7	33.8	24.6	31.7	37.8	15.3	16.5	9.3	10.4	100.0	100.0
Total Benefits By Regional Quintile												
First	6.5	5.8	6.6	4.8	6.2	5.4	8.1	8.0	4.2	4.6	6.8	5.7
Second	15.2	16.3	16.2	12.9	14.6	11.6	12.3	11.8	9.6	10.4	15.0	12.6
Third	23.7	24.5	24.1	21.9	23.7	22.5	20.6	20.1	21.7	20.9	23.7	21.9
Fourth	27.1	25.6	25.6	26.9	27.3	28.2	27.9	28.5	32.5	29.3	26.4	27.6
Fifth	27.5	27.8	27.5	33.5	28.2	32.3	31.1	31.6	32.0	34.8	28.1	32.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs By Canadian Quintile												
First	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.5	0.1
Second	0.5	0.7	1.5	1.3	2.2	1.7	1.2	0.9	0.6	0.6	5.9	5.1
Third	1.1	1.9	3.4	4.9	5.6	5.8	2.5	2.7	1.8	1.8	14.4	17.1
Fourth	1.5	2.1	4.8	6.7	10.9	11.1	3.8	4.4	3.1	3.3	24.1	27.5
Fifth	2.1	2.3	10.5	9.9	27.3	23.0	7.5	8.3	7.7	6.7	55.1	50.2
Total	5.2	7.0	20.3	22.8	46.2	41.6	15.1	16.3	13.3	12.4	100.0	100.0
Total Costs By Regional Quintile												
First	0.3	0.1	0.5	0.1	0.9	0.3	0.4	0.1	0.3	0.1	0.5	0.1
Second	4.2	4.6	6.2	4.5	7.8	6.2	4.6	3.9	5.4	4.8	5.9	5.1
Third	12.3	18.9	14.0	17.8	15.6	17.6	13.7	15.3	15.2	16.4	14.4	17.1
Fourth	25.5	28.8	23.8	26.9	23.5	27.5	24.9	27.7	22.9	28.3	24.1	27.5
Fifth	57.7	47.6	55.5	50.7	52.2	48.4	56.4	53.0	56.2	50.4	55.1	50.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 12

Size Distribution of Benefits and Costs of the Canada and Quebec Pension Plans as a Per Cent of Total Before-Tax Benefits Paid, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada ¹	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
Total Before-Tax Benefits Paid To Families	11.3	10.1	28.3	22.0	39.0	42.0	11.8	14.9	9.6	11.0	100.0	100.0
Total After-Tax Benefits Paid To Families	10.0	9.4	25.1	20.6	32.5	37.7	10.0	13.2	8.0	10.0	85.5	90.8
Income Tax Paid On Benefits ²	1.4	0.7	3.3	1.4	6.4	4.3	1.8	1.7	1.7	1.1	14.5	9.2
Total Before-Tax Contributions Paid By Individuals ³	24.5	10.4	92.4	37.6	140.1	56.2	56.6	24.0	37.4	16.3	351.0	144.6
Income Tax Savings On Contributions Paid ⁴	6.2	3.1	25.0	12.2	38.4	17.2	15.7	7.3	10.4	5.1	95.7	44.9
Costs To Employees Of Employer Contributions ⁵	16.8	6.7	62.3	23.6	94.3	36.0	32.6	13.4	25.0	10.5	231.0	90.2
Total Costs Paid By Families ⁶	36.5	14.7	133.0	50.5	202.5	79.3	75.3	31.7	53.7	22.8	500.9	199.0

1 The totals for Canada include both the Canada Pension Plan and the Quebec Pension Plan.

2 The marginal tax rate on benefits averaged over all recipients may be calculated by dividing the income tax paid on benefits by total before-tax benefits.

3 This includes only employees' own contributions (at 1.8 per cent) and all the self-employed contributions (at 3.6 per cent).

4 The marginal tax rate on contributions averaged over all contributors may be calculated at the dividing the income tax savings on contributions by total before-tax contributions.

5 The contributions paid by employers on behalf of their employees have been shifted to the wages and salaries of employees. Income taxes on these shifted contributions have been calculated at the individual's marginal tax rate and deducted from the contributions to employees. Employees and the self-employed are thus treated similarly with respect to contributions.

6 Total costs paid by families is given by the sum of income tax paid on benefits, total before-tax contributions paid by individuals, cost to employees of employer contributions, less the income tax savings on contributions paid.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 13

Distribution of Total Before-Tax Benefits and Total Costs of the Canada and Quebec Pension Plans Across All Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits by Canadian Quintile												
First	1.7	2.5	3.9	6.2	8.8	10.9	3.5	3.9	2.3	3.3	20.2	26.8
Second	4.5	3.1	7.5	6.8	10.8	13.4	3.6	4.5	3.8	2.9	30.2	30.7
Third	1.8	2.1	7.3	3.4	5.9	7.6	2.4	2.9	1.3	2.3	18.7	18.3
Fourth	1.0	1.3	3.6	3.1	5.4	5.6	1.3	1.7	0.6	1.1	11.9	12.8
Fifth	2.3	1.1	6.0	2.5	8.1	4.5	1.0	1.9	1.6	1.4	19.0	11.4
Total	11.3	10.1	28.3	22.0	39.0	42.0	11.8	14.9	9.6	11.0	100.0	100.0
Total Benefits by Regional Quintile												
First	10.6	22.6	13.7	25.7	31.5	30.9	22.1	23.1	22.2	29.0	20.2	26.8
Second	30.1	26.8	25.5	31.6	26.3	31.6	31.0	27.8	43.8	28.1	30.2	30.7
Third	23.1	17.7	23.4	13.5	10.5	18.0	23.8	22.0	12.0	21.9	18.7	18.3
Fourth	10.7	16.2	16.0	15.0	14.2	11.0	10.0	13.6	6.3	9.3	11.9	12.8
Fifth	25.5	16.7	21.4	14.2	17.5	8.5	13.1	13.5	15.7	11.7	19.0	11.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs By Canadian Quintile												
First	0.2	0.2	0.6	0.6	0.8	0.8	0.6	0.5	0.3	0.3	2.5	2.4
Second	1.6	1.3	4.3	3.8	4.3	4.7	2.6	2.5	1.1	1.4	13.9	13.6
Third	2.0	2.1	6.6	6.2	7.7	7.5	3.7	3.6	2.3	2.3	22.3	21.6
Fourth	1.8	2.0	6.9	7.3	11.4	10.7	3.9	4.2	3.0	3.0	27.1	27.2
Fifth	1.7	1.8	8.2	7.5	16.2	16.2	4.2	5.1	4.0	4.4	34.2	35.2
Total	7.3	7.4	26.6	25.4	40.4	39.9	15.0	15.9	10.7	11.4	100.0	100.0
Total Costs By Regional Quintile												
First	1.7	2.1	2.2	2.2	3.3	3.0	2.4	2.3	2.1	2.3	2.5	2.4
Second	10.6	11.7	14.3	13.1	15.7	14.6	12.0	13.2	12.4	13.2	13.9	13.6
Third	21.7	21.1	22.2	21.4	21.7	21.5	22.9	22.2	23.3	22.3	22.3	21.6
Fourth	28.0	27.9	27.0	27.5	26.6	26.6	28.7	27.9	27.1	27.3	27.1	27.2
Fifth	38.0	37.2	34.3	35.8	32.7	34.3	34.0	34.4	35.1	34.9	34.2	35.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 14

Size Distribution of Benefits and Costs of Unemployment Insurance as a Per Cent of Total Before-Tax Benefits Paid, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
Total Before-Tax Benefits Paid To Families	13.6	15.9	32.4	32.4	29.5	30.6	13.0	6.0	11.5	15.1	100.0	100.0
Total After-Tax Benefits Paid To Families	13.6	13.5	32.4	27.7	29.5	25.2	13.0	4.9	11.5	12.2	100.0	100.0
Income Tax Paid On Benefits ¹	0	2.4	0	4.7	0	5.5	0	1.1	0	2.9	0	16.5
Total Before-Tax Contributions Paid By Employees	1.8	2.0	6.7	7.2	10.3	10.9	3.3	4.0	2.8	3.2	24.8	27.4
Income Tax Savings On Contributions Paid ²	0	0.6	0	2.3	0	3.3	0	1.2	0	1.0	0	8.3
Cost To Employees Of Employer Contributions ³	1.4	2.0	4.9	6.9	7.5	10.6	2.4	3.9	2.0	3.1	18.3	26.5
Income Tax Allocation ⁴	1.4	0.8	5.6	2.4	12.7	6.0	4.1	2.3	3.6	1.8	27.4	13.3
Total Costs Paid By Families ⁵	4.6	6.5	17.2	18.9	30.4	29.7	9.9	10.2	8.4	10.1	70.5	75.4

1 1971 was the last year covered by the old Act. As such, benefits were not taxable, nor were contributions tax deductible. For 1975 the marginal tax rate on benefits may be calculated by dividing the income tax paid on benefits by total before-tax benefits.

2 The marginal tax rate on contributions averaged over all contributors may be calculated by dividing the income tax savings on contributions by total before-tax contributions.

3 In 1971 although contributions were not tax deductible, employer contributions were assumed shifted to the wages and salaries of contributors and as such were taxed. For both years the employee cost was calculated as the employer contribution less the income tax the employee would have paid had he received the contribution as wages or salary.

4 For Unemployment Insurance, the income tax allocation is calculated by applying the ratio of the net Unemployment Insurance deficit to total federal government expenditure to the federal income tax paid by all taxpayers.

5 Total costs paid by families is the sum of income tax paid on benefits, total before-tax contributions, the income tax allocation, less the income tax savings on employer contributions paid.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table 15

Distribution of Total Before-Tax Benefits and Total Costs of Unemployment Insurance Across All Economic Families by Canadian After-Tax Income Quintiles and by Regional After-Tax Income Quintiles, for the Economic Regions and Canada, 1971 and 1975

	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
(per cent)												
Total Benefits												
By Canadian Quintile												
First	1.6	0.9	2.5	2.7	2.5	2.2	2.0	0.5	1.1	1.7	9.8	8.1
Second	5.0	4.9	8.9	8.0	5.5	4.9	2.8	1.3	2.4	2.9	24.6	22.0
Third	3.8	4.7	10.5	8.1	7.0	7.1	3.7	1.5	2.8	3.6	27.7	24.9
Fourth	1.8	3.1	5.6	7.0	8.4	7.8	2.9	1.4	3.2	3.4	21.9	22.7
Fifth	1.4	2.3	4.9	6.6	6.1	8.6	1.6	1.3	2.0	3.5	16.0	22.3
Total	13.6	15.9	32.4	32.4	29.5	30.6	13.0	6.0	11.5	15.1	100.0	100.0
Total Benefits												
By Regional Quintile												
First	8.5	4.8	7.8	7.1	10.9	9.6	9.7	6.0	7.9	10.1	9.8	8.1
Second	23.4	21.5	25.0	23.1	23.0	17.9	21.2	19.3	25.5	21.4	24.6	22.0
Third	28.4	28.0	30.0	23.7	26.6	25.5	24.1	24.9	24.4	26.1	27.7	24.9
Fourth	22.2	23.0	19.8	22.4	24.0	24.4	27.2	25.9	26.4	22.0	21.9	22.7
Fifth	17.5	22.7	17.4	23.7	15.5	22.6	17.8	23.9	15.8	20.4	16.0	22.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs												
By Canadian Quintile												
First	0.2	0.2	0.4	0.6	0.5	0.7	0.4	0.4	0.2	0.3	1.6	2.1
Second	1.2	1.5	3.6	3.5	3.7	3.7	1.8	1.7	1.0	1.6	11.3	11.9
Third	1.8	2.5	5.7	6.2	7.4	7.1	3.1	2.8	2.3	2.7	20.3	21.3
Fourth	1.7	2.3	6.3	6.9	11.9	10.5	3.8	3.6	3.2	3.5	26.9	26.9
Fifth	1.6	2.1	8.4	7.8	19.7	17.4	4.9	5.1	5.2	5.3	39.9	37.8
Total	6.5	8.6	24.4	25.0	43.2	39.4	14.0	13.6	11.9	13.4	100.0	100.0
Total Costs												
By Regional Quintile												
First	1.4	1.5	1.7	1.8	2.2	2.6	1.5	1.8	1.3	2.2	1.6	2.1
Second	8.8	10.8	12.8	12.0	12.9	12.2	8.5	10.1	9.6	12.4	11.3	11.9
Third	20.6	23.2	20.8	22.2	20.5	20.9	20.4	19.9	20.8	22.0	20.3	21.3
Fourth	29.1	27.7	26.6	27.0	26.3	26.8	28.1	27.9	26.3	27.4	26.9	26.9
Fifth	40.1	36.8	38.1	37.0	38.1	37.5	41.5	40.3	42.0	36.0	39.9	37.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Footnotes

- 1 Social security transfers include all direct income transfers of governments to individuals, except such payments as interest payments on government debt and the wages, salaries and pensions of government employees.
- 2 Thirteenth Annual Review, Economic Council of Canada, 1976, Chapter 2.
- 3 Income is used to designate funds received from all sources, while earnings, employment earnings, or employment income excludes dividends, interest, other investment income, government transfer payments, and private pension payments.
- 4 J.E. Cloutier, "The Distribution of Benefits and Costs of Social Security in Canada 1971-1975", Discussion Paper No. 108, Economic Council of Canada, February 1978.
- 5 Ibid. For details of how the costs were calculated see Appendix B, pp. 57-63, of that discussion paper. For details on the adjustment made to the benefits reported in the Survey of Consumer Finances see Appendix C, pp. 64-68. The benefits and costs reported in this discussion paper used the same procedures which were not varied from one region to another.
- 6 When we speak of economic families, or simply families or family units, we shall mean economic families and unattached individuals. For a definition see: Statistics Canada, Income Distributions by Size in Canada, Catalogue 13-207 (Annual), 1976, page 17.
- 7 It is not feasible to allocate the contributions from other sources (corporate taxes, sales taxes, etc.) to families due to the lack of data. Although it is relatively easy to calculate the employer contributions for the Canada and Quebec Pension Plans and for Unemployment Insurance, these have not been included in the cost allocated to families in Table 4 and Table 5. While there is little doubt that employees bear a proportion of the employer contributions in lower wages or salaries, there is no evidence to indicate that these costs should be treated any differently than corporate taxes, or other overhead costs, and thus shared with shareholders and consumers through lower profits and higher prices respectively. In the following sections, where programs are examined individually, we make a different set of assumptions and shift the employer contribution entirely to employees through wages or salaries.
- 8 The type of analysis done is essentially a marginal analysis in which the impact of a particular program on economic families is calculated by considering the benefits and the incremental financing changes that affect families due solely to the existence of the program. In the analysis the benefits considered are the total before-tax benefits for the program under consideration. The costs that are included vary from program to program but include some or all of the following types of costs. If the benefits paid under the program are taxable, then one of the costs is the income tax paid on those benefits. Included in the tax-back are both the federal and provincial component. If the plan is contributory, then the before-tax contributions paid under the program are another cost. If, however, the contributions are tax deductible, then an offset to the cost of the contributions is the income tax saving due to the deductibility of contributions. In the analysis we assume that the entire cost of the employer contribution is shifted to employees' wages or salaries. If, however, employees were to receive these contributions in wages or salaries they would become taxable. Thus, the income tax payable on these shifted employer contributions is deducted from the contributions leaving the cost of employer contributions to employees. The last type of cost included is an income tax allocation from government general revenues. The ratio of income tax support for a program is calculated as the net deficit of the program, to government net general expenditure (specific revenue items have been netted out of the expenditure figures). This ratio is then

applied to personal income taxes adjusted by taxes paid on benefits, and tax savings due to contribution deductibility, to reflect the taxes that would have been paid in the absence of the program. All other costs are assumed not to change and are independent of the existence of a particular program. A reconciliation of the benefits reported in the Survey of Consumer Finances with the National Accounts is given in Discussion Paper No. 108, Appendix C, Table C1, p. 64.

- 9 The Old Age Security pension and the Guaranteed Income Supplement are reported together in the SCF. The method used to separate the two is given in Discussion Paper No. 108, Appendix C, pp. 64-65.
- 10 The pensionable earnings for each year are adjusted so that they bear the same relationship to the average of the pensionable earning ceiling in force when the pension is paid and those of the preceding two years, as they bore to the upper limit in force when the income was actually received.
- 11 The distribution of total costs given for Canada in 1975 is not identical to that presented in Table 14, page 41, of Discussion Paper No. 108. As described in Appendix C of that Discussion Paper, Unemployment Insurance benefits were adjusted upwards to compensate for nonreporting of benefits in the Survey of Consumer Finances. At the same time, the increase in benefits was taxed at the average marginal rate calculated for individuals within income classes. This additional tax was then added to the costs allocated to families. In the distribution presented in Discussion Paper No. 108 this additional cost was omitted in error. The distributions presented in this paper include this extra marginal tax. The cost distributions for 1973, 1974, and 1975 in Table 14 and Table 15 of Discussion Paper No. 108 are the only ones affected by this omission. The remaining tables in that Discussion Paper include the marginal tax on the adjusted benefits.

Bibliography

Statistics Canada, Income Distributions by Size in Canada, Catalogue 13-207
(Annual).

Statistics Canada, Social Security: National Programs 1978, Catalogue 86-201
(Annual).

APPENDIX

Table A1

Average Family¹ Total Income Before Tax For All Economic Families by Canadian After-Tax Income Quintiles,² for the Economic Regions and Canada, 1971 and 1975

Quintile	Average Family Total Income 1971					
	Atlantic	Quebec	Ontario	Prairie	B.C.	Canada
	(Dollars ³)					
First	1,702	1,574	1,614	1,665	1,614	1,623
Second	4,526	4,723	4,805	4,673	4,628	4,706
Third	7,579	7,763	7,854	7,771	7,951	7,799
Fourth	10,677	10,985	11,026	11,132	11,087	11,015
Fifth	<u>17,328</u>	<u>19,522</u>	<u>19,084</u>	<u>18,469</u>	<u>19,561</u>	<u>19,081</u>
Total	6,860	8,532	9,853	7,914	9,165	8,845
	Average Family Total Income 1975					
	(Dollars ³)					
First	2,840	2,724	2,780	2,600	2,904	2,752
Second	7,242	7,375	7,407	7,341	7,502	7,381
Third	11,976	12,215	12,261	12,228	12,321	12,222
Fourth	17,040	17,216	17,396	17,358	17,433	17,322
Fifth	<u>27,455</u>	<u>29,137</u>	<u>29,371</u>	<u>30,238</u>	<u>29,326</u>	<u>29,350</u>
Total	11,618	12,891	15,001	13,349	14,264	13,805

1 Economic families and unattached individuals.

2 The income tax was a calculated value. Linear interpolation was used on the income after tax group that separated adjacent quintiles. The largest range for an income after tax group was \$1,000.

3 Current dollars.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table A2

Average Family¹ Total Income² Before Tax for All Economic Families by Regional After-Tax Income Quintiles,³ for the Economic Regions and Canada, 1971 and 1975

Average Family Total Income 1971						
Quintile	Atlantic	Quebec	Ontario	Prairie	B.C.	Canada
	(Dollars ³)					
First	1,454	1,571	1,925	1,406	1,519	1,623
Second	3,675	4,598	5,713	3,943	4,624	4,706
Third	5,880	7,376	8,995	6,811	8,251	7,799
Fourth	8,659	10,430	12,114	10,064	11,385	11,015
Fifth	<u>14,632</u>	<u>18,684</u>	<u>20,518</u>	<u>17,348</u>	<u>20,049</u>	<u>19,081</u>
Total	6,860	8,532	9,853	7,914	9,165	8,845
Average Family Total Income 1975						
	(Dollars ³)					
First	2,665	2,587	3,122	2,327	2,826	2,752
Second	6,450	6,973	8,336	6,680	7,482	7,381
Third	10,290	11,522	13,532	11,438	12,662	12,222
Fourth	14,534	16,060	18,869	16,724	18,148	17,322
Fifth	<u>24,151</u>	<u>27,316</u>	<u>31,145</u>	<u>29,578</u>	<u>30,203</u>	<u>29,350</u>
Total	11,618	12,891	15,001	13,349	14,264	13,805

1 Economic families and unattached individuals.

2 The income tax was a calculated value. Linear interpolation was used on the income after tax group that separated adjacent quintiles. The largest range for an income after tax group was \$1,000.

3 Current dollars.

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table A-3

The Ratio of Total Before-Tax Benefits Received by Economic Families to Total Costs Paid by Families, by Social Security Program and Economic Region, Canada 1971 and 1975

Program	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
OAS	3.66	4.26	2.23	3.29	1.47	2.00	2.31	2.44	1.84	2.19	1.92	2.46
GIS	5.13	5.74	2.70	3.81	1.06	1.24	2.42	2.03	1.71	1.95	1.90	2.20
FYA	5.12	2.42	4.49	1.70	1.85	1.43	2.75	1.60	1.88	1.34	2.70	1.58
C/QPP	0.31	0.69	0.21	0.44	0.19	0.53	0.16	0.47	0.18	0.48	0.20	0.50
UI	2.96	2.45	1.89	1.72	0.97	1.03	1.32	0.59	1.37	1.50	1.42	1.33
Total	3.38	4.15	1.79	2.36	1.17	1.63	1.70	1.60	1.49	2.00	1.57	1.99

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

Table A-4

Average Marginal Tax Rates for Programs with Taxable Benefits and Tax Deductible Contributions by Economic Region, Canada, 1971 and 1975

Program	Atlantic		Quebec		Ontario		Prairie		B.C.		Canada	
	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975	1971	1975
	(Per Cent)											
OAS	4.03	2.22	5.70	2.80	8.14	5.12	6.44	5.09	6.85	4.63	6.67	4.22
FYA	0	23.63	0	28.05	0	29.81	0	27.44	0	30.04	0	28.35
C/QPP												
Benefits	11.95	7.22	11.50	6.52	16.53	10.16	15.45	11.37	17.28	9.56	14.53	9.18
Contributions	25.48	30.10	27.02	32.37	27.40	30.57	27.70	30.60	27.76	31.14	27.25	31.07
U.I.												
Benefits	0	14.86	0	14.42	0	17.83	0	19.08	0	19.14	0	16.53
Contributions	0	28.86	0	31.80	0	29.96	0	29.88	0	30.61	0	30.43

Source: Statistics Canada (Survey of Consumer Finances) and estimates by the author.

NEGATIVE INCOME TAX EXPERIMENTS: A DESCRIPTIVE
SURVEY WITH SPECIAL REFERENCE TO WORK INCENTIVES

by

Derek P. J. Hum*

1. POVERTY, POLICY AND THE NEGATIVE INCOME TAX EXPERIMENTS

Proposals to alleviate poverty based upon a government guarantee of a certain minimum level of income to every individual or family are no longer new. They have a moderately long history in terms of intellectual advocacy, policy discussion, and program proposals. When one views the poverty problem primarily as a matter of insufficient income in a market-oriented society, as do most economists, it is natural to look to tax transfer measures to redistribute society's income. Simultaneously the mechanism is asked to administer the welfare system, finance the transfer costs, and integrate the able-bodied poor into the labour market. Friedman (1963) was among the first to suggest a "negative income tax" (NIT) by means of which a portion of the unused tax exemptions and deductions allowable under the personal income tax system would be actually paid to individuals by the government. Lampman's (1965a, 1965b) various proposals specified that different rates of subsidy be added to earnings in order to bring an individual's income up to some predetermined level. Tobin (1965, 1966) advocated a system of income allowances in which those with no earnings would receive a certain minimum amount. All of these proposals are related to the income tax system; hence a negative income tax can be taken most generally to mean any form of income maintenance or supplementation based upon the mechanism of the personal income tax. Specifically, it involves the payment of cash transfers by the government to households having income below a prespecified amount; it is the technical inverse of taxes paid to the government by households with incomes above a certain exemption level. [1] The combination of three elements; namely -- the view that poverty can be largely defined in terms of income, that the tax transfer mechanism is an appropriate instrument for welfare reform objectives, and the economist's fascination (or infatuation) with the logical symmetry of the income tax system - influenced much of the design and basic language of the "negative income tax" schemes. The negative income tax proposal, in its many manifestations, has had its share of advocates (e.g., Rolph, 1967; Tobin, Pechman and Mieskowski, 1967), detractors (e.g., Schorr, 1966; Hitch, 1966; Vadakin, 1968), and skeptics (e.g., Hildebrand, 1967).

Almost all variants of income maintenance schemes embody a basic support level to which families are entitled if they have no earnings or other income, and some rate of taxation by which this support amount is reduced or "offset" for each dollar earned. Consequently, a negative income tax scheme may be characterized by the combination of its guaranteed minimum income level, G , and its offset taxation rate, t . A breakeven level of income, B , can then be defined in terms of G and t , and is that level of income at which cash transfers or negative taxes to the family are no longer paid. The higher the level of the minimum income guarantee and/or the lower the tax rate, the higher is the level of income below which negative taxes will be paid and consequently the greater will be the proportion of the population which receives negative taxes. The costs of such NIT transfers are therefore greater with higher guarantee levels and lower tax

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rates. At the same time, a negative income tax offers to able-bodied, low-income individuals a certain lump sum amount of income unconditionally; that is, without reference to his work performance. Operating in conjunction with a tax on earned income, the guaranteed income will tend to lessen work incentives according to standard economic theory. Again, the higher the degree of work disincentive, the higher will be the transfer costs associated with the negative income tax and, as well, the less likely it will be that public support or political initiative would be forthcoming. So, the crucial policy questions concerning the negative income tax are: how much work disincentive is there likely to be? and what will be the costs associated with different levels of support and taxation rates? [2]

Unfortunately, precise and reliable estimates of work response to nonwork conditioned income receipts have not been available and, in the opinion of most econometric researchers, would unlikely be forthcoming from nonexperimental data alone. Also it was not clear whether general research results on work behaviour could be applied to the low-income working poor, and it is upon this group that NIT policy concerns were focused and about which, perhaps, the least was known concerning work habits and responses. Consequently the stage was set for a series of large scale social experiments in the United States and Canada to address this important issue of income guarantees and work incentives. These experiments were conducted in a variety of locations, cost millions of dollars each, took place over a number of years, and required vast amounts of resources in terms of research and scientific talent, operational and administrative effort, data processing, field survey and other professional personnel. Taken as a whole the experiments were audacious and innovative. As a research endeavour they established a precedent in introducing large scale randomized controlled experimental designs to the social sciences, and resulted in methodological advances in many areas. At the same time, they produced new policy relevant information and novel administrative techniques. Their total impact has surely been to change, substantially and irrevocably, the nature of the debate concerning welfare reform, work incentives and the negative income tax.

Relative to either the significance or extent of the negative tax experiments, the objective and scope of this paper is very limited indeed. The purpose of this paper is to provide a descriptive survey of the negative tax experiments in the United States and Canada and the attempts to scientifically test theory and policy proposals through explicit experimentation. Section 2 describes two features common to all the income maintenance experiments; namely, the policy focus on the work incentives issue and the Watts-Conlisk approach to allocating an experimental sample. An overview of the designs of the individual income maintenance experiments is given in Section 3. Section 4 summarizes, quite uncritically, labour supply results reported to date, restricting its attention almost exclusively to earnings and work response. Section 5 mentions, for completeness, other issues unrelated directly to the earnings or work disincentive question and offers some concluding remarks. Throughout this survey, a conscious attempt will be made to place the discussion within a Canadian context in terms of income levels and policy issues, to make it pertinent to those engaged in Canadian incomes research and policy planning.

2. ECONOMIC THEORY AND EXPERIMENTAL DESIGN

The research design of the negative income tax experiments is crucial for understanding the experimental objectives and interpreting the results. Common to the design of all the experiments were two features. The first was the emphasis given to the labour supply response to a guaranteed annual income. Detecting and measuring the work disincentive effect of various combinations of guarantee levels and offset tax rates was con-

sidered the primary research objective. The second feature was the use in each of the experiments of a variant of the Watts-Conlisk model for optimizing experimental designs for estimating response surfaces. The Watts-Conlisk model is not a traditional approach to experimental statistical design and considerable intellectual debate and controversy involving detailed technical discussions was generated. A discussion of these statistical intricacies is, however, beyond the scope of this paper. Instead, in considering the overall design of each experiment I shall confine my attention to stating the central research thrust of each experiment, describing its various experimental NIT treatments (its design space), commenting briefly on its sample characteristics and mentioning the special features or unique contribution distinguishing each of the several experiments. [3]

Theory of Work Response and NIT

First of all, however, it is necessary to outline the essential theory relating work response to minimum income guarantees and offset tax rates. It was these relationships that the experiments were expected to measure and test.

Models of the labour supply decision process can differ in considerable detail and complexity but the "conventional" model of work response to income maintenance can be illustrated as a standard application of static consumer choice theory. The rational individual is assumed to make choices according to his preferences (as characterized by a well-behaved utility function) subject to a budget constraint on his total available time, T . Time allocated to work, H , provides earnings which are then used to purchase a composite commodity, X , having price, p . Aggregated nonmarket uses of time is called leisure, L , and is priced at w , the opportunity cost of leisure measured in wage units. Suppose that the individual has unearned income of Y , and assume without loss of generality the price of X to be unity. The budget constraint is

$$X = w(T - L) + Y = wH + Y \quad , \quad (1)$$

which simply states that hours of work, $H \equiv T - L$, at the wage rate w will provide earnings to buy goods X in addition to any amount possible from unearned income. Faced with a predetermined value for w and Y , the individual chooses the levels of L and X which maximizes his preference function: [4] $U = U(X, L)$. The individual's most preferred equilibrium position will imply a certain demand function for leisure, $L = L(w, Y)$. But since $T - L \equiv H$, the demand for leisure may also be viewed as determining his supply function of labour

$$H = H(w, Y) \quad (2)$$

Now consider the introduction of an income maintenance program on the supply of work effort. Since any NIT program can be characterized by its support level, G , and offset tax rate, t , the result is to alter the effective budget constraint from $X = wH + Y$ to

$$X = G + (1 - t)(wH + Y) \quad (3)$$

for persons with $wH + Y < G/t = B$; that is, individuals with total income below breakeven levels. Since $wH + Y$ and $G + (1 - t)(wH + Y)$ are respectively the amounts of total income available before and after the NIT subsidy, it is easy to see that the negative tax payment is simply, P ,

$$P = G - t(wH + Y) \quad (4)$$

indicating that the basic support level, G , is reduced at the rate, t , for each additional dollar of earned income. Clearly, the altered budget constraint (3) is equivalent to (1) except

that Y is altered to $G + (1 - t)Y$ and w is changed to $(1 - t)w$. Accordingly, the change in work effort occasioned by a NIT program will be given as

$$\begin{aligned} \Delta H &= H[w(1-t), G + (1-t)Y] - H(w, Y) \\ &= F(\dots, t, G, \dots) \end{aligned} \quad (5)$$

which indicates that the magnitude of the work response is related to the offset tax rate and guarantee support level parameters of the NIT program. Further manipulations and assumptions allow a partitioning of the work response into separate effects due to the tax rate and the guarantee level, and to establish the general expectation of a reduction in work effort. Nonetheless, the significance for public policy concerns the magnitude of the work response for alternative values of the guarantee level and tax rate since various combinations of G and t determine the amount of the work disincentive, the extent of program coverage, and the overall dollar costs of a NIT program.

Since conventional economic theory would suggest that work response among low-income families was dependent upon both the guarantee level as well as the offset tax rate, the experiments accordingly focused on measuring the direction and magnitude of this labour supply response over a feasible (politically relevant) range of the two crucial NIT program parameters; namely, G and t . This orientation was dominant in the design of each of the experiments.

The Watts-Conlisk Assignment Model [5]

The manner in which an experimental sample is chosen and allocated to different combinations of G and t (called NIT treatment plans) is a fundamental component of the income maintenance experimental design. Once the number of treatment plans to test has been decided, some procedure must be specified to allocate the sample. The conventional analysis-of-variance (ANOVA) procedure would entail assigning to each experimental treatment plan an equal number of observations, given equal costs for each sample point. Despite possible modifications to take account of differential costs per treatment observation, unequal expected variances, different stratum populations, and unequal policy importance of experimental plans, the common ANOVA approach to sample allocation was not employed by any of the NIT experiments.

The sample design and assignment process in all of the NIT experiments incorporated specific assumptions and constraints and used the Watts-Conlisk formal model to generate an optimum sample for estimating response surfaces. The Watts-Conlisk assignment model is a formal technique for optimally allocating observations or sample points among various experimental treatments in order to maximize the value of the information generated by the experiment. The basis of the assignment model is a rigorous benefit-cost analysis of the alternative sample allocations that are feasible within a given budget constraint. In the context of the NIT experiments benefits are measured in terms of reductions in the variances of certain predicted values. Costs are measured in monetary terms reflecting the financial budget constraint of the experiment.

More formally, the design model may be stated:

$$\begin{aligned} \text{Minimize } \Phi(n_1, \dots, n_m) &= \text{tr} [w \text{ var} (Pb)] \\ \text{subject to } \sum_i c_i n_i &\leq C; L(n_1, \dots, n_m) = 0, \\ n_i &\geq 0 \quad (i = 1, \dots, m) \end{aligned} \quad (6)$$

where m is the number of NIT plans or design points, c_i is the cost of one observation at the i th design point, n_i is the number

of observations at the i th design point, and C is the total available budget. $L(n_1, \dots, n_m) = 0$ represents additional external or arbitrary linear constraints imposed on the choice set. A criterion to rank alternative feasible designs is given by the objective function ϕ . An estimation viewpoint for the experiment is adopted in specifying ϕ in terms of estimation error $\text{Var}(Pb)$. In particular, a response function and regression model is specified and the optimal sample allocation is that which minimizes the weighted sum of the variances of the elements of Pb . Pb is a linear combination of the estimated vector of regression coefficients b , $\text{tr}(\cdot)$ is the trace operator and W is a positive definite diagonal weight matrix whose diagonal elements measure the relative importance (policy relevance) to the experimenter of the elements of Pb .

The above is a well-behaved programming problem involving minimization of a convex objective function over a set of linear constraints. Accordingly, the Watts-Conlisk assignment model indicates for a given budget the optimal allocation of sample points which will yield the least prediction error for an estimated regression equation.

3. THE DESIGN OF THE NEGATIVE INCOME TAX EXPERIMENTS

There have been five negative income tax experiments in North America, four in the United States and one in Canada. In chronological sequence they are (1) The New Jersey Graduated Work Incentive Experiment (hereafter New Jersey Experiment), (2) The Rural Income Maintenance Experiment (RIME), (3) The Seattle-Denver Income Maintenance Experiment (SIME-DIME), (4) The Gary Income Maintenance Project (G-X), and (5) The Manitoba Basic Annual Income Experiment (Mincome Manitoba). I shall outline, in turn, salient design features of each of the income maintenance experiments, focusing on each experiment's "policy design space"; that is, the set of relevant policy parameters deemed of interest and about which the experiment sought information. [6]

The Design of the New Jersey Experiment

The New Jersey Experiment was the first of the income maintenance experiments. Its very remarkable achievement in design, data collection and analysis is all the more significant because many of its features were subsequently adopted by other negative income projects. The New Jersey Experiment started its initial enrollment of families in 1968 in three urban sites in New Jersey, a state chosen partly because it had no welfare program covering families with unemployed fathers (AFDC-UP), and partly because of research administrative convenience and sympathetic state welfare officials. As well, the sites in New Jersey represented a substantial low-income population in central cities. Later, a fourth site in Scranton, Pennsylvania, was included to increase the number of non-Spanish speaking whites in the experiment. The experiment's paramount interest in the labour supply response of the "working poor" -- a group for whom the NIT work disincentive issue was thought most relevant and about which the least was known concerning the behavioural effects of extending cash assistance -- motivated certain eligibility restrictions in defining the relevant target population for the experiment. Participation in the experiment was therefore limited to (randomly) selected low-income, male-headed, able-bodied family units; that is, eligible families had to contain a male between the ages of 18 and 58, not enrolled in school, the armed forces or an institution, and receiving a normal income not greater than 150 per cent of the official poverty line. [7] A sample of 1357 families, stratified primarily by normal income range, ethnicity and race, was eventually enrolled in the experiment for a three-year period. Families selected were randomly assigned to either a control group, which did not receive NIT payments, or alternatively, to one of several treatment programs paying benefits according to a specified guarantee level and tax rate

combination, (G,t). Three constant tax rates (.3, .5, .7) were used to offset earned income and four support levels (50 per cent, 75 per cent, 100 per cent, 125 per cent) expressed in terms of percentages of the official poverty line were employed. These were combined into eight separate NIT treatment plans to be tested. [8] The resulting sample of the New Jersey Experiment assigned to the various NIT plans, it must be stressed, was not a nationally representative segment of the American low-income population. In fact, the experimental sample contained a higher proportion of nonwhites, large families, and young family heads when compared to the national population of the nonaged, male-headed, low-income families. In addition, the sample represented sites characterizing the nonSouth urban U.S. at most. In keeping with the central interest of the experiment to focus on the labour supply effects of a guaranteed income, the experimental treatments in the New Jersey Experiment were strictly financial. [9]

The Design of the RIME Experiment

The Rural Income Maintenance Experiment (RIME) was the second of the American NIT experiments and focused upon the work efforts of rural low-income families. Because of differences in labour markets and the proportion of self-employed individuals, the work response of rural low-income families was expected to be different from that of the urban work-eligible poor. The rural experiment was conducted in North Carolina and Iowa and its design had many of the same features as the New Jersey Experiment. Families were randomly assigned to either a control group or to a variety of guarantee and tax treatments. The Watts-Conlisk model for allocating a dispersed sample was also employed. The NIT program was to last three years; three distinct tax rates (.3, .5, .7) were employed in combination with four guarantee levels (50 per cent, 75 per cent, 100 per cent, 125 per cent of official poverty level). Originally, only five experimental treatments were specified but because AFDC benefit levels in Iowa were more generous than all but the most generous NIT plan, three new treatments were established for Iowa alone. A distinctive feature of RIME was the inclusion, at the insistence of the OEO, of female-headed families as well as aged-headed (either sex) families in addition to nonaged male-headed families in the sample. The RIME experimental sample was therefore stratified by sex, age of head, and site as well as three normal income strata. Again, as in the New Jersey Experiment, the RIME sample was truncated to exclude families with income levels in excess of 150 per cent of the poverty line. Final enrollment numbered 809 families of whom 729 remained in the program for the entire three year period. The RIME sample is relatively small as the 809 sample households must "represent" the approximately 35.5 per cent of the U.S. poverty population residing in rural areas. Of the 809 sample families, 587 were headed by a nonaged male, 108 by a nonaged female and 114 by an older family head of either sex. Blacks comprised 56 per cent of the North Carolina sample, and there were no blacks in the Iowa segment. In general, the North Carolina and Iowa samples differed substantially with respect to race composition, education level and occupational mix as well as other demographic differences. The RIME sites are representative of groups of states in the Midwest (Illinois, Iowa and Wisconsin) and the South (Alabama, Georgia, Mississippi, North Carolina and South Carolina) rather than all of American rural poverty. The Midwest typifies the condition of scattered poverty within a prosperous agricultural region and the South represents area-wide poverty or a depressed region.

Although the RIME experiment continues the central emphasis on investigating the labour supply response to a guaranteed income, RIME is distinctive in focusing upon the rural poor and farm operators, extending the sample to include female-headed and aged-headed family units, broadening the research interest to include some noneconomic topics and providing some provision for

administrative experimentation by placing families on either a three-month or one-month accounting plan. The payments system of RIME was also a major innovation from that of the New Jersey Experiment and provided valuable insights into the administration of an income maintenance plan.

The Design of the SIME-DIME Experiment

The Seattle-Denver Income Maintenance Experiment (SIME-DIME) is the largest and most elaborately designed of the American experiments. The major research objective of SIME-DIME is the work effort and family stability responses of families to a variety of negative income tax plans in combination with manpower programs and training subsidies. The manpower component is intended to counteract any negative effects on work responses resulting from the negative income tax program. The intent of SIME-DIME is to measure both the separate and combined effects of these programs. A variant of the Watts-Conlisk model was again used to generate the sample requirements. The sample was stratified by race (whites, blacks, Mexican-Americans), number of family heads, and normal income (six levels), and truncated to exclude families with incomes exceeding a given level (approximately \$11,000).

The policy design space of SIME-DIME is elaborate. Three support levels are employed: \$3800, \$4800 and \$5600 (1970-71 prices) per annum for a family of size four. Unique to the SIME-DIME design is the fact that a variety of constant and declining tax rates are specified.[10] In essence, two types of tax systems were employed. The tax function may be represented in general terms as $t(Y) = t - rY$ where t is an initial tax rate, r is the rate of decline and Y is income. When $r = 0$, the tax rate is constant. In SIME-DIME two tax rates are constant at .5 and .7 and two others begin at either .7 or .8 and decline at the rate of 2.5 per cent per \$1000 increment in income. Altogether eleven financial treatments are given. The two constant tax rates are combined with each of the three support levels; the two declining rates are used with the low and middle support levels, and the declining rate with the higher initial value (i.e., $t = .8$, $r = 0.025$) is used with the high support level (\$5600).

A manpower component also distinguishes the SIME-DIME policy design space. Treatments consist of manpower counselling as well as counselling together with training subsidies. Direct costs of training in programs not longer than two years are reimbursed at the rate of either 50 per cent or 100 per cent. Actual training programs were not feasible as it would not have been possible to design a set of experimental training and educational options comparable to those available from the existing manpower system in Seattle and elsewhere. However, the manpower treatments of SIME-DIME are consistent with the general spirit of the NIT approach. In terms of the human capital accumulation framework, the cash support of the NIT can be viewed as replacing the foregone income costs of seeking training. The cost reimbursement component of the manpower experiment may be viewed as changing the effective price of increasing human capital, in the same manner in which negative taxes change the effective price of leisure (Kurz and Spiegelman, 1971).

Another distinctive design feature of SIME-DIME is its treatment of program duration as an experimental variable. In order to isolate short run responses from longer term behaviour, experimental families are assigned to financial treatments for a three-year, five-year, or twenty-year duration. Accordingly SIME-DIME is the only experiment that will allow some evaluation of the validity of limited duration experiments.

The experimental sample of SIME-DIME is the largest of all the income maintenance experiments, having an original sample of about 4800 urban families representative of the western United

States. A greater proportion of experimental families are in low income groups, compared to the total U.S. population. Finally, because of Seattle's highly volatile unemployment rate (3 per cent in 1969 to 10.5 per cent in 1971), it is possible that estimates of effects can be made for varying levels of unemployment. [11]

The Design of the G-X Project Experiment

The fourth American NIT experiment was the Gary Income Maintenance Project (G-X) which commenced payments in 1971 for a three-year period. Distinguishing the G-X from its predecessors is the fact that its target population represents segments not prominently treated in other experiments; namely black, female-headed families in a ghetto setting. The G-X experimental sample has a size of approximately 1800 units, composed entirely of black families and structured so that a large portion (60 per cent) are headed by females. The G-X sample was allocated by a version of the Watts-Conlisk model, and stratified by normal income level (four strata), sex of head, and place of residence (Model City or NonModel City).

The principal focus of the Gary Experiment was directed towards economic responses such as labour supply, consumption, investment in human capital (education), etc., resulting from financial NIT programs. In addition, interest was expressed in examining income maintenance in conjunction with various social services treatments. In other words, G-X sought to determine the amount of social services demanded with and without income maintenance, and whether there exists an interaction between the receipt of social services and the receipt of cash transfers such that the social benefits deriving from the programs in combination exceed the sum of individual programs alone. The G-X project was intended, therefore, to have a slightly more sociological orientation than previous income maintenance experiments.

The financial treatments of G-X constitute a straightforward two-by-two design; that is, support levels of \$3300 and \$4300 are each combined with tax rates of .4 and .6 to yield four NIT plans. The G-X project also included social services and day care components in its design space. Social services treatment was given by an access worker who provided information on a mix of services available from existing agencies. The day care component of the experiment comprised subsidies of varying amounts (35 per cent, 60 per cent, 80 per cent, 100 per cent of cost) together with an eligibility requirement; that is, for some families the subsidies were also contingent on working. In sum, the G-X experiment is distinctive by its re-emphasis of the interest in the economic effects of a NIT program, the addition to this policy concern of an investigation of the relationship between income maintenance and social services, and the fact that its sample is composed entirely of black families, 60 per cent female-headed.

The Design of the Mincome Manitoba Experiment

The first large scale social experiment ever undertaken in Canada was jointly funded by Canada and Manitoba and had as its objective the evaluation of the economic and social consequences of a NIT. Similar to the design of the American experiments, the Manitoba Basic Annual Income Experiment (Mincome) also had as its focus the issue of labour supply response of households and individuals to a guaranteed income. As well, attention is paid to a range of administrative issues relating to program participation and operation.

The design of Mincome involved selecting participants employing a modified Watts-Conlisk model, and assigning families to alternative NIT programs for a three-year duration. The experimental sample was drawn from three sites: the urban centre

of Winnipeg, the community of Dauphin, and a number of small rural communities collectively referred to as the "rural dispersed sites". The sample was stratified by family structure type (number of heads, one or two earners, single individuals) and normal income (4 or 5 levels), and truncated at a pre-specified income level (approximately \$13,000 for a double-headed family of size four). Since the primary research objective influencing the design of the experiment was work response, the experiment also excluded the aged, the disabled and the institutionalized from the sample.

Payments to an initially-enrolled sample (approximately 1000) began in 1975. A supplementary sample (approximately 300) was subsequently enrolled and received payments also for a three-year period, but commencing one calendar year after the originally-enrolled sample. Three support levels were used: \$3800, \$4800 and \$5800 (1975 prices) for a family of size four, composed of two adults and two children. [12] The support levels are adjusted for differing family sizes and structure, and increased periodically to maintain approximately constant real value. Three constant offset tax rates were specified: .35, .50 and .75. The three support levels and three tax rates yield nine possible combinations. The combination of the highest guarantee and the lowest tax rate was not employed, nor was the combination of the lowest support level with the highest tax rate. Inclusion of a control group resulted in the design space comprising eight distinct NIT plans.

The outstanding feature of the Mincome design was its inclusion of Dauphin as a "saturation" site in the sense that every resident was eligible to participate in a single NIT program (\$3800, .50). Previous American experiments had all used randomly drawn dispersed samples in their design. The essential methodological advantage of a dispersed sample lies in isolating treatment families within a given area, thereby making it possible to experimentally vary the NIT program parameters. However, this very isolation placed treatment families in a highly artificial environment -- quite unlike the circumstances that would exist under a national NIT whereby all eligible families could benefit from receiving cash transfers. In recognition of this, Mincome included in its overall design a single saturation site (Dauphin) wherein everyone was eligible for payments. [13] By so doing, Mincome hopes to improve the extent to which results of dispersed experiments can be generalized and to answer questions about administrative, operational and community issues resulting from a less artificial environment.

* * * * *

This section has briefly sketched the various designs of the five major negative income tax experiments by concentrating on the issue of work responses to support levels and offset tax rates. All of the experiments employed the sample design and allocation approach of the Watts-Conlisk model, had among their major research objectives the measurement of work response, and specified a varying range of NIT plans by using combinations of support levels and tax rates. Yet, each and every experiment remains distinctive and special. The New Jersey Experiment rightfully deserves its "first" place in history and influenced much of the design of subsequent income maintenance experiments. The RIME experiment extended the issue of work incentives and NIT programs to the rural poor, SIME-DIME innovated by experimenting with declining tax rates and varying duration of programs, G-X focused its attention on black, predominantly female-headed families, and Mincome included single individuals and a saturation site component in its overall design.

4. INCOME AND WORK RESPONSE: SOME EXPERIMENTAL RESULTS

The Negative Income Tax Experiments were extremely complex research undertakings. All were elaborately designed, produced massive amounts of data, and resulted (and continue to result) in

an enormous amount of research. The findings are not easy to summarize. Similarly, because each experiment differed in design, sample composition, payment delivery mechanism, method of data collection, analytic models employed, statistical methodology, as well as specific research focus, the results of different experiments are also not directly comparable. Nevertheless, some overall indication of the accumulating evidence being generated by the various income maintenance experiments can be given.

On Interpreting Experimental Responses

This paper will restrict its attention to describing broad results -- paying particular attention to income (total earnings) and work incentives (hours worked). I shall focus principally on one particular unit (the family), and concentrate almost exclusively on one particular experimental effect measure (the mean difference between treatment families and control families). Many measures of work incentives are possible. Commonly used measures of labour supply response include: labour force participation, employment, hours worked, and earned income. Labour force participation rates include unemployed individuals without earnings and employment measures reflect changes in both participation and unemployment. Hours worked includes changes in participation, unemployment, as well as variations in work intensity; that is, hours per week of persons at work. Since hours worked is the more comprehensive and understandable of these measures, I will concentrate on describing work incentives using this response. At the same time, total earned income is the most inclusive of all measures. In addition, it is (family) earnings that is the relevant magnitude for calculating payments, and hence in determining the overall costs of NIT plans. Hence, the effect of a NIT on earnings is of direct interest to policy. [14]

Response to a NIT by the family as a whole will undoubtedly mask interesting income responses and work efforts by individual members. But again, it is usually in the context of the family unit rather than the individual that policy concerns are focused when considering income maintenance and NIT proposals. Finally, by focusing upon the "experimental" response; that is, the difference in response between families eligible for NIT payments (treatment families) and those not eligible to receive payments (control families), I can simultaneously highlight the "experimentally-induced" dimension of the research result as well as avoid the more complicated and qualified findings associated with different experimental plans, modes of administration, econometric models, etc.

In other words, I am reporting only whether or not experimental families (those eligible for payments) behaved differently from control families as a result of merely being in the experiment, and if so, by how much. Two more points need to be noted for interpretation. First, assignment of treatment families to specific NIT plans is neglected, hence any response is generally an overall "single number" measure typifying reaction to an "average" NIT program in the experiment. Second, in most cases differences in age, education, family size, etc., between the treatment and control sample groups were "controlled for" statistically; accordingly, the response may be viewed as representing solely the experimental effect of being given a guaranteed income. Finally, it is useful to express the results in terms of an "experimental percentage differential", that is, the difference in response (hours worked or income) between similarly composed treatment and control families as a percentage of the control group. In sum, the behaviour of the control families is taken as the benchmark.

Work Response Results from the New Jersey Experiment

The New Jersey Experiment was the first of the experiments to publish its research results. [15] Based upon a sample of 693

"continuous husband-wife families" who completed at least eight of the quarterly interviews, the New Jersey Experiment findings were in accord with general theoretical expectations. The overall labour supply effect for the experimental group as a whole was negative, small, and of mixed statistical significance. More specifically, small, statistically insignificant, absolute and relative experimental differentials were reported for husbands, ninety-five per cent of whom worked full time during the experiment. For white and Spanish speaking husbands the percentage differential measured by hours worked per week was negative; approximately -6 per cent and -1 per cent respectively. For black husbands, the percentage differential was positive, 2.3 per cent, contrary to theoretical expectations. Indeed, the behaviour of the black families defies plausible explanations. In terms of earnings [16] per week, the percentage differential for white (.1 per cent), black (9.3 per cent) and Spanish (6.4 per cent) husbands were all positive and insignificant.

The results for wives indicated predominantly negative labour supply differentials. Because of the generally low levels of market work effort by wives, a fairly small absolute magnitude translates into a large percentage experimental differential. At the same time, the very small number of working wives in the sample made such estimated effects highly unreliable. The estimated percentage differential in hours worked per week for wives were -30.6 per cent for whites, -2.2 per cent for blacks, and -55.4 per cent for the Spanish speaking females. The percentage differential in earnings per week between treatment and control groups were -33.2 per cent for whites, 7.8 per cent for blacks and -54.7 per cent for the Spanish. All of the above results were statistically insignificant; that is, these differentials could have occurred purely by chance.

The prime interest is in the mean labour supply response and earnings for the family as a whole; that is, including husbands, wives, and all other members of the household sixteen years of age or older. The reported experimental effects were again predominantly negative, generally insignificant, and relatively small. Most of the estimated experimental differentials were less than ten per cent. Measured in terms of percentage differences in hours worked per week between treatment and control families of identical composition, white families worked approximately 13 per cent less, black families worked 5 per cent less and Spanish speaking families 1 per cent less. With respect to total earnings of all members of the household, white experimental families received 8 per cent less, black treatment families enjoyed approximately 4 per cent more, and Spanish families 5 per cent more earnings than their control counterparts. Of all the above experimental responses for the family, only the hours per week measure for white families was statistically significant (.99 level, two-tailed test). In general then -- based upon the simplest summary measure of experimental effects; namely, the mere presence of cash payments without regard to distinction among the different NIT programs -- the New Jersey findings present a picture of generally small labour supply differentials between treatment and control groups as a whole. Total family earnings seem little affected, hence the impact on earnings of a NIT with benefit structures of the levels approximately those of the New Jersey Experiment for double-headed intact families was not dramatic. Although more detailed and refined technical analyses were performed and added to the overall understanding, certain ambiguities remain. The New Jersey Experiment could not detect consistently significant response effects to variations in either the support level or the tax rate, failed to find significant results or explanations for the "unusual behaviour" of the black families, and remains "puzzled" by the perplexities of ethnic differences. These and other results of the New Jersey Experiment are continually subject to challenge, reinterpretation (Aaron, 1975; Hall, 1975; Cogan, 1978) and extension (Hauseman and Wise, 1976).

Work Response Results from the
RIME Experiment

The Rural Income Maintenance Experiment [17] was designed to include rural families in its test of response to a NIT. Accordingly, interest was high in examining the work and income responses of rural wage earners as well as those families whose major source of income derived from self-employed farming. Significantly different response patterns were found to vary by site and race, hence results were separately reported for North Carolina whites, North Carolina blacks and Iowa families (all white). I shall again focus narrowly on the average experimental response; that is, the behaviour of those who received cash payments compared to a control group of families having similar characteristics who received no benefits. Because of the different experimental NIT benefit structures, the experimental differential can be best interpreted in terms of an estimated response to a "standardized" combination of a 45 per cent tax rate and 80 per cent basic guarantee level. Similarly, since the experimental sites were chosen to represent the low-income rural population of an eight-state region, the result is more meaningful if stated in terms of a weighted eight-state aggregate response.

For families in which wages constitute the major source of income, the relative experimental differential measured by total income was -13 per cent for the eight-state aggregate. This means that experimental families were estimated to have 13 per cent less total income (excluding general assistance payments and transfers conditional on experimental payments such as food stamps and free school meals) than similar control families as a result of being given the "standardized" NIT treatment. The estimated experimental differential for North Carolina black families, North Carolina white families and Iowa families were -14 per cent, -9 per cent, -18 per cent respectively. The experimental response of families measured by hours worked for wages were -10 per cent, -18 per cent, -5 per cent and -13 per cent respectively, for North Carolina black families, North Carolina white families, Iowa families and the eight-state aggregate.

The above results unavoidably conceal great variations in response among individual family members. Husbands in particular responded very little to the experiment. For the eight-state aggregate, the estimated experimental differential for husbands was -4 per cent in wage income and -1 per cent in hours worked. Only the result for Iowa husbands, who had an experimental differential of 11-13 per cent, was statistically significant (.95 level). Large negative responses were noted for wives, however. These differentials averaged about -25 per cent for the eight-state aggregate, whether measured in terms of wage income or hours of wage work. Of the three subpopulations, only North Carolina black wives revealed a statistically significant response (.95 level). Among dependents -- defined to be those living at home, unmarried and under 21, or married and under 18 -- large average negative experimental differentials in both earnings and hours worked were also reported, approximately 55-65 per cent. The response was statistically significant (.95 level) only for North Carolina white dependents (-56.3 per cent differential). Again, it should be noted that while the experimental responses seem quite large in percentage terms for wives and dependents, the absolute effect on family income is very much smaller because of the small contribution to total family income of this group. Finally, the experimental effect appeared to be insensitive to the guarantee level but slightly positive in response to the implicit tax rate.

The response to a NIT by self-employed farm operators was a major research interest of RIME. Since self-employed farmers do not receive a well-defined hourly wage rate, the most appropriate measure of farm earnings is profits, defined as gross revenue

minus current variable costs. This magnitude will include a return to land and capital as well as to operators' labour. Adopting such a measure, the average experimental differential was approximately -25 per cent for North Carolina farmers and -8 per cent for Iowa farmers, both marginally significant (.80 level and .85 level respectively). It is clear that farm work cannot be viewed in isolation of wage work opportunities. In fact, 78 per cent of North Carolina families and 50 per cent of Iowa families had one or more members also in the wage work force. Hours of wage work declined for farm families. The experimental differential for farm operators was about -31 per cent for North Carolina and -10 per cent for Iowa, and a quite substantial -63 per cent (North Carolina) and -54 per cent (Iowa) for farm wives. Accompanying this was a positive farm operator experimental differential of approximately 11 per cent for farm work. In sum, because of the intricate interaction of wage work and self-employed endeavour, there seemed to be a substitution of wage work towards farm work. This simultaneous pattern of lower profits and increased farm work effort implies a declining efficiency of farm operations. Farms operated by experimental families were found to be less technically efficient in terms of output produced per given amount of inputs. Why this should occur remains unclear although it is suggested that experimental farm families might have deferred sales of output, invested in activities with a longer run payoff, shifted production from market to own-consumption activities, or simply underreported income. Summarizing, the work response of RIME wage earners resembles the New Jersey results. Total income of experimental families declined modestly relative to their control counterparts. Hours of farm work increased, however, while both profits, efficiency, and hours of wage work declined. The RIME findings have also been subject to review and some reanalysis (Welch, 1978; Ashenfelter, 1978).

Work Response Results from the G-X Project

The Gary Income Maintenance Project (G-X) has not published a final report nor completed its research findings. [18] However, some preliminary indications based upon the first two years of the experiment are available. The initial analysis of G-X also focused on the work response of the experimental participants. Tentatively, little difference in work response was found among alternative NIT plans, hence one may again conveniently summarize findings in terms of the average experimental differential; that is, by comparing treatment families to their control counterparts without regard to assignment to specific NIT treatment plans. The G-X project has not published experimental responses in terms of family labour supply or total earnings directly. Based upon limited data and employing hours worked per week as the measure of experimental response, the first findings by G-X reveal a modest disincentive effect. In intact families, the treatment husbands reduced their work effort by an average of 7 per cent relative to control husbands, after taking into account statistically, age, education, family income, pre-experimental work effort, and other factors. The labour supply responses of husbands detected by G-X seem to be roughly of the same order of magnitude as that found by the New Jersey Experiment generally. One interesting difference is worth highlighting, however. While the decline in work effort on the part of husbands in New Jersey and RIME was attributed to a small reduction in hours worked by many husbands, the G-X response resulted from a complete withdrawal from the labour force on the part of a few husbands, suggesting that for institutional reasons small adjustments to work effort may not always be possible in some labour markets.

For wives of husband-wife families, the percentage experimental differential in terms of hours worked per week was approximately -17 per cent. Again, this relatively large percentage differential found for wives constitutes a small overall impact on either family labour supply or total earnings since wives had

low levels of work effort initially. The wives in the control group worked less than six hours per week on average.

One of the more interesting aspects of the G-X sample population was the fact that approximately 60 per cent of the participating families were female-headed; that is, families without a male head of household present. The work response of female heads of households is especially relevant in NIT policy discussions. Among female heads previously on AFDC (Aid to Families with Dependent Children), a modest work reduction (5 per cent) was detected, centering primarily on a few female heads who stopped working. For female heads not previously on AFDC, the experimental differential was slightly positive (2 per cent) but statistically insignificant and unstable. Finally, it must be emphasized that only initial findings based upon incomplete data are available from the G-X project to date.

Work Response Results from SIME-DIME

The Seattle-Denver Income Maintenance Experiment (SIME-DIME) has also released an interim report on the work effort effects based upon data from the second year of the experiment. [19] The sample analysed included black and white (but not Mexican-American) families from both sites and from both the three-year and the five-year plans. Separate responses were reported for husbands (sample size 1593) and wives (sample size 1698) in two-headed households and for female heads of single parent families (sample size 1358).

Before considering the results reported by SIME-DIME, several remarks are necessary in order to interpret the findings. Unlike the New Jersey, RIME and G-X experiments, SIME-DIME did not calculate an overall "experimental differential", that is, the average response of those receiving payments regardless of benefit structure compared to the response of similar control families. Instead, SIME-DIME attempted to estimate directly the "substitution" and "income" effects employing models which incorporate the benefits of participation in the experiment in terms of individual inducements to change behaviour. Very briefly, SIME-DIME calculated by how much an individual's wage rate and disposable income would have been changed as a result of the combination of particular NIT opportunities offered him (her) and his (her) initial situation. For control families, the inducements to alter behaviour are defined to be zero. The subsequent work effort response is then measured in terms of a separate substitution effect (due to the change in net wage rate) and the income effect (the change in disposable income evaluated at the initial hours of work). Within the context of this viewpoint, the total work effect comprises both these effects and applies only to workers and families below breakeven. Because nonworkers and families with incomes above breakeven are excluded, the reported mean effects are larger than that of the experimental sample as a whole since the excluded individuals would have smaller responses.

Based upon the second year of data and measured in terms of annual hours worked, the estimated mean total effects found by SIME-DIME were quite large. In percentage terms, the average work disincentive is -5.4 per cent for husbands, -22 per cent for wives and -11.2 per cent for female heads. [20] Tests for different responses by race, site or duration of experimental program were not statistically significant. Especially noteworthy is the fact that SIME-DIME is the first NIT experiment to successfully distinguish the effects of different program levels on response; specifically, higher payments and higher marginal tax rates caused greater work effort reductions. This latter point is particularly relevant in the design and costing of income maintenance options (for example, Keeley et al., 1977b).

5. SOME FINAL REMARKS

The preceding sections have described the policy setting, theoretical thinking and historical origins of the negative income tax experiments. The designs of the various experiments were outlined and a summary of selected research findings concerning work effort responses was given. The various income maintenance experiments also undertook to investigate a number of other questions. Information was gathered and research conducted on such experimental outcomes unrelated to the work incentive issue as marital dissolution, nutrition, geographical mobility, school performance, delinquency, political participation, psychological well-being, health, consumer expenditure patterns, housing consumption, and day care use, to name but a few of the "noneconomic" responses analysed. But despite the amount of knowledge and experience gained to date, a number of ambiguities persist.

This paper has been purposely narrow in scope. As stated at the outset, it focuses upon attempts in the United States and Canada to test theory and policy proposals through explicit experimentation. The particular issue of a guaranteed income and its impact on work incentive was singled out and existing experimental evidence was described. It would be inappropriate and presumptuous to offer either a conclusion or an evaluation of the results summarized for a number of reasons. First, research is still of an ongoing nature in some cases. Even for those experiments in which a final report has been officially released, the results should still be interpreted as "first wave" explorations. Further work continues to correct initial findings, extend and refine results and add to our understanding and knowledge. Secondly, our survey concentrated exclusively on the work disincentive issue in terms of reductions in hours worked or earnings. No attention was given to labour force participation, employment rates, job search, wage rates, human capital investment and other dimensions of market labour supply. As well, a number of issues brought to light by the experiments have been omitted. For example, it is increasingly clear that administrative parameters -- that is, the actual way in which a program is delivered [21] -- have important and significant implications for behavioural response. Indeed, some now even declare that such issues may ultimately prove more important than any work disincentive effects in terms of either costs, program design or political acceptability.

It is undoubtedly true that research tends to beget yet more research, and therefore, what is more important concerns what we cannot say rather than what we feel we now know. Still, I offer in closing the following observation. The issue of the work disincentive potential arising from a negative income tax is unlikely to disappear in Canadian policy discussions. Whatever the "ultimate number" that emerges from the negative income tax experiment in Canada, controversy will undoubtedly erupt concerning the characterization of that figure as either "small" or "large", "modest" or "substantial", "affordable" or "unacceptable". This debate is inevitable since it is highly unlikely, given all that we know, that absolutely no labour supply responses will result. This is the way one participant at a conference evaluating recent American findings put it (reported by Smith, 1978). Whatever the characterization of the labour disincentive effect, the percentage reduction in family work effort found so far is certainly not zero. And according to this observer, zero is a very significant political number. That being so, I expect the issue of the negative income tax, and work incentives, to be a lively and enduring feature of the Canadian policy landscape in the foreseeable future.

Footnotes

- 1 The proposals of Friedman, Lampman and Tobin being emphasized are all based upon considerations of fiscal efficiency and tax equity. Robert Theobald (1963) was also among the first to argue for a guaranteed income based upon the view that new technology and automation will increasingly displace man in the productive process. He therefore advocated a guaranteed income as an absolute and constitutional right, not because of anything to do with personal income tax mechanics. In a similar vein, Schwartz (1964) also advocated a guaranteed income based upon his social work philosophy. The income allowance approach of Tobin's can be traced back to Lady Rhys-Williams (1942, 1953) who proposed weekly cash dividends together with a work test. Among Canadian writers, Reuben Baetz (1970) has advocated a guaranteed income on the argument that such a right is inherent in the United Nations Universal Declaration of Human Rights which Canada has endorsed. An early proposal for unconditional income allowances, complete with moderately detailed administrative procedures and cost calculations for Canada was advocated by D. Smith (1965), a businessman and chartered accountant. During the early sixties Canadians appeared not so preoccupied with defining poverty levels as they were to quibble over John Porter's (1965) portrayal of middle class aspirations in The Vertical Mosaic, which also appeared at this time.
- 2 There are dozens of other policy issues. For example, what is the role of in-kind transfers? How should social services be regarded? How should income (or wealth) be defined or treated? What should be the relationship of a NIT to other forms of social security, either work related or not? Another example, one which I feel is heavily under-appreciated, is the question of how the NIT would be integrated with the positive income tax (PIT) system and with other income maintenance programs. My purpose here is merely to highlight the importance of the work disincentive and cost sensitivity issues as items of major political and policy concern which led eventually to the experiments.
- 3 It must be made clear that I am using the term "experiment" in a strict statistical sense, thereby excluding both "pilot projects" and "demonstrations". Pilot projects are usually feasibility studies of some proposed mechanism aimed at testing detailed procedures or detecting unforeseen program features. Demonstrations are often employed to evaluate or dramatize some program already selected as the committed course to follow. This distinction is sometimes blurred because policy makers often loosely refer to any nonpermanent program as an "experiment". My use conforms to the definition by Riecken and Boruch (1974): "by experiment is meant that one or more treatment (programs) are administered to some set of persons (or other units) drawn at random from a specified population; and that observations (or measurements) are made to learn how (or how much) some relevant aspect of their behaviour following treatment differs from like behaviour on the part of an untreated or control group also drawn at random from the same population". Parentheses in original.
- 4 The neo-classical theory of choice emphasizes the pleasurable trade-off an individual must make between increased consumption of goods and additional leisure. However, for those who must work at low wages, the earnings, wH , may be insufficient to purchase an adequate standard of living, say \bar{X} . Accordingly, if one were to emphasize the displeasures of working and inadequate consumption the low-income individual is seen to minimize his disutility, i.e., Minimize $U(X - \bar{X}, wH - \bar{X})$. Therefore, rather than the happy situation of choosing either more goods or more leisure, the neo-classical theory makes it clear just what the choice situation facing the poor is: work or starve!
- 5 This section may be omitted without loss of continuity. The Watts-Conlisk model is technical and fairly difficult. This summary is included for completeness and aims at presenting the sample structure from an overall design viewpoint rather than from a detailed statistical or sampling context. See Conlisk and Watts (1969) and Conlisk (1973) for details of the model. See also Lyall (1975) and Metcalf (1973) for a discussion of some of the design issues concerning the model. See Hum et al. (1979b) for its application to Mincome Manitoba.

- 6 A comment on sources is required. Every attempt has been made to insure that the information provided is accurate. However, changes in design were often made during the experiments and published documents often do not reflect these alterations. As well, some design features were not fully documented. Accordingly, I have relied on a combination of public documents, where available, unpublished material in some cases, personal conversations with individuals involved in the experiments and my own knowledge and experience. Nonetheless, for details on the design of the New Jersey Experiment see Haveman and Watts (1976), Skidmore (1975), Rossi and Lyall (1976) in addition to the New Jersey Final Report. For RIME, consult Bawden (1970), Bawden and Harrar (1978), Metcalf and Bawden (1976) in addition to Vol. I of the RIME final Report. For SIME-DIME, see Kurz and Spiegelman (1971, 1972), and Conlisk and Kurz (1972). For G-X, see Kelly and Singer (1971) and Kehrer (1978). My understanding of G-X was also helped by discussions with Andy Anderson, Co-Principal Investigator of G-X. For Mincome, see Hum et al. (1979 a,b), Mincome Manitoba Technical Reports 1 and 2.
- 7 Normal income is an economic concept connoting an income level from which transitory components have been removed. In most of the experiments, normal income was estimated on the basis of income information provided by families prior to enrollment in the experiment. The official U.S. poverty line in 1967 was \$3300 per year for a family of four, hence a normal income in excess of \$5000 rendered a family ineligible for the New Jersey Experiment. An income cut-off was employed in every experiment and results in what is sometimes called a truncated sample.
- 8 Not all possible combinations were used. Originally, the 125 per cent guarantee was not considered and the most generous and least generous combinations were not used. The plan consisting of the 125 per cent guarantee and a .5 tax was implemented after New Jersey introduced its AFDC-UP program. Henceforth in the descriptions of the design space, I will only indicate the range or distinct values of guarantee levels and tax rates. Readers interested in specific plan combinations, time of introduction, etc., for the various experiments should consult the various design documents. Also, every one of the experiments had one or more control groups.
- 9 The central experimental focus on labour supply effects refers to the research orientation in determining the set of treatments or design space. Policy concerns also quite properly emphasized program costs. Since costs are related to labour supply effects, both viewpoints turn out to be merely a question of emphasis. Indeed, early on in the design discussions, the experimental objective was agreed to be "the estimation of the national transfer cost due to work response of a NIT". (Rossi and Lyall, 1976, p. 30).
- 10 See Kurz and Spiegelman (1971) for a justification of declining tax rates. See also the discussion by James Morgan in the same issue.
- 11 The original design called for an experiment in Seattle. The Denver site was subsequently added because of Seattle's highly irregular employment situation.
- 12 It might be helpful to compare the support levels of Mincome to other measures of low income levels often discussed in Canada. All comparisons are stated in terms of 1972 dollars and are for a family of size four. The low and high support levels for Mincome are \$3301 and \$5040 respectively. The Statistics Canada low income line is \$4922 as calculated by J. Podoluk (Income of Canadians, Queen's Printer, 1968). This figure of \$4922 is the "unofficial" poverty line of the Economic Council of Canada and is also used as the low-income cut-off for the Consumer Finance Survey Reports. The Senate Committee on Poverty would place the poverty line for a family of four in 1972 dollars at \$5556 (based upon the 1969 poverty line adjusted by changes in the Consumer Price Index). Finally, to place all of this in perspective, the 1972 median income for a family of four was \$11,234 (Income Distribution by Size in Canada: Preliminary Estimates (1972)).

- 13 The saturation site includes both the rural municipality and town of Dauphin which is approximately 150 miles "as the crow flies" north-west of Winnipeg. The Town of Dauphin had a 1971 Census population of 8,891; the Rural Municipality of Dauphin had a population of 3166. Slightly over 4000 households were eligible to be participants in the experiment.
- 14 The use of the earnings measure might also be justified as providing a straightforward way of weighting the relative importance of individual member responses (see Hollister, 1974). For a discussion of alternative aggregation rules in this context, see Sharir and Weiss (1975). In any case, discussion of results in terms of earnings and income would seem appropriate, given the theme of this Conference.
- 15 The experiments are in varying stages in terms of reported results. New Jersey and RIME have released final reports, SIME-DIME and G-X have reported interim results on incomplete data, and Mincome has yet to undertake serious analysis on labour supply. The results of New Jersey and RIME have also been subject to reanalysis and extensions by other researchers. In a sense, research concerning the experiments can be expected to continue for some time and it is not unlikely that initial findings will be subsequently challenged and corrected. My purpose is not to give a (premature) appraisal of this debate. I will merely describe the "first round", "official report" results. In particular, the New Jersey results described here are from the experiment's final report, particularly the summary report. As well, I have relied on Hollister (1974), Rees and Watts (1975) and Haveman and Watts (1976).
- 16 A bias may exist in the use of earnings as a measure of response since experimental families learn more quickly than control families to report their income on a gross rather than net basis. There is some evidence to support this differential learning effect (Hollister, 1974).
- 17 The results described here are from the Summary Final Report of RIME. Assessment and criticism of the RIME findings may be found in J. Palmer and J. Pechman, editors (1978).
- 18 The results described here are from Kehrer (1978).
- 19 The results described here are from Keeley *et al.* (1977a, 1977b, 1977c).
- 20 Income effects were significant for wives (1 per cent level) and female heads (5 per cent level). Substitution effects were significant for husbands (5 per cent level), wives (10 per cent level) and female heads (10 per cent level). Tests were performed using OLS although the estimated effects employed TOBIT analysis.
- 21 I mean by this not only such considerations as the accounting period, the definition of the income base, the method of reporting, auditing, and so forth. All of these issues are of special concern to program designers and administrators. In addition, the interaction of such administrative parameters with nominal measures of program generosity also proved to have implications for work behaviour, savings, misreporting, program participation, etc. I also include under this heading such fundamental policy questions concerning the role and functions of various eligibility requirements, the issue of integrating income maintenance programs with the positive income tax, the labour market mechanisms, the social welfare system and so forth. Time and space preclude my discussing these issues, either from an efficiency or equity point of view.

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THE IMPACT OF TRANSFERS
ON THE DISTRIBUTION OF INCOME IN QUEBEC:
ELEMENTS OF ANALYSIS APPLIED TO CERTAIN PROGRAMMES

by

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1 INTRODUCTION

The ballooning size of government in developed economies is well known. In Quebec, for example in 1961, government expenditures on goods and services represented 15 per cent of the gross domestic product. By 1976, the government sector accounted for 25 per cent of the economy. Put another way, government expenditures in current dollars were seven times their size in 1961.

But these expenditures on goods and services do not include payments of government's social insurance, social security and other transfer payments which have expanded even faster. By 1976, these transfer payments were nearly eight times as large as in 1961. By 1976, 15 per cent of personal income came from transfers.

It is logical to ask what people received for their money. Have transfers fulfilled the role better or worse than in the past? This study will examine these questions. The emphasis is on the major social security and insurance programmes.

First, we briefly discuss the literature on transfer programmes, to help set up guidelines for evaluating the programmes and to see what additional information we can extract from other analyses of the Canadian transfer system. Studies of the impact of social security programmes in Quebec using microdata do not exist.

The main analysis proceeds in four parts. It begins with a look at transfer programmes overall. Each of two major social security programmes (old age security and supplement, and unemployment insurance) is analysed separately. These two programmes represent the extremes: the first conforming to norms for effective programmes that we will suggest, the latter violating them. (A more detailed study, Morgan (forthcoming) analyses two other programmes, family allowances and social assistance and also includes definitions, data sources and methods.) In the present study there is special stress on whether programmes are becoming more or less effective following major reforms. We conclude by evaluating the relative contribution of the programmes to inequality reduction.

Transfer programmes, and more specifically social security programmes, represent one of the major attempts by government at redistribution. Even though this objective has been neglected at times in favour of others, one of the primary roles of transfer programmes is to transfer resources from better off members of a society to those who are in need.

There are no hard and fast rules on just how far the drive to reduce income inequality should go. There is no objective theory which tells what optimum inequality is. This remains

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a philosophical and political question. Different countries at different times have adopted very different policies. What is important, however, is to establish the facts so that policy makers know as far as is possible where existing transfer payments go and what their effects are.

Therefore it is important to add up what people in different circumstances receive from social security programmes and how this is changing. It is particularly important to estimate how much of the various social security programmes goes to those on the lower end of the income scale. The major part of our study is devoted to examining this question. As a result of work with microdata files we will be able to give a detailed picture of where transfer payments go and their evolution following major reforms. We will be able to do this both with the raw data for family units and using data adjusted for family size to approximate more closely family needs.

However, there are other criteria by which social security programmes can be judged. We shall outline some of these briefly and try to evaluate how far individual programmes meet these criteria.

One of the most obvious criteria is overall cost. This cost includes dollars paid out in the name of the programme and administrative cost. It also includes costs induced by disincentive effects of the programme on individual decisions to work. If, as a result of a particular social security benefit, or the taxes required to pay for it, individuals decide to work less in the market-place the cost of the programme is higher. This is not simply a matter of the poor sitting idle because they have an income but also of a reduction in effort by those whose tax rates rise to pay for the programme. Firms may also find it's easier to lay off employees when they know workers are protected by social security programmes.

These disincentive effects have often been neglected when studying the impact of tax transfer programmes although their existence has been known for some time. Atkinson (1973) cites Sidgwick (1883): "It is conceivable that a greater equality in distribution of produce would lead ultimately to a reduction in the total amount to be distributed in consequence of a general preference of leisure for the results of labour". Work by Mirrlees (1971) and Fair (1971) on formal models for optimal tax-transfer systems has reopened academic interest in the subject. Atkinson (1973) explores the implications of their model under different hypotheses. Work on general models including disincentive cost is not sufficiently advanced to lead to a precise method of predicting those costs or determining optimum transfers. The relevance of this work to our study is to force us to watch for specific disincentives and attempt to measure their importance.

The existence of disincentives to work associated with high tax-transfer rates can justify a "patchwork" social security system (such as that in effect in Canada) as opposed to an overall system. Under an overall system, such as a negative income tax, those individuals who have similar needs are treated similarly; the system is fair and provides positive work incentives to the poor. However, as Akerloff (1978) shows if it is possible to identify (by age, employment status, etc.) categories of people who have a higher probability of being poor, it is also possible to concentrate transfer payments on those groups and have lower marginal rates of tax for the whole economy. By tailoring programmes to individual groups it may be possible to avoid reducing work incentives for other groups. Akerloff calls this "tagging".

This works only if:

1. there is a high proportion of low incomes in the target group, and
2. people cannot easily choose to enter the target group.

The analysis of individual programmes will show that this is a fruitful approach for identifying why certain programmes have worked well and others have not.

We should note that tax-transfer programmes may change incentives other than the incentive to work. For example, the incentive to save may be affected by the existence of old age pensions or by unemployment insurance, as well as by the transfer of income from groups with a high propensity to save to groups with a lower one (See Von Furstenburg and Malkiel, 1977). The existence of certain transfer programmes also affects individual decisions to invest in further education (Rea, 1977). Unfortunately, work in these areas has started so recently that we will be able to offer only a few very general and tentative comments on possible effects.

Some of the social security programmes are open to criticism by more mundane criteria, such as simplicity, ease of administration and the extent to which people entitled to them take up the benefits. We will comment on these aspects as far as is possible.

We now turn to an outline of empirical work in Canada on the impact of government on the distribution of income. The most global approach is adopted by Dodge (1975), Gillespie (1976), and Maslove (1973). They all use data from the 1969 Survey of consumer expenditures to allocate all taxes and all government expenditures to different income groups. Maslove deals only with taxes. The other two conclude there is general overall progressivity in government expenditures, and all three find taxes, in general, mildly progressive, with the possible exception of the lowest income class. The result for the lowest income class appears due to data difficulties (business losses are concentrated in this class). Gillespie suggests that the major changes in distributional effects of government since 1969 should arise from changes in income taxes and social security. If this is so, our results capture a large part of changes in distribution due to government since that time.

There have been several empirical studies of social security programmes in Canada. Horner and McLeod (1975), in part of an overall study of inequality trends in Canada, find that the increase in transfer programmes from 1951 to 1971 "should have substantially reduced the level of inequality" a reduction translating into a 5-8 per cent reduction in the Gini coefficient.

Cloutier (1978), in a study whose aims more closely parallel ours, finds a larger and larger part of social security payments going to those in the top 40 per cent of the income scale. He covers the period from 1971 to 1975 and analyses individual programmes in detail. His paper attempts to allocate the costs of social security as well as the benefits so we shall be referring to his work in more detail further on in the text.

The individual programme which has been most closely studied is surely the unemployment insurance programme. A whole literature exists on the 1971 revision of unemployment insurance and its impact on the unemployment rate, that is on work incentive. A bibliography and summary is given in Lazar (1978). We will discuss these results more fully when discussing unemployment insurance in detail. Another approach to analysing the impact of unemployment insurance is taken by Kapsalis (1978)

who tries to determine the relative contributions of and benefits to various groups in 1975 and offers some suggestions for reform. We will come back to his analysis and conclusion in Chapter 4.

2 TRANSFER PROGRAMMES - AN OVERVIEW

Since transfer programmes are primarily intended to transfer resources to those in need, it is important to begin by examining the difference between the pretransfer share of income and the post-transfer share of income of those at the bottom of the income scale.

The broadest possible definition of those at the bottom of the income scale is the 50 per cent of family units below the median income. In other words, imagine all family units lined up, in order of income, from the lowest income to the highest. The 50 per cent of families below the median will be the first half of the line-up. Table 1 shows how the income share of the lowest 50 per cent changed as a result of transfers. To produce Table 1 family units line up in order of their private sector income, before any government transfers take place. The percentage of income received by the lowest 50 per cent is calculated. We can imagine the transfers being handed out and then the family units re-order themselves according to their total income, or income including transfers. The percentage share of total income of those in the first half of the new line up is calculated. So Table 1 shows us that the share of income of the lower half is increased by transfers in the four years we can observe. The increase in share was greater in 1975 (5.3 per cent) than in 1967 (3.5 per cent). Many transfer programmes take family size into account. In Table 2 we repeat the calculations of Table 1, this time adjusting for family size.[1]

Table 2 confirms the results of Table 1: the post-transfer share of income is increased and the increase in share is greater at the end of our period than at the beginning.

In other words, the existence of transfers has altered the distribution of income and reduced inequality. More important, their contribution appears to be increasing. However, as we shall see, this statement is subject to some very important qualifications.

First, for a closer look at how the very lowest on the income scale have fared, Table 3 shows the shares of the lowest 10 per cent, and the lowest 20 per cent before and after transfers.

The increase in share after transfers going to these groups does not seem to show a marked trend in time. It rather seems to flutter randomly. Table 4 shows the same groups, this time adjusted for family size. It is more difficult to interpret this table, given that there is one less year of data. However, there is somewhat less upward movement in the shares of the very lowest groups than in the shares of the bottom 50 per cent as a whole. The impact of transfers on the lowest group did not increase. For the lowest 20 per cent, the impact rose 0.6 percentage points from 3.9 per cent for a 15 per cent increase. The impact on the lowest 50 per cent went up 1.4 percentage points from 5.4 per cent or a 26 per cent increase.

This means the improvement observed was concentrated in the 3rd, 4th and 5th deciles rather than in the first or second, especially in 1975. The conclusion is the same whether or not family size is taken into account.

To understand the analysis in this next section, imagine our family units lining up once again in order by income after transfer. This time we compute the shares of pretransfer income and of transfers themselves when all units stay in their post-transfer order.

Now we seem to arrive at a completely conflicting result. The share of transfers of those below the median has declined steadily in the three years of observations that we have.

When we follow the lowest 20 per cent in Table 6, we see that their share of transfers is declining as well. The results for the first decile are harder to interpret. It is tempting to note that this decile receives much less than the 10 per cent share of transfers which would be theirs if transfers were merely allocated proportionally.

However, we know that the first decile tends to contain those with business losses, those who enter the labour market part way through the year and other special cases. About all we can conclude is that their share is subject to fluctuation and may or may not be decreasing.

How do we reconcile the two results: 1) the income share of those below the median on a pretransfer basis shows a greater gain with each passing observation as we shift to a post-transfer basis and 2) a smaller and smaller percentage of transfers goes to those below the median?

One possibility is that the sheer magnitude of the increase in volume of transfers is sufficient to swamp the fact that a smaller proportion goes to those below the median.

First, we verify if, in fact, transfers are an increasingly important source of income in our sample. Table 7 presents the results.

Transfer income is growing in both absolute and relative terms. While the survey of consumer finances underestimates transfer income, the rate of growth of transfer income is approximately correct.

We can see what is happening using Table 5 and Table 7; we show how the share of post-transfer income of those below the median can be calculated as the weighted average of their share of pretransfer income and of transfers. This is done in Table 8.

We can see the increase in volume of transfers was sufficient to compensate for the fact that transfers were less equally distributed. The contribution of transfers to the income share of those below of the median was 5.3 per cent in 1971 and 6.4 per cent in 1975.

In Table 9, we turn to concentration coefficients [2] to summarize the change in the overall distribution of transfers, not just the share of the bottom 50 per cent.

The concentration coefficients confirm the earlier evidence of income shares from transfers. Transfer income is less and less redistributive. Even though the share of transfers in total income is growing, the second line of Table 8 shows us that this is insufficient to offset the marked increase in the concentration coefficient for transfers, when family units are ordered by their income after transfers. Family units just below the median increased their share of transfers at the expense of the first and second deciles. The concentration coefficients capture this effect, whereas the share of income of those below the median is insensitive to it.

In Tables 5 to 8 family units are always ordered according to post-transfer income. A family is counted as being above the median if its total income is greater than the median, even if it would have been in the poorest group without transfers.

What happens when family units are ordered by pretransfer income? The concentration coefficients are much larger (Table 10 compared to Table 9). A large part of transfers went to family units whose pretransfer income was below the median pretransfer income. However even on a pretransfer basis, concentration coefficients are declining. The rising volume of transfers in our sample has maintained the total contribution of transfers in spite of their less equal distribution.

Our earlier Tables (1-4) ask what the income distribution would have been like without transfers: it would have been more unequal. What is happening is that transfers are shifting family units to a higher rank in the income scale. More and more family units which were in one of the lower deciles receive enough in transfers to transform them into family units above the median. Other studies have suggested transfers are going more and more to the rich. This is only part of the story. Our data indicates it is the transfers themselves which are making more and more people rich. This effect is particularly strong with one programme -- unemployment insurance; we shall return to this topic in the chapter which covers unemployment insurance.

If we adjust the data with the equivalence scale to take account of family size our conclusions change somewhat. Table 9 does show transfer income increasing in both absolute and relative terms for income adjusted for family size, just as it did for unadjusted income. However, in Table 10, the concentration coefficients for transfers adjusted for family size are most redistributive in 1971, least redistributive in 1973 and climb again in 1975, although not to 1971 levels.

The percentage reduction in inequality induced by transfers climbs steadily. The increasing share of transfers in income is sufficient to increase the power of transfers to reduce inequality in 1973 even though their distribution was less favourable to low income families. In 1975, an increased share of transfers went to low income families on a basis adjusted for family size (the concentration coefficient is more negative). This, combined with the greater weight of transfers in income, meant a substantial increase of the percentage by which the Gini coefficient was reduced due to transfers.

It is true that transfers have increased the incomes of certain family units to a point above the median income. However, the results with equivalence scales show that most of the units which were shifted over the median income by transfers are families and that the income must support several people.

Therefore results are very sensitive to whether or not family size is taken into account. While we do not claim our adjustment for family size is the only one possible, the effect produced is large enough that it would still exist even if other reasonable equivalence scales were chosen. It is obvious governments do wish to take family size into account to a certain extent in paying transfers. The exact extent is of course a political question. Our results show that whether recent changes in transfer programmes are considered a success or a failure depends critically upon whether family size is considered or not. None of the studies previously cited take family size into account, thus omitting a very important element in the analysis. In succeeding chapters two major transfer programmes will be examined, programme by programme, to see their individual impact on income redistribution. We will see that the adjustment for family size changes our conclusions about the success or failure of certain programmes, as well as about how various programmes have contributed to the overall impact.

3 OLD AGE SECURITY AND GUARANTEED INCOME SUPPLEMENT

For most of the period for which our data is available, the old age security (OAS) and guaranteed income supplement (GIS)

constituted the largest transfer programme. Although there have been revisions of the old age security law and its regulations almost every year since its adoption in 1951, the last far-reaching change in the system was the adoption of the guaranteed income supplement in 1966. Since old people constitute one of the poorest groups in the community and since a part of the benefits (the guaranteed income supplement) is based on a means test it is not surprising that this programme is one of the most redistributive of the transfer programmes. We discuss it first as a sort of benchmark for the other programmes.

Table 13 shows that payments are an increasing fraction of post-transfer income. The average amount increased 25 per cent between 1971 and 1973 and 33 per cent between 1973 and 1975.

Table 14 shows the gain to lower income groups because of the existence of OAS and GIS. Since we want to see the effect on the distribution of income, income shares based on income ordered by pretransfer income are compared to income shares based on income ordered by the sum of pretransfer income and OAS plus GIS.

The impact of this programme is concentrated at the lower end of the income scale. Well over 80 per cent of the programme goes to the lower half on the income scale and this proportion has been increasing (Table 15). The strongly negative concentration coefficient summarizes its powerful redistributive effect and shows it is increasingly so.

Although very few old age pensioners have dependent children, even adjusting the data for family size does not rob old age security of its strong redistributive effect (Table 16).

It is important to note that the concentration coefficient continues to decline, even after adjustment of the data for family size. This programme is also an increasing proportion of post-transfer income. It is therefore not surprising that the programme has played the major role in reducing inequality as we shall see in the overall conclusions in Chapter 5.

Old age security has been the least criticized of the transfer programmes. Why is it so successful?

First, it meets the two criteria for successful tagging. A large proportion of the programme goes to those on the lower half of the income scale. In addition people cannot become old by choice. This means the disincentive costs of old age security are very low which helps with its public acceptance. The public does not feel defrauded by old age security: most of OAS-GIS goes to the poor and it does not encourage people to change their work-leisure habits.

By other criteria, OAS-GIS is also a success. The programme is easy to administer; administrative costs per dollar paid out are the lowest of any of the four major programmes. The public finds it simple to understand: the take-up on the guaranteed income supplement is higher than other means-tested programs.

Cloutier (1978) analyses the costs of the programme and finds their incidence progressive, since old age security and supplement are paid out of general revenues and old age security is taxable. The only change he suggests is the elimination of the special income tax exemption for old age with the tax savings applied to the supplement.

The way in which OAS-GIS may change behaviour is if its existence encourages people to save less since this could mean a lower rate of investment and growth in the long run. We do not

now know the extent to which OAS-GIS has affected saving: it seems probable the Quebec pension plan would have a greater effect.

When we analyse unemployment insurance in the following chapter we will see why it has been subject to so much more criticism than OAS-GIS.

4 UNEMPLOYMENT INSURANCE

There was a major revision of the Unemployment Insurance Act in 1971: our 1971 data falls under the old act, the results for 1973 and 1975 are affected by the revision. Since the 1971 revision, unemployment insurance has probably become the most criticized social security programme. Its costs have far outrun the original projections and various amendments and revisions have been undertaken.

In our sample there is some under-reporting of unemployment insurance, so Table 17 shows unemployment insurance as a smaller percentage of income in 1975 than it really was, probably an underestimation of about $\frac{1}{2}$ percentage point. [3] If the under-reporting of benefits was approximately the same proportion of income in all income classes our results will not be materially affected. The evolution of benefits is clearly shown in Table 17. The impact of the new act shows clearly between 1971 and 1973 when benefits increased $2\frac{1}{2}$ times although the unemployment rate dropped from 7.3 per cent in 1971 to 6.8 per cent in 1973 in Quebec. As unemployment rose to 8.1 per cent in 1975 average benefits increased 50 per cent.

Table 18 shows the gain to lower income groups.

As usual income shares based on income ordered by pretransfer income are compared to income shares ordered by the sum of pretransfer income and UIC benefits. There is no significant redistribution toward the lowest decile or the lowest quintile but there is some minor improvement in the share of lowest half and this is increasingly true.

It is important to use an equivalence scale in examining the impact of unemployment insurance since recipients are more likely to have dependants than, say, old age pensioners. Table 19 shows the change in income shares due to UIC benefits, as in Table 18, but this time using equivalence scales.

On a basis adjusted for family size the UIC benefits may help the lowest 20 per cent in 1975. They have more impact on those in the lower half of the adjusted income scale especially in 1975. But this impact is less than $\frac{1}{3}$ of the impact of OAS-GIS (see Chapter 3), although unemployment insurance payments are about 80 per cent of OAS-GIS payments in our sample.

So far we may conclude that UIC benefits have redistributed income and have done so to an increasing extent. However the total effect is not very large, even when the income distribution is adjusted for family size.

We now turn to analysis of the concentration coefficients for unemployment insurance in Table 20.

Those who were in the lowest half of the income scale on a post-transfer basis have received less than half of the unemployment insurance since the revision of the act. Very low proportions were received by those in the lowest decile or quintile on a post-transfer basis. This is reflected in the concentration coefficients which are positive, indicating that unemployment insurance added to inequality. Even adjusting by equivalence scales does not change the picture greatly, although unemployment insurance becomes more nearly proportionately distributed.

Table 22 shows results in more detail. With our adjustment for family size the first two deciles have consistently less than their proportional share of UI benefits, as does the last. The rest is distributed almost proportionately over the 3rd to 9th deciles. The decrease in the concentration coefficient in 1975 comes from a drop on the 10th decile share, which is absorbed by the 4th, 5th and 6th deciles. The lack of impact of unemployment insurance on the first quintile may be partly linked to the fact it does not cover new entrants to the labour force who tend to be young and low paid. Unemployment has increasingly hit this group. Failure to insure this group may have contributed to fluctuations in inequality as unemployment has varied (see Frappier-DesRochers et al. (1979)).

In addition, unemployment insurance benefits were sufficient to lift families units out of the first quintile and into higher quintiles. Table 23 shows the share of unemployment insurance going to groups whose pretransfer income was below the pretransfer median. Without transfers, these groups would have had income below the median. Over 50 per cent of unemployment insurance went to these family units (59.9 per cent in 1971, 51.3 per cent in 1973 and 55.9 per cent in 1975). Unemployment insurance was almost proportionately distributed.

In fact it redistributed so much income that many family units passed the median income on a post-transfer basis. This appears to be particularly true in 1973 and 1975 after the revision. Many family units receiving unemployment insurance were in need of transfers, but it is possible to question whether they needed the full amount of UIC benefits.

It is now very evident that unemployment insurance served mainly the well off and some of these were made well off by the programme itself. It thus failed to meet the first criterion for a successful tagging programme.

It also failed to meet the second criterion. While unemployment is certainly not always or even mostly a matter of choice, it is possible to choose to be unemployed. A temporary job is also more inviting if it permits the job holder to qualify for unemployment insurance and thus to continue to receive payments when the job ends. Feldstein (1978) also shows that the existence of UI benefits provides incentives to employers for more frequent layoffs.

Various studies of the impact of the unemployment insurance act (Grubel, Maki and Sax (1975); Green and Cousineau (1976); Wallace (1974)) have found that the new act raised the Canadian unemployment rate 0.6 to 0.8 percentage points in 1972. The study by Lazar (1978) suggests the impact may have been larger: an increase of 1.3 percentage points in 1972. Lazar separates this increase into two sources. The first source of increase in the unemployment rate is an increase in the duration of unemployment: on average the unemployed were unemployed longer after the act than before. The second source is an increasing labour turnover: there were more frequent spells of unemployment. The turnover rate captures the effects of increased participation rates and increasing layoffs and voluntary quits.

According to Lazar's results, the largest induced changes came from an increase in the duration of unemployment for men and women aged 14 to 24 years. It was probably the changes in the qualifying period and the calculation of benefits which lowered the cost of unemployment for this group and made them lengthen their period of job search. According to Lazar's findings, there was much less change in behaviour for men aged 25 to 44 and none for men 45 and older. An increase in turnover played an important role in induced unemployment among women aged 25 and older. Here again, changes in the qualifying period probably

increased participation rates for women. The duration of unemployment of women 25 and older also increased. The new way of calculating benefits probably induced this.

Lazar calculates that there were 150 000 additional unemployed in Canada in 1975 because of the revision. This represents about 20 per cent of the unemployed. A very crude calculation would be that it also represents about 20 per cent of unemployment costs. [4] This is probably an overestimate since Green and Cousineau (1976) estimate that in 1973 Quebec had 36 per cent of the unemployed but only 23 per cent of the induced unemployment. In any case, there is ample evidence unemployment insurance had high hidden costs in the form of changes in behaviour by individuals and firms.

Unemployment insurance also had high administrative costs. Attempts to police the programme pushed costs up to 4¢ for every dollar of benefits (compared to 1¢ costs for every dollar of old age security and GIS).

The rules and regulations governing UI are extremely complex. This no doubt adds to administrative costs and to dissatisfaction and complaints from beneficiaries.

Cloutier (1978) also analyses unemployment insurance taking financing into account. This is important in the case of unemployment insurance since it is paid for partly by contributions and it is taxable. He finds the financial costs are distributed progressively. Our results therefore underestimate somewhat the redistributive effect of unemployment insurance. The underestimation should not be large since Cloutier estimates contributions (employers and employees) and income tax paid on benefits amounted to only about 60 per cent of benefits in 1975. In addition, financial costs of unemployment insurance are less progressively distributed than income tax (Cloutier (1978)).

It is important to remember that the aim of unemployment insurance is to prevent sharp drops in family income, or at least to prevent a drop below a certain minimum. As a result it will never be among the most redistributive of programmes. But various suggestions have been made to make it less costly and more redistributive.

Cloutier suggests the most sweeping change. He points out that heads of families whose family income is greater than \$8,000 are net contributors to unemployment insurance on the average.

Wives and other secondary earners, and heads of families with income less than \$8,000 are net beneficiaries. Cloutier proposes insuring family earnings rather than individual earnings, to prevent high income families from collecting large amounts of unemployment insurance. Cloutier mentions that a family approach would complicate administration since the income of all family members would have to be assessed in granting unemployment insurance.

Kapsalis (1978) has an alternative suggestion to offer, based on his finding that families with working wives are net contributors on a family basis. He proposes a flexible ceiling on insurable earnings. This ceiling would vary according to the number of dependants. A family head with small children would be able to insure a greater amount of earnings than someone with no dependants. This would be simpler to administer since family income would not have to be investigated, simply the number of dependants.

Kapsalis mentions that lengthening the qualifying period may cause hardship. His preliminary findings suggest that those with less work experience in a given year are not poorer risks for the

unemployment insurance fund. This finding is hard to accept given the increase in unemployment attributed to changes in the act by Lazar (1978), Grubel, Maki and Sax (1975); Green and Cousineau (1976); and Wallace (1974). On the other hand it is true that individual cases of hardship could arise from lengthening the qualifying period. If we wish to reduce incentives for becoming or staying unemployed by increasing the qualifying period it may cause less hardship if the length of the qualifying period is adjusted according to the number of dependants.

Feldstein (1978) suggests that some part of the cost of layoffs should be borne by the firm in order to decrease the incentive to lay off workers temporarily. As a starting figure he proposes that the firm should pay the first month's unemployment insurance benefit of any employee they lay off. This approach also has the desirable effect of costing more to firms which create a great deal of unemployment and less to those which provide more stable employment.

Although unemployment insurance has become less redistributive, and has cost more in terms of disincentives since the revision of the act in 1972, we should avoid suggesting massive changes. Unemployment insurance has the most complex effects of any of the social security programmes. In addition to its influence on the labour-leisure choice, on the hiring and firing policies of firms, and on the distribution of income it is one of the main weapons for stabilizing the economy. In that respect its performance is more impressive: it operates automatically and its effects are greater in regions with greater unemployment. "People and Jobs", a study by the Economic Council of Canada (1976), suggests the stimulative effects increased employment by 0.5 to 1.0 per cent in 1973. Of government programmes, only the tax structure and, to a small extent social assistance, act as automatic stabilizers in the economy. Since governments have had difficulty in timing and regional impact of fiscal policy (see Rabeau and Lacroix, 1978), it is important that part of the process be automatically in tune with overall levels of aggregate demand and their regional distribution.

5 CONCLUDING OVERVIEW

We have established several dimensions of the evolution of transfers. We have seen the evolution of transfer programmes as a whole. We have looked at the evolution of two individual programmes. The evolution of two other programmes is analysed in Morgan (1979). But, to conclude, we want to look at the extent to which the individual programmes have contributed to the overall distribution and its evolution.

If we assign pretransfer income an index of inequality of 100, we can identify the percentage change in inequality caused by each transfer programme and the final reduction in inequality. This is done in Table 24. Old age security and supplement and social assistance have reduced inequality every year. On the other hand family allowances and unemployment insurance have increased it. Since these two programmes are distributed regressively, the overall percentage reduction in inequality is less in 1973 and 1975 than in 1971. The increase in other transfers is caused by QPP payments which do reduce inequality as Table 24 shows.

We can compare the changes in inequality brought about by the transfer programmes in different years. We can also identify whether changes in programme size or changes in the distribution of programmes have been the cause of the reduced impact of transfers. This is done in Table 25.

The total change (columns 1 and 4) is calculated by subtracting the appropriate columns of Table 24. The other

changes are calculated from changes in the concentration coefficients and from changes in the size of the programme as a per cent of total income in our sample. These figures are very small: one percent or less. They should be thought of as probable indicators rather than exact results. However, it does appear that the growth of family allowances and unemployment insurance had done more to increase inequality, than the fact that they are more unequally distributed. These programmes were regressively distributed in 1971; their rising share in income has reduced the effectiveness of transfers more than their slight increase in regressivity. Only the rising size and increasing progressivity of OAS-GIS prevented a much more marked deterioration.

Once again, we repeat our results using equivalence scales (Table 26). Using equivalence scales all the programmes appear more effective: in fact transfers have more impact in 1973 and especially in 1975 than in 1971, when adjustments are made for family size. It is still true that the major redistributive effect comes from OAS/GIS and social assistance. Family allowances have a small, probably insignificant, redistributive effect; unemployment insurance benefits have a small probably insignificant, regressive effect.

In Table 27, we subdivide the adjusted changes over time produced by the transfer programmes into changes caused by changes in distribution of the programmes and changes caused by variations in the size of the programmes. The usual caveats apply about the smallness of the percentages involved. OAS/GIS still provides the major impact. However the behaviour of social assistance appears different when equivalence scales are applied. The programme decreased in relative size from 1971 to 1973. Since social assistance is very redistributive, especially on an adjusted basis, its shrinkage reduced the effectiveness of transfers. In the same way, an increase in the relative size of social assistance in 1975 increased the power of transfer programmes to reduce inequality. What is especially interesting is that the changes in the structure of social assistance in 1974 caused a deterioration in redistributivity: larger families in need received relatively less after 1974.

Changes in size and structure of unemployment benefits still add to inequality, but to a lesser degree: an insignificant amount, nearly neutral, neither redistributing nor the reverse. As a result changes in size of the programme do not have much effect. Family allowances have moved to regressivity: they have had a small impact on changes over time in our sample. It is interesting that "other" transfer payments help reduce inequality since QPP benefits will continue to rise in the future.

In summary, family allowances and unemployment insurance have never been programmes that redistributed much income, and the redistributive power has not increased. Any changes in the size of these programmes, without accompanying changes in their distribution, will at best do little to change income distribution. At worst, such increases in size will make the income distribution less equal. On the other hand, OAS/GIS and social assistance are markedly redistributive. More spending on these programmes, or similar ones, will get more income to those most in need, without changes in the structure of the programmes.

There have been recent changes in the least redistributive programmes; unemployment insurance and family allowances. Our results have implications for the analysis of these changes in addition to other more qualitative criteria. We would suggest an evaluation should include the effects of changing their size, of changing their distribution, the number of family units whose income shifted over the median, and an adjustment for family size, since all of these should affect a final conclusion on the success or failure of the reforms.

Table 1

Impact of Transfers on Family Units with Income Below the Median,
Quebec, 1967-1975

	1967	1971	1973	1975
Percentage of income before transfer	19.0	16.0	16.7	15.4
Percentage of income after transfer	<u>22.5</u>	<u>20.3</u>	<u>21.3</u>	<u>20.7</u>
Increase in percentage share	3.5	4.3	4.6	5.3

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families for 1971, 1973 and 1975, and unpublished data for 1967 from Statistics Canada.

Table 2

Impact of Transfers on the Lower End of the Income Scale Adjusted for
Family Size, Quebec, 1971-1975

	1971	1973	1975
Percentage of income before transfer	17.1	18.4	17.2
Percentage of income after transfer	<u>22.5</u>	<u>24.3</u>	<u>24.0</u>
Increase in percentage share	5.4	5.9	6.8

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 3

Impact of Transfers on the Lower End of the Income Scale, Quebec,
1967-1975

	1967	1971	1973	1975
<u>Lowest 10 per cent</u>				
Percentage of income before transfer	-0.1	0.0	-0.2	-0.1
Percentage of income after transfer	<u>0.8</u>	<u>0.7</u>	<u>0.9</u>	<u>0.9</u>
Increase in percentage share	0.9	0.7	1.1	1.0
<u>Lowest 20 per cent</u>				
Percentage of income before transfer	0.8	0.3	0.5	0.3
Percentage of income after transfer	<u>3.3</u>	<u>3.0</u>	<u>3.5</u>	<u>3.3</u>
Increase in percentage share	2.6	2.7	3.0	3.0

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families for 1971, 1973 and 1975, and unpublished data for 1967 from Statistics Canada.

Table 4

Impact of Transfers on the Lower End of the Income Scale Adjusted for Family Size, Quebec, 1971-1975

	1971	1973	1975
<u>Lowest 10 per cent</u>			
Percentage of income before transfer	0.0	-0.2	-0.1
Percentage of income after transfer	<u>1.0</u>	<u>1.4</u>	<u>1.4</u>
Increase in percentage share	1.0	1.6	1.5
<u>Lowest 20 per cent</u>			
Percentage of income before transfer	0.3	0.7	0.4
Percentage of income after transfer	<u>4.2</u>	<u>5.0</u>	<u>4.9</u>
Increase in percentage share	3.9	4.3	4.5

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 5

Percentage Share of Income Sources for Family Units Below the Median Ordered by Post-Transfer Income, Quebec, 1971-1975

	1971	1973	1975
Share of pre-transfer income	16.3	17.1	15.9
Share of transfers	68.3	63.7	61.5
Share of post-transfer income	20.3	21.3	20.7

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 6

Share of income sources for lowest post-transfer income families, Quebec, 1971-1975

	1971	1973	1975
<u>Lowest 10 per cent</u>			
Share of pretransfer income	0.3	0.2	0.3
Share of transfers	6.1	7.3	5.8
Share of post-transfer income	0.7	0.9	0.9
<u>Lowest 20 per cent</u>			
Share of pretransfer income	1.0	1.2	1.0
Share of transfers	26.8	25.8	23.1
Share of post-transfer income	3.0	3.5	3.3

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 7

Mean Income by Source, Quebec, 1971-1975

	1971		1973		1975	
Mean pretransfer income	7,077	92.2	8,429	90.9	10,500	89.5
Mean transfer income	598	7.8	835	9.1	1,228	10.5
Mean post-transfer income	7,675	100.0	9,264	100.0	11,728	100.0

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 8

Contribution of Pretransfer Income and Transfers to Income of Family Units Below the Median, Quebec 1971-1975

	1971	1973	1975
Contribution of pretransfer income [1]	15.0	15.6	14.3
Contribution of transfers [2]	5.3	5.7	6.4
Share of post-transfer income	20.3	21.3	20.7

1 Share of pretransfer income (Table 5) multiplied by mean pretransfer income as a percentage of post-transfer income (Table 7).

2 Share of transfers (Table 5) multiplied by mean transfer income as a percentage of post-transfer income (Table 7).

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 9

Concentration Coefficients and Contribution to Inequality (Ordered by Post-Transfer Income) Quebec, 1971-1975

	Pretransfer income			Transfers		
	1971	1973	1975	1971	1973	1975
Concentration coefficients	0.476	0.463	0.475	-0.198	-0.142	-0.111
Contribution to inequality (total Gini) (line 1 x per cent of post- transfer income)	0.439	0.421	0.425	-0.015	-0.013	-0.012
Contribution in per cent (line 2 Gini for post- transfer income)	103.5	103.2	102.7	-3.5	-3.2	-2.9

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 10

Concentration Coefficients and Contribution to Inequality (Ordered by Pre-transfer Income) Quebec, 1971-1975

	Post-transfer income			Transfers		
	1971	1973	1975	1971	1973	1975
Contribution coefficients	0.417	0.401	0.406	-0.349	-0.294	-0.254
Contribution to inequality (line 1 x per cent of pre-transfer income)	0.452	0.441	0.453	-0.030	-0.029	-0.030
Contribution in per cent (line 2 contribution of post-transfer income)	100.0	100.0	100.0	-6.6	-6.6	-6.6

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 11

Mean Income by Source Adjusted for Family Size, Quebec, 1971-1975

	1971		1973		1975	
Mean pretransfer income	4,113	91.3	4,949	89.8	6,258	99.6
Mean transfer income	391	8.7	560	10.2	808	11.4
Mean post-transfer income	4,503	100.0	5,509	100.0	7,067	100.0

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 12

Concentration Coefficients and Contribution to Inequality Adjusted for Family Size, Quebec, 1971-1975

	Pretransfer income			Transfers		
	1971	1973	1975	1971	1973	1975
Concentration coefficients	0.464	0.440	0.453	-0.307	-0.248	-0.265
Contribution to inequality (total Gini) (line 1 x per cent of post transfer income)	0.424	0.395	0.401	-0.027	-0.025	-0.030
Contribution in per cent (line 2 by Gini for post-transfer income)	106.8	106.8	108.1	-6.8	-6.8	-8.1

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 13

Old Age Security Payments as a Percentage of Average Post-Transfer Income of Family Size, Quebec, 1971-1975

	1971	1973	1975
Average dollar amounts	242	303	394
Percentage of average post-transfer income	3.2	3.3	3.4
Percentage change in average		+25.1%	+32.7%

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 14

Percentage Change in Income Shares Due to OAS and GIS [1] Quebec, 1971-1975

	1971	1973	1975
		(Percentage)	
Lowest 10 per cent	----	0.3	0.1
Lowest 20 per cent	1.5	1.8	1.7
50 per cent below the median	2.3	2.4	2.7

1 Share of pretransfer income and OAS/GIS less share of pretransfer income.

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 15

Percentage Share of Old Age Security and Guaranteed Income Supplement Received by Different Income Groups Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	4.8	9.7	5.9
Lowest 20 per cent	40.5	44.6	43.1
50 per cent below the median	82.6	84.5	87.2
Concentration coefficient	- 0.390	- 0.413	- 0.436

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 16

Percentage Share of Old Age Security and Guaranteed Income Supplement Received by Different Income Groups Adjusted for Family Size, Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	4.7	7.6	7.0
Lowest 20 per cent	30.6	43.5	41.3
50 per cent below the median	82.2	83.4	87.8
Concentration coefficient	- 0.363	- 0.382	- 0.430

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 17

Unemployment Insurance Benefits as a Percentage of Average Post-Transfer Income, Quebec, 1971-1975

	1971	1973	1975
Average dollar amount	61.0	212.0	317.0
Per cent of average post-transfer income	0.8	2.3	2.7
Percentage change in average	+ 248%	+ 50%	

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 18

Percentage Change in Income Shares Due to Unemployment Insurance [1] Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	0	0	0
Lowest 20 per cent	0	0	0.1
Lowest 50 per cent	0.3	0.7	1.0

1 Share of pretransfer income and unemployment insurance less share of pretransfer income.

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances incomes of families, Statistics Canada.

Table 19

Percentage Change in Income Shares Due to UI Benefits Adjusted for Family Size, Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	0	0	0.1
Lowest 20 per cent	0.1	0.1	0.1
Lowest 50 per cent	0.4	0.8	1.2

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 20

Percentage Share of Unemployment Insurance Benefits Received by Different Income Groups, Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	1.7	0.8	1.3
Lowest 20 per cent	5.0	4.7	3.5
Lowest 50 per cent	49.8	38.5	41.9
Concentration coefficient	0.061	0.189	0.159

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 21

Percentage Share of Unemployment Insurance Benefits Received by Different Income Groups, Adjusted for Family Size Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	2.7	1.9	2.1
Lowest 20 per cent	7.3	5.3	6.0
Lowest 50 per cent	51.1	44.9	48.6
Concentration coefficient	0.017	0.100	0.055

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 22

Decile Shares of Unemployment Insurance Benefits Received by Different Income Groups Adjusted for Family Size, Quebec, 1971-1975

Decile	1971	1973	1975
.10	2.7	1.9	2.1
.20	4.6	3.4	3.9
.30	13.6	12.5	11.0
.40	18.5	13.8	15.9
.50	11.7	13.3	15.7
.60	11.7	10.2	13.2
.70	10.9	13.5	10.9
.80	11.9	12.7	11.3
.90	11.9	11.2	12.1
1.00	2.5	7.5	3.9

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 23

Percentage Share of Unemployment Insurance Benefits Received by Different Income Groups (Income Ordered by Pretransfer Income) Quebec, 1971-1975

	1971	1973	1975
Lowest 10 per cent	2.8	2.7	2.0
Lowest 20 per cent	9.7	10.7	7.4
Lowest 50 per cent	59.9	51.3	55.9
Concentration	- 0.073	+ 0.030	0.000

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 24

Index of Inequality Reduction by Various Programmes, Pretransfer Income = 100, Quebec, 1971-1975

	1971	1973	1975
Inequality of pretransfer income	100.0	100.0	100.0
Percentage change caused by:			
Old Age Security and Supplement	- 2.6	- 2.9	- 3.1
Family Allowances	+ 0.8	+ 0.7	+ 1.4
Social Assistance	- 1.5	- 1.2	- 1.5
Unemployment Insurance	+ 0.1	+ 0.9	+ 0.9
Other transfers	----	- 0.3	- 0.2
Inequality of post-transfer income as an index of pre-transfer inequality	96.8	97.2	97.5

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 25

Changes in Inequality Over Time Caused by Changes in Size and Distribution of Transfer Quebec, Programmes, 1971-1975

	1971-1973			1971-1975		
	Total	Due to Change in Distribution	Due to Change in programme size	Total	Due to change in Distribution	Due to change in programme size
Old Age Security & Supplement	-0.3	-0.2	-0.1	-0.5	-0.3	-0.2
Family Allowances	-0.1	0.0	-0.1	+0.6	+0.2	+0.4
Social Assistance	+0.3	-0.1	+0.4	0.0	0.0	0.0
Unemployment Insurance	+0.8	+0.2	+0.6	+0.8	+0.2	+0.6
Other transfers	-0.3	-0.2	-0.1	-0.2	-0.2	0.0
ToTal	+0.4	-0.3	+0.7	+0.7	-0.1	+0.8

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Table 26

Index of Inequality Reduction by Various Programmes Adjusted for Family Size Pretransfer Income = 100, Quebec, 1971-1975

	1971	1973	1975
Inequality of pretransfer income	100.0	100.0	100.0
Percentage change caused by:			
Old age Security and Supplement	- 3.4	- 3.9	- 4.3
Family Allowances	0.0	0.0	+ 0.2
Social Assistance	- 2.2	- 1.9	- 2.4
Unemployment Insurance	0.0	+ 0.5	+ 0.3
Other transfers	- 0.2	- 0.4	- 0.4
Inequality of post-transfer income as an index of pre- transfer inequality	94.2	94.3	93.4

Source: OPDQ, Special compilation from microdata of Survey of Consumer Finances on incomes families, Statistics Canada.

Table 27

Changes in Inequality Over Time Caused by Changes in Size and Distribution of Transfer Programmes Adjusted for Family Size, Quebec, 1971-1975

	1971-1973			1971-1975		
	Total	Due to change in Distribution	Due to change in programme size	Total	Due to change in Distribution	Due to change in programme size
Old Age Security & Supplement	-0.5	-0.7	+0.2	-0.9	-0.7	-0.2
Family Allowances	0.0	0.0	0.0	+0.2	+0.1	+0.1
Social Assistance	+0.3	-0.2	+0.5	-0.2	-0.1	-0.1
Unemployment Insurance	+0.5	+0.2	+0.3	+0.3	+0.1	+0.2
Other Transfers	-0.2	-0.1	-0.1	-0.2	-0.2	0.0
Total	+0.1	-0.8	+0.9	-0.8	-0.8	0.0

Source: OPDQ, special compilation from microdata of Survey of Consumer Finances on incomes of families, Statistics Canada.

Footnotes

- 1 The equivalence scale used is that implicit in the low income cut-offs for 1975 from Statistics Canada (1975). The approach is explained in Frappier-DesRochers et al. (1979).
- 2 Concentration coefficients are defined by Kakwani (1978) and Frappier-DesRochers et al. (1979).
- 2 We say probably because other income sources are also under-estimated so exact total income is not known.
- 3 For a discussion of the problems of reconciling labour force survey data with UIC data see People and Jobs, Economic Council of Canada (1976).

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TARGETTING OF INCOME TRANSFERS AND THE INFORMATIONAL ENVIRONMENT OF PUBLIC DECISION-MAKERS

by

S. E. Bennett*

1 INTRODUCTION

Targetting of income transfers is a process of deciding who should benefit from changes in transfer policy. If and when a government official seeks formal analysis as an input into that process, he finds that the most useful formal research on the topic grows out of the development and refinement of indicators of well-being such as poverty lines and low-income status indicators. Given the nature of the informational and political environment of most senior officials, the information contained in these indicators is of very limited practical value. This paper briefly examines existing indicators, explores the features of the information that is important to the decision-maker involved in targetting, identifies gaps in that information, discusses some of the consequences of those gaps, and concludes by delineating the types of data that might be used to fill those gaps. In general, the paper develops the idea that targetting decisions are based on small amounts of information about public preferences, and this dearth of preference data is the major practical difficulty which should be addressed in attempts to provide decision-makers with more useful targetting information.

Although this paper has been primarily focused on the informational aspects of transfer targetting decisions, most readers will probably appreciate that political decisions on the allocation of income or other resources can be viewed in terms of a set of factors, which is more comprehensive than the set discussed in this paper. Both informational and noninformational factors would be included in a more comprehensive set of analytic elements.

Models for more complete analysis of allocative public decision-making are one part of the realm of models of public choice. The accelerated development of public choice models and theories will be important in achieving a better understanding of the ways in which public policies are developed and the ways in which they may be changed. Although, the informational environment and information processing procedures of policy-makers will only supply part of the content of more refined theories of public choice, it will likely be an important part.

2 THE NATURE AND LIMITATIONS OF EXISTING INDICATORS

In order to provide some perspective on currently available, formalized information which may be useful to evaluate the target efficiency of transfers, a brief description of existing low income indicators will be useful. Indicators of poverty status, low income status and material well being have been available in North America for over two decades. Examples of the nature of these indicators are:

(1) Income Distribution Cutting Points

-- Here, certain percentiles of an overall income distribution are identified as being the dividing

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lines between poverty and nonpoverty. Sometimes, these percentiles are computed for demographic sub-groups defined in terms of variables which are thought to be important in defining variation in basic needs. [1]

(2) Consumption Pattern Relations to Income

-- A percentage of income spent on certain basic items is used to define poverty or low-income status. For instance, the average income of families of a particular type who spend more than a certain percentage of income on basic items may be used to define a poverty level for that type of family. Different numbers of variables are used to define family types in different versions of this indicator genre. [2]

(3) Prescriptive Budget Itemizations

-- Basic "baskets" of goods thought to be required by certain types of families in certain locations are priced through actual observations of existing price patterns. Components of such itemizations are often used for constructing actual welfare benefit rate rather than for constructing standard definitions of low-income status. [3]

With the exception of the third type of index listed, these low-income or poverty indicators are not intended to provide a detailed basis for defining parameters of income transfer programs, and this point has often been stressed by the people and agencies involved in developing such indicators. Prescriptive budget itemizations are also usually presented with a variety of caveats regarding their lack of geographic generality and restrictions embodied in their underlying assumptions concerning the volume and type of consumer items which have been designated as necessary for a minimally adequate standard of living.

The limitations of existing indicators begs the question as to what constitutes their intended usefulness. The common delineations of their intended use are, depending on the particular type of indicator in question, as follows:

(1) Provision of a Statistical Standard with Fairly Invariant Meaning

-- Either for purposes of description, academic analysis, or policy evaluation, some indicators do provide a standard benchmark for measuring changes in the magnitude of poverty over time. [4]

(2) Provision of a Framework for Expanding Perceptions of the Structure of Low-Income Status

-- Here, emphasis is really placed on the variables which are used to define differences in family type and/or family situation, and it is a use of indicators which is related to the first putative use noted above. It is felt that gradual factoring of low-income status into an increasing number of determining components will enhance the clarity of and effectiveness of political decision-making in the realm of income transfer program design. [5]

(3) Provision of a Decision-Making Framework within Which Cost-Effectiveness Trade-Offs of Income Transfer Programs can be Considered

-- One of the more abstract purposes preferred for certain types of poverty indicators is that they might be used to evaluate different proposals for reducing poverty once: [6]

(a) the values of the poverty lines have been determined to be politically acceptable or compatible with prevailing value systems

(b) cost constraints for such evaluations have already been output from political processes.

(4) Provisions of a Basis for Determining Rate Increases in Components of Some Types of Programs

-- This is an intended purpose only of prescribed itemization indexes. Its imperfections in relation to the range of parameters which must be considered by public decision-makers have, with good reason, severely limited its fulfillment in the overall realm of income transfer program design.

The political decision maker or any of the analysts who may serve him, would be justified in assuming that poverty indicators are not of terribly direct use to him in making decisions about the focus and design of income transfer programs. Before such indicators can be of great use in actually evaluating existing or proposed income transfer programs, the political decision-maker must make a number of decisions which are so demanding that the contribution of standardized statistical indicators pale into insignificance. The political decision-maker must make decisions regarding publicly acceptable cost, eligibility limitations, benefit levels and the nature of their programmed variation. The contribution of poverty indicators to such decision making is initially relevant only as a minor aspect of efforts to modify or prepare public opinion for policy proposals and the educative influence of this type of information is likely to be quite minimal in the politically unavoidable short-run.

Obviously, the political shortcomings of existing indicators of material well-being are consistent with the uses intended for them by many of their progenitors, and the foregoing comments simply indicate that the scope of their legitimate application in public decision-making is limited. Those comments also imply that there are other kinds of indicators of well-being which have not been developed and which may be of direct relevance to the primary decisions confronting those who design and propose income transfer policy. This paper examines some of the factors which may be relevant to the design of more politically relevant indicators of well-being.

3 THE PERSPECTIVE OF THE PUBLIC DECISION-MAKER

Decisions and Decision-Makers of Interest

In order to simplify this presentation, it will be assumed that the perspective of central interest is that of a senior, elected, or politically selected, official. In Canadian government, the type of decision-maker of interest would usually be a cabinet minister or a deputy minister. In other types of systems senior legislators with preeminent caucus and committee status, chief executives and selected cabinet officials might be of interest.

The decisions of interest in our examination of targetting would generally fall into one of the following categories:

- (1) decisions regarding the scope of proposed new transfer programs
- (2) decisions regarding the focus of expansionary changes in an existing program
- (3) decisions regarding the focus of proposed contractions of an existing program.

In general, the decisions of interest are decisions which may directly influence who receives government income transfers and how much is received by different types of beneficiaries. Such decisions may relate to programs considered separately or to more systemic features of whole sets of existing and proposed programs.

Politically Relevant Preferences

Our prototypical decision-maker will, like most people, have the general objective of improving his own well-being. To a great extent, this means that he will want to maintain or enhance his own position in a government, but this is seldom the only dimension of his perception of what is good or desirable. Some personal concept of social equity or ideology is generally a part of the decision-maker's definition of his own utility, and such factors do have some influence on the choices and behaviours of public decision-makers.

Effective distribution of income transfers can be an important tool in the decision-maker's attempts to maintain or improve his position, and may even be a part of his own view of social justice. In considering ways to make the most effective use of his tool, the decision-maker must:

- (1) consider the preferences, both positive and negative, of groups that may have an impact on his future,
- (2) estimate the relative importance of the impact of these groups on his future,
- (3) form some opinion of the relative importance of income transfer policy decisions compared to the use of other policy instruments.

An example of part of this process is represented in the following diagram. For the purposes of simplifying our analysis, we will not consider the importance of our example decision in relation to other pending decisions.

Source of Preference	Undeserving Target Group	Deserving Target Group	Political Importance Preference Source [7]
al view of equitable distribution	A	B, C	1
View of D.M.'s party allies	A	C	8
View of opposition Party 1	A	D, E	4
View of Opposition Party 2	no preference	E	2
View of Interest Group 1	A	B	7
View of Interest Group 2	E	D	4
The Media	A	B, C, D	7
Residual Public Preference	A	no preference	4
Bureaucracy	A, E	C	5

In the preceding chart, we have assumed, for illustrative purposes, that:

- (1) the decision-maker assumes that preference sets can be described in terms of a 5 group categorization of target groups (A,B,C,D,E)
- (2) there are a limited number of interest groups, political factions, and other preference sources
- (3) the decision-maker is able to form some estimate of the modal preferences of different preference sources.

This last point is particularly important in that it means that information in the preceding table represents the view of the decision-maker and is not necessarily an accurate assessment of preference and potential political influence.

Some Determinants of the Decision-Maker's Assessment

Availability of Information

The decision-maker's assessment of factors which should influence his targetting decision will, at best, only be partially determined by formal indicators of poverty, deservedness, well-being or income deficiency. Such formal indicators may influence his definition of potential target groups and it is not unlikely that interest groups and other organized entities will use those indicators to press for the acceptance of their preferences. However, ultimately the public decision-maker must base his decision on an estimate of what target group or groups, if any, contains the most publicly acceptable recipients of transfers. In essence, the public decision-maker must attempt to assess what standards of need can be used to define a target group which is compatible with politically acceptable standards of need and equity.

There is no great difficulty in assessing the preferences of many of the groups whose views are politically important. Obviously, the decision-maker knows his own preferences, possibly based on some standard of equity which seems sound to him. His political sympathizers and any relevant interest groups will apprise him of their views at no cost, and, in many cases their preferences may be apparent from an examination of past policy statements and proposals. The media may not always have clearly expressed preferences per se, but the decision-maker can reasonably surmise that most media perspectives will be largely determined by a desire to seek out inconsistencies or anomalies in the progression of the decision-maker's policy statements.

Slightly greater uncertainty is associated with estimation of the preference of political opponents. To some extent, opposing political groups' preferences are constrained and defined by the same types of factors which constrain the decision-maker's activity. Their decisions respecting targetting will depend upon maintaining some logical consistency in the progression of policy positions over time, and such adversaries will also have a knowledge of the readily available views of organized interests. However, insofar as political opponents can play a reactive role in policy debates, they are able to take advantage of mistakes in judgement made by a governing decision-maker. In other words, political oppositions can marginally adjust their views of appropriate target groups to move closer to the real preference of different preference sources, and their latitude in making these adjustments may be enhanced when a governing decision-maker has grossly miscalculated the preferences of different preference sources.

One type of preference which is not easily estimated by the decision-maker or any of the organized groups he deals with is

"residual public preference." There are a large number of citizens who are not active in political organizations, interest groups or the media who may still have preferences regarding the definition of recipients of public income transfers. Although the intensity of such preferences may not be terribly strong, the cost of expressing them through conversation or voting at the time of an election is not very large in most political systems. Yet, public decision-makers seldom have direct and accurate estimates of the preferences of these ordinary citizens. In fact, it is probably safe to assume that public decision-makers seldom have easily available, accurate descriptions of the dimensions of need which ordinary voters use to distinguish appropriate income transfer target groups from inappropriate ones.

Temporal Changes in Importance of Preference Sources

In most political systems, there is a cycle of events which influence the weight that a decision-maker will attach to particular kinds of preferences at a given time, and this cyclical pattern has a direct influence on income transfer targetting decisions.

During periods of time immediately following an election, the decision-maker must assign a relatively high weight to the preferences of his political allies, supporters and sympathetic interest groups. These are the forces which will determine his immediate success in his work, and members of some of these groups may expect consideration to be shown to them as a result of their support of the decision-maker and his associates during a previous election. As an election approaches the decision-maker must be more aware of a wider range of preferences and the manner in which political opponents are positioning themselves in relation clusters of preferences.

One of the preference source which should normally experience an enhancement of its perceived political importance during a pre-election period is the source we have labelled "residual public preferences." The unorganized part of the citizenry takes on increasing importance as an election approaches, and this is simply a result of the impact that their numbers can have on electoral outcomes. Thus, periods preceding elections are among the few times when the political decision-maker may attempt to overcome the high cost of measuring general public preferences, but he will likely measure such preferences in a highly aggregated manner which does not provide many insights into the public's assessment of specific policy proposals.

Changes in the Relative Importance of Issues

The manner in which income transfer policy compares in importance to other issue areas will be of great importance in shaping a decision-maker's assessment of his income transfer policy options. Unfortunately, this is an aspect of the topic of interest which cannot receive sufficient discussion in the context of this type of paper.

One set of nontransfer issues which can serve as a preeminent illustrative example is the set of aggregate economic problems which demand so much of the attention of political executives. Changes in basic economic performance or problems are often reflected in a decision-maker's reweighting of the importance of policy areas, and this sort of change can, in turn, result in a reweighting of the importance of organized interests which are associated with specific issue areas or policy proposals.

For example, in the case of income transfer targetting decisions, changes in unemployment rates can influence decisions

relating to the focus of unemployment compensation. Decisions to restrict the target group for unemployment compensation may be carried out in the face of rising unemployment rates, but regional variations in the design of such restrictions may be allowed to accommodate interest groups representing particularly unemployment prone segments of a population. In the United States, a more applicable example might be the impact of economic conditions in the agricultural sector on the focus and packaging of food stamp policy. [8]

Ultimately, aggregate economic conditions can be viewed as one of the more important factors which influence intertemporal changes in the political influence weights assigned to different sources of preferences by public decision-makers.

Summary of the Preceding Commentary

The preceding portions of this paper are intended to show that:

- (1) there are known limitations in the policy relevance of existing indicators of poverty and well-being
- (2) there are gaps in the knowledge which senior decision-makers can bring to bear on income transfer targetting decisions
- (3) the most serious gaps in decision-maker knowledge probably occur in the realm of information about general public preferences of ordinary citizens who do not occupy a senior position in any organized political, governmental, or pressure group.

We have not yet considered what the specific consequences of major gaps in decision-maker knowledge might be. The next part of the paper will offer some analysis of those consequences, and, in accordance with the emphasis of earlier remarks, that section will concentrate on problems arising from a lack of information about unorganized public preferences.

4 CONSEQUENCES OF IGNORANCE OF CITIZEN'S PREFERENCES FOR INCOME TRANSFERS

In the table that was presented earlier in the paper, reference was made to "residual public preferences" or preferences of individual citizens who are not tied in any obvious way to major political and interest group organizations. Although this terminology may be useful in describing the senior decision-maker's view of his environment, it does not really do justice to the total phenomenon of interest. "Residual" is not an appropriate word to describe the vast majority of potential voters in most political systems. Furthermore, even people who have some minor affiliation with some of the organized forces in the world of a senior decision-maker, cannot really rely on their leaders to represent acceptable stances on policy proposals. Therefore, all that the senior public decision-maker knows about preferences relating to many types of policies may be mostly representative of a very small number of senior political actors, regardless of the formal claims of such actors to roles as spokesmen for larger groups.

There are several types of consequences of this lack of information about disaggregated public preferences for transfers. Some of these types of consequences relate directly to the personal concerns of the public decision-maker while others are of more direct interest to people concerned with the ultimate effectiveness of transfer policy, apart from any short-run political considerations. Major types of consequences are briefly discussed under the following sub-headings.

Essentially Political Consequences

A lack of accurate information about public preferences for transfers can lead to electoral losses or other changes affecting the public decision-maker's occupation of his position. Over time, it is also possible that persistent miscalculation of public preferences can alter the position of a decision-maker within his own group of associates, even though he may maintain control of his position.

Of course, it is also possible for decision-makers to commit fortuitous mistakes in gauging public opinion in a haphazard manner. A decision-maker may think that he is implementing a program which satisfies major preference constraints in a manner that will keep him in power. In fact, he may have inaccurately gauged the preferences of this portion of the public he normally relies on for support, but at the same time, may have unknowingly gained support from new, expanding parts of the population who are critical elements in any plan to maintain control of a political system, or part of it. Unfortunately, for the decision-maker such fortuitous mistakes are rare because announcements of new transfer programs or changes in programs are seldom packaged so that unintended beneficiaries or unintended advocates of such change will understand them. At least, it would usually be quite costly for those types of people to understand the focus of a new program.

Ultimately, the political effectiveness of transfer targetting decisions depends on how well the decision-maker has positioned his policy proposal in relation to the policy proposals by opposing groups. Position in these situations would be measured with respect to major nodes of citizen preference in a multi-dimensional distribution of citizen preferences. Although a number of interesting strategic points can be learned from analysis based on these sorts of factors, the details of such analysis will not be presented here. [9]

One further political consequence of the degree of information commonly underlying such decisions is the piecemeal or fragmented nature of transfer targetting decisions. Since interest groups have no particular incentive to argue for types of people not commonly associated with its goals and since political actors are primarily concerned with the preference of particular groups of potential beneficiaries who:

- (1) are well represented by major interest groups
- (2) and/or have an obvious and specific importance in an electoral strategy
- (3) and/or have some personal or ideological importance to the decision-maker.

Targetting decisions, at a given point in time, tend to deal with certain groups to the exclusion of others. At a later point in time, the results of this incrementalism may or may not be redressed, but the nature of beneficiaries will change with political perceptions of senior decision-makers and those in their immediate environment.

To some extent, this fragmentation is the same phenomena referred to by Professor Tullock when he once noted that politicians attempt to introduce transfer programs with easily seen benefits but dispersed, hard to understand costs. [10] However, the nature of the identifiability of benefits and costs probably varies considerably across different types of political systems. Prevailing decision rules and decision-making structures can vary considerably, even within the set of western democracies, and this variation can have an effect on the nature of target group fragmentation in targetting decisions.

For instance, it would seem as though the parameters of the Canadian system encourage the focusing of transfers in accordance with the boundaries of very broad demographic groups and a relatively high degree of universality of benefits within such groups. Over time, there is a certain balancing of benefits across groups, but some types of target groups are, explicitly, if not implicitly, generally ignored. Alternatively, the U.S. system appears to have parameters which, compared to the Canadian system, encourage

- (1) targetting in terms of specific needs and disability types (rationalization of programs for the blind and disabled, development of highly specific rules relating to single parent work availability, and in formal research a much more fine grained analysis of poverty and need variation)
- (2) a smaller degree of universality of benefit eligibility within identified target groups (in the sense that demogrants do not play a major role in American income transfer policy)
- (3) a somewhat greater degree of reliance on insurance principles as a means of cost dispersion. [11]

A more formal analysis of the decision structure underlying these differences would likely indicate that the divergences between the two systems should not be unexpected. Basically, the divergences are those which would be expected between a system where median preferences have a very direct relationship to electoral outcomes in most jurisdictions and a system where median preferences have a much less direct relationship to such outcomes, even at the national level. The latter, or Canadian system is one which encourages the proliferation of broadly targetted programs because of the difficulties involved in even guessing at what types of program specific preferences may be most critical to electoral outcomes.

Consequences which Derive from Direct Political Consequences

For most people, the truly important consequences of lack of information about preferences derive from the types of political consequences just discussed. The fragmented manner in which targetting decisions are made is a particularly important cause of these derivative consequences.

Examples of derivative consequences are as follows:

(1) Administrative Complication of Government
Activities

-- A nontrivial part of the time of staff involved in transfer program delivery is absorbed by adjusting to or keeping track of changes in other income transfer programs. This is also true of planning activities. Both existing fragmentation and lack of information about general public targetting preferences tends to focus on marginal adjustments in existing programs rather than a focus on either current public preferences or rationalization of systems through analysis of nonprogram data on disposable income, net worth, etc.

(2) Effects on Low-Income Population

-- It is well known that one probable outcome of current targetting decision processes is reduced target efficiency of the overall set of income transfer programs. The introduction of greater

amounts of information on public preferences may produce suggested income cut-offs that could be either high or low compared to commonly used poverty lines, but it is almost certain that adherence to the comprehensive structure of public preferences for transfer targetting would reduce the target inefficiency of those transfers.

(3) Economic Effects

-- The economic effects of the lack of public preference data used in transfer targetting are not generally describable. If decision-makers were made aware of such preferences and if those preferences necessitated a dramatic change in targetting policy, then such change would obviously have some form of impact on income distribution, consumption patterns, micro-employment decisions, aggregate distribution of employment, and many other dimensions of economic activity. Whether or not such impacts would be "good or bad" would depend on, *inter alia*, the exact nature of public preferences and the extent to which they dictated a course of action which diverged from existing income transfer policy.

(4) Effects on the Further Evolution of Public Preferences

-- It is likely that ordinary citizens do have some opinions about the determinants of needs which may be relevant for a particular type of income transfer program. Existing data indicates that they do have general conceptions of deserving and undeserving recipients of government money. Often these conceptions may be the result of rather unsystematic encounters with information about specific cases, and such data tends to cast a shadow of ill-opinion on an overly large part of the domain of income transfer policy.

If more information on public preference is available, then it will be possible to reduce the number of inaccuracies or anomalous features of these preferences not only by redesigning income transfer programs but also by defending reasonable, but not necessarily publicly acceptable, policy changes in terms which address the major gaps in citizen perceptions of low-income status.

5 THE NATURE OF PUBLIC PREFERENCE DATA:
IMPLICATIONS FOR FUTURE DATA COLLECTION

In thinking about the implications of public preferences for decision-makers involved in income transfer targetting, it will be useful to consider the conceptual dimensions of public preferences, the nature of actual objects of such preferences and the important relations between those types of information and other types of data. This is accomplished in a preliminary manner in the following remarks.

Dimensions of Public Preferences

The dimensions of preference sets are those variables which people use to rank the desirability of different items. For our purposes, the items of interest are different definitions of appropriate and inappropriate beneficiaries of income transfers. Little work has been done in exploring the operative dimensions underlying this sort of preference. A few opinion surveys have elicited highly constrained measures of perceptions of poverty according to income and family size. Other surveys have gathered information more in terms of the desirability of certain

programs. Still other surveys have focused on isolated aspects of the possible characteristics of desirable transfer beneficiaries. The problems inherent in nearly all these surveys are: [12]

- (1) They were based on a piecemeal approach to measuring preference dimensions.
- (2) They embodied many presuppositions about the dimensions of citizens' preferences for targetting of income transfers.

Thus, one cannot be certain that these surveys tapped the full range of preference dimensions, which are relevant to the perspectives of ordinary citizens. Therefore, it may be worthwhile for future work on targetting preferences to include some testing of different models of the dimensional structures underlying public preferences for income transfers.

Initially, there are at least two "models" of preference dimensions which seem to deserve some analysis. These are: [13]

(1) Item of Need-Income Model

-- Here, one attempts to determine what goods and services people view as being legitimate expenses to be underwritten by transfers and subsidies. Then, one determines how much income particular families feel they would need in order to purchase such services themselves. Thus, one establishes family type benchmarks of minimum need assuming a hypothetical situation of income deficiency.

(2) Demographic Characterization of Deserving and Undeserving Beneficiaries

-- Here, one elicits responses regarding the general characteristics of those who are seen as legitimate beneficiaries of certain programs and those who are not seen as being legitimate beneficiaries of those programs. To some extent, this verges on measuring donor preferences, but it is really more akin to mapping rather crudely defined senses of social equity.

It may be that both of these models of preference have some validity and that they are partially complementary.

Actual Preferences

Here, one is concerned with examining the way in which citizens rank different specific income transfer proposals. This would involve presenting the basic features of programs or program modifications to people and measuring the way in which people ranked the desirability of particular options. Presumably, descriptions of proposals would contain illustrations of typical beneficiaries of each proposal.

Decision-makers may view such data as being useful in and of itself as a guide in making specific decisions. However, a more formally important use of this type of data is in the realm of predictive validation of models of the underlying dimensions of public preferences for transfer targetting. To the extent that one of the models discussed earlier predicts a certain type of person's choices among options, it has been predictively validated.

The practical importance of predictive validation is that it provides a sound foundation for assessing what factors in preference dimensions are determining the degree of desirability

of particular transfer targetting policy options. Knowledge of this sort is useful in designing more acceptable options or in gauging what aspects of public preference prohibit a high valuation of some policy option which has a preeminent normative desirability in the view of the decision-maker.

Useful Linkages and References to Other Data

Earlier in this paper, it was noted that decision-maker preferences are partially dependent upon intertemporal changes in aggregate economic and demographic factors. It is also quite likely that the preferences of ordinary citizens for income transfer targetting vary in accordance with such factors. Validation of this possibility would require that citizens' preferences be measured longitudinally.

Any attempt to understand the precise causal structure surrounding preferences, and thus understand how to modify or anticipate their development, would require that preference data not only be measured repeatedly but also that it be relatable to micro-data on citizen socio-economic characteristics. For instance, we need not make the assumption that preferences are completely a function of income and wealth, to assume that family income and wealth will have some influence on the nature of a given family's preferences [14] or even its underlying preference structure. Thus, longitudinal measurement of family income, wealth, structure, age composition and other factors in conjunction with preference measures is recommended as a means of looking at specific, micro-analytic relationships that are only grossly represented in analysis relating aggregate economic and demographic factors to preferences.

The political importance of the data collection just suggested resides in the fact that the public decision-maker should not only know what preferences are in the present but should also know how such preferences are likely to evolve during the years between option selection and final program implementation. It is also useful for him to know the extent to which preferences for transfer targetting are dependent on easily modified factors. For instance, if certain critical preferences are primarily determined by current income of those expressing preferences, then a marginal option may be made into a highly desirable one by simply extending the range of people for which it is intended. Alternatively, if an option that is desired by a decision-maker and his associates is not generally valued because of the influence of permanent income or extremely fixed value structures on preferences, then the decision-maker would be well-advised to substantially modify his own perspective.

Footnotes

- 1 In Canada, this would include poverty lines used by the Canadian Council on Social Development and the Senate Committee on Poverty. For a discussion of comparable U.S. indicators, see Jack McNeil, The Measure of Poverty: Technical Paper XIII - Relative Poverty (Washington, D.C.: H.E.W., 1976). Any discussion of this type of indicator can, in large part, also be related to quintile and decile analysis.
- 2 This category would encompass the Revised Statistics Canada Low Income Cut-offs, U.S. indicators developed by M. Orshansky, and the Watts Iso-Prop Index. There is considerable variation within this category.
- 3 In Canada, this would refer to guidelines developed by the Montreal Diet Dispensary and the Metropolitan Toronto Social Planning Council.
- 4 Research and Analysis Section, Consumer Income and Expenditure Data, "Revision of Low Income Cutoffs" (Statistics Canada, 1973) pp. 2-4.
- 5 Improving Measures of Economic Well-Being, eds. M. Moon, E. Smolensky, (New York: Academic Press, 1979) see the Forward.
- 6 Harold Watts, "An Economic Definition of Poverty" in Improving Measures of Economic Well-Being, ed. M. Moon, E. Smolensky, (New York: Academic Press, 1977), pp. 19-32.
- 7 1 = low importance, 10 = high importance.
- 8 The Canadian example refers to some recent activity surrounding changes in Unemployment Insurance. It is an example in which certain provincial governments can be seen as interest groups working in conjunction with occupational interest groups.
- 9 The classic public choice literature by Downs, Buchanan, and Tullock is relevant here, and there is a variety of more recent works of interest.
- 10 Gordon Tullock, Toward a Mathematics of Politics (Ann Arbor: University of Michigan Press, 1972), pp. 100-105.
- 11 In examining expenditure and revenue patterns for fiscal year 1973-1974, this author found that social insurance premiums collected by all levels of Canadian government during that period were equivalent to about 30.4 per cent of income transfers made to individuals and families by Canadian governments during the year of interest. A comparable U.S. figure for all levels of government during 1973-1974 would be no lower than 60 per cent and possibly somewhat higher, depending on the way in which one attempts to equate Canadian programs to U.S. programs.
- 12 For those not familiar with opinion measurement in Canada, it may be worth noting that the bulk of the surveys referred to have been conducted by the Canadian Institute of Public Opinion. Although these surveys may not precisely meet the information needs identified in this paper, they do provide some useful information which, in some cases, spans more than three decades.

Other noteworthy studies have been conducted by government agencies and a major study of attitudes relating to Unemployment Insurance was conducted by York University's Institute for Behavioural Research. It would appear as though many of these studies are based on a rather restrictive view of the direct use of survey based analysis in policy and program design.
- 13 Another approach which has been tried is the measurement of perceptions of poverty levels for types of families other than one's own. There are problems with this measurement strategy.
- 14 A limited examination of one aspect of this possibility is contained in: Robert Kilpatrick, "The Income Elasticity of the Poverty Line," The Review of Economics and Statistics, August 1973.

LINGUISTIC DISPARITIES

There is a strong tendency towards the reduction of earnings disparities between linguistic groups in the province of Quebec; however, a gap in favour of anglophones continued to exist in 1970-71. The following two papers examine the levels and trends in linguistic earnings disparities and seek to evaluate the factors contributing to both.

Discussants and delegates raised several points to do with the adequacy of data for continued analysis in this subject area, the appropriateness of definitions of income thresholds and required language skills (reading and writing as well as speaking), the consideration of female income disparities between linguistic groups (see the Rose-Lizée/Dussault paper in the "Female Incomes" section), and the important matter of the effect of linguistic capacity on labour mobility.

Both authors rely heavily on census data, particularly since it is necessary to distinguish between the effects of language and other personal factors affecting earnings (education, occupation, age, marital status, and so on); still the census has limitations as a vehicle to investigate labour market phenomena. The issue of linguistic skills in earnings attainment is so crucial to the attainment of equal employment opportunities for all Canadians that the continuation of comprehensive census data and the application of labour force surveys to the development of relevant labour market data was emphasized. In particular, the impacts of language on job mobility, within and between occupations, across geographic distance (between geographically defined labour markets) and over time are all critical dimensions of the issue. Likewise, the laws concerning the use of French in the Québec workplace has an overall impact on employment and earnings within the province, and in Québec compared to other areas of Canada. This requirement, via its influence on job location as well as labour mobility (into, as well as out of, the province), must continue to be examined.

THE ROLE OF LANGUAGE IN THE DETERMINATION OF THE LABOUR
EARNINGS OF QUEBEC MALES IN 1970

by

François Vaillancourt*

INTRODUCTION

The literature on the determination of individual earnings has seen quite a few developments in the last fifteen years. Using various sources of microdata, economists working in that field have examined the impact of education, experience, health, migration decisions, family background, sex, race, intelligence and other individual characteristics on the earnings of individuals. Little has been done, however, to examine the impact of an individual's language skills on his earnings. Studies in the United States on the incomes of minorities other than the black minority have looked at the impact of ethnicity rather than at the impact of language skills (Carliner, 1976; Fogel, 1966). This is also the case, in the main, of the work done for the Royal Commission on Bilingualism and Biculturalism as reported in the final report of the commission and elsewhere (Raynauld and Marion, 1972). More recently empirical studies have been conducted by, amongst others, Boulet, Renaud, and Vaillancourt on the impact of language on the earning of residents of Quebec.

The first part of this paper presents a brief overview of a theoretical framework useful in understanding the role of language in economic activity. The second part of the paper reports on various indicators of the socio-economic status of the English-speaking group (Anglophones) [1] and French-speaking group (Francophones) in the Quebec labour market in 1970; some of these indicators give prima facie support to the inclusion of language skills amongst the set of independent variables when estimating earnings equations in the Quebec labour market. In the third part of the paper the database and the variables are described and the empirical results presented. In the fourth and final part these results are discussed and avenues for future research are suggested.

1. THE ROLE OF LANGUAGE IN ECONOMIC ACTIVITY: A THEORETICAL
FRAMEWORK

Languages are systems of vocal and written symbols. They are complete if each real world situation can be described by them. It is assumed that individuals have a minimum level of fluency in their mother tongue and in any other language they may know, that the minimum level of fluency of an individual in his mother tongue is higher than his minimum level of fluency in a second language and that, on average, individuals who are of the X-mother tongue are more fluent in the X-language than individuals of another mother tongue who learned the X-language as a second language.

Language is a form of general human capital (Becker, 1964) since it is a skill whose acquisition will bring an individual consumption or investment benefits, or both. For example, a knowledge of language is required for the consumption per se of such cultural goods as novels or songs; it is also combined with time to permit the consumption of most goods. As to investment benefits, language is often used by individuals to supply their

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services to their employers and it is also used by individuals to acquire other human capital, such as education and on-the-job training.

While all the languages known by an individual are part of his stock of human capital, one of them, his mother tongue, also contributes to the definition of his ethnic group. This results from the fact that the mother tongue of an individual is usually closely linked to the values, norms, and customs which determine his ethnic background; as Hocevar puts it, there is "...a correspondance between linguistic identity and other cultural elements". (Hocevar, 1975b, p. 31.)

The definition of ethnicity given here is not the same as the one used by Statistics Canada in its 1971 Census. In our opinion the use of the term ethnicity to describe the ethnic group of the first paternal ancestor of an individual that came to America is not correct and researchers using that characteristic should label it "paternal ancestry". [2]

The fact that language can be both a form of human capital and a determinant of ethnicity has not been generally acknowledged in the literature on the economics of language. Both Migué (1970) and Raynauld and Marion (1972) treat language as an ethnic characteristic while Breton and Mieszkowski (1975) and Breton (1978) treat it as a type of human capital, useful in the purchase of goods and in the accomplishment of work related tasks; as to Hocevar (1975), he treats language as an ethnic characteristic of goods and as a type of human capital useful in work-related activities. It appears appropriate to point out that the acquisition by an individual of a second language in a society where two or more languages are used in the labour market is akin to migration in enhancing his employment opportunities with linguistic mobility replacing geographic mobility; however his ethnicity, partly defined by his mother tongue, influences in part the choice of the economic environment in which he is willing to live.

In the discussion of the role of language in economic life, it will be assumed that individuals choose to use their mother tongue. One of two assumptions can be made to explain this choice. One is that they have a preference for doing so: they are willing to pay more, *ceteris paribus*, for goods available in their own language and are also willing to earn less, everything else being equal, for working in their own language.

The alternate assumption is that individuals are more fluent in their mother tongue than in other languages. This assumption seems reasonable if the mother tongue of an individual is also used in early schooling and social interaction as is the case, for example, in Quebec with both Anglophones and Francophones. However, in a society where the mother tongue of the minority group is seldom used outside the home it is possible that members of that group will be, by the time they enter the labour market, more fluent in their second language, the language of the majority. This case is not considered here. An individual will, by using his mother tongue, need less time to convey information with precision, and do so with a lesser likelihood of error and possible embarrassment. In this analysis the second of these two assumptions is used to explain language choices.

In the analysis of the consumption activities of individuals, the Z-commodity model, first put forward by Becker (1965), is used. In that model, both goods purchased in the market and time are used by individuals as inputs in the production of Z-commodities, chosen according to the individual's preferences. Since the amount of time used in the production of Z-commodities is partly spent finding out how to use the market goods, and since using language is one of the most common means of doing so, it seems plausible that the time spent by an individual in

producing Z-commodities, using a given set of goods, depends in part on the language those goods are available in and on his language skills; the availability of a good in a language is a function of the language of the written and oral information linked to the good. This explicit recognition of the role of language in the production of Z-commodities, a role that results from the fact that language is used to carry information, is recent (Vaillancourt, 1978).

In the analysis of the labour supply decision of individuals it is assumed that individuals make a choice between leisure and work, given the usual budget constraint and that they want to attain the highest possible level of utility. If employers pay individuals according to the value of their marginal product, individuals must then choose the job where they are the most productive. Therefore they will seek a job where they can work using their mother tongue, the language they are most fluent in. They will make such a choice since the greater their fluency in the language needed to carry out a given task, the smaller the amount of time needed to carry it out and the lesser the likelihood of mistakes on the job. Of course, the smaller the importance of on-the-job information flows, the smaller the importance of language in determining the marginal productivity of employees in carrying out a given task. The role of language in production activities has not been explicitly recognized in the literature although reference is often made to the importance of the coordination of production factors (Alchian and Demsetz, 1972).

In his choice of a language of work the entrepreneur will prefer working in his mother tongue since individuals are assumed to be more fluent in their mother tongue than in a second language. Hence, it is likely that most workers he hires will be of his group. While the greater productivity of an entrepreneur in his mother tongue will lead him to prefer it, ceteris paribus, as the language of operations in his firm, a second factor influencing his choice is the language of technology (the language of operating, maintenance, and repair instructions of his production equipment). This may lead to different language requirements in various occupations and in particular to different requirements for employees working in the plant, where the language of technology may dictate the language requirements, and for employees working in the office, where the language of the owner may, because of the importance of information flows, dictate the language requirements. Finally the language of the suppliers and of the purchasers has an impact on the language choices of a firm.

The arguments put forward above indicate that productivity considerations, which depend on information flows, may lead employers to prefer a particular language for all or part of a firm's operations. This preference for a particular language may lead to members of one linguistic group, that which has the language of operations of the firm as its mother tongue, having a greater access to jobs than members of other language groups because of their greater fluency in that language. This interesting result means that preferential hiring of members of one's language group can be explained without assuming that the entrepreneur practices discrimination (Raynauld and Marion, 1972), or screening (Arrow, 1972; Migué, 1970). Such a result was implicit in Keyfitz (1963) but had not since been followed up.

We now turn to an examination of the socio-economic status of Anglophones and Francophones in the Quebec labour market, for which the results of earnings equations will be reported in the third part of this paper.

2. THE SOCIO-ECONOMIC STATUS OF THE MAIN LANGUAGE GROUPS IN QUEBEC IN THE EARLY SEVENTIES

In this section we first examine the demographic weight of the various language groups in Quebec and their ownership of enterprises. These two factors and the fact that English is the language of most of Quebec's labour markets and of its sources of technology can be seen as factors explaining the higher socio-economic status of English and Anglophones in Quebec that is described thereafter.

The population of Quebec can be broken down into three main language groups: Allophones (that is, individuals who are neither of English nor French mother tongue), Anglophones and Francophones. In 1971 the first group made up 7 per cent of all males in Quebec aged 15 to 64, the second 13 per cent and the last 80 per cent. Since in this paper we will look only at the earnings of Anglophones and Francophones, for reasons of convenience in statistical analysis, we neglect Allophones in the discussion that follows. Looking at Table 1 one can see the relative importance of these two groups in both the whole of Quebec and Montreal.

An examination of Table 1 shows that the breakdown between Anglophones and Francophones, and within those groups between those who are and those who are not bilingual, is different in Montreal from the one observed in the whole of Quebec. Outside Montreal, Francophones were mainly unilingual and Anglophones bilingual in 1971, while in Montreal the reverse was true.

Anglophones and Francophones differ not only in terms of their geographic dispersion across Quebec but also in terms of their socio-economic status. Looking first at the ownership of enterprises in Quebec one finds that Francophones are under-represented (Raynauld, 1974). For example in manufacturing, the percentage of employees working in firms owned by Francophones was according to various studies 21.7% in 1963 (Raynauld, 1974, p. 50) 25.3% in 1970 (Dagenais and van Peeterssen, 1973, p. 64) and 22.2% in 1973 (Sales, 1977, p. 35). Given the differences in methodology between the studies, the results are remarkably similar and indicate that between one fifth and one quarter of employees in the manufacturing sector work in firms owned by Francophones.

Finally it can be shown (Vaillancourt, 1978) that English is the language through which modern technology from outside Quebec is made available to Quebec and exports from Quebec are made available to the remainder of the world. In other words English is the language of external trade for Quebec. It is also the language of work in the labour markets adjacent to Quebec.

Applying the theoretical framework outlined previously to the situation described above one is led to conclude that English is likely to be a more useful language than French in the Quebec labour market and that this may lead to those who know English holding better jobs and earning more than those who do not. Let us now examine the evidence on these points.

First one finds that Francophones have to use more English on the job than Anglophones French, both in the whole of Quebec and in the Montreal area. This is shown in Table 2.

Looking at more traditional indicators of socio-economic status one finds that while Anglophones have a similar distribution across occupations, be they bilingual or not, Francophones have a distribution across occupations that differs if they are bilingual or not and they also have a distribution different from that of Anglophones. Unilingual Francophones are under-represented in white collar occupations while Anglophones are overrepresented. Table 3 presents evidence on this point for whole of Quebec but the pattern is similar in the Montreal area.

Finally looking at Table 4 one can see that in 1970, for the whole of Quebec, unilingual Anglophones earn (on average) 69 per cent more than unilingual Francophones, bilingual Anglophones 61 per cent more, and bilingual Francophones 37 per cent more. The pattern of differences is similar in the Montreal area. Differences appear among occupations, however, with the differential being the highest for those employed in Management/Engineering occupations and the lowest for Production Workers. These differences, however, are not necessarily the result of differences in language skills; they could also be brought about by differences in the distribution across language groups of other individual characteristics important in explaining earnings, such as education. Hence it will be necessary to examine mean earnings differences between language groups while taking into account explanatory factors other than language. This will be done in the next part of this paper.

To summarize, one can say that in Quebec in 1970 Francophones owned a share of enterprises smaller than their population share, had to use English at work more often than their Anglophone counterparts had to use French, were underrepresented in more prestigious occupations and earned less than Anglophones.

3. THE IMPACT OF LANGUAGE ON THE EARNINGS OF MALES IN QUEBEC: A MULTIVARIATE ANALYSIS

In this part of the paper we shall first discuss the variables used in the analysis, the database and the specifics of the variables and the functional form used. We will then turn to a presentation and discussion of the results.

The Preliminaries

As pointed out above it is not sufficient to show that the mean earnings of groups of individuals with differing language skills differ to be able to conclude that language has an impact on the earnings of males in Quebec. Other factors which influence the earnings of individuals must be controlled for. In this analysis it will be possible to take into account the education of individuals, their work experience, the amount of labour supplied and, when appropriate, the size of their place of residence.

The inclusion of education as an explanatory factor is usual in human capital models (Mincer, 1974); it has been argued, however, that such a variable should not be included when examining earnings differences between language groups in Quebec since the higher level of education of the Anglophones compared to that of the Francophones is linked to the historical place in society of these two groups (Raynauld and Marion, 1972).

The inclusion of experience as an explanatory factor is also usual in human capital models. Both education and experience, that is age corrected for the level of schooling, can be interpreted as indicators of the level of human capital.

The inclusion of the amount of labour supplied, in this case the number of weeks worked, as an explanatory factor of earnings is more debatable because it can be seen as the result of supply decisions by individuals and demand decision by firms in the same way as the earnings, occupation, and industry of employment of an individual. In this study it will be accounted for in two ways: first by putting it explicitly into an earning equation estimated over the whole sample and also by selecting a sub-sample of individuals who worked a full year.

Finally regional variables will be included in equations estimated for Quebec to account for the size of the labour markets.

The database used in the analysis carried out in this paper is a one-in-one-hundred sample of the Quebec population, drawn from the 1971 Census of Canada carried out in the first week of June 1971. For the whole of Quebec the sample comprises 60,280 individuals, while for Montreal it is made up of 27,433 observations. Those two samples were stratified by sex, age and mother tongue.

Not all individuals found on the Quebec and Montreal sample tapes have been used in this analysis. Only 9,869 individuals were available for calculations performed for the whole of Quebec; for Montreal that number is 4,638. This comes about because (a) women were excluded as the information available on their work experience makes it impossible to model adequately the earnings for women; (b) Allophones and nonwhites were excluded due to insufficient cell frequencies; (c) other individuals are also excluded if they had no declared positive earnings in 1970, if their major source of income was not wages and salaries in 1970, if they were not wage earners at the time of the Census, or if they immigrated to Canada in 1970 or 1971 so as to ensure that the analysis looks at individuals whose main source of income in 1970 was wages and salaries earned in Quebec and not self-employment income or transfer payments; and (d) individuals working in the "Agriculture, Fishing and Trapping" or in "Industry Not Determined" and in "Artistic and Literary", "Religion", "Farming", "Other Occupations", and "Occupations Not Stated" were excluded.

In the various regressions, the results of which are found here, the dependent variable is the natural logarithm of the individual's earnings. This continuous variable is defined as the logarithm of the sum of all wages, tips, bonuses, commissions and amounts of a similar nature received during 1970, gross of deductions.

The language variable reflects the mother tongue of an individual and his capacity in the other official language of Canada. One should be aware that if an individual is bilingual, it implies that he has a minimum level of oral fluency in either English or French as a second language. He may, however, be more fluent in English or French than the minimum required to be reported as bilingual in the Census.

The education variable is a polytomous variable since the number of years of schooling of an individual is not given, each individual being assigned to one of twelve schooling categories according to his number of years of schooling. These twelve groups were collapsed into five in this analysis.

Experience is measured by age minus "assumed number of years of schooling" (Vaillancourt, 1978) plus six. Such a variable is a better representation of experience than age alone since individuals who have more schooling must, at a given age, have less work experience. The weeks worked variable is a polytomous variable since the exact number of weeks worked is not indicated in the database, individuals being assigned to one of five groups. Finally a polytomous variable is included to account for the size of the urban environment.

A semi-logarithmic earnings function will be used as it is suggested by both theoretical and empirical considerations. That type of equation is used in Mincer's work (1974) and allows for implicit interaction between the variables: hence, the impact of an independent variable on the dependent variable will depend on the value of the other independent variables. [3]

Empirical evidence also suggests that using a log-linear function is preferable. For example, Taubman chooses a semi-log function since "...a variety of tests suggested that the semi-log

form was statistically better than double logs or linear form" (Taubman, 1976, p. 453). According to Welland (1976, p. 25), there is

"...strong empirical support for the use of the natural logarithm of earnings as the appropriate dependent variable in earnings regressions. The evidence marginally favours the semi-logarithmic specification of the earnings function over the double logarithmic form. The linear specification is clearly rejected."

This is also the conclusion of Heckman and Polachek (1974). Furthermore, the use of a log-linear function reduces the problem caused by possible heteroscedasticity (Riboud, 1975) and allows the dependent variable to vary from minus infinity to plus infinity so the assumption of normal errors is more acceptable.

The Regression Results

In this section the results of the regression analysis of the earnings of males in Quebec are examined. One notes that the following variables are excluded, becoming the reference category for the appropriate set of polytomous variables: "unilingual Francophone" from the language set, "Primary 0-8" for the education set, "1 to 13 weeks" for the weeks worked set and "rural" for the region of residence set. Finally in all tables of regression results the "t-ratio" is the statistic found in brackets below each coefficient; a * next to the coefficient indicates that it is significant using a one-tailed t-test at the 95 per cent confidence level while ** indicates that it is significant at the 99 per cent level.

The coefficients of the polytomous education variable are expected to be positive and to increase with increasing education; the same is true of the coefficients of the polytomous weeks worked variable. The experience coefficients are expected to show a concave experience-earnings profile and the region variable should show those living in cities earning more than those living in rural areas. As to the language coefficients they are assumed to reflect the net effect of the ethnicity and language skills of individuals. Given the various forces at work in the Quebec market in 1970, three hypotheses are put forward.

- (I) Individuals who know English earn more than those who do not know English. This means that Anglophones and bilingual Francophones earn more than unilingual Francophones.
- (II) Anglophones are expected to earn more than bilingual Francophones since their mastery of the English language is greater.
- (III) Bilingual Anglophones are expected to earn more than their unilingual counterparts since they have a greater amount of linguistic human capital.

Table 5 presents the results obtained by estimating the earnings equations for all males in our samples of Quebec and Montreal males.

As shown by the F-statistic, the equation used to calculate the results of Table 5 is highly significant overall. Furthermore, all the coefficients are significant and have the expected signs. The experience coefficients are of the expected sign and relative magnitudes and show a concave earnings-experience profile peaking at thirty-two years of experience in Quebec and thirty-one in Montreal. The education coefficients are also significant and of the expected signs and relative magnitudes. Assuming that the average level of education in the "some university" category is 16 years and dividing the percentage increase in earnings indicated by the coefficient of that

variable by 16, one finds that on average one year of education increases earnings by 5 per cent in Quebec and 5.6 per cent in Montreal.

With respect to the education variable, it must also be pointed out that the choice of such a broad education category as that of "some university" was imposed by the size of the sample. It could be argued, however, that this could have some impact on the language coefficients since Anglophones may differ from Francophones as to their number of years of university schooling, being on average more educated; this could bias upward the Anglophone language coefficients. However, evidence from the study of the Highly Qualified Manpower Survey of 1973 (Ahmad, 1977) indicates that, at least for all of Canada, Francophones earn less than Anglophones even when differences in the level of university degrees are taken into account.

The weeks worked coefficients have the expected signs and relative magnitudes and are significant. Their inclusion, however, raises the problem of simultaneity since annual earnings are determined by the wage rate and the amount of time worked while the amount of time worked is the result of a choice made given an income-leisure constraint. Hence, including weeks worked as a set of independent variables implies that the number of weeks worked is assumed to be determined by demand factors outside the control of the individuals.

The regional variables are significant: the higher value for the smaller urban areas could be the result of the choice of suburban towns as a residence by many who work in larger adjoining urban areas.

The language coefficients show that knowing English increases the earnings of individuals in both Quebec and Montreal lending support to the hypothesis (I). Furthermore, as Table 6 shows, Anglophones earn significantly more than bilingual Francophones in both Quebec and Montreal, that being true at the ninety per cent confidence level for unilingual Anglophones in Quebec. This lends support to the hypothesis (II). On the other hand, one notes that bilingualism does not increase the earnings of Anglophones in either Quebec or Montreal, a fact which contradicts the hypothesis (III).

One criticism that could be levelled at the equation used to obtain the results of Table 5 is that it does not truly capture the ultimate causes, such as I.Q. and family background of earnings differences among individuals (Blinder, 1973). The information available in the database unfortunately precludes exploration of these causes.

Another criticism is that industry and occupation variables have been excluded from the independent variables used in the regression analysis. This choice was made because we felt that the equation used above captures the total effect, both direct and indirect, of human capital on earnings. This distinction between the direct and indirect effects of human capital was made, for example, by Kalacheck and Raines (1976) who argued that using an earnings equation with human capital variables and without demand-type variables such as occupation or industry was the correct way of capturing "the total effect" of human capital on earnings. The inclusion of demand-type independent variables simply permits the breakup of the impact of human capital on earnings as direct effects and as indirect effects that manifest themselves through intervening variables. Such an approach is in agreement with our view that earnings, industry, and occupation are all the results of the interplay of demand and supply forces and that to explain the first item by the last two is incorrect, particularly since we are estimating a type of reduced form equation (Mincer, 1974).

It could be argued that it is preferable to account for labour supply decisions by estimating equations only for those employed full-time and, for the impact of mother tongue and language skills, by estimating equations for appropriate subgroups of individuals. In Table 7 the results of equations estimated for all individuals who worked forty-nine weeks or more in 1970 are reported; in Table 8 the results of regressions estimated on appropriate subgroups of Francophones and Anglophones are reported.

The results of Table 7 are once more in agreement with the expected results. The F-statistics indicate that the equations are highly significant as in Table 5 but the value of \bar{R}^2 is lower. The education, experience and, where appropriate, region coefficients have the expected signs and relative magnitudes. The language coefficients show not only that knowing English increases the earnings of individuals in Quebec but also that Anglophones earn more than bilingual Francophones, a result similar to that reported in Table 5. Hence the use of either approach to account for differences in labour supply does not affect our conclusions on the gross returns to language skills in Quebec.

The use of polytomous language variables in an equation where Anglophones and Francophones are combined implies that the coefficients of the other variables are the same for both groups. This may not be the case, however in fact; the results of Table 8 indicate the existence of different equations for Anglophones, unilingual Francophones and bilingual Francophones, as indicated by the appropriate Chow-tests. The education-earnings and experience-earnings profiles of the Anglophones are steeper than that of the Francophones with all the coefficients of the expected signs and relative magnitudes.

Other empirical results could be presented where specific age, education, industry or occupation subgroups have been examined but lack of space prevents this. It seems useful, however, to present the main empirical finding of our work on those subgroups (Vaillancourt, 1978). One finds when using four age groups (25-34 to 55-64) that:

- the premium for knowing English and for being of English mother tongue increases as one moves up from one age group to the next, reaching a peak in the 45-54 age group. This could indicate either that the labour market has changed throughout the last forty years with the returns to knowing English or being Anglophone decreasing throughout the period but remaining stable for a given age group as it ages or that as a cohort ages it faces increasing returns to being Anglophone or knowing English. In our opinion it is likely that the labour market in Quebec has undergone structural changes in the last forty years that make the first explanation more plausible but the evidence available to us does not permit us to show this;
- the premium to knowing English and to being of English mother tongue was highest in 1970 for those with a grade 13 education, increasing as individuals acquire schooling below that level and decreasing for those with some university training. This could possibly result in part from the fact that university education gives Francophones access to professional public sector jobs in Quebec where a knowledge of oral English may not be required;
- the premium to knowing English and to being of English mother tongue was highest for manager/engineers, and drops to almost zero for blue-collar workers, a result that could be explained in part by the location of

Canada-wide head offices in Quebec and in part by the interface role of management in Quebec between owners, outside markets, and technology and Quebec workers;

- the premium to knowing English and to being of English mother tongue was in general lowest in those Industries where Francophone ownership is highest, a result that could be explained in part by the fact that these owners are likely to use French as the internal language of work of the company.

It is now appropriate to examine more carefully the results reported above and to point out avenues of future research.

4. THE EFFECT OF LANGUAGE ON THE EARNINGS OF MALES IN QUEBEC IN 1970: SUMMING UP

In the discussion that follows it must be remembered that one is comparing Anglophones and Francophones in Quebec in 1970 and that the results thus obtained do not necessarily generalize to other regions of Canada [4] or other time periods. In particular, one should note that Anglophones who were living in Quebec in 1970 were there, in part, because of the earnings opportunities open to them; the linguistic make-up of the North-American continent means that there are no language barriers to their working elsewhere in Canada. On the other hand, Francophones living in Quebec in 1970 had to overcome a language barrier if they wished to settle elsewhere in Canada, its importance depending on their language skills. Hence they may, ceteris paribus, have had to accept lower earnings than Anglophones, a partial explanation of earnings differences.

The gross earnings differences between language groups in Montreal were presented in Table 4. One way to calculate the net impact of language on the earnings of these groups is to use the regression coefficients for the language variables reported in Table 5. The results of these calculations are reported in Table 9 and compared to the gross differences.

Looking at the results of Table 9, one notes that the gross earnings differences between unilingual Francophones and Englishspeaking workers are three to six times higher than the net earnings differentials. This indicates that differences in education, job experience, weeks worked, and region of residence are important factors in explaining the differences in earnings between language groups in the whole of Quebec and in Montreal.

These net differences in earnings between language groups do not indicate, however, the relative contributions of the human capital and of being Anglophone or Francophone to those differences. Pure human capital effects can be easily observed, however, when a comparison is made of individuals of the same language group who know or do not know a second language. Doing this, one finds that:

- for Anglophones, being bilingual has no significant positive impact, (see Table 6) on their earnings in the whole of Quebec and in Montreal. Looking at the coefficients carefully, however, one is led to suspect that there probably is a positive monetary return to knowing French for Anglophones living in Quebec outside Montreal but it is impossible because of data limitations to measure it. Such a result would not be surprising, however, given the make-up of the population and the widespread use of French as a language of work outside Montreal. As to the lack of monetary returns to Montreal Anglophones for knowing French in 1970, one possible explanation was the presence of a number of offices of Canadian companies in that city for which English was the working language.

On this point it is interesting to note that in both Quebec and Montreal, 45 per cent of unilingual Anglophones completed their last year of high school outside Quebec. This proportion drops to 17 per cent for bilingual Anglophones, 4 per cent for unilingual Francophones and 7 per cent for bilingual Francophones. This, and the fact that, in Montreal, two-thirds of unilingual Anglophones working in Management/Engineering occupations received their last year of high school outside Quebec, lends support to the hypothesis that the role of Montreal as a city with many head and branch offices explains in part the difference between the earnings of Anglophones and Francophones in Quebec. Indeed regression equations similar to those whose results are reported in Table 5 but with a dichotomous variable added to account for the fact that some individuals acquired their last year of high school outside Quebec, show that variable to have a significant impact on the earnings of individuals. It leaves all other coefficient unchanged save for the unilingual Anglophone coefficients which drops by about .035 in both Quebec and Montreal. Whatever the reason, it remains that there was little market inducement for most Anglophones to learn French in Quebec in 1970.

- For Francophones, being bilingual has a positive impact on their earnings in both Quebec and Montreal. Various explanations can be offered as to why this is so, ranging from the ownership of industries to the language of the external marketplace. Whatever the reason it remains that there is a positive market inducement for Francophones to learn English in Quebec.

This discussion of the returns to language as human capital was reasonably straight-forward since it was possible to isolate, by holding it constant, the effect of being Anglophone or Francophone and to look at the effect of specific linguistic human capital on the earnings of individuals in Quebec. On the other hand, if one were to compare unilingual Francophones and Anglophones, it would not be possible to sort out the positive impact on earnings of knowing English (the human capital effect) and of being of English mother tongue. One way of isolating the human capital effect and the effect of having English as a mother tongue on the earnings of an Anglophone is a two-step procedure; first, one compares the earnings of bilingual Francophones to unilingual Francophones and ascribes the difference to the acquisition of English as human capital. Secondly, one compares the earnings of bilingual Francophones and bilingual Anglophones and ascribes the differences primarily to these differences of mother tongue. The results of calculations conducted along these lines are presented in Table 10.

Examining the results of Table 10, one finds that being Anglophone explains 28 per cent of the net earnings premium of Anglophones over unilingual Francophones in the whole of Quebec and 52 per cent in Montreal. Using the same approach, one finds that being Anglophone explains 6 per cent of the gross earnings premium of Anglophones over unilingual Francophones in Quebec and 9 per cent in Montreal. These differences in earnings that appear to be linked to being Anglophone or Francophone could be the result of different information networks for Anglophones and Francophones in Quebec (Migué, 1970), of discrimination, pure or statistical, or of differences of fluency in the English language.

On the other hand, the net differences in earnings could be the result of differences between Anglophones and Francophones in personal attributes that were not captured by the control variables used in the regression analysis to net out the impact of factors other than language. Three attributes whose effect on earnings could possibly be captured by the language variables are the intelligence, health, and attitudes towards work and monetary rewards of Anglophones and Francophones. In our opinion (Vaillancourt, 1978) this is not the case.

Another way of examining differences in earnings between language groups is to use group specific equations to sort out the impact of differences in the mean characteristics of a group and the impact of different earnings equations on their earnings. [5] This was done using the group specific equations of Tables 8 and the results are reported in Table 11 for Quebec only since the results for Montreal are quite similar.

The results reported in Table 11 corroborate those reported in Table 9 as to the relative returns to English both as an ethnic attribute and as human capital in the Quebec labour market in 1970.

The results reported above were obtained using a specific set of data and a rather classical earnings equations. In our view it would be interesting if:

- using the results found in this paper and elsewhere (Vaillancourt, 1978) on the gross returns to knowing English for Francophones in Quebec, one were to compute the net returns to knowing English using various assumptions as to the costs of doing so and as to the evolution of gross returns as the share of bilingual individuals amongst Francophones in Quebec varies. This could throw some light on the fact that, given the gross returns reported above, not all Francophones have learned English;
- using the same data, one examined more complex models of earnings determination where, for example, weeks worked are first determined by various individual characteristics, including language, and are then used to explain the earnings of individuals through an earnings equation. This would be an interesting development since the raw data indicate that unilingual Francophones worked substantially less than Anglophones in Quebec in 1970 (Vaillancourt, 1978) and since Roy has shown in the case of New Brunswick that this appeared to be an important factor in explaining earnings differences between Anglophones and Francophones (Roy, 1978). One difficulty, however, is that the information on the 1/100 sample of Statistics Canada would require the use of a dichotomous dependent variable in a system of simultaneous equations. Possibly the censored regression approach or the algorithm recently put forward by Heckman (1978) could be used;
- using data already in existence, earnings equations could be estimated in such a fashion as to take into account the language of work of individuals. One could then examine the hypothesis that the more individuals use a second language at work, the greater their returns to knowing the second language;
- using an already existing survey, such as the Survey of Consumer Finances one could collect information on the mother tongue and knowledge of official languages on an annual basis. This would provide a rich source of cross-sectional data on a continuous basis;
- finally it would be interesting to examine the dynamics of income inequalities to test, amongst others, the hypothesis that the present lower levels of educational attainment of Francophones are, in part, the result of characteristics of their ancestors including both their education and income. These factors, in turn, may be due to earlier personal and societal attitudes related to language. If such is the case, then the "personal characteristics equations" approach, whose results are reported in part 3, in my opinion underestimate the impact of being a Francophone on earnings in the same fashion that it underestimate the amount of discrimination against blacks in the United States (Blinder, 1973).

To conclude we restate our main findings which are:

- gross differences in earnings between language groups greatly overstate the net impact of language on the earnings of males in Quebec since the net differences were three to six times smaller than the gross differences in earnings between Anglophones and Francophones;
- the net impact of language on earnings, that is its impact once other factors have been controlled for, is significant in that knowing English in 1970 brought higher earnings to males in Quebec and in its metropolis, Montreal. One can summarize these findings by stating for 1970, using the results of Table 9;
 - that bilingualism brought no monetary returns to Anglophones in Quebec;
 - that bilingualism brought monetary returns to Francophones in Quebec of the order of 10 per cent (6 per cent in Montreal);
 - that being of English mother tongue brought monetary returns to Anglophones in Quebec of the order of 4 per cent (6 per cent in Montreal).

Table 1

Share of Male Populations (15-64), Quebec and Montreal, 1971

	Quebec	Montreal
Anglophones	14.5	24.8
- Unilingual	6.8	13.0
- Bilingual	7.7	11.8
Francophones	85.5	75.2
- Unilingual	43.7	23.9
- Bilingual	41.8	51.3

Source: Calculations made using the 1/100 PUST data described in part 3 of this paper.

Table 2

Average Percentage Use in Specific Work Activities Other Official Language, 1970

	Quebec	Montreal
Anglophones	13%	11%
Francophones	26%	38%

Source: La situation de la langue française au Québec, Vol. 1, La langue de travail, Commission d'enquête sur la situation langue française et sur les droits linguistiques au Québec, Editeur officiel du Québec, 1972, p. 42.

Note: These results were compiled from a survey of 5000 residents of Quebec carried out in 1971. See Carlos (1973) for more details.

Table 3

Distribution across Five Occupations, Males, Quebec, 1970 (Percentage)

Language Skills	Occupations				
	Management/ Engineering	Education/ Health	Clerk	Sales	Production Workers
Unilingual Anglophones	26.1	4.3	17.5	12.3	39.8
Bilingual Anglophones	21.5	6.1	18.3	17.0	37.1
Unilingual Francophones	3.9	4.6	8.5	7.6	75.4
Bilingual Francophones	15.1	8.5	15.7	12.6	48.1
All	11.4	6.3	12.9	10.7	58.7

Source and Note: See Table 4.

Table 4

Mean Earnings, Five Occupations, Males, Quebec, 1970

Language Skills	Occupations					All Individuals
	Management/ Engineering	Education/ Health	Clerk	Sales	Production Workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Unilingual Anglophones	13584	8130	5962	8471	7028	8776
Bilingual Anglophones	13505	7784	5841	8882	6292	8350
Unilingual Francophones	7059	6386	4828	4985	5094	5198
Bilingual Francophones	10243	8505	5924	7498	6242	7146
All Individuals	10759	7762	5601	6958	5644	6497

Source: The data are taken from the 1/100 "PUST" data described in part 3 of this paper.

Note: The five occupational groups listed above correspond to the following major groups of the Occupational Classification Manual, Census of Canada, 1971 (S-C 12-536): Management - 11, 21; Education/Health - 23, 27, 31; Clerk - 41; Sales - 51; Production Workers - 61, 73, 75, 77, 81, 82, 83, 85, 87, 91.

Table 5

Regression Results, Males, Quebec and Montreal, 1970
(t-statistics in parentheses)

	Quebec	Montreal
<u>Variables</u>		
Constant	5.98** (214.57)	5.92** (141.87)
<u>Language</u>		
Unilingual Anglophones	.129** (5.41)	.111** (3.68)
Bilingual Anglophones	.136** (5.95)	.113** (3.64)
Bilingual Francophones	.099** (7.56)	.057** (2.65)
<u>Education</u>		
High School 9-10	.124** (7.79)	.143** (5.92)
High School II	.218** (10.75)	.227** (7.64)
High School 12-13	.273** (13.16)	.289** (9.61)
Some University	.590** (29.05)	.643** (22.05)

Table 5 (cont.)

	Quebec	Montreal
<u>Experience</u>		
Experience	.065** (45.66)	.069** (32.83)
(Experience) ²	-.0001** (-38.78)	-.001** (-27.59)
<u>Weeks Worked</u>		
14 - 26 Weeks	.841** (28.41)	.940** (19.54)
27 - 39 Weeks	1.35* (46.93)	1.35** (28.79)
40-48 Weeks	1.66** (60.30)	1.76** (39.77)
49-52 Weeks	1.81** (74.60)	1.92** (49.0)
<u>Regions</u>		
Urban 30,000+	.052** (3.09)	-
Urban 30,000-	.074** (3.90)	-
\bar{R}^2	.617	.608
F-statistic	1061.72	555.41
No. of Observations	9869	4638

Source: Vaillancourt (1978, p. 133).

Table 6

Significance Test of Differences between Language Coefficients in Table 5
(t-statistics in parentheses)

	Quebec	Montreal
Bilingual Anglophones- Unilingual Anglophones	0.007 (0.24)	0.002 (0.52)
Unilingual Anglophones- Bilingual Francophones	0.029 (1.28)	0.054* (2.09)
Bilingual Anglophones- Bilingual Francophones	0.036* (1.67)	0.056* (2.05)

Source: Vaillancourt (1978, p. 135).

Note: The formula used to calculate the t-statistics referred to above is:

$$t = \frac{\hat{\beta}_2 - \hat{\beta}_1}{\sqrt{\text{var } \hat{\beta}_1 + \text{var } \hat{\beta}_2 - 2 \text{cov}(\hat{\beta}_1, \hat{\beta}_2)}}$$

with $\hat{\beta}_1$ and $\hat{\beta}_2$ the estimated regression coefficients, $\text{var } \hat{\beta}_1$ and $\text{var } \hat{\beta}_2$ their estimated variances, and $\text{cov}(\hat{\beta}_1, \hat{\beta}_2)$ their estimated covariance and the difference being significant if the t-statistic is greater than some reference value.

A * indicates that the difference is significantly different from zero at the ninety-five per cent confidence level using a one tailed t-test.

Table 7

Regression Results, Males, Quebec and Montreal, 1970, Employed 49
Weeks or More
(t-statistics in parentheses)

	Quebec Full Year	Montreal Full Year
<u>Variables</u>		
Constant	7.87** (296.14)	7.94** (240.67)
<u>Language</u>		
Unilingual Anglophones	.194** (8.31)	.168** (5.58)
Bilingual Anglophones	.179** (7.72)	.178** (5.67)
Bilingual Francophones	.103** (7.51)	.123** (5.49)
<u>Education</u>		
High School 9-10	.138** (8.44)	.189** (7.92)
High School 11	.237** (11.47)	.272** (9.35)
High School 12-13	.295** (11.05)	.347** (11.68)
Some University	.583** (28.70)	.671** (23.65)

Table 7 (cont.)

	Quebec Full Year	Montreal Full Year
<u>Experience</u>		
Experience	.051** (32.81)	.053** (24.08)
(Experience) ²	-.0008** (-28.74)	-.0008** (-20.49)
<u>Regions</u>		
Urban 30,000+	.135** (7.04)	-
Urban 30,000-	.132** (6.14)	-
\bar{R}^2	.269	.288
F-statistic	210.36	142.46
No. of Observations	6265	3150

Source: Vaillancourt (1978, p. 292).

Table 8.1

Regression Results, Males, Quebec, 1970, Employed 49 Weeks or more
(t-statistics in parentheses)

Variables	Anglophones	Francophones	
		Unilingual	Bilingual
Constant	7.93** (133.51)	7.97** (211.08)	8.19** (236.55)
<u>Education</u>			
High School 9-10	.259** (5.37)	.133** (5.43)	.118** (4.62)
High School 11	.409** (7.96)	.244** (6.84)	.174** (5.73)
High School 12-13	.435** (8.12)	.265** (6.62)	.266** (9.11)
Some University	.728** (15.43)	.631** (14.57)	.528** (18.63)
<u>Experience</u>			
Experience	.062** (16.93)	.049** (18.56)	.048** (20.75)
(Experience) ²	-.001** (-14.69)	-.0007** (-16.1)	-.0008** (-18.52)
\bar{R}^2	.319	.158	.196
F-statistic	81.89	75.69	116.44
No. of Observations	1035	2385	2845

Source: Calculations made using the 1/100 PUST data.

Table 8.2

Regression Results, Males, Montreal, 1970, Employed 49 Weeks or More
(t-statistics in parentheses)

Variables	Anglophones	Francophones	
		Unilingual	Bilingual
Constant	7.81** (95.44)	7.94** (117.54)	8.21** (205.78)
<u>Education</u>			
High School 9-10	.261** (3.88)	.205** (4.55)	.150** (5.28)
High School 11	.406** (5.87)	.107 (1.47)	.234** (6.80)
High School 12-13	.531** (7.09)	.251** (3.05)	.274** (8.27)
Some University	.880** (13.17)	.553** (6.49)	.589** (18.16)
<u>Experience</u>			
Experience	.061** (11.87)	.055** (11.28)	.047** (17.40)
(Experience) ²	-.001** (-8.96)	-.001** (-10.25)	-.001** (-15.50)
\bar{R}^2	.267	.181	.252
F-statistic	51.60	25.19	94.40
No. of Observations	832	656	1662

Source: Calculations made using the 1/100 PUST data.

Table 9

Gross and Net Earnings Differences, Quebec and Montreal, 1970 males

Percentage Difference between the Average Annual Earnings
of Three Groups and those of Unilingual Francophones

	Quebec		Montreal	
	Gross	Net	Gross	Net
Unilingual				
Anglophone	69	13.8	66	11.7
Bilingual				
Anglophone	61	14.5	62	12.0
Bilingual				
Francophone	37	10.4	35	5.8

Source: Tables 4 and 5.

Table 10

The Returns to Knowing English and Being an Anglophone, Quebec and Montreal Males, 1970

	Quebec	Montreal
Share of Gross Earnings differences attributed to:		
Knowing English	17.0	9.3
Being an Anglophone	6.7	10.0
Share of Net Earnings differences attributed to:		
Knowing English	71.7	48.3
Being an Anglophone	28.3	51.7

Note: The formulas used to calculate the gross and net returns to knowing English (human capital) and being of English mother tongue are written down below.

	Gross Returns		Net Returns
Knowing English	$\frac{\text{Net B.F.}}{\text{Gross B.A.}}$	(1)	$\frac{\text{Net B.F.}}{\text{Net B.A.}}$ (3)
Being an Anglophone	$\frac{\text{Net B.A.} - \text{Net B.F.}}{\text{Gross B.A.}}$	(2)	$1 - \frac{\text{Net B.F.}}{\text{Net B.A.}}$ (4)

where B.A stands for Bilingual Anglophones, B.F. stands for Bilingual Francophones, and Gross and Net refer to the columns of Table 9, the "Gross and Net Earnings Differences" table.

Table 11

Earnings of Language Groups Calculated using Mean Personal Characteristics and Group Specific Equations, Quebec, 1970

Equation Used	Characteristic Vectors	Estimated Earnings \$	Ratio of Estimated Earnings to those of: Anglophones	Bilingual Francophones
Anglophones	Anglophones	8421	1.00	1.18
Bilingual Francophones	Bilingual Francophones	6895	.82	1.00
Unilingual Francophones	Unilingual Francophones	6003	.71	.87
Unilingual Francophones	Anglophones	6679	.79	.97
Bilingual Francophones	Anglophones	7260	.86	1.05
Unilingual Francophones	Bilingual Francophones	6714	.80	.97

Source: Table 8.

Footnotes

- 1 By X-speaking we mean of X mother tongue, where the mother tongue is the first language spoken.
- 2 See A Dictionary of the Social Sciences for evidence on the various definitions of ethnicity.
- 3 If we assume that we have E: earnings
 X a 0, 1 variable
 Z a continuous variable.
 and if the regression equation is

$$\ln E = \beta_1 X + \beta_2 Z + u$$

this implies that

$$\frac{\partial E}{\partial Z} = \beta_2 \cdot E \text{ so that}$$

$$\frac{\partial E / \partial Z}{E} = \beta_2$$

and that

$$\text{if } X = 0 \text{ then } E_0 = e^{\beta_2 \cdot Z}$$

$$\text{if } X = 1 \text{ then } E_1 = e^{\beta_2 Z} \cdot e^{\beta_1}$$

$$\text{Hence } E_1 - E_0 = e^{\beta_2 Z} \cdot (e^{\beta_1} - 1)$$

$$\text{and } \frac{E_1 - E_0}{E_0} = e^{\beta_1} - 1$$

Therefore the percentage change in E resulting from X going from 0 to 1 is equal to $e^{\beta_1} - 1$ and not to β_1 . Hence $\Delta E/E > \beta_1$ for all $\beta_1 > 0$ with the difference growing with β_1 .

- 4 See for example the work of Roy (1978) on New Brunswick.
- 5 See Oaxaca (1973) for an application of that technique in a similar context.

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THE ORIGIN OF LINGUISTIC DISPARITIES IN EARNINGS
BETWEEN FRANCOPHONE AND ANGLOPHONE MALE WORKERS
IN THE MONTREAL METROPOLITAN ZONE IN 1970

by

Jac-André Boulet*

INTRODUCTION

Income disparities arising from linguistic [1] differences have been the subject of several investigations in Canada. Most of these efforts, however, have been completed in recent times, either during or even after the hearings and report of the Royal Commission on Bilingualism and Biculturalism. In addition to allowing researchers of this period to make major inroads into this field of income disparities between groups of workers, an area previously little explored in Canada, the Commission also permitted these researchers to better identify the pertinent questions that deserved further attention.

One of the problems attacked during this period, to which only a very partial answer was found, was the extent to which differences in characteristics and attributes between francophone and anglophone workers could be held responsible for the differences in earnings between these two linguistic groups. The following text will specifically examine this problem [2] and attempt to come to grips with it through data drawn from the 1971 Census. [3]

The first section will deal briefly with the evolution of earnings disparities since 1961, the sample to be used for the purposes of this discussion, the relative numbers of workers involved, and the size of the disparities studied. The second section will introduce and apply the model which makes it possible to measure the portion of earnings disparities between linguistic groups that may be attributed to differences in characteristics and attributes. The third section will seek other factors that might account for that part of the disparities left unexplained in the preceding section. Finally, the conclusion will evaluate the importance of the results.

THE CONTEXT OF THE PROBLEM

Review of the Evolution of Linguistic Earnings Disparities [4]

In 1961, the spread between the average earnings [5] of francophone and anglophone male workers was 51 per cent in favour of the latter. In 1970, it had dropped to 32 per cent, and was down to 15 per cent by 1977. It is interesting to note that if linguistic earnings disparities had continued to decline between 1970 and 1977 at the same rate as between 1961 and 1970, they would have decreased to 21 per cent, rather than the 15 per cent observed, by 1977.

Furthermore, if we analyse the evolution of linguistic earnings disparities by earnings brackets, we find that the relative gains achieved by francophones over this period were real gains at all earnings levels, and particularly at the upper levels. If, for example, we examine the top 20 per cent of

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francophones and top 20 per cent of anglophones, we find that the latter earned 76 per cent more in 1961. By 1970, this advantage had dropped to 50 per cent and by 1977 was no more than 19 per cent. Similarly, if we examine the best-paid 15 per cent of workers in both groups combined, we find that in 1961, 44 per cent were francophones. In 1970, the proportion of francophones had risen to 57 per cent, and had reached 70 per cent by 1977. If this rate were to continue, francophones would reach their quota among the highly-paid workers by about 1982.

Over these 17 years, the linguistic configuration of the Montreal market, in terms of manpower and earnings, has been altered considerably. In 1977, bilingual francophones ranked second in earnings, 11 per cent below bilingual anglophones, up from fourth in 1961. In turn, unilingual anglophones dropped from second in 1961 to fourth, right below bilingual allophones [6], who continued to hold the third rank.

Another interesting fact revealed by the last survey in early 1978, was that anglophones represented 18 per cent of the male labour force, compared to 21 per cent in 1971 and 23 per cent in 1961. This drop is especially due to a major reduction in the proportion of unilingual anglophones on the market. These represented only 5 per cent in 1978, down from 11 per cent in 1971 and 13 per cent in 1961. On the other hand, bilingual anglophones grew in proportion from 10 to 13 per cent over the period 1961-1978.

The data from the survey conducted in 1978 are insufficient for us to learn the true causes of linguistic earnings disparities. On the other hand, those taken from the 1971 decennial census are very complete and well documented, and will be quite sufficient for drawing conclusions as to whether or not significant earnings disparities still persist, once differences between francophone and anglophone workers in terms of age, number of weeks worked, level of education, occupation, ethnic origin, citizenship, marital status and nature of employment have been eliminated.

The Labour Force Studied [7]

The data to be studied consist of a sample of 33 per cent of the male labour force in the Montreal metropolitan zone in 1971. Statistics Canada distributed to one individual out of every three, aged 15 or over, a detailed questionnaire on his or her income and sources of income. Thus, 273,847 male workers were surveyed. However, workers who did not correctly answer the census questions pertinent to this study were excluded. In addition, we left out workers having annual earnings below \$500 or above \$50,000. This eliminated the few extreme cases and improved the quality of the results estimated. In all, 17 per cent of the respondents were thus excluded. Of the remaining 227,678 workers, 147,587 (65 per cent) were francophones, 48,414 (21 per cent) were anglophones and 31,677 (14 per cent) were allophones. It should be noted that this percentage distribution among linguistic groups is the same as before the eliminations but that the average earnings of francophones rose from \$6,625 to \$6,741 while that of anglophones increased from \$8,736 to \$8,743. Consequently, the earnings disparity that we will attempt to explain is \$2,002 or 30 per cent rather than \$2,112 or 32 per cent. However, these modifications, unavoidable for the most part, do not have any bearing on the conclusions.

Several factors explain our choice of the Montreal metropolitan region for analysis, as well as our decision to limit this analysis to the male labour force in this region. This does not, however, mean that we are not interested in learning about the evolution of linguistic earnings disparities in other regions of Quebec or Canada; the choices were made simply on the basis of our chosen objectives.

The Choice of the Montreal Metropolitan Zone

There are five arguments we use for why we chose to concentrate on the Montreal region:

- a) This region contains the greatest concentrations of francophones, anglophones and allophones in Quebec. In 1971, some 42 per cent of the male francophone labour force lived in this region. The corresponding proportions of anglophones and allophones were 75 per cent and over 80 per cent, respectively. None of these proportions has changed considerably since.
- b) When we study a particular linguistic group in this region, regardless of the criterion used (industrial composition, demographic structure or any other), we benefit in each individual case or in all cases combined from a complete and very diversified picture. No other region in Quebec can offer this.
- c) As a well known report has already emphasized: "Regional development (...) does not consist of fencing off fields; it consists of obtaining the means of overcoming competition and making use of the true advantages one may possess. These advantages are found in Montreal; it is up to us to put them to use." (Unofficial translation.) [8] This insistence on Montreal's importance in the more modern sector of Quebec's economy and the French-Canadian community's poor control over this sector were repeated by Maurice Saint-Germain. [9]
- d) To conduct a study covering all of Quebec, or to combine into a single region that part of Quebec outside the Montreal region would be to hide the particular aspects of certain regions in terms of the industrial and occupational composition in each or the income disparities registered between them. Moreover, anglophone workers outside Montreal have distributions of socio-economic characteristics that differ, not only from those of francophones, but also from those of the anglophones in Montreal. The characteristics of the groups of anglophone workers outside Montreal also differ considerably among themselves, whether speaking of anglophones in the Eastern townships, in northwestern Quebec or in the Gaspé region. Consequently, a study covering all of Quebec or just the region outside Montreal, to be thorough, would have to include a very important regional dimension. This point has already been made in the report just quoted. "The occupational structure and the level of education vary substantially among sub-regions of the province. Jobs with relatively low productivity are found in some, while others register fairly high levels of education. Thus, disparities between social groups correspond to sub-regional disparities." (Unofficial translation.) [10] The importance of the urban character and the size of urban centres has again been recently brought to the surface. "There is a very clear distinction between the rural and urban environments favouring the latter in levels of average incomes. In addition, in the industrialized countries at least, there is a very clear positive correlation between demographic size of urban agglomerations and per capita income. (...) Three factors exert a major influence on the increase in the level of income with urban size. First, there is a positive relationship between the participation rate of the adult population and urban size; thus, even with a constant level of average wages, the inhabitants of large cities will have a greater purchasing power per individual. Second, we observe an increase in value added per worker in the manufacturing sector that reflects the presence of

economies of agglomeration; this greater productivity commands a higher remuneration of the labour factor. Finally, occupational structure changes with urban size so that the highest paid occupational categories increase their relative share of the total labour force." (Unofficial translation.) [11]

- e) We must finally add that our study is aimed primarily at identifying the causes of linguistic earnings disparities rather than producing a descriptive study of the evolution of these disparities; in order to be able to propose solutions, we must accurately delimit the major source of the problem. In view of the arguments already set forth, it is our opinion that the major source of this problem is located in the Montreal region. If we are successful in dissecting it, in understanding what lies behind it, and if others correct what must be corrected, this will already have a certain impact on the means of approaching linguistic earnings disparities in the other regions of Quebec. In any case, we should recognize that the day when there will no longer be any linguistic earnings disparities in the Montreal metropolitan zone, but only reasonable or economically justifiable income differences, this problem will no longer be an important subject for debate in Quebec as a whole.

The Choice of the Male Labour Force

By choosing to focus our analysis on only the male labour force, there was no intent to underestimate the importance of the debate over the type of work and incomes of the female labour force. In the framework of an analysis centred primarily on linguistic earnings disparities, the "female" variable carries with it a wide range of particular problems specifically linked to the female market, as is the case for the "regional" variable as well.

The studies conducted on the female labour market, primarily descriptive but also analytical, lead us to believe that the characteristics and attributes of women are not combined in the same ways as for men to produce their earnings. This was particularly true of women who entered the labour market before the 1970's, and more so before the 1960's. This argument makes it difficult to analyze the evolution of women's earnings from the perspective of a particular socio-economic factor such as language.

We know, for example, that for many years women limited "themselves" to very specific types of occupations and industries. Today, they are expanding this horizon. Thus, not only is the basis for comparison changing over time, but we also no longer know whether the reaction of women to these changes is the same among francophones and anglophones.

It has already been demonstrated in an article published in the United States [12] that the female labour market was to some extent towed along by the male labour market, since women often "must" move as a result of their husbands' position or work. When they move away from their region, there is no guarantee that they will find a job corresponding to their qualifications. In this respect, the Montreal region is particularly interesting because the presence of head offices and branches of foreign or Canadian head offices in this region means that a good part of the anglophone labour force in Montreal was not born in Quebec. This raises a problem: how do the wives who accompany their husbands combine their characteristics and attributes to produce their income level? There is reason to believe that their combinations are less than optimal. Consequently, they decrease the average incomes of all anglophones compared to a maximum, while at the same time their case is difficult to compare with that of the other women, those born in Quebec.

Furthermore, since the early 1960's, the female labour market has experienced strong expansion caused, impart, by the strong growth of the service sector. This sector does not always pay the highest wages, and thus may have contributed little to narrowing linguistic earnings disparities. We can also ask whether this market has not been more receptive to francophone women than anglophone women since more of the former would be bilingual and since the positions available would very often require some knowledge of the two official languages.

Again we stress that this does not mean the evolution of linguistic earnings disparities in this labour market is not interesting. But any analysis must deal specifically with this market rather than submerge it in the male labour market. The quality of analysis and identification of causes and thus remedies would suffer if the two markets were not explicitly differentiated throughout the study.

For these various reasons, we chose to centre our analysis on the problems of linguistic earnings disparities among male francophone and anglophone workers.

THE ANALYTICAL MODEL AND RESULTS

The conventional approach consists basically of attributing the earnings disparities observed between workers to differences in their characteristics and attributes. [13] The worker's education, his occupation, age and amount of time devoted to work are among the most important factors usually considered for determining the value of the worker's characteristics and attributes. To these four factors commonly used in any earnings determination function applied to the type of problems dealt with here, we have added five others: the worker's citizenship status; ethnic origin; language(s) spoken; marital status; and type of employment. The reasons for choosing these factors have already been explained in a Discussion Paper published by the Council. [14]

The Theoretical Aspect

Schematically, two major types of labour market could exist, depending on whether earnings disparities between the groups of workers studied were involved or not. In the absence of such disparities, following the traditional theory, workers in the groups in question should not show differences, on average, in characteristics and attributes [15] and, by definition, each group would have the same average earnings as that of the entire market. [16]

In such a case, it would obviously be unnecessary to identify and measure the contribution of various characteristics and attributes at the level of average earnings for the groups since these earnings would all be at the same level. [17]

The second type of market assumes the existence of disparities in the earnings of groups that the conventional approach basically attributes to differences in characteristics and attributes. It is thus important to know the impact of each characteristic and attribute in the level of earnings. Once this impact is known, as well as the characteristics and attributes of each group, we can write the following equation:

$$\bar{R}_l = \bar{R} + A_l \quad \text{for all } l, (l = 1, 2, \dots, L) \quad (1)$$

In this equation, any group of workers l would have an average income equal to the average income of the market (\bar{R}), corrected by a factor (A_l) accounting for the difference in its characteristics and attributes compared to those of the market as a whole.

In the Montreal case, equation (1) would apply if traditional economic theory were strictly correct. In other words, the linguistic groups do not show the same average earnings and, still in accordance with traditional theory, these linguistic groups do not possess the same characteristics and attributes; that is, the distribution of workers in each group across the categories used to define the explanatory factors is not the same from one group to the next. [18]

Following the traditional approach, if there are no remuneration effects in the market (i.e., the rules of the game are the same for all groups) and if the explanatory factors used are exhaustive and categorized so that they clearly reflect the way in which the characteristics and attributes influence earnings -- this type of model should allow us to clearly identify the origin of the income disparities observed between the linguistic groups studied.

The Share of Linguistic Earnings Disparities Attributable to
Differences in the Characteristics
and Attributes of Workers

The application of this approach to the Montreal case produces the sort of results one might expect from traditional theory. In effect, the earnings disparities were, in 1970, in accordance with the differences in characteristics and attributes; in other words, a positive disparity in earnings corresponds in aggregate with a positive impact of characteristics and attributes, while the opposite occurs when a negative earnings disparity is present (Table 1).

Although the expected theoretical relationship generally does occur, it should be noted that the model's explanatory power is not very great. In effect, if we account for the differences in characteristics and attributes between francophones and anglophones, we cause the linguistic earnings disparities between the two groups to drop from 30 to 25 per cent. We are thus well short of our goal of explaining all linguistic earnings disparities through differences in characteristics and attributes between workers.

To conclude this section, we can thus say that the model presented, although generally satisfactory in terms of the direction of the results obtained, does not have great explanatory power. This deficiency may be the result of one or more of four causes or problems:

- 1) the categories used to characterize the explanatory factors used in the model do not sufficiently define the way in which characteristics and attributes influence the level of earnings; and/or
- 2) some major characteristics and attributes for earnings determination were not included in the model; and/or
- 3) there existed, in 1970, market forces or mechanisms that prevented certain workers, because they belonged, for example, to a certain linguistic group, from taking as full advantage as others of their characteristics and attributes, or from combining them in the same way; or
- 4) the model in general, as formulated, does not apply to the reality concerning us.

We have attempted to avoid the first two problems by using as much information as may possibly be drawn from the 10-year censuses which have already been used in similar work. In the following chapter, we will review the formulation of the problem and then propose another channel for research. In this way, we will attempt to deal with the last two problems.

LINGUISTIC INCOME DISPARITIES VIEWED FROM
A NEW ANGLE

This section will stray somewhat from the conventional approach. Rather than seek to analyze linguistic earnings disparities at the general level of the whole market, as is usually done, we will first ask whether linguistic earnings disparities in 1970 affected all workers in the market regardless of their earnings bracket and then whether those who were affected, were hit with equal impact. By proceeding in this manner, we believe that not only will it be easier to determine the reasons why the traditional model explained only 16 per cent of the disparities studied but also that this will perhaps allow us to throw some new light on other theories capable of explaining the reaction of workers to market mechanisms, as well as throwing light on the resulting residuals.

In order to better clarify this aspect of the problem, we will examine the cumulative progression of linguistic earnings disparities. [19] This exercise will allow us to give a rough sketch of their origin. We will analyse the situation with the help of Table 2.

This table reveals first that an observer in 1970 who examined only francophone and anglophone workers with labour earnings below \$11,000 would not have found, on average, earnings disparities between the two groups. This earnings bracket includes 86 per cent of the workers in both linguistic groups combined and 67 per cent of their total earnings. However, each of the two groups was not represented in identical proportions: 90 per cent of all francophone workers fell into this group compared with 75 per cent of all anglophone workers. Finally, it should be noted that the 10 per cent of the francophone workers belonging to the earnings brackets above \$11,000 had average earnings of about \$15,914 while the remaining 25 per cent of anglophones in the same earnings brackets showed an average earnings of about \$17,617. The advantage enjoyed by anglophones therefore worked out to 11 per cent.

This information makes it possible to attribute the earnings disparity of \$1,958 (Table 2) observed between francophones and anglophones in 1970, in the Montreal market as a whole, to three major sources. [20] The first arises from the observation that francophones did not have average earnings identical to those of anglophones above the \$11,000 threshold. If this situation did not exist, the earnings disparity between the two groups would have been reduced by \$179 or 9 per cent. Another source is the fact that francophones, compared with anglophones, were over represented below this threshold. If we moved the workers causing this over representation above this threshold and gave them the average earnings of the francophones already in this bracket, the earnings disparity would have been further reduced by \$1,527 or 78 per cent. And finally, if we gave them the average earnings of the anglophones, rather than that of francophones, the disparity between the two groups would have been reduced by an additional \$274 or 13 per cent. We can thus state that 9 per cent of the observed disparity between both groups as a whole was directly linked to differences in average earnings between workers above the threshold and 91 per cent (78 per cent + 13 per cent) was directly linked to differences in the distribution of workers above and below the threshold. [21]

This information is of utmost importance. If, in effect, we can show that francophones earning less than \$11,000 generally possessed characteristics and attributes significantly similar to those of the anglophones in this same earnings bracket during the same period, and that they combined these characteristics and attributes in a fairly similar way, we would also have demonstrated that the majority of workers in these two linguistic groups (86 per cent) generally did not show any problems in their

respective income determination functions. [22] The difference observed between the two groups as a whole would then be primarily a reflection of a different distribution of workers above and below the threshold rather than a poor functioning of the normal market mechanisms. Should this hypothesis prove to be true, we would then have to ask why the two groups studied show such a difference in their respective distribution of workers around the \$11,000 threshold. This hypothesis will be tested in what follows.

The Situation Among Workers Earning Less than \$11,000

In order to simplify the rest of the analysis, we will divide the Montreal market into workers above and below a threshold set at \$11,000. This section will deal with the situation in the latter group while the following section will discuss the situation of the former. In Table 3, we have reproduced the average earnings and average performances of francophone and anglophone workers in relation to a certain number of factors, four of which deserve a brief introduction.

Since we are now going to discuss the average performances of the linguistic groups, it was impossible to retain the "occupation" variable previously used in this paper where each category was measured qualitatively. We thus chose the Blishen index, which can be measured in a continuous manner. In the opinion of those who usually use it, this index is a composite measure of occupation, position within that occupation, earnings attached to that position, level of education required to reach that position and the value attached to it by others. [23] Average experience takes into consideration the age of the worker, the number of years of education and the law prohibiting full-time work before the age of 16. Average occupational training indicates the average number of months during which the worker received full-time vocational training or apprenticeship of three months or longer, in addition to his education. Finally, the label "average mobility" includes the average number of times that the worker moved from one city to another between June 1, 1966 and June 1, 1971.

In Table 3, we find that the francophone-anglophone ratio, with regards to the respective performance in each of the factors, changes direction between factors. Francophones, in 1970, held an advantage over anglophones in four factors: average experience; average number of weeks worked in the year; average number of hours worked each week, and average occupational training. Anglophones, on the other hand, held an advantage over francophones in three factors: average Blishen index, average number of years of education and average mobility.

According to this information, there were compensating effects within the characteristics and attributes of these two linguistic groups, since, while characteristics and attributes vary between the two groups, the average earnings of both were practically the same. We must now determine whether this hypothesis can be supported by the usual arsenal of statistical tests presented in Johnston. [24] The first of these tests consists of verifying whether one of the two groups systematically held an advantage over the other group in 1970, an advantage which the seven factors used would be incapable of reflecting. Such an effect would be measured by comparing the constant term of the estimated equation for the two linguistic groups combined, by first differentiating between the two groups, and then not differentiating between them. The second test consists of verifying whether a significant difference exists in the way in which the two linguistic groups in question combine the seven income determination factors presented in Table 3. The third test determines to some extent whether, by combining the information in the first and second tests, the conclusions drawn

from them remain valid. Finally, the fourth test will determine whether the behaviour of the two linguistic groups differs for each of the factors considered individually but estimated in the equation as a whole. The general model used to conduct these tests can be written as follows (see Tables for definition of terms): [25]

$$\ln R = f(\ln Bli, \ln Exp, \ln Sco, \ln Sem, \ln Heu, \ln Mob, \ln Form) \quad (2)$$

In the framework of the second test, we added a dummy variable to differentiate francophone from anglophone workers. The results of the various tests [26] and interpretations are presented in Appendix B.

The results obtained from application of these four tests to workers having earnings below \$11,000 matched those expected (see Appendix B); after estimating model (2), we first found that francophone and anglophone workers show no true differences in the seven regression coefficients considered as a whole, nor in the constant term nor in the equation as a whole. Equally, when we compared the coefficients one by one, we found that there was no significant disparity between the two groups. [27]

Henceforth, since no significant statistical differences appear between workers in the two groups, we can conclude that the major part of linguistic earnings disparities between francophone and anglophone workers was massively concentrated in the earnings brackets above \$11,000. A possible explanation might be that francophone workers do not have the characteristics and attributes that would permit them to reach the earnings level of anglophones and/or that the particular mechanisms of the Montreal market automatically induce linguistic earnings disparities. We will now analyse the situation for this higher-paid group of workers in the next section.

The Situation of Workers Earning More than \$11,000

The Direct Impact of the Presence of Workers Born Outside Quebec on Linguistic Income Disparities Observed in Montreal

The presence in Montreal of foreign head offices or branch offices of corporations located abroad may partially explain why, in the upper earnings brackets, we find many workers who were brought into Montreal to work; the requirements of the hiring and promotion policy of these firms lead to such mobility since sales markets and factors of production often extend considerably beyond Quebec's borders. [28]

We have no intention of determining here what the proportion of Québécois should be in these firms when such situations occur within Quebec, nor even what the proportion of Québécois in these firms should be outside Quebec. Nor do we seek to determine what proportion of the high-earnings employees born outside Quebec works directly for head offices or their branches. Such analyses would require detailed data on the extent of the markets in question and on the nature of each worker's job. They are sufficient in themselves to constitute the goal of a separate study. For the moment, we will assume that the presence of numerous high-earnings workers in Montreal who were not born in Quebec may amplify the earnings disparities observed in the market as a whole. The extent of the impact of this factor on the disparities being studied will indicate whether this aspect of the question should be studied in depth. It is quite obvious, of course, that not all migrating workers in Montreal falling into the upper earnings levels have answered the call of a head branch or office. Some, for example, have entered the liberal professions, the teaching field, etc.

What we wish to emphasize is that a large part of the linguistic income disparities may simply have been imported. [29] Nonetheless, we do know that workers possessing desirable characteristics and attributes from the employer's point of view, and thus earning high income, will not move unless there is an insured job opening, which the head and branch offices in particular would provide. This is even more applicable to workers born elsewhere in Canada and earning a high income: it would be very surprising to find them moving to Montreal if a position was not already guaranteed them. This type of behaviour corresponds well to the hiring and promotion policies of large firms, a large number of which are found in Montreal.

In Table 4, we have attempted to isolate the impact of this phenomenon using three earnings groups: first, the group of all earnings brackets, then those below and finally those above the \$11,000 threshold. We first note, for earnings brackets as a whole, that the average income of a given linguistic group varies considerably from one place of origin to another and that workers born elsewhere in Canada, regardless of their linguistic group, show higher average earnings. Anglophone workers born elsewhere in Canada earn incomes exceeding those of immigrant workers by 12 per cent and those of workers born in Quebec by 26 per cent. For francophones, these values were 2 and 9 per cent respectively. The relative earnings disparities also vary considerably between the linguistic groups. The disparity between francophone and anglophone workers born in Quebec is 21 per cent, between those born outside Canada 27 per cent and finally, between those born elsewhere in Canada, 40 per cent. The origin of workers would therefore appear to have an impact on the disparities in question. But an even more interesting fact is that when we divide the workers into groups earning more or less than \$11,000, the average earnings of a given linguistic group are surprisingly similar regardless of whether the workers were born in Quebec, elsewhere in Canada, or abroad. This result clearly indicates that if the presence in Montreal of workers born outside Quebec can affect the general average earnings in 1970, this can only be due overall to the fact that the proportions of these workers vary considerably above and below the threshold in terms of linguistic groups. These results can be seen in Table 5.

Among anglophones we first observe that, for immigrant workers, and particularly for workers born elsewhere in Canada, the proportion found in the high earnings brackets was much larger than among workers born in Quebec. In fact, while 21 per cent of the anglophones born in Quebec had earnings exceeding \$11,000, the proportion among immigrant anglophones was 27 per cent and among anglophones born elsewhere in Canada, 35 per cent.

We also observe this phenomenon among francophones but in sharply reduced proportions. Among immigrant workers, 15 per cent had earnings of over \$11,000. Among workers born elsewhere in Canada the proportion was 14 per cent, while it was only 10 per cent among those born in Quebec. But the size of the francophone labour force born in Quebec was such that, when compared with the number of those born elsewhere in Canada and immigrants, the behaviour of these last two groups had almost no influence on the entire group as a whole.

We note that for each francophone worker born outside Quebec and falling below the threshold, there were 1.4 anglophones in the same situation. Above the threshold this ratio was 3.6, again in favour of anglophones.

It is thus obvious from these last figures and from Table 6 that the presence of numerous anglophone workers born outside Quebec in the high-earnings brackets contributed considerably to creating the type of disparities observed in 1970. We will attempt to measure their magnitude by eliminating from the

calculation of the groups' average earnings those workers not born in Quebec and earning more than \$11,000.

It should first be noted that 51 per cent of the anglophones earning \$11,000 or more were not born in Quebec (Table 6). This represents 13 per cent of all anglophone workers in Montreal. Among francophones, 11 per cent of the workers earning \$11,000 or more were not born in Quebec, representing 1 per cent of all francophones in the market. By excluding this 1 per cent of workers from the francophones, the average earnings of this group drops from \$6,576 to \$6,471. However, by excluding the 13 per cent from the anglophone group, their overall average earnings drops from \$8,534 to \$7,229. [30] The relative income gap between francophones and anglophones thus drops from 30 to 12 per cent. Consequently, we can conclude that of the absolute disparity of \$1,958 observed for the two groups as a whole, \$1,200 or 61 per cent originated solely from the presence in Montreal of workers born elsewhere in Canada or abroad. [31] In other words, 4 per cent of the workers in these two groups combined are directly responsible for 61 per cent of the income disparity. This exercise reveals why, using the conventional approach it was not possible to reduce the earnings disparity between francophones and anglophones by more than 16 per cent; no variable used explicitly accounted for this phenomenon which, to a certain extent, is minimal in terms of the number of workers involved but has a major impact on earnings since these workers are all concentrated in the upper income brackets. They are concentrated there because they are most often highly skilled and/or they often receive an allowance for displacement, [32] or because they are generally more mobile than workers born in Quebec.

The indirect impact of the presence of workers born outside Quebec on linguistic income disparities observed in Montreal

We have just determined to a certain extent the possible impact of this major presence of head offices and branches of foreign head offices in the Montreal region and, more generally, the importance of this region's cosmopolitan role. However, this phenomenon might also contribute indirectly to linguistic earnings disparities since, through various information networks, it could favour anglophone workers born in Quebec over francophone workers also born in Quebec. These advantages could exist, for example, in the hiring and promotion of workers simply because it would be easier for anglophones born in Quebec to make and maintain contacts with those born outside Quebec than it would be for francophones, if only for the obvious reasons of ease of communication in English. If such a situation did exist, it could result in either one or both of the following phenomena:

- i) in the upper income brackets, the proportion of anglophones born in Quebec would be greater than the proportion of francophones born in Quebec; and/or
- ii) in the upper income brackets among workers with similar characteristics and attributes, anglophones born in Quebec would earn higher average earnings than francophones born in Quebec.

Parallel to the first case, and following our hypothesis, we should normally observe that anglophones born in Quebec have less difficulty in crossing the \$11,000 threshold than francophones born in Quebec. However, this variation in the ability to cross the threshold is not easy to verify because, even if we did find a very high concentration of francophones born in Quebec just below the \$11,000 threshold, we would still have to demonstrate that they possessed the characteristics and attributes that would allow them to move up into the higher earnings brackets, alongside the anglophones born in Quebec.

While it is difficult to identify the mechanisms that make it possible to cross the threshold, it is easier on the other hand to verify how earnings above the threshold are determined since the data available to us make it possible to quickly calculate the average earnings of workers and their average characteristics and attributes relative to their citizenship status and level of earnings.

It is particularly interesting to note in Table 7 that, when average earnings are placed alongside corresponding characteristics and attributes, the relationship varies according to the linguistic groups in question and also, to a great extent, on the place of origin of the workers within a given linguistic group.

It has already been noted that the average earnings vary little by birthplace for a given linguistic group. The same can be said of all characteristics and attributes. For example, immigrant workers and those born elsewhere in Canada had an average level of education in 1970 exceeding that of workers born in Quebec by approximately a year and a half. We observe the same for the group's average occupational training, although workers from the rest of Canada showed a fairly weak performance in this area. The Blischen Index shows that immigrant workers and those born elsewhere in Canada hold better positions than those born in Quebec. This would agree fairly well with the direction of the influence that should normally be exerted on hiring and promotion by the major presence of head offices and large branch offices in Montreal, as well as by restrictive immigration policies.

What does, however, make this table particularly interesting is the income disparity of \$1,701, or 11 per cent, between the average earnings of highly-paid francophones and anglophones born in Quebec, which does not generally appear to be justified by the corresponding differences in characteristics and attributes; particularly in the Blischen Index, the average levels of earnings, and the length of work in numbers of weeks per year or hours per week. This result could be an indication that in 1970, anglophones born in Quebec benefitted more than francophones born in Quebec from the market conditions created in high earnings levels by the presence of head and branch offices. If such was the case, this presence of head and branch offices could be indirectly responsible for some 10 per cent of the disparities observed in the market as a whole.

Those highly-paid workers born in Quebec represents 10 per cent of all the workers in both groups, francophone and anglophone, combined, or 9 per cent of all francophone workers in the market and 12 per cent of all anglophone workers in the market. The whole question is to determine whether this earnings disparity of \$1,701 is the result of anglophones earning more than the market mechanisms should normally allow, considering the characteristics and attributes involved, or whether this is the result of francophones earning less than the same market mechanisms should allow, again considering the characteristics and attributes involved. The latter case could be the consequence of francophones failing to break into the network created by head and branch offices, for example, during this period. The first case, on the other hand, should perhaps be viewed as a subsidy received by anglophones born in Quebec solely because they belong to this linguistic group. If this group of francophones had the same average earnings as the corresponding anglophone group, the earnings disparity between the average earnings of both groups as a whole would have decreased by 8 per cent. If, on the other hand, should the anglophones have received average earnings similar to those of the corresponding francophones, the earnings disparity between the two groups in the market as a whole would have decreased by 11 per cent.

By combining the results of this last exercise with the results of the preceding exercise we could thus conclude that close to 70 per cent of the linguistic earnings disparities observed in the Montreal market in 1970 might be attributed to the major presence in upper earnings levels of workers born outside Quebec. In short, three-fourths of the "problem" could be "imported," or linked to Montreal's international and cosmopolitan role.

To verify this hypothesis, we followed the same procedure as that applied in the section on page 12 to workers with earnings below \$11,000. This time, however, we applied it to all workers in all 100 earnings brackets.

The hypothesis to be verified is as follows: if a situation existed in the Montreal market in 1970 that systematically favoured anglophones in the high earnings brackets but was not linked to differences in characteristics and attributes, the results obtained in the preceding section should persist for the market as a whole, except for the test of the constant term. This parameter captures the systematic effects; consequently, if Quebec-born anglophones above the \$11,000 threshold possess an advantage or receive a subsidy relative to their francophone colleagues, the constant terms of the equations estimated for each of the groups should differ significantly. The same would be true if the hypothesis on francophones applied instead.

The results of the statistical tests for this verification are given in Tables B-3 and B-4 in the Appendix.

We first observe in Table B-3 that in estimating equation 2 for francophone and anglophone workers (with no exclusions based on place of birth) in the 100 earnings brackets, a significant statistical difference appears in the constant term between the two linguistic groups in question. No significant differences occur, however, in the regression coefficients taken as a whole (test $F(2)$) or taken individually (Table B-4). [33] We can thus conclude that these two linguistic groups have very similar behaviour when they possess the same characteristics and attributes, but that there nonetheless exists a systematic advantage favouring one group or the other.

Following the information already taken from Table 7, our hypothesis states that the systematic advantage or disadvantage observed in 1970 was linked to francophone and anglophone workers born in Quebec with earnings above \$11,000. Thus, we re-estimated equation 2 excluding these workers. Footnote 1 to Table B-3 indicates that when these workers are excluded, this systematic effect also disappears. We now need only determine which of the two groups lies at the root of this situation. Consequently, we re-inserted into the model francophone workers born in Quebec earning more than \$11,000. The systematic effect remained (footnote 2 to Table B-3). We can thus conclude that the hypothesis stating that anglophones born in Quebec earning more than \$11,000 receive a subsidy linked to their linguistic group must be rejected. We re-introduced these latter workers into the model and excluded francophone workers born in Quebec earning more than \$11,000. Footnote 3 to Table B-3 indicates that when this was done, the systematic effect that we had previously isolated disappeared. It can thus be concluded that these tests tend to support the hypothesis that in 1970 francophones born in Quebec earning more than \$11,000 experienced difficulty in penetrating the market for highly paid jobs because of the possible existence of information networks, resulting in the fact that they were unable to draw from their characteristics and attributes earnings as high as those of their corresponding anglophone colleagues. In the absence of this situation, as previously stated, the earnings disparity in 1970 between average earnings of the two groups in the market as a whole might have decreased by 8 per cent.

CONCLUSION

Although the linguistic earnings disparities are declining and although a significant and systematic rise of francophones in the earnings scale can be observed, the reasons that produced and are still producing these disparities are such that the impact of the Montreal region's international and cosmopolitan role cannot be ignored in analyses, any more so than the major presence of head and branch offices in this labour market, or the hiring and promotion policies of these firms, not only in Montreal, but also in all labour markets in which they operate throughout the world.

In effect, it was demonstrated in this text that in 1970 some 16 per cent of the linguistic earnings disparities between francophone and anglophone workers could be attributed to differences in characteristics and attributes in eight income determination factors. We then demonstrated that the massive presence of workers born outside Quebec in the high income brackets was responsible for about 61 per cent of the disparities observed (these workers represented only 4 per cent of all workers in both groups combined in 1970). Finally, we presented the hypothesis that another 8 per cent of these disparities might be linked to the fact of the presence in Montreal of head and branch offices which created a hiring climate that was more favourable to anglophones born in Quebec than to francophones also born in Quebec. In all, we thus succeeded in "isolating" some 85 per cent of the explanation for linguistic earnings disparities. [34]

By assuming that the 15 per cent of the disparities that we did not succeed in isolating originates from differences in the characteristics and attributes that we did not introduce into the study because no quantitative information was compiled on them, [35] we can conclude that approximately 30 per cent of the linguistic earnings disparities could arise from the supply side of the labour market, while some 70 per cent could arise from the demand side.

This result is particularly important for understanding the origin of linguistic earnings disparities and for formulating policies aimed at reducing them. In effect, as long as Montreal wishes to remain a metropolis, maintain its place in the international markets and attract highly skilled labour, a large, and perhaps even the most substantial, part of the linguistic earnings disparities may very well be linked to Montreal's national and international role; it may be considered the natural result of the functioning of the normal mechanisms related to this type of market, which gives special attention to highly-skilled and mobile workers in hiring and promotion, and which pays them accordingly.

Based on the results presented in this study, we should not lose sight of the fact that by accepting the establishment in Montreal of national and international firms, a large number of which are anglophone because of the economic milieu in which they operate, we must at the same time not be surprised at the creation of a disparity in earnings between the two linguistic groups, a disparity in favour of the anglophones. The whole question in this context then becomes one of determining what the hiring and promotion policies of these firms should be, not only in Quebec but also elsewhere, and whether actual impact of these policies is on the earnings of francophone and anglophone workers. Finally, the question of the indirect impact of these firms on the Montreal economy as a whole should be dealt with.

In fact, not only can these firms directly and indirectly contribute to the creation of an income disparity favouring anglophones, but they could also have helped to create a hiring climate favourable to francophones in the various spheres of the

economy and at other income levels. André Ryba has already stressed in an article [36] that "in Canada, finance has become a factor in location, particularly for national and multinational companies. The head offices of these firms in fact tend to concentrate around financial institutions and markets to take advantage of greater credit facilities and externalities produced by the financial core, among other things." (Unofficial translation.) Prior to this, he had also stressed that "financial institutions directly contribute to the domestic product of a region in which they are established. First, they are a source of jobs, and the wages paid to employees of financial institutions are spent in the region and consequently a slowdown in the growth rate of the financial sector in a region has a definite multiplier effect. Moreover, the financial sector has a chain reaction effect on other activities in the region. Related services cluster around financial institutions. Some examples are lawyers, printers, telecommunications industries and construction firms. All these activities suffer the repercussions of a slowdown in financial activities." (Unofficial translation.)

Finally, it should be noted that selective immigration policies are also capable of creating an income disparity favouring either of the two groups to the extent that one of these groups is more successful than the other in attracting a specialized foreign labour force and, consequently, a high income.

Once again, in seeking a certain type of immigrant, one must accept the consequences and take this factor into account when analyzing linguistic earnings disparities. In our application of the conventional approach, we partially took this factor into account. In future, it should be given even greater attention and should be categorized to give particular consideration to the fact that its impact is greatest in the highest earnings levels.

Table 1

Impact of Differences in Characteristics and Attributes of Linguistic Groups on Labour Income Disparities Observed in 1970, Montreal Metropolitan Zone

Factors	Francophones	Anglophones
Occupation	- 25	+ 113
Education	- 15	+ 61
Ethnic origin	- 23	+ 80
Length of work	- 4	+ 13
Age	+ 11	- 4
Citizenship status	+ 5	+ 3
Marital status	- 1	- 1
Type of employment	- 1	- 1
Total impact	- 53	+ 264
Observed income disparity ¹	-382	+1620
Total impact as a percentage of the observed disparity	14	16

¹ Difference between average earnings of the linguistic group and average market earnings.

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table 2

Cumulative Progression of Linguistic Earnings Disparities in the Montreal Metropolitan Zone, 1970

Earnings Bracket (in 1970 dollars)	Average Income (in dollars)		Absolute Disparity Francophones Anglophones (in dollars)	Relative Disparity* (per cent)	Proportion of Workers in Both Groups (per cent)	Proportion of Income Supply (per cent)
	Francophones	Anglophones				
Less than 2,000	942	877	65	7 f	13	2
Less than 4,000	2,009	1,776	233	13 f	26	7
Less than 6,000	3,297	2,940	357	12 f	45	20
Less than 8,000	4,487	4,190	297	7 f	67	42
Less than 10,000	5,216	5,112	104	2 f	81	59
Less than 10,750	5,481	5,541	60	1 a	86	67
Less than 15,000	5,938	6,508	570	10 a	94	81
Less than 20,000	6,218	7,226	1,008	16 a	97	89
Less than 30,000	6,403	7,891	1,488	23 a	99	95
All income	6,576	8,534	1,958	30 a	100	100

The absolute earnings disparity shown in this table does not correspond exactly with that shown in Table 1 (\$2,002 in the latter, compared to \$1,958 here) because we have considered here all workers whose earnings were not nil, except those who declared labour earnings but also declared that they had not worked. Consequently, 3 per cent of the workers had to be rejected for this reason. If we had not rejected them, the relative earnings disparity would have been 32 per cent (see Table 1, Appendix C) rather than 30 per cent as shown here and in Table 1. As will be seen further on, this 3 per cent were rejected because we will make extensive use of the variables "number of weeks worked during the year" and "average number of hours worked each week."

* "f" indicates a relative disparity favouring francophones and "a" indicates a relative disparity favouring anglophones.

Source: Special data drawn from the 1971 Census, Statistics Canada, and calculations by the author.

Table 3

Average Earnings and Average Performances of Francophone and Anglophone Workers Having Earnings Less than \$11,000, Montreal Metropolitan Zone, 1970

	Average Income	Average Blisshen Index (Bli)	Average Level of Education (Sco)	Average Experience in Years (Exp)	Average Number of Weeks Worked During the Year (Sem)	Average Number of Hours Each Week (Heu)	Average Occupational Training in Years (Form)	Average Mobility (Mob)
Francophones	5,481	36.34	9.68	19.50	42.20	41.54	2.53	0.54
Anglophones	5,541	40.19	11.12	19.26	41.29	40.44	2.45	0.57

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table 4
Average Earnings by Mother Tongue, Birthplace and Income Level, Montreal Metropolitan Zone, 1970

	Linguistic Group and Birthplace											
	All Workers		Workers Born in Quebec		Workers Born Elsewhere				Workers Born in Canada		Immigrant Workers	
	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Allo-phones	Allo-phones	Franco-phones	Anglo-phones	Franco-phones	Allo-phones
Threshold	6,576	8,534	6,314	6,533	7,914	7,138	9,970	9,439	7,013	8,930	6,240	
All earnings	6,576	8,534	6,314	6,533	7,914	7,138	9,970	9,439	7,013	8,930	6,240	
Earnings below \$11,000	5,481	5,541	5,115	5,466	5,376	5,778	5,859	5,884	5,558	5,774	5,114	
Earnings above \$11,000	15,914	17,617	16,571	15,961	17,662	15,622	17,705	17,319	15,471	17,425	16,458	

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table 5
 Percentage Distribution of Workers in Relation to \$11 000 Threshold and Citizenship Status, Montreal Metropolitan Zone, 1970

Threshold	Linguistic Group and Birthplace									
	All Workers		Workers Born in Quebec		Workers Born Elsewhere in Canada		Immigrant Workers			
	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones
Earnings below \$11,000	90	75	90	79	86	65	69	85	73	90
Earnings above \$11,000	10	25	10	21	14	35	31	15	27	10
Total earnings	100	100	100	100	100	100	100	100	100	100

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table 6
 Percentage Distribution of Workers by Place of Birth Around the \$11,000 Threshold, Montreal Metropolitan Zone, 1970

Threshold	Linguistic Group and Birthplace										
	All Workers		Workers Born in Quebec			Workers Born Elsewhere in Canada			Immigrant Workers		
	Franco-phones	Anglo-phones	Franco-phones	Anglo-phones	Allo-phones	Franco-phones	Anglo-phones	Allo-phones	Franco-phones	Anglo-phones	
Earnings below \$11,000	100	100	92	62	13	3	17	1	5	21	86
Earnings above \$11,000	100	100	89	49	15	5	27	3	6	24	82
Total earnings	100	100	92	59	13	3	19	1	5	82	86

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table 7

Average Earnings and Average Performances of Montreal Workers Having Earnings Exceeding \$11,000, in Relation to Birthplace Mother Tongue, Montreal Metropolitan Zone, 1970

Workers Classified by Place of Origin	Earnings and Performances									
	Average Earnings	Average Blisshen Index	Average Level of Education	Average Number of Years of Experience	Average Age	Average Number of Weeks Worked	Average Number of Hours Worked Each Week	Average Occupational Training	Average Mobility	
All Montreal Workers	16,651	54.79	13.47	22.25	43.19	49.12	43.24	5.18	0.45	
Francophones	15,914	53.71	13.09	22.26	41.95	48.93	43.38	4.98	0.46	
Anglophones	17,617	56.77	13.89	24.31	44.43	49.40	42.88	5.15	0.46	
Allophones	16,571	52.63	13.70	23.98	44.44	48.97	43.88	6.21	0.40	
Workers Born in Quebec	16,487	53.23	12.89	2.06	42.49	49.03	43.45	4.53	0.41	
Francophones	15,961	53.37	12.90	22.41	41.95	48.93	43.43	4.79	0.44	
Anglophones	17,662	53.73	12.93	24.38	43.62	49.30	43.48	3.99	0.36	
Allophones	17,018	43.41	12.04	25.21	43.98	48.81	43.54	3.72	0.34	
Workers Born Elsewhere in Canada	17,331	59.09	14.44	23.90	44.52	49.46	42.20	4.52	0.65	
Francophones	15,622	54.87	13.37	22.43	42.33	49.01	43.06	5.27	0.70	
Anglophones	17,319	57.93	14.33	23.53	44.20	49.27	43.11	5.18	0.69	
Allophones	17,319	57.93	14.33	23.53	44.20	49.27	43.11	5.18	0.69	
Immigrant Workers	16,728	56.88	14.64	23.44	44.51	49.17	43.23	7.57	0.47	
Francophones	15,471	57.53	15.49	20.08	41.76	48.96	42.79	7.31	0.62	
Anglophones	17,425	59.31	14.98	24.25	45.45	49.42	42.67	8.47	0.47	
Allophones	16,458	54.10	13.97	23.82	44.53	48.98	43.97	6.71	0.40	

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Footnotes

- 1 The linguistic groups used in this analysis are defined on the basis of their mother tongue, the first language spoken and understood.
- 2 Compared to a study dealing more specifically with the economic profitability of learning a language, as in the case of the work of François Vaillancourt.
- 3 It should be remembered that the 1971 Census reflects incomes and length of employment in 1970; occupation and hours worked could be for either 1970 or 1971; the remaining characteristics of workers used in this study, including language, are those for 1971.
- 4 For a more complete discussion of the subject, see J.-A. Boulet, L'évolution des disparités linguistiques de revenus de travail dans la zone métropolitaine de Montréal de 1961 à 1977, Discussion Paper No. 127, Economic Council of Canada, February 1979, 61 pages.
- 5 This includes wages, military pay, the net earnings of self-employed individuals, and all other amounts related to a position, such as tips, bonuses, tokens, fees, etc.
- 6 The first term relates to mother tongue, the second to languages understood and spoken. An allophone is a person whose mother tongue is neither English nor French. The bilingual label applies to those who speak both English and French. In certain cases, bilingual people actually speak several languages. By analogy, a unilingual allophone is one who speaks neither English nor French.
- 7 For details, see J.-A. Boulet, op. cit.
- 8 Higgins, B., F. Martin and A. Raynauld, Les orientations du développement économique régional dans la province de Québec, DREE, Ottawa, 1970, page 149. Even though the conclusions of this study did not receive the unanimous approval of the various circles involved, no basis was found to deny the importance of Montreal in the Quebec economy.
- 9 Saint-Germain, M., Une économie à libérer, Les Presses de l'Université de Montréal, Montreal, 1973.
- 10 Higgins, B., F. Martin and A. Raynauld, op. cit., page 96.
- 11 Boisvert, M. and M. Legault, La relation entre la taille urbaine et le revenu per capita, au Canada, Discussion Paper No. 115, Economic Council of Canada, April 1978. See also M. Boisvert, The Correspondence Between the Urban System and the Economic Base of Canada's Regions, Economic Council of Canada, 1978.
- 12 Frank, R.H., "Why Women Earn Less: The Theory and Estimation of Differential Overqualification," The American Economic Review, Vol. 68, No. 3, June 1978, pp. 360-373.
- 13 Another part of the earnings differences could arise from characteristics of the demand for labour. In this chapter, we analyse only the labour supply aspect, the impact of which on the earnings of workers holding jobs in the same market is deemed to be more important in principle than the impact of characteristics of demand.
- 14 J.-A. Boulet and A. Raynauld, L'analyse des disparités linguistiques de revenus suivant l'origine ethnique et la langue sur le marché montréalais en 1961, Discussion Paper No. 83, Economic Council of Canada, March 1977.
- 15 In other words, the relative distribution of workers in each group (among the categories of each factor retained to describe its characteristics and attributes) would be the same for all groups.

- 16 The methodological aspect of this approach has already been developed in J.-A. Boulet, L'analyse des disparités de revenus : un cadre méthodologique de recherche, Discussion Paper No. 34, Economic Council of Canada July 1975.
- 17 Otherwise, this would signify that different combinations of characteristics and attributes could produce the same earnings levels. This situation is not impossible and might possibly be taken into account within the model. This topic will be discussed later.
- 18 The factors (8 in all) and the categories (68 in all) are presented in detail in Appendix A.
- 19 Before carrying out this exercise, we first analyzed the distribution of linguistic earnings disparities by quintile. The results appear in Discussion Paper No. 127, already footnoted. This allowed us to determine whether the linguistic earnings disparities originated primarily in the lower rather than the higher income brackets. Because linguistic earnings disparities originate primarily in the higher earnings brackets, we thus caused the cumulative process to begin in the lower income brackets and work gradually toward the higher brackets.
- 20 It should be remembered here that we have excluded those workers who declared labour earnings but also declared that they had not worked.
- 21 This breakdown would have been the same if we had used the data employed to construct Table C-1 in the Appendix rather than those used to construct Table 3-1.
- 22 This does not mean, however, that problems of another nature do not exist. For example, we might ask why a greater proportion of francophones than anglophones show these characteristics and attributes. Obviously, it is not our purpose here to answer this question; other researchers have, however, shown interest. Of particular note are the works of Albert Breton, including Nationalism and Language Policies, Harold A. Innis Lecture, Canadian Economics Association, University of Western Ontario, London, Ontario, May 1978.
- 23 Blau, P. M. and O. D. Duncan, The American Occupational Structure, John Wiley and Sons Inc., New York, 1967, page 184 and following pages.
- 24 Johnston, J., Econometric Methods, McGraw-Hill Inc., New York, 1972, Second Edition, pp. 192-207.
- 25 The mnemonics are defined in the column headings of Table 3.
- 26 To estimate these equations, we used grouped information; that is, the average earnings and average performance of francophone and anglophone workers in each of the 100 income brackets that we decided to use. From \$0 to \$14,999, the intervals were \$250; from \$15,000 to \$24,999, they were \$500; from \$25,000 to \$34,999, they were \$1,000; from \$35,000 to \$59,999, they were \$2,000; and finally, the 100th bracket was composed of workers earning \$60,000 or more. To estimate these equations, we followed the generalized least squares procedure presented in J. Johnston (Econometric Methods, Second Edition, pp. 228-238). Finally, we note that the equation is in log form.
- 27 Except for occupational training, where the confidence level is 95 per cent.
- 28 "Anglophone businessmen are principally 'export-oriented' and operate in a widespread market, whereas francophone businessmen are limited to a local market." (Unofficial translation.) In Saint-Germain, M., Une économie à libérer, Les Presses de l'Université de Montréal, Montréal, 1973, p. 78.

- 29 This hypothesis has already been raised in SECOR Inc., La Charte de la langue française et son impact, in Journal des Débats, Quebec National Assembly, Standing Committee on Education, Cultural Affairs and Communications, June 27, 1977, Quebec City. It also appears in Vaillancourt, F., "La Charte de la Langue Française du Québec: un essai d'analyse," Analyse de politiques, Vol. IV, No. 3, Summer 1978, pp. 284-308.
- 30 See footnote to Table 2 on p. 231.
- 31 Workers born elsewhere in Canada account for 54 per cent of this impact while immigrants account for 46 per cent.
- 32 "Thus, the average salary of a portfolio director is around \$28,000 in Toronto, but closer to \$30,000 in Montreal," (Unofficial translation.) excerpt from an interview recorded in 1972 in Ryba, A., Le rôle du secteur financier dans le développement économique du Québec: un essai en finance régionale, Dossier No. 3, CRDE, University of Montreal, March 1974, p. 169.
- 33 Except a slight difference in the "occupational training" variable at a confidence level of 99 per cent and the "mobility" variable at a confidence level of 95 per cent.
- 34 These three figures of 16, 61 and 8 per cent cannot truly be added because the income determination function used previously is not identical to that used later and these earlier results are based on a model estimated for all Montreal workers. On the other hand the interpretation of the 8 per cent value for information networks is based on a behavioural hypothesis, while the interpretation of the 16 and 61 per cent values is based on the application of precise mathematical exercises. What should be retained from these figures is primarily their indicative value.
- 35 We could not give consideration here, however, to the field of specialization of workers, the data from the 1971 Census do not allow this. This variable would have been useful, as demonstrated particularly by the work of R. Lacroix, P. Robillard and C. Lemelin, "Champ de spécialisation et revenu," L'actualité économique, No. 1, Vol. 54, January-March 1978, pp. 1-20.
- 36 Ryba, André, "Le secteur financier et le développement économique du Québec", L'actualité économique, Vol. 50, No. 3, July-September 1974, pp. 379-400.

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APPENDIX A

A FEW METHODOLOGICAL EXPLANATIONS

This appendix will briefly [1] review how we arrived at the values shown in Table 1. To measure the impact of the various characteristics and attributes of the two groups of workers on the earnings disparities observed, three pieces of information were required:

- 1) the characteristics and attributes capable of influencing the level of earnings, or in other words, those factors which determine earnings and that are divided into a certain number of categories, each of which is supposed to have its own impact on earnings;
- 2) the differences that the study groups showed in these factors, or in other words, the distribution of workers in each group among the categories used to define the factors retained;
- 3) the impact on earnings levels of each of the categories retained to define each factor on earnings levels.

Items 1 and 2 are related, in the sense that although a factor may influence the level of earnings, it will not necessarily be useful for explaining the disparities to be analysed. The groups in the study must also show differences in distribution (Table A-1) for this factor.

In principle, the regression coefficients derived from the income determination function estimated for the market as a whole (Table A-2), could conceivably be used as a measure of the impact of characteristics and attributes on the level of earnings. However, this proves impossible because in calculating these coefficients, the hypothesis assumes that the workers in question, regardless of their linguistic group, are always paid at the same rate for a given combination of characteristics and attributes. One means of verifying this hypothesis is to estimate an earnings determination function for each of the linguistic groups studied. When this was done, it was found that after standardization, the functions were not the same in all groups. Consequently, the coefficient used to measure the impact of a characteristic on earnings had to take this particularity of the market into consideration. To accomplish this with the determination functions estimated for each of the groups, we calculated an average coefficient weighted by the relative size of the linguistic groups. The results are shown in Table A-3.

We find in Table 1 that of the -\$382 disparity between the average market earnings and the average earnings of francophones, -\$53 or 14 per cent originates from the fact that, in the factors used, this group does not register the same distribution of workers among the categories used to define these factors as that found in the market as a whole.

In this same table, we find that this value of -\$53 originates from the sum of -25, -15, -23, -4, +11, +5, -1 and -1. These figures measure the impact of differences in the characteristics and attributes of francophones compared to all workers in the market in each of the eight earnings determination factors.

Let's examine the case of length of work. In Table 2-1, francophones show an unfavourable distribution in the five categories of the "length of work" factor in terms of their average income, equal to -\$4 compared to the distribution shown by workers in the market as a whole. Where does this figure of -\$4 come from?

Table A-3 gives the value of the weighted coefficients for the "length of work" factor.

<u>Categories</u>	<u>Coefficients</u>
1-13 weeks	- 3 915.99
14-26 weeks	- 3 149.85
27-39 weeks	- 1 888.88 (Vector 1)
40-48 weeks	- 139.76
49-52 weeks	+ 934.09

On the other hand, Table A-1 shows the distribution of francophone workers among these five length of work categories.

<u>Categories</u>	<u>Distribution of Francophone workers</u>
1-13 weeks	.0602
14-26 weeks	.0690
27-39 weeks	.0832 (Vector 2)
40-48 weeks	.1339
49-52 weeks	.6537

By multiplying vector 1 by vector 2, and the resulting product by the relative size of the "length of work" factor in the equation in question, we obtain this value of -\$4. The same procedure applies to the other factors as well. The relative size of the factors is shown in Table A-4 and the method of calculating them is shown in Discussion Paper No. 34, already footnoted.

It should be noted that these weights do not measure the size of the factors in the explanation of earnings disparities between linguistic groups, but rather their size in the explained portion of the workers' earnings levels. In other words, a factor could, for example, have a high level of explanation while not significantly affecting the earnings disparities between linguistic groups, if the groups in question did not register differences of distribution in this factor. Similarly, a factor having a smaller weight could prove very significant in explaining the disparities if the groups registered major differences in distribution.

Table A-1

Percentage Distribution of Workers with Respect to Their Linguistic Group and Attributes, Montreal Metropolitan Zone, 1971

Factors	Categories	Francophones Percentage Distribution of Workers	Anglophones Percentage Distribution of Workers
Length of work	1-13 weeks	6.02	6.64
	14-26 weeks	6.90	6.50
	27-39 weeks	8.32	6.27
	40-48 weeks	13.39	9.89
	49-52 weeks	65.37	70.70
Age	15-19	5.61	5.98
	20-24	14.51	14.11
	25-29	15.24	12.63
	30-34	11.97	9.97
	35-39	11.35	10.09
	40-44	11.16	10.15
	45-49	9.59	10.33
	50-54	7.59	9.06
	55-59	6.26	8.18
	60-64	4.25	5.73
	65 and over	2.46	3.79
Citizenship status	Born in Canada	95.15	77.05
	Immigrated before 1946	0.61	6.56
	Immigrated after 1946	4.24	16.40
Education	Primary or less	27.64	11.82
	Secondary 1-2	22.32	14.13
	Secondary 3-5	34.12	39.60
	University	4.51	14.03
	Graduates	11.41	20.43
Occupation	Administrator	4.35	10.66
	Engineer	2.31	5.57
	Scientist	0.43	0.89
	Teacher	2.97	3.06
	Doctor, dentist, etc.	0.64	0.93
	Optometrist, pharmacist, etc.	0.26	0.20
	Magistrate, lawyer, etc.	0.43	0.63
	Accountant, economist, etc.	2.47	6.53
	Architect	0.10	0.17
	Other profession	4.18	4.52
	Office employee	12.89	16.86
	Salesperson	12.61	15.38
	Security	4.31	2.67
	Services	6.66	4.64
	Transportation supervisor	0.35	0.59
	Pilot	0.05	0.33
	Transportation	7.85	3.57
	Communications supervisor	0.03	0.05
	Communications	0.18	0.19
	Farmer, fisherman, etc.	1.19	0.58
	Tradesman	33.11	20.60
	Unskilled labourer	2.62	1.39

Table A-1 (cont.)

Factors	Categories	Francophones Percentage Distribution of Workers	Anglophones Percentage Distribution of Workers
Ethnic origin	French	93.06	8.04
	English, Scottish or, in essence, British	1.76	53.58
	Irish	1.18	12.51
	Scandinavian, Dutch	0.09	1.25
	German	0.45	1.91
	Italian	1.13	1.93
	Jewish	0.50	13.02
	Eastern European	0.24	2.57
	Other	1.60	5.18
Marital status	Single	25.61	25.49
	Married or other	74.39	74.51
Type of employment	Wage earner	89.03	69.82
	Self-employed wage earner	7.61	7.20
	Self-employed	3.36	2.97
Total		100.00	100.00

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table A-2

Regression Coefficients for the Earnings Determination Equation Estimated for the Market as a Whole, Montreal Metropolitan Zone, 1970

Factors	Categories	Coefficients	Student
Length of work	1-13 weeks	-3,956.46	-115.23
	14-26 weeks	-3,078.83	-103.44
	27-39 weeks	-1,684.08	-62.62
	40-48 weeks	+ 43.62	+ 2.12
	49-52 weeks	+ 869.70	+142.28
Age	15-19 years	-1,627.73	- 40.28
	20-24 years	-1,623.59	- 69.95
	25-29 years	- 804.46	- 40.76
	30-34 years	+ 267.77	+ 12.24
	35-39 years	+ 956.85	+ 42.91
	40-44 years	+1,146.42	+ 50.79
	45-49 years	+1,090.60	+ 45.23
	50-54 years	+ 774.11	+ 28.36
	55-59 years	+ 414.40	+ 13.88
	60-64 years	- 90.45	- 2.50
65 years and over	-1,305.44	- 27.95	
Citizenship status	Born in Canada	+ 112.46	+ 18.49
	Immigrated before 1946	+ 301.51	+ 5.96
	Immigrated after 1946	- 547.80	- 21.41

Table A-2 (cont.)

Factors	Categories	Coefficients	Student
Education	Primary or less	-1,078.21	- 67.09
	Secondary 1-2	- 533.39	- 32.05
	Secondary 3-5	+ 192.78	+ 16.35
	University	+ 441.04	+ 14.62
	Graduates	+2,124.46	+ 85.95
Occupation	Administrator	+4,986.29	+146.77
	Engineer	+1,338.10	+ 30.42
	Scientist	+ 20.85	+ 0.20
	Teacher	+ 139.04	+ 2.84
	Doctor, dentist, etc.	+7,612.90	+ 79.36
	Optometrist, pharmacist, etc.	+1,986.58	+ 11.97
	Magistrate, lawyer, etc.	+5,277.77	+ 43.31
	Accountant, economist, etc.	+3,133.61	+ 13.95
	Architect	+1,039.08	+ 23.69
	Other profession	- 573.64	- 14.94
	Office employee	- 967.64	- 46.34
	Salesperson	- 149.71	- 7.16
	Security	+ 18.05	+ 0.43
	Services	-1,627.88	- 56.78
	Transportation supervisor	+ 399.73	+ 3.14
	Pilot	+7,415.93	+ 31.86
	Transportation	-1,059.13	- 34.03
	Communications supervisor	+2,492.25	+ 5.53
	Communications	+ 231.95	+ 1.21
	Farmer, fisherman, etc.	-1,005.79	- 13.51
Tradesman	- 236.91	- 18.68	
Unskilled labourer	- 660.15	- 13.62	
Language origin	Unilingual francophone	- 286.59	- 14.94
	Unilingual anglophone	+ 682.03	+ 20.85
	Unilingual allophone	- 790.89	- 9.18
	Bilingual francophone	- 84.07	- 6.12
	Bilingual anglophone	+ 507.75	+ 17.14
	English allophone	- 286.66	- 6.06
	French allophone	- 382.75	- 5.52
Bilingual allophone	+ 20.81	+ 0.49	
Ethnic origin	French	- 70.00	- 5.59
	English, Scottish or in essence, British	+ 201.91	+ 6.57
	Irish	+ 124.28	+ 2.75
	Scandinavian, Dutch	+ 646.37	+ 6.34
	German	+ 533.95	+ 8.47
	Italian	- 40.83	- 0.94
	Jewish	- 759.55	+ 18.28
	Eastern European	- 171.47	- 3.00
Other	- 464.30	- 12.03	
Marital status	Single	-1,072.69	- 59.79
	Married or other	+ 354.83	+ 59.79
Type of employment	Wage earner	- 124.82	- 41.78
	Self-employed wage earner	+1,575.30	+ 57.99
	Self-employed	3.36	2.97
	Constant term	+7,122.57	+908.69
	R ²	47.87	
	F statistic	3,542.55	

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table A-3

Regression Coefficients for the Labour Income Determination Equation
Derived from the Equation of First Order Interaction Among Linguistic
Groups, Montreal Metropolitan Zone, 1970

Factors	Categories	Coefficients
Length of work	1-13 weeks	-3,915.99
	14-26 weeks	-3,149.85
	27-39 weeks	-1,888.88
	40-48 weeks	- 139.76
	49-52 weeks	+ 934.09
Age	15-19 years	-1,740.67
	20-24 years	-1,590.93
	25-29 years	- 833.95
	30-34 years	+ 170.13
	35-39 years	+ 872.80
	40-44 years	+1,098.52
	45-49 years	+1,120.87
	50-54 years	+ 882.59
	55-59 years	+ 551.93
	60-64 years	+ 11.39
65 years and over	-1,091.35	
Citizenship status	Born in Canada	+ 76.81
	Immigrated before 1946	+ 928.46
	Immigrated after 1946	- 484.53
Education	Primary or less	-1,416.21
	Secondary 1-2	- 660.48
	Secondary 3-5	+ 283.76
	University	+ 992.65
	Graduates	+2,447.74
Occupation	Administrator	+5,290.23
	Engineer	-1,670.91
	Scientist	+ 390.45
	Teacher	+ 405.26
	Doctor, dentist, etc.	+7,867.15
	Optometrist, pharmacist, etc.	+2,103.60
	Magistrate, lawyer, etc.	+5,493.85
	Architect	+3,336.21
	Accountant, economist, etc.	+1,497.48
	Other profession	- 374.69
	Office employee	- 697.38
	Salesperson	+ 22.82
	Security	+ 131.30
	Services	-1,868.80
	Transportation supervisor	+ 688.69
	Pilot	+8,027.25
	Transportation	-1,204.99
	Communications supervisor	+2,832.10
	Communications	+ 425.75
	Farmer, fisherman, etc.	-1,517.81
Tradesman	- 488.71	
Unskilled labourer	-1,268.00	
Ethnic origin	French	- 350.93
	English, Scottish (British)	+1,455.67
	Irish	+1,134.97
	Scandinavian, Dutch	+1,087.78
	German	+ 640.53
	Italian	- 788.14
	Jewish	-1,371.96
	Eastern European	- 32.13
Other	- 606.50	

Table A-3 (cont.)

Factors	Categories	Coefficients
Marital status	Single	-1,044.89
	Married or other	+ 345.63
Type of employment	Wage earner	- 123.68
	Self-employed wage earner	+1,576.02
	Self-employed	- 474.00
	Constant term	7,122.57

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Table A-4

Relative Size of Earnings Determination Factors Measured Through Standardized Equations Estimated for Linguistic Groups
Montreal Metropolitan Zone, 1970

Factors	Relative Size
Occupation	21.10
Length of Work	19.88
Age	13.81
Education	12.41
Marital status	9.21
Type of work	8.58
Ethnic origin	7.55
Citizenship status	7.46
Total	100.00

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Finally, while the sum of the weights in this table equals 100, this does not signify that these eight factors explain all the variations in earnings observed in the market, as the table deals only with the explained portion of earnings.

APPENDIX B
STATISTICAL RESULTS

Table B-1

Results of Statistical Tests on the Parameters for the Income Determination Functions Estimated for Francophone and Anglophone Workers Earning Less Than \$11,000, Montreal Metropolitan Zone, 1970

Sums of Squares	Degrees of Freedom	Mean Square
S4=3.53	72	0.049
S3=0.77	7	0.11
S2=S3+S4=4.30	79	0.0544
S1=0.20	1	0.20
4.50	80	

Calculated Value	Critical Value at Confidence Level of	
	99 Per Cent	95 Per Cent
(1) = $\frac{0.20}{0.0544} = 3.68$	F(1,79) = 7.00	4.00
(2) = $\frac{0.11}{0.049} = 2.24$	F(7,72) = 3.00	2.20
(3) = $\frac{(0.20+0.77)/8}{0.049} = 2.47$	F(8,72) = 2.90	2.10

Explanatory Notes

Test F(1) applies to the constant term. Since the calculated value is less than the critical value at the 99 per cent or 95 per cent confidence level, we can conclude that there are no significant statistical differences between the constant term of equation (2) estimated for francophone workers and the constant term of the same equation estimated for anglophone workers.

Test F(2) applies to all regression coefficients for the 7 explanatory variables in equation (2). Since its calculated value is less than the critical value at the 99 per cent confidence level and differs little at the 95 per cent level, we can conclude that there is no significant statistical difference between the regression coefficients of equation (2) estimated for francophone workers and the regression coefficients of the same equation estimated for anglophone workers.

Test F(3) applies to the entire equation and thus covers the constant term and the regression coefficients. Since its calculated value is less than the critical value at the 99 per cent confidence level and differs little at the 95 per cent level, we can conclude that there is no significant statistical difference between the entire equation (2) estimated for francophone workers and the same entire equation estimated for anglophone workers.

In Table B-2, we will now analyse the regression coefficients individually. Even if we find no significant statistical difference for the regression coefficients as a group, some might still exist in one or another of the coefficients if their influence were not strong enough to change the pattern of the overall test. This step will be carried out with the usual t statistic test:

$$t = \frac{\hat{\beta}_i^f - \hat{\beta}_i^a}{\sqrt{\text{var } \hat{\beta}_i^f + \text{var } \hat{\beta}_i^a - 2\text{cov } \hat{\beta}_i^f \hat{\beta}_i^a}}$$

where $\hat{\beta}_i^f$ and $\hat{\beta}_i^a$ are the estimated coefficients for variable i for francophone workers (f) and anglophone workers (a) and where the denominator contains the variances and covariances of these coefficients.

Table B-2

Results of the Statistical Tests on Individual Regression Coefficients the Income Determination Functions Estimated for Francophone Workers Earning Less than \$11,000, Montreal Metropolitan Zone, 1970

Variable	Calculated Values	Critical Value at 99 Per Cent Confidence Level
Blishen (Bli)	0.632	2.42
Experience (Exp)	0.902	2.42
Education (Sco)	1.31	2.42
Weeks (Sem)	0.80	2.42
Hours (Heu)	1.49	2.42
Mobility (Mob)	0.119	2.42
Training (Form)	2.23	2.42

* The values required for these calculations are available from the author.

Table B-3

Results of Statistical Tests on Parameters for the Income Determination Functions Estimated for Francophone and Anglophone Workers, All Income Brackets, Montreal Metropolitan Zone, 1970

Sums of Squares	Degrees of Freedom	Mean Squares
S4=13.85	184	0.0752
S3=0.96	7	0.1371
S2=S3+S4=14.81	191	0.0775
S1=1.50	1	0.50
16.31	192	

Calculated Value*	Critical Value at Confidence Level of	
	99 Per Cent	95 Per Cent
$F(1) = \frac{1.50}{.0775} = 19.35$	$F(1,191) = 6.60$	3.80
$F(2) = \frac{.1371}{.0752} = 1.82$	$F(7,184) = 2.60$	2.00
$F(3) = \frac{(1.50+0.96)/8}{13.85/184} = 4.09$	$F(8,184) = 2.50$	1.95

Notes

- 1 By excluding from the calculations Quebec-born francophone and anglophone workers earning \$11,000 and more:

$$F(1) = \frac{.14}{.1115} = 1.26$$

- 2 By excluding from the calculations only Quebec-born anglophone workers earning \$11,000 and more:

$$F(1) = \frac{1.84}{.0825} = 22.30$$

- 3 By excluding from the calculations only Quebec-born francophone workers earning \$11,000 and more:

$$F(1) = \frac{.07}{.115} = 0.61$$

*See Explanatory Notes in Table B-1 for explanation of F(1), F(2), and F(3).

Table B-4

Results of Statistical Tests on Individual Regression Coefficients for the Income Determination Functions Estimated for Francophone and Anglophone Workers, In All Income Brackets, Montreal Metropolitan Zone, 1970

Variable	Calculated Values*	Critical Value at Confidence Level of	
		99 Per Cent	95 Per Cent
Blishen	1.08	2.36	1.66
Experience	0.88	2.36	1.66
Education	1.03	2.36	1.66
Weeks	0.70	2.36	1.66
Hours	0.20	2.36	1.66
Mobility	2.32	2.36	1.66
Training	2.49	2.36	1.66

* The values required for these calculations are available from the author.

Table C-1
Cumulative Progression of Linguistic Earnings Disparities, Montreal Metropolitan Zone, 1970

Income Bracket (in 1970 dollars)	Average Income (in dollars)		Absolute Francophone Anglophone Disparity (in dollars)		Relative Disparity* (per cent)	Proportion of Workers in Both Groups (per cent)	Proportion of Income Supply (per cent)
	Francophones	Anglophones	Francophones	Anglophones			
Less than 2,000	941	876	65		7 f	13	2
Less than 4,000	2,006	1,773	233		13 f	26	7
Less than 6,000	3,293	2,935	358		12 f	45	20
Less than 8,000	4,482	4,184	298		7 f	67	41
Less than 10,000	5,211	5,106	105		2 f	81	59
Less than 10,750	5,445	5,482	37		1 a	85	65
Less than 15,000	5,934	6,500	566		10 a	94	79
Less than 20,000	6,195	7,219	1,024		17 a	97	87
Less than 30,000	6,398	7,883	1,485		23 a	99	94
All income	6,625	8,736	2,111		32 a	100	100

The earnings disparity shown in this table does not correspond to that in Tables 2-1 and 3-1 of the text because we have used here, without exception, all workers nonzero earnings.

* "f" indicates a relative disparity in favour of francophones and "a" indicates a relative disparity in favour of anglophones.

Source: Special data taken from the 1971 Census, Statistics Canada, and calculations by the author.

Footnotes

Appendix A

- 1 For a more complete discussion of this methodology, see Boulet, J.A., L'analyse des disparités de revenus : un cadre méthodologique de recherche, Discussion Paper No. 34, Economic Council of Canada, July 1975 and also J.-A. Boulet and J.C.R. Rowley, "Measurement of Discrimination in the Labour Market: A Comment," The Canadian Journal of Economics, Vol. X, No. 1, February 1977, pp. 149-154.

Appendix B

- 1 The results of these equations as well as all those used in the text are available from the author. They have not been reproduced here due to space limitations. It should nonetheless be noted that the determination coefficients, regardless of the equation used, are always above 94 per cent here, and above 80 per cent in the following tables. The Fisher tests on all the equations estimated have values which are above 100 here and above 70 in the tables that follow.

SPECIAL CONCERNS

Income inadequacy as a social concern relates to the destitution of some of those not in the labour force, the intermittent income flows to those working in occupations and regions which are noted for high off-season unemployment and accompanying low average annual incomes, and the continuous but low-level incomes associated with particular low-skill employment opportunities.

One element of the regional dimension of this concern is addressed in the Brown/Foster paper which suggests that labour mobility contributes to higher average income in the Atlantic Region. It was argued, however, that migration merely "shuffled" people and that while primary earners might raise their incomes by moving to higher-paying jobs, secondary earners accompanying them might have to take lower-paying jobs, leaving family income little changed. Still, it seems reasonable to expect that an improved income is a principal inducement to mobility and, it follows, mobility should contribute to higher individual income levels. If such movements do not depress incomes of nonmigrants and mobile secondary earners, average regional income might be expected to increase as a consequence of labour mobility.

Commentators on the Podoluk paper, which looks at alternative ways of defining "poverty" and those sub-populations which have the highest probability of falling into this profound state of income inadequacy (the elderly and female-headed families), disagreed on the preferred way of defining this condition. The "relative" criterion provides an indication of how the system is evolving in its distributional character. The "absolute" criterion, on the other hand, aids in the evaluation of deprivation so that policy and action can be directed to precisely those who require assistance. The poor and the persistently poor must be distinguished, the extent of family assistance should be quantified (it exceeds state transfers by about five times in the United States), and programs supporting employment -- as well as state transfers -- must be seriously considered (for instance, later retirement, subsidized child care and so on).

While "minimum wages" are designed to assure a reasonable minimum income, the Fortin paper notes that in the Québec experience there are associated negative employment effects, particularly for young people, unattached adults and second wage earners. The questions raised dealt more with alternative, perhaps more efficient, methods of transferring money to the working poor so as not to disturb the labour market (e.g. income tax credits and targeted job/wage subsidies). Still, minimum wages are simple to administer, they keep governments at arm's length from family finances and they benefit those who react as our societal work ethic would have them do.

REGIONAL INCOME EFFECTS OF MIGRATION
IN ATLANTIC CANADA

by

Murray G. Brown and Robert D. Foster*

INTRODUCTION

Migration typically alters, first, the personal income of individual migrants who enter or leave a geographic area, and, second, the average income of migrants and nonmigrants living in a geographic area. This paper focuses on the second of these two income effects of migration.

An individual's or a family's decision to migrate is a function of many factors, expected personal monetary gain being one. As yet, no integrated theory has emerged which fully explains migration behaviour. (Greenwood, 1968; Shaw, 1975) The Sjaastad model, however, sets forth a general analytical framework in which migration is treated as a personal investment decision (Sjaastad, 1962). Within this framework migration from region i to j occurs only when the expected net real gain to a migrant is positive; net real gain is defined as the present value of future streams of money income and psychic income in location i versus location j , adjusted for the money and psychic cost of migration. The effect of migration on the real personal income of migrants is, therefore, expected to be positive. The effect of migration on the money income of migrants is also expected to be positive, provided there is not a strong negative correlation between changes in unmeasured psychic income and changes in measured money income.

The effect of migration on the mean income of migrants and nonmigrants in regions i and j combined is also expected to be positive. This follows if the net gains in income expected by migrants prior to migration are realized, on average, as a consequence of their more efficient spatial distributions within regions i and j . In contrast, the separate effects of migration from region i to region j on the mean income of migrants and nonmigrants in (1) the sending region i and in (2) the receiving region j , are indeterminate. For example, if the income of a migrant from i to j is, prior to migration, less (greater) than the mean income in sending region i , then his departure from i will raise (lower) the mean income of those remaining in region i . Similarly, if the income of a migrant after arrival in region j is greater (less) than the mean income in region j prior to his arrival, then his arrival will raise (lower) the mean income in region j . Since the income of a migrant from i to j may fall anywhere in the income distributions of regions i and j , it is not possible to predict whether the act of migration by a "typical migrant" will raise or lower the mean income in either the sending region or in the receiving region. Neither is it possible to predict whether the collective effect of all migration from i to j will raise or lower the mean income in the sending region or in the receiving region. The signs, like the magnitudes, of these separate regional income effects of migration may be determined only through empirical investigation.

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This paper reports estimates of the size of annual regional income effects of migration in Atlantic Canada, by sex, based on longitudinal microeconomic data from the period 1967-72. Relative personal incomes of migrants are represented by the ratios of money incomes reported by migrants and "nonmigrants" (those who neither migrated intra- or interregionally during the period 1967-72). Regional income effects of migration, both interregional and intraregional, are estimated using a weighted average of the relative personal incomes of migrants and the migration rates for various categories of migrants. Estimates of the annual regional income effects of migration are given, by sex, for the Atlantic Canada region, the four Atlantic Provinces, and eleven subprovincial areas within Atlantic Canada.

A distinct advantage of using income ratios of migrants and nonmigrants in estimating regional income effects of migration is the removal of inflation and secular growth in real income as factors which might bias the estimates. By computing income ratios observed annually, then averaging these annual observations, the estimating procedure yields a percentage change in average income in a region associated with migration, after accounting for inflation and for secular and cyclical changes in real income which occurred during the period studied. These estimates, therefore, approximate the percentage change in regional real income per capita which are associated with migration.

Our estimates of the regional income effects of migration in Atlantic Canada during the period 1967-72 indicate that average income in Atlantic Canada increased as a consequence of both interregional migration to and from the rest of Canada and intraregional migration between and within the four Atlantic Provinces. The regional income effects estimated for interregional migration are similar in size to those estimated for intraregional migration. The annual percentage change in real income per capita estimated to be associated with current interregional and intraregional migration combined, although small in absolute terms, represents between 20 per cent and 40 per cent of the long-run annual rate of growth of real GNP per capita.

The evidence also indicates that disparities in real income per capita across provinces and subprovincial areas within Atlantic Canada tend to be reduced as a consequence of migration within Atlantic Canada.

The regional income effects associated with migration by males and by females, estimated separately, yield patterns which are broadly comparable, but which differ greatly in detail.

MEASURING REGIONAL INCOME EFFECTS

Methodology

The regional income effect of migration in region A_j is defined to be the percentage change in average real income associated with, if not attributable to, migration into, out of, or within that region. This regional income effect is estimated by comparing the average income reported in A_j at the end of a migration period with the average income expected in A_j if no migration occurred.

Two sets of estimates of regional income effects of migration in Atlantic Canada are reported. The first set considers only the impact of current-year migration on average income in A_j . The second set considers the impact of both current and past migration on average income in A_j . In both cases the estimating procedure utilizes the fact that average income in A_j may be expressed as a weighted average of the incomes of various categories of migrants and nonmigrants. [1]

Estimates of what average income in A_j would have been in the absence of current (current and past) migration are computed as follows. First, current (current and past) immigrants to A_j are omitted from the population used to compute average income in A_j since it is assumed that no immigration occurred. Second, current (current and past) outmigrants from A_j are included in the population used to compute average income, since it is assumed that no outmigration occurred. And third, current (current and past) outmigrants are assumed to earn incomes in A_j , in the current year, comparable to the incomes which they reported earning in A_j prior to migrating. A weighted average estimate of average income in A_j is made, assuming either (a) no current migration or (b) no current or past migration. These estimates of average income in A_j in the absence of migration are then compared with average income actually reported from A_j in a given year. This comparison gives the percentage changes in average income in region A_j which is associated with current, or current and past, migration.

To remove the effects of trends, cycles and inflation from money incomes reported in A_j from 1967-72, current year incomes of all past, current, and future migrants were divided by the average income of nonmigrants in A_j . These income ratios, for various categories of migrants vis-à-vis nonmigrants, for years 1967-72, were then averaged to give income ratios representative of a "typical" year. Similar averaging procedures were used to compute population weights for migrants and nonmigrants in a "typical" year. These relative income ratios and population weights were then used to estimate the change in average real income in A_j associated with current, or current and past, migration.

Ratios of personal incomes, before or after migration, describe the personal income levels of migrants relative to nonmigrants. These ratios for migrants do not give a direct measure of the gross money returns to migrants. They do indicate, however, whether migration by persons falling within various categories of migrant has the effect of raising or lowering average income in a sending or receiving region.

The size of the regional income effect of migration in A_j , measured in terms of percentage change in real income per capita, depends upon the relative income of immigrants, weighted by the number of immigrants, and the relative incomes of outmigrants, weighted by the number of outmigrants.

The following categories of migrants are used: current immigrants, past immigrants, current return immigrants, past return immigrants, current outmigrants, past outmigrants, and future migrants. Nonmigrants in A_j are those individuals who gave no evidence of migrating into or out of A_j during the period 1967-72.

The Atlantic Canada Data Base

The 1967-72 longitudinal data base used in this study contained a 2 per cent sample of all individuals who had been issued a social insurance number by 1971 and who filed a personal income tax return which recorded a place of residence in Atlantic Canada within the period 1967-72. This Atlantic Canada data base is a subset of the Canada-wide data base assembled by the Unemployment Insurance Commission (UIC). [2] Records consisted of UIC data for 1965-72 matched with Department of National Revenue (DNR) personal income tax return data. [3]

The Atlantic Canada Data Base roughly corresponds to Atlantic Canada's labour force. The correspondence is closer for males than for females, with about 95 per cent of male tax filers reporting earnings compared to 91 per cent of female tax filers. The data base is least representative of younger males and

females in the labour force, who are underrepresented (Grant and Vanderkamp, 1976). Inclusion of persons who are not labour force participants is advantageous for purposes of estimating the regional income effects associated with all migration.

Individuals represented in the Atlantic Canada Data Base were classified as migrants or nonmigrants, using end-of-year locality code data reported on their tax returns. Nonmigrants were defined as those who retained the same locality code in Atlantic Canada throughout the 1967-72 period, even though they may have filed annual tax returns only intermittently during this period. For example, a person was classified as a nonmigrant in a subprovincial area of Atlantic Canada if, in the period 1967-72, that person filed at least one and a maximum of six tax returns bearing a locality code falling within that subprovincial area. All other persons were classified as migrants. Migrants must have filed at least two tax returns from 1967-72 and have reported locality codes falling within more than one subprovincial area, province, or region.

Each migrant is both an outmigrant from the locality initially reported and an immigrant to the locality subsequently reported. Three categories of migration based on origin and destination, were used: (A) interregional migration, between Atlantic Canada and the rest of Canada, (B) Atlantic Canada intraregional interprovincial migration, among the four Atlantic Provinces, and (C) Atlantic Canada intraregional migration, which includes both interprovincial migration and intraprovincial migration among designated subprovincial geographic areas. [4]

Migrants are also classified according to whether, in a particular year for which a tax return has been filed, the person is a current migrant, a past migrant, or a future migrant with respect to his current locality code. Return migrants are those who first leave and then return to a subprovincial area, province or region. Future migrants are those who leave their current subprovincial area, province or region during a subsequent year within the period 1967-72.

Relative Incomes of Migrants and Nonmigrants

Table 1 displays ratios of gross money incomes reported by migrants and nonmigrants in Atlantic Canada, by sex, for a typical year within the period 1967-72. Ratios of relative incomes are reported separately for Current Immigrants, Current Return Immigrants, Past Immigrants, and Current and Future Outmigrants. Income ratios are also reported by migration category, i.e., A. Interregional Migration between Atlantic Canada and the rest of Canada, B. Intraregional Interprovincial Migration within Atlantic Canada, and C. Intraregional Migration within Atlantic Canada, including intraprovincial migration. The major points are discussed below.

Males

The ratio of money incomes reported by current interregional male immigrants from the rest of Canada to Atlantic Canada was 1.07, or 7 per cent higher than money incomes reported by nonmigrants in Atlantic Canada during the year in which migration occurred (Table 1, I, A). This ratio was slightly greater than that for all current return interregional male migrants, 1.05; these migrants moved previously from Atlantic Canada to the rest of Canada before returning to Atlantic Canada in the current year. Incomes reported in a typical year by past interregional male immigrants to Atlantic Canada relative to incomes of nonmigrant males were much greater than those of current immigrants, 1.27 or 27 per cent above the mean for nonmigrant males. Incomes reported in a typical year by current first-time immigrants, by current return immigrants, and by past immigrants to Atlantic Canada were all greater on average than incomes reported by

nonmigrant males in Atlantic Canada. The presence of current and past immigrants in Atlantic Canada thus exerted an upward influence on the mean income computed for all males who filed income tax returns in Atlantic Canada at the end of a typical year during the period 1967-72.

In contrast, the income ratio for current and future interregional male outmigrants from Atlantic Canada to the rest of Canada is 0.87, or 13 per cent below the mean income of nonmigrant males in Atlantic Canada. Since mean incomes of current and past immigrants to Atlantic Canada are above the mean income of nonmigrant males in Atlantic Canada, while mean incomes of current and future outmigrants are below the mean income of nonmigrants, the effect of interregional in- and outmigration is to increase the mean income reported by males resident in Atlantic Canada.

Similar patterns of income ratios for male migrants and nonmigrants are found in Table 1 for (A) interregional migration between the rest of Canada and each of the Atlantic Provinces, and (B) interprovincial migration among the four Atlantic Provinces. Newfoundland income ratios for immigrants are notably greater than those found in the other Atlantic Provinces.

A somewhat different pattern of income ratios is found for interprovincial and intraprovincial migrants within Atlantic Canada, for 11 subprovincial areas. In particular, income ratios of current male immigrants relative to nonmigrant males in these subprovincial areas are less than 1.0 in about half the areas. The principal factor contributing to this change in pattern is discussed in the next section of this paper.

Females

Ratios of incomes reported by female migrants and nonmigrant females in Atlantic Canada are shown in Table 1, part II. These ratios differ from those for males in several respects. First, the income ratio for current return interregional female immigrants to Atlantic Canada is larger than that of female first-time current interregional immigrants to Atlantic Canada, i.e., 1.03 versus 0.98; comparable data for males are 1.05 and 1.07. Third, the income ratio for females who are past interregional immigrants to Atlantic Canada, while much larger than the income ratios for current first-time and current return interregional immigrants, are much smaller than the comparable ratios for males, e.g., 1.11 for females compared to 1.27 for male interregional migrants to Atlantic Canada. In contrast, personal incomes reported by female current and future outmigrants from Atlantic Canada are almost identical to those for males, each being about 13 per cent below the mean incomes reported by female and male nonmigrants.

These data indicate that the sign, or direction, of the regional income effect in Atlantic Canada due to interregional outmigration from Atlantic Canada to the rest of Canada is positive for both males and females; the sign of the regional income effect associated with current (first-time) interregional immigration to Atlantic Canada is negative for females but positive for males; the signs of the regional income effect associated with interregional current return immigration and with past immigration to Atlantic Canada are positive for both sexes, but the respective income ratios differ greatly in terms of both absolute and relative magnitude.

Income ratios of female migrants and nonmigrants exhibit greater variability across provinces and subprovincial areas than do income ratios for males. This is attributable primarily to the smaller size of the female sample population. Space limitations preclude a detailed discussion of the many interesting

similarities and differences between the relative incomes of male and female migrants and nonmigrants in Atlantic Canada.

Incomes of Nonmigrants in Atlantic Canada

It is important to recognize that the mean incomes of nonmigrants, the denominators of the income ratios, vary greatly within Atlantic Canada, both across provinces and within provinces across subprovincial areas. Table 2 shows these differences in mean incomes of nonmigrants, by province, by subprovincial area and by sex. Incomes reported by current, past, and future migrants -- by geographic area -- are all expressed relative to incomes of nonmigrants in that geographic area in a current year for purposes of estimating the size of regional income effects of migration.

It was previously noted that the incomes of male migrants within Atlantic Canada, relative to those of nonmigrants during the year in which migration occurred, varied greatly across the 13 subprovincial areas of Atlantic Canada. Examination of Tables 1 and 2 reveals that income ratios for current male immigrants from other areas of Atlantic Canada are generally smaller in subprovincial areas where incomes of nonmigrants are high (i.e., Halifax-Dartmouth, Sydney, Fredericton, Saint John and St. John's) and vice versa. This illustrates well the fact that the direction (and magnitude) of the regional income effect of migration on income per capita in any geographic area is a function of both the incomes of migrants and the incomes of nonmigrants.

Population Weights of Migrants and Nonmigrants

The effect of migration on income per capita in any geographic region is estimated, in percentage terms, using a weighted average of relative incomes for the various categories of migrants vis-à-vis nonmigrants. The weights used are the proportions of the total population in a region comprised of persons falling within the various migrant or nonmigrant categories. These population weights are shown in Table 3.

Three sets of population weights are given, by sex. The first set (Table 3, section (1), col. 1-4) shows the population weights used in estimating the regional income effects of current migration only. The second set (Table 3, section (2), col. 5-8) shows the population weights used in estimating the regional income effects of both current and past migration. The third set (Table 3, section (3), col. 9-13) shows post-migration population weights, i.e., those observed on average over the period 1967-72, which were used in the estimation procedures.

A description of how these population weights were derived is appropriate. To estimate the regional income effect of current-year migration for a geographic area, we wished to compare the income actually reported by residents of an area in a "typical" year with the hypothetical income which would have been reported from that area assuming, first, that no current-year in- or outmigration occurred, and second, that relative incomes reported by residents during the previous year persist during the current year. The year-end population of the area would, in the absence of current migration, include the following groups: (i) nonmigrant residents, who neither migrated into or out of the area during the period 1967-72, (ii) past immigrants, who arrived in previous years, (iii) future outmigrants, who left in subsequent years within the period 1967-72, and (iv) current (actual) outmigrants who, by assumption, did not migrate but remained as part of this area's hypothetical population; current (actual) immigrants to this area are excluded from the hypothetical year-end population since, by assumption, no current migration occurred. Population weights computed for migrants and nonmigrants, assuming no current-year migration, are shown in

Table 3, section (1), columns 1-4, for Atlantic Canada, each Atlantic Province, and selected subprovincial areas.

A similar approach was used to compute year-end population weights for these same geographic areas, assuming no in- or outmigration in either the current year or in prior years within the period 1967-72. Under this assumption the population in an area would include: (i) nonmigrants, (ii) future outmigrants, (iii) current (actual) outmigrants, and (iv) current (actual) return immigrants to the area who, assuming no prior in- or outmigration, would not have left their "home" area in the past, (v) past outmigrants, and (vi) past return immigrants; excluded from this hypothetical population for purposes of estimating the regional income effects of current and past migration are (actual) current and past immigrants to the area. Population weights for Atlantic Canada, assuming neither current nor past in- or outmigration, are shown in Table 3 (section (2), columns 5-8, ff. a-f).

Population weights for migrants and nonmigrants in a typical year, based on averages of annual observations for years 1967-72, are shown in Table 3, section (3), columns 9-12. These weights reflect actual patterns of current and past in- and outmigration in Atlantic Canada during the period studied. The population of an area at the end of a "typical" year included: (i) nonmigrants, (ii) past immigrants, (iii) future outmigrants, (iv) current immigrants, and (v) current return immigrants; absent, of course, are current and past outmigrants.

The population weights in part A, Table 3, for Atlantic Canada and each of the Atlantic Provinces, relate to inter-regional migration to and from the Rest of Canada; population weights in part B, for each of the Atlantic Provinces, relate to intraregional interprovincial migration among these provinces; and population weights in part C, for 11 subprovincial areas and Prince Edward Island, relate to both interprovincial and intraprovincial migration within Atlantic Canada.

The population weights shown in Table 3 are combined with the relative incomes of migrants and nonmigrants shown in Table 1 to estimate the regional income effects of migration. To estimate the effect of a particular type of current migration on income per capita in a geographic area, the income ratios for current, past, and future migrants reported in Table 1 are weighted by the relative numbers of such migrants and nonmigrants in the population at the start of a typical year (computed on the assumption that no current migration occurred) and summed to give a weighted average of income per capita in that geographic area (standardized by the incomes of nonmigrants). This weighted average is then compared with the weighted average of income ratios given by using post-migration population weights. The regional income effect estimated to be associated with current migration to and from this geographic area is the difference between the two weighted averages of income per capita, expressed in percentage terms. A similar procedure is followed to estimate the regional income effect of current and past migration, over the period 1967-72, using population weights computed on the assumption that neither current nor past migration occurred.

The population weights shown in Table 3 reveal a great deal about the origins, destinations, and relative numbers of migrants during a typical year in Atlantic Canada. A full discussion of these migration patterns is not possible here. Our comments at this point are restricted to the following, which are designed to assist the reader with the interpretation of Table 3.

Consider for example, the distribution of male migrants and nonmigrants in Atlantic Canada at the beginning of a typical year

during the period 1967-72 (Table 3, part A, row 1, columns 1-4). The population weights show that nonmigrant males in Atlantic Canada accounted for 89.58 per cent of the male population. These nonmigrants did not change residence during the period 1967-72 -- between regions, provinces, or subprovincial areas -- according to the UIC-DNR cohort data analysed. Past immigrant males comprised 3.83 per cent of the population; this figure includes 0.54 per cent past return immigrants to Atlantic Canada (footnote b). Future outmigrants who remained in Atlantic Canada during the "current" year, but who migrated to the rest of Canada in some future year, comprised 4.09 per cent of the population. And current interregional outmigrants to the rest of Canada averaged 2.50 per cent of the premigration population base in Atlantic Canada at the start of a typical year. The population weights given for current immigrants and outmigrants (x100) may be read as annual migration rates.

Other population weights shown in Table 3 may be read similarly. The second set of population weights (Table 3, columns 5-8) show relative numbers of migrants and nonmigrants in a geographic area, assuming neither current nor past migration has occurred. The third set of population weights (columns 7-11) reflect the actual numbers of migrants and nonmigrants observed on average over the period 1967-72.

ESTIMATED REGIONAL INCOME EFFECTS OF MIGRATION

The regional income effects of migration estimated for Atlantic Canada, the four Atlantic Provinces, and selected sub-provincial areas, are shown in Table 4. Estimates are given, by sex, of the effect of (1) current migration only and (2) current and past migration on income per capita during a typical year during the period 1967-72. Separate estimates are given for different types of migration, i.e., (A) Atlantic Canada inter-regional migration, (B) Atlantic Canada intraregional inter-provincial migration, (C) Atlantic Canada intraregional migration, both interprovincial and intraprovincial, and (D) Atlantic Canada interregional and intraregional migration. Estimates may be interpreted as percentage changes in real income per capita for the designated population. The estimating procedure effectively standardizes for both inflation and for trends in real income per capita.

Regional Income Effects of Current Migration

For males in Atlantic Canada, the regional income effect on income per capita of current migration to and from the rest of Canada is estimated to be 0.40 per cent annually (Table 4, A, col. 1). Comparable estimates for each of the provinces are: Nova Scotia, 0.41; New Brunswick, 0.23; Newfoundland, 0.82; and Prince Edward Island, 0.50. The magnitude of these estimates varies greatly across these provinces. The percentage income effect of current interregional migration in New Brunswick is about half the size of that for all Atlantic Canada.

Comparison of regional income effect estimates associated with current interregional migration, by province, with comparable estimates associated with current interprovincial migration by males among the four Atlantic Provinces, reveals the latter effects to be considerably smaller, with the exception of Newfoundland (Table 4, B, col. 1).

When the effects of current intraprovincial migration within the four Atlantic Provinces are added to the effects of current interprovincial migration among the four Atlantic Provinces, the combined regional income effect for males averaged across these provinces is about the same size as the regional income effect estimated to be associated with interregional migration to and from the rest of Canada, being 0.38 per cent (Table 4, C, col. 1).

The total regional income effect associated with current migration by males, both interregional and intraregional, is estimated to be 0.77 per cent annually in Atlantic Canada. The comparable estimate for Newfoundland, 1.18 per cent is much greater than this regional average, while the estimate for Prince Edward Island, 0.47 per cent, is much lower (Table 4, D, col. 1).

The direction of the estimated regional income effect of current migration by males is positive for each of the Atlantic Provinces and the region. In contrast, comparable estimates for eleven subprovincial areas and Prince Edward Island include a few negative signs. In particular, the estimated regional income effect of current migration for the Halifax-Dartmouth subprovincial area is negative, and relatively large, for both males and females. Thus current migration tends to reduce income per capita of both sexes in Halifax-Dartmouth, which has the highest income per capita of all subprovincial areas in Atlantic Canada.

Estimates of the effect of current migration by females on average incomes of females in Atlantic Canada differ somewhat from those for males. For example, the regional income effect associated with current interregional migration by females is 0.24 per cent annually, compared to 0.40 per cent for males. The estimated impact of female current migration is much less than the regional average in Nova Scotia and New Brunswick, while it is much greater than average in Newfoundland and Prince Edward Island.

Province by province estimates for females of the size of the regional income effect associated with current interprovincial migration within Atlantic Canada are smaller than those for males, except for New Brunswick (Table 4, B, col. 1 and 3). In contrast, estimates of the size of regional income effects associated with current intraregional migration, including intraprovincial migration, were larger for females than for males, in each of the Atlantic Provinces. The sum of the current interregional and intraregional income effects of migration for all females in Atlantic Canada was slightly greater than that for males, i.e., 0.85 per cent versus 0.77 per cent.

Regional Income Effects of Current and Past Migration

Estimates of the regional income effects of current and past migration are also given in Table 4, for a "typical year" within the period covered. [5] For males in Atlantic Canada, it is estimated that 2.11 per cent of income per capita in a given year is associated with current and past migration to and from the rest of Canada. Another 2 per cent of income per capita is associated with current and past migration within Atlantic Canada, with about half of this effect due to interprovincial migration and half to intraprovincial migration. The size of these estimates differ considerably across the four provinces and subprovincial areas. The signs of all the estimates are positive, indicating that the net effect of current and past in- and outmigration was to raise income per capita in each geographic area.

Similar estimates for females in Atlantic Canada give estimates of the regional income effect of current and past interregional migration to be about 1 per cent of female income per capita, compared to twice that amount for males. The estimated size of the regional income effect associated with current and past migration within Atlantic Canada, however, was about 2 per cent for females and for males. The total regional income effect associated with current and past migration is 3 per cent for females compared to 4 per cent for males.

DISCUSSION

Migration and Regional Income Per Capita

Whether migration raises or lowers income per capita in any given geographic area is strictly an empirical question, since either outcome is possible. If the mean incomes of migrants differ systematically from those of nonmigrants in a geographic area, then migration may alter income per capita. If the opposite were true, i.e., if mean incomes of migrants and nonmigrants were identical, then income per capita in an area would be unaffected by the size and composition of migration flows.

The facts are that mean incomes of various categories of migrants do differ systematically from the mean incomes of nonmigrants. Consequently, the income per capita in a region is affected by the size and composition of gross migration flows into and out of a geographic area. The Atlantic Canada data reported above illustrate the way in which migration alters income per capita in an area as a function of (A) the relative incomes of migrants and nonmigrants, (B) the relative numbers of migrants and nonmigrants, and (C) the absolute income levels of nonmigrants.

For example, among males in Atlantic Canada the incomes reported by current return immigrants are typically greater than those of nonmigrants and marginally smaller than incomes reported by first-time immigrants to Atlantic Canada, which in turn are substantially below incomes reported by past (first-time and return) immigrants; in contrast, incomes reported by current and future outmigrants from Atlantic Canada are substantially below the incomes of nonmigrants. Consequently, as factors contributing to the direction and size of the regional income effect of migration in an area, the relative size and composition of past and current migration flows are just as important as the relative incomes of the various categories of migrants.

Lastly, the income effect of migration in an area, measured in terms of a positive or negative percentage change in income per capita, is a function of the absolute level of income per capita of nonmigrants in the area. This is illustrated by the large and systematic differences in relative incomes of migrants and nonmigrants observed across subprovincial areas within Atlantic Canada. Where absolute income levels of nonmigrants are higher, relative incomes of migrants tend to be lower. The typically positive income effect associated with current migration is therefore weakened, or even reversed. In the case of the Halifax-Dartmouth subprovincial area, for example, which has the highest income per capita in Atlantic Canada, the effect on income per capita of intraregional migration between Halifax-Dartmouth and other parts of Atlantic Canada is estimated to be negative, for both males and females.

Biases in the Estimates

These estimates of the regional income effects of migration are subject to several biases.

First, estimates of the regional income effects associated with current migration are biased downward since immigrants reside for only part of a taxation year in their new location. The annual income they report at the end of a taxation year will only partially reflect their new, typically higher, annual earning power. To estimate regional income effects of current migration, one would like to know annual incomes received by migrants following their arrival in an area. While the size of this bias is unknown, recognition of its existence helps to explain the unexpectedly large difference in incomes reported by current immigrants compared to past immigrants, who immigrated within the past three years on average.

Second, the size of the estimates of regional income effects associated with current and past migration are a function of the number of past years included in the analysis. Relative incomes and population weights computed from Atlantic Canada for past immigrants in a typical year represent the current year status of persons who immigrated during the previous two or three years. Data sets which yield longer or shorter "past" time periods would raise or lower estimates of the regional income effects of current and past migration, since migrants consist disproportionately of younger persons with rising age-income profiles. The longer the "past" time period, of course, the less tenable is the ceteris paribus assumption that, in the absence of migration, relative incomes and population weights of migrants and non-migrants which are observed in a premigration period will remain constant.

Third, all estimates of regional income effects associated with migration within Atlantic Canada are very sensitive to the number and size of the intraregional areas selected for purposes of analysis. For example, selection of only 13 subprovincial geographic areas, including two on Prince Edward Island, has effectively excluded from the estimates the income effects of migration associated with migration occurring within these subprovincial areas.

Fourth, small sample sizes for subprovincial areas and for Prince Edward Island reduce the confidence which may be placed on estimates of the income effects of migration in these areas for any given year. This small-sample-size problem is partly overcome through the averaging of relative incomes and populations weights observed annually during the period studied, then using these averaged data in estimating regional income effects of migration for a "typical" year.

Fifth, whether or not migration systematically alters real incomes of nonmigrants in a region is an open question. If there is a systematic downward or upward effect on mean incomes of nonmigrants due to current or past migration, then our estimates of the regional income effects of migration will be biased upward or downward. This study brings no evidence to bear on this question.

On balance, while it is not possible to identify and quantify the importance of all sources of bias, it appears likely that estimates of the size of regional income effects of migration derived from the Atlantic Canada data base yield conservative estimates of the true effects.

CONCLUSIONS

Combined Regional Income Effects

To this point, regional income effects of migration in Atlantic Canada have been reported separately for males and for females. What are the estimates for the total study population of income tax filers? The percentage change in male and female personal real income per capita is estimated to be 0.8 per cent annually due to current migration to, from, and within Atlantic Canada; the estimate for current and past migration is 4.0 per cent of income per capita in a typical year. [6]

What are the comparable estimates for the entire population of Atlantic Canada? Provided that the number of dependents accompanying male and female immigrants and outmigrants is similar, the effect of migration on real income per capita for all residents of Atlantic Canada will be similar in size to those just cited for our study population. In fact, age and marital status data included in the Atlantic Canada micro data base show that current immigrants to Atlantic Canada are somewhat older than current outmigrants, and that a greater proportion of

inmigrants are married (Brown and Foster, 1978). This suggests that the regional income effects of interregional migration estimated for our study population of tax filers are somewhat larger than the regional income effects experienced by all residents of Atlantic Canada.

Regional Income Effects: Large or Small?

Are the estimated regional income effects of migration in Atlantic Canada large or small? During the period 1967-72, the average annual percentage change in constant (1971) dollar GNP per capita in Canada was 3.68 per cent. [7] Over the longer run from 1926-50, Canada's average annual growth rate in constant (1949) dollar GNP per capita was 2.01 per cent. [8] Relative to these growth rates, the size of the estimated effects of current migration to, from and within Atlantic Canada on real income per capita in Atlantic Canada are not small. The estimated annual effect of current migration on average real income in Atlantic Canada, 0.8 per cent, represents 40 per cent of Canada's long-run rate of growth of real GNP per capita, and 22 per cent of the real growth rate during the 1967-72 period studied.

Regional Income Disparities

Evidence presented in this paper bears only indirectly on the question of whether interregional migration across Canada tends to increase or to reduce the regional income disparities which have persisted for decades. This important question could be investigated through application of the methodology used in this Atlantic Canada study to Canada-wide UIC-DNR data.

Certain clues about the findings likely to emerge from a Canada-wide study are to be found in the experience of Atlantic Canada. First, the change in income per capita associated with current interprovincial and intraprovincial migration within Atlantic Canada is typically positive in the subprovincial areas of Atlantic Canada, the change tends to be smaller in subprovincial areas which have higher incomes per capita, and the change is estimated to be negative (for males and for females) only in the Halifax-Dartmouth area, which has the highest male and female income per capita in Atlantic Canada. This evidence indicates that migration within Atlantic Canada tends to reduce income disparities within Atlantic Canada. Second, the change in income per capita associated with current interregional migration to and from the rest of Canada is estimated to be positive in each of the four Atlantic Provinces, which have low incomes per capita relative to the rest of Canada.

Given such evidence from Atlantic Canada, we would expect a Canada-wide study to find, first, that current intraregional migration within other regions of Canada also tends to reduce income disparities within these regions, and second, that current interregional migration across Canada tends to reduce regional income disparities within Canada.

Table 1

Relative Incomes of Migrants and Nonmigrants in Atlantic Canada, by Sex, 1968-72: (A) Atlantic Canada Interregional Migration (Atlantic Canada and the Rest of Canada), (B) Atlantic Canada Intraregional Interprovincial Migration, and (C) Atlantic Canada Intraregional Migration (Interprovincial and Intraprovincial)

	Income Ratios ^a			
	Current Immigrants	Current Return Immigrants	Past Immigrants	Current and Future Outmigrants
I. Males				
A. Atlantic Region	1.07	1.05	1.27	.87
Nova Scotia	1.07	1.04	1.26	.83
New Brunswick	1.06	1.06	1.26	.95
Newfoundland	1.24	1.24	1.54	.87
Prince Edward Is.	1.05	1.05	1.24	.83
B. Nova Scotia	1.14	1.02	1.32	.83
New Brunswick	1.07	1.08	1.66	.95
Newfoundland	1.58	1.27	2.17	.87
Prince Edward Is.	.93	1.36	1.49	.83
C. Nova Scotia				
Hfx.-Dart.	.81	.89	1.10	.87
Truro, etc.	1.12	1.02	1.33	.93
Sydney	.89	.85	1.28	.73
Cape Breton	1.23	1.02	1.60	.65
Rest of N.S.	1.09	1.29	.90	.73
New Brunswick				
Fredericton	.98	1.14	1.36	.92
Moncton	1.31	1.08	1.70	.80
Saint John	.86	1.11	1.25	.87
Rest of N.B.	1.26	1.22	1.42	1.06
Newfoundland				
St. John's	.84	1.19	1.40	.72
Rest of Nfld.	1.15	.98	1.48	.92
Prince Edward Is. ^b	.86	.86	1.56	.83
II. Females				
A. Atlantic Region	.98	1.03	1.11	.86
Nova Scotia	.98	.98	1.12	.90
New Brunswick	.87	.87	1.05	.85
Newfoundland	1.01	1.01	1.43	.83
Prince Edward Is.	1.15	1.15	1.31	.82
B. Nova Scotia	.88	1.54	1.10	.90
New Brunswick	1.04	1.06	1.24	.85
Newfoundland	1.12	1.06	1.03	.83
Prince Edward Is.	.96	1.06	1.16	.82
C. Nova Scotia				
Hfx.-Dart.	.76	.98	1.24	.89
Truro, etc.	1.27	1.33	1.33	.87
Sydney	1.27	1.33	1.33	1.03
Cape Breton	1.27	1.33	1.33	.91
Rest of N.S.	1.15	1.54	1.27	.88
New Brunswick				
Fredericton	.75	1.06	1.34	.64
Moncton	1.27	1.06	1.29	.91
Saint John	1.11	1.06	1.23	.78
Rest of N.B.	.86	1.06	1.31	.95
Newfoundland				
St. John's	.84	1.35	.97	.70
Rest of Nfld.	1.05	1.42	1.49	.93
Prince Edward Is. ^b	1.15	1.15	1.12	.82

Note: ^aRatios reported are averages of ratios computed separately for years 1969 through 1972.

^bData for Prince Edward Island's two subprovincial areas are not reported separately due to small sample size.

Table 2

Mean Annual Incomes Reported by Nonmigrants in Atlantic Canada, by Province, Subprovincial Area, and Sex, 1967-72

	Mean Income						Income Ratio: Females Males
	Males			Females			
	\bar{Y}	%	\bar{N}	\bar{Y}	%	\bar{N}	
Nova Scotia	\$5633	(107)	3362	3157	(106)	1641	.56
Hfx.-Dart.	6848	(130)	1137	3531	(118)	676	.52
Truro, etc.	4963	(94)	505	2870	(96)	237	.58
Sydney, etc.	5695	(108)	545	3066	(103)	242	.54
Cape Breton	4497	(85)	144	2889	(97)	54	.64
Rest of N.S.	4772	(90)	1031	2812	(94)	432	.59
New Brunswick	5023	(95)	2608	2967	(99)	1409	.59
Fredericton	5444	(103)	397	3100	(104)	230	.57
Moncton	4653	(88)	285	2791	(99)	148	.60
Saint John	5506	(104)	658	2986	(100)	423	.54
Rest of N.B.	4722	(89)	1268	2945	(99)	607	.62
Newfoundland	5153	(98)	1926	2644	(88)	705	.51
St. John's	6641	(126)	417	3223	(108)	258	.49
Rest of Nfld.	4741	(90)	1509	2308	(77)	447	.49
P.E.I.	4673	(89)	418	2981	(100)	213	.64
Charlottetown	6518	(123)	109	3540	(118)	75	.54
Rest of P.E.I.	4015	(76)	309	2677	(90)	138	.67
Atlantic Region	5280	(100)	8313	2989	(100)	3968	.57

Key: \bar{Y} is annual income;
 % is column percent;
 \bar{N} is average number of annual observations.

Table 3

Population Weights Representing Relative Numbers of Migrants and Nonmigrants in Atlantic Canada, by Sex, 1967-72 Means for: (A) Atlantic Canada Interregional Migration (Atlantic Canada and the Rest of Canada), (B) Atlantic Canada Intraregional Interprovincial Migration, and (C) Atlantic Canada Intraregional Migration (Interprovincial and Intraregional).

I. Males	(1) Population Weights, assuming no current migration				(2) Population Weights, assuming no current or past migration				(3) Post-Migration Population Weights				
	Nonmigrants	Past In-migrants	Future Out-migrants	Current Out-migrants	Nonmigrants	Future Out-migrants	Current Out-migrants	Current Return In-migrants	Nonmigrants	Past In-migrants	Future Out-migrants	Current In-migrants	Current Return In-migrants
A. Atlantic Canada ^a	.8958	.0383 ^b	.0409	.0250	.8840	.0468	.0183	.0068	.8904	.0380 ^c	.0471	.0176	.0069
Nova Scotia	.9013	.0354	.0469	.0164	.9818	.0485	.0169	.0028	.8975	.0352	.0467	.0179	.0027
New Brunswick	.8990	.0352	.0462	.0196	.9275	.0477	.0203	.0046	.8959	.0350	.0460	.0186	.0045
Newfoundland	.8933	.0385	.0464	.0218	.9237	.0480	.0225	.0058	.8925	.0385	.0463	.0171	.0056
P.E.I.	.8856	.0339	.0593	.0212	.9087	.0609	.0217	.0087	.8800	.0337	.0589	.0189	.0084
B. Nova Scotia	.9208	.0145	.0583	.0063	.9339	.0592	.0064	.0006	.9188	.0145	.0582	.0079	.0005
Nova Brunswick	.9183	.0144	.0595	.0077	.9304	.0603	.0078	.0014	.9170	.0144	.0594	.0077	.0014
Newfoundland	.9202	.0096	.0631	.0072	.9277	.0636	.0072	.0014	.9189	.0095	.0630	.0072	.0014
P.E.I.	.9028	.0151	.0605	.0216	.9028	.0605	.0216	.0151	.8932	.0150	.0598	.0171	.0150
C. Nova Scotia													
Hfx.-Dart.	.8753	.0562	.0408	.0277	.9236	.0431	.0292	.0041	.8646	.0555	.0403	.0357	.0038
Truro, etc.	.8907	.0494	.0335	.0265	.9335	.0351	.0277	.0037	.8860	.0491	.0333	.0281	.0035
Sydney	.9053	.0332	.0332	.0282	.9332	.0342	.0291	.0034	.9098	.0334	.0334	.0200	.0033
Cape Breton	.8324	.1329	.0173	.0173	.9474	.0197	.0197	.0132	.7912	.1264	.0165	.0549	.0110
Rest of N.S.	.8888	.0509	.0345	.0259	.9339	.0362	.0272	.0027	.8903	.0509	.0345	.0216	.0026
New Brunswick													
Fredericton	.8556	.0668	.0517	.0259	.9106	.0550	.0275	.0069	.8393	.0655	.0507	.0381	.0063
Moncton	.8863	.0638	.0304	.0395	.9164	.0322	.0418	.0096	.8610	.0634	.0302	.0363	.0091
Saint John	.8727	.0650	.0371	.0252	.9268	.0394	.0268	.0070	.8681	.0646	.0369	.0237	.0066
Rest of N.B.	.9012	.0384	.0412	.0192	.9337	.0427	.0199	.0037	.9018	.0384	.0413	.0149	.0036
Newfoundland													
St. John's	.8357	.0721	.0541	.0381	.8948	.0579	.0408	.0064	.8257	.0713	.0535	.0436	.0059
Rest of Nfld.	.9069	.0325	.0433	.0174	.9338	.0446	.0179	.0037	.9074	.0325	.0433	.0132	.0036
P.E.I. ^d	.8636	.0579	.0558	.0227	.9107	.0588	.0240	.0065	.8583	.0575	.0554	.0226	.0062
II. Females													
	(1) Population Weights, assuming no current migration				(2) Population Weights, assuming no current or past migration				(3) Post-Migration Population Weights				
	Nonmigrants	Past In-migrants	Future Out-migrants	Current Out-migrants	Nonmigrants	Future Out-migrants	Current Out-migrants	Current Return In-migrants	Nonmigrants	Past In-migrants	Future Out-migrants	Current In-migrants	Current Return In-migrants
A. Atlantic Canada ^e	.8875	.0284	.0550	.0291	.8649	.0643	.0177	.0052	.8814	.0282	.0655	.0195	.0053
Nova Scotia	.8875	.0297	.0611	.0216	.9096	.0626	.0222	.0055	.8813	.0295	.0607	.0231	.0054
New Brunswick	.9055	.0225	.0488	.0231	.9239	.0498	.0236	.0026	.9090	.0226	.0490	.0168	.0026
Newfoundland	.8650	.0258	.0761	.0331	.8812	.0775	.0337	.0075	.8725	.0260	.0767	.0173	.0074
P.E.I.	.8912	.0167	.0711	.0200	.8987	.0717	.0211	.0084	.8838	.0166	.0705	.0207	.0083
B. Nova Scotia	.9012	.0148	.0741	.0099	.9137	.0752	.0100	.0011	.8997	.0148	.0740	.0104	.0011
New Brunswick	.9143	.0130	.0655	.0071	.9245	.0663	.0072	.0020	.9096	.0129	.0652	.0103	.0019
Newfoundland	.8758	.0137	.0944	.0161	.8857	.0955	.0163	.0025	.8736	.0136	.0942	.0161	.0025
P.E.I.	.8987	.0084	.0717	.0211	.8987	.0717	.0211	.0084	.8950	.0084	.0714	.0168	.0084
C. Nova Scotia													
Hfx.-Dart.	.8418	.0598	.0648	.0336	.8906	.0685	.0356	.0053	.8356	.0593	.0643	.0358	.0049
Truro, etc.	.8876	.0412	.0300	.0412	.9186	.0310	.0426	.0078	.8843	.0410	.0299	.0373	.0075
Sydney	.9202	.0114	.0304	.0380	.9272	.0307	.0383	.0038	.9167	.0114	.0303	.0379	.0038
Cape Breton	.8852	.0328	.0492	.0328	.9000	.0500	.0333	.0167	.8710	.0323	.0484	.0323	.0161
Rest of N.S.	.8798	.0550	.0346	.0305	.9290	.0366	.0323	.0022	.8745	.0547	.0344	.0344	.0020
New Brunswick													
Fredericton	.8712	.0530	.0379	.0379	.9127	.0397	.0379	.0079	.8614	.0524	.0375	.0412	.0075
Moncton	.8506	.0690	.0517	.0287	.9024	.0549	.0305	.0122	.8132	.0659	.0495	.0604	.0110
Saint John	.9156	.0390	.0238	.0216	.9463	.0246	.0224	.0067	.9019	.0384	.0235	.0299	.0064
Rest of N.B.	.8861	.0307	.0599	.0234	.9100	.0615	.0240	.0045	.8836	.0306	.0597	.0218	.0044
Newfoundland													
St. John's	.8301	.0577	.0545	.0577	.8750	.0574	.0608	.0068	.8248	.0573	.0541	.0573	.0064
Rest of Nfld.	.8531	.0439	.0420	.0611	.8851	.0436	.0634	.0079	.8696	.0447	.0428	.0350	.0078
P.E.I.	.8765	.0329	.0576	.0329	.8987	.0591	.0338	.0084	.8730	.0328	.0574	.0287	.0082

a The weighted pre-migration population (current and past migration) for all males in the Atlantic Canada region does not sum up to 1.0 due to the omission of two migrant categories, i.e., past outmigrants (weight 0.0388) and past return immigrants (weight 0.0053). Data for these omitted categories are not available for provinces and subprovincial areas in Atlantic Canada due to small sample sizes. In Part A of this table the past immigrant category of the post-migration population includes past return immigrants.

b This weight includes past immigrants (0.0329) and past return immigrants (0.0054).

c This weight includes past immigrants (0.0327) and past return immigrants (0.0053).

d P.E.I.'s two subprovincial areas (Charlottetown and Rest of P.E.I.) were combined to get these population weights.

e The weighted pre-migration population (current and past migration) for all females in the Atlantic Canada region does not sum to 1.0 due to the omission of two migrant categories, i.e., past outmigrants (0.0440) and past return immigrants (0.0039). Data for these omitted categories are not available for provinces and subprovincial areas in Atlantic Canada due to small sample sizes.

Table 4

Estimated Regional Income Effects of Migration in Atlantic Canada, by Sex, 1968-62 Means: (A) Atlantic Canada Interregional Migration (Atlantic Canada and Rest of Canada), (B) Atlantic Canada Intraregional Interprovincial Migration, (C) Atlantic Canada Intraregional Migration (Interprovincial and Intraprovincial Migration, and (D) Atlantic Canada Interregional and Intraregional Migration (A + C = D)

Estimated Regional Income Effects (per cent change in income per capita)				
	Males		Females	
	Current Migration Only (1)	Current and Past Migration (2)	Current Migration Only (3)	Current and Past Migration (4)
A. Atlantic Canada	.3950	2.1113	.2368	1.0929
Nova Scotia	.4140	1.4336	.1619	.5996
New Brunswick	.2326	1.1860	.9039	.2699
Newfoundland	.8172	3.0410	.5908	1.8949
Prince Edward Is.	.5010	1.5189	.8280	1.5312
B. Nova Scotia	.2217	.7179	.0343	.2069
New Brunswick	.1026	1.0713	.1648	.5226
Newfoundland	.5453	1.7068	.4957	.6033
Prince Edward Is.	.7942	1.8169	.3735	.6669
C. Nova Scotia ^a	.3913	1.3582	.5132	1.9002
Hfx.-Dart.	-.3622	.3060	-.5039	1.0624
Truro, etc.	.5155	2.2077	1.7780	3.3133
Sydney	.4958	1.5948	1.0259	1.3922
Cape Breton	1.4314	10.3235	1.6822	2.9589
Rest of N.S.	.9863	.6238	.9787	2.5617
New Brunswick ^a	.4290	2.5882	.4418	1.8122
Fredericton	.1753	2.6623	.3772	2.6764
Moncton	1.9048	6.8193	1.8652	4.0787
Saint John	.0612	1.8457	.8382	1.9376
Rest of N.B.	.3459	1.9219	-.1637	.8323
Newfoundland ^a	.3580	2.3598	.9817	2.8013
Saint John's	.4643	3.8272	1.0865	1.3086
Rest of Nfld.	.3279	1.9435	.9519	3.2248
Prince Edward Is. ^b	-.0297	3.4456	1.1629	1.7690
Atlantic Canada ^a	.3763	2.0786	.6161	1.9810
D. Nova Scotia	.8053	2.7918	.7351	2.4998
New Brunswick	.6616	3.7742	.5357	2.0821
Newfoundland	1.1752	5.4008	.7748	4.6962
Prince Edward Is.	.4713	4.9645	1.9909	3.3002
Atlantic Canada	.7713	4.1899	.8529	3.0739

a Provincial and Atlantic Canada income effects of intraregional migration are derived by taking a weighted average of the subprovincial populations as weights.

b Separate estimates for Prince Edward Island's two subprovincial areas are not reported here.

Footnotes

- 1 The methodology is described fully in (Brown and Foster, 1978). Copies of this paper are available from the authors.
- 2 This Atlantic Canada Data Base is described fully in (Brown and Foster, 1978).
- 3 Two earlier studies of migration in Canada which used Canada-wide UIC-DNR data are (Courchene, 1974) and (Grant, 1976); both contain descriptions of the UIC-DNR data base, its strengths and limitations. Other recent empirical studies of migration in Canada based on micro data are (Denton, 1976) and (Vanderkamp, 1973). Recent analysis of regional income effects of migration, not based on micro data, are (Economic Council of Canada, 1977) and (Wrage, 1977). Recent U.S. studies of private returns to migration, based on longitudinal micro data for families, are (Devanzo, 1977), (Mincer, 1978) and (Polachek, 1977).
- 4 Note that category (C) includes category (B).
- 5 Data for this typical year, in the case of past immigrants to or outmigrants from a given geographic area, are derived by averaging annual data from study years two through five; for past return migrants (available only at the Atlantic Canada level of aggregation) data for the typical year are based on averages of annual data from study years three through five. Within the five year study period the number of past immigrants currently resident in (and the number of outmigrants previously resident in) a given geographic area continually rises; conversely, the number of future outmigrants currently resident in a particular area continually falls. The averaging techniques used to generate relative incomes and population weights for past and for future migrants in a "typical year", consequently, yield estimates of the changes in income per capita in a current year which are associated with cumulative in and outmigration over the previous two to three years.
- 6 Estimates are based on weighted averages of the separate estimates for males and for females.
- 7 (Statistics Canada, 1975) Table 21.1 and Statistics Canada population data.
- 8 (Lithwick, 1970), p. 7.

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POVERTY AND INCOME ADEQUACY

by

Jenny Podoluk*

The sixties were the era of government wars on poverty in both the United States and Canada. In his 1964 State of the Union address, President Johnson declared an all-out war on poverty in the United States. The Council of Economic Advisers in the 1964 Economic Report to the President addressed itself to the problem of poverty and attempted to define it and to analyze the characteristics of the poor. [1] In the 1964 Report, the Council arbitrarily designated as poor any family of two or more persons with income for the year of less than \$3,000 and any person living alone (or with nonrelatives only) on an income of less than \$1,500. Subsequently more refined poverty lines were developed which are known as the Orshansky lines, and these remain to the present as the U.S. "poverty" lines, although they have also been called "low income" lines. These will be discussed in more detail further in the paper.

The U.S. war on poverty initiated a decade of federal antipoverty programs and experiments such as food stamp programs, "head start" programs for children from poor families, manpower training programs and guaranteed income experiments. Some of these programs are still in existence while some have disappeared. In the United States in the last several years the emphasis has been on reviewing and evaluating the efficacy of these programs and on the degree of success which has been achieved in alleviating or ameliorating the causes and conditions of poverty. In the course of such a review one social scientist recently took the position that "the day of income poverty as a major public issue would appear to be past." [2] He went on to suggest the increasing inequality of base income or earnings would lead to an increase in proposals for more direct attacks on income inequality.

In Canada, one can date the government's official concern with poverty with the release of the Economic Council's Fifth Annual Review in 1968 which discussed the problem of poverty in Canada. This is not to mean that a previous concern did not exist in respect to particular disadvantaged groups. The Special Committee of the Senate on Aging, for example, which recommended to the government supplementation of the low income of the elderly population, influenced the government of the day to introduce supplementation of the universal old age pension shortly after the report appeared. The release of the Economic Council's report was followed by the setting up of a Special Senate Committee on Poverty, a poverty secretariat in the Privy Council Office, and a major review of the social security system. Although no general overhaul was made of the social security system, new benefits have been introduced or improvements made in areas such as medicare, family allowances, unemployment insurance and old age pensions over the last decade.

The concern with poverty and/or low incomes has manifested itself in other countries such as Great Britain which has set up a permanent royal commission on income and Sweden which set up a Low Income Commission to study poverty problems. In recent years international agencies such as ILO and OECD have joined in the exercise of trying to develop internationally comparable approaches to the delineation and measurement of poverty, an exercise which, it is safe to forecast, is largely doomed to failure. Approaches to defining and measuring poverty have often been judgmental and arbitrary and the likelihood that

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international solutions can be found where national solutions have been difficult is highly improbable.

These comments are only meant to be a very general introduction as to why poverty and income adequacy have been a matter of major concern in respect to income distributions both in Canada and in other countries. The surge of interest in the last 15 years in "poverty" has made poverty a growth industry among welfare workers, social scientists and legislators. In 1976, for example, the U.S. Department of Health, Education and Welfare published a series of technical papers on its measurement. [3] Included among these was an annotated bibliography of nearly 500 pages to accompany a review of the definition and measurement of poverty. Since 1976, even more books and articles have been produced on the subject.

DEFINITION OF MEASUREMENT OF POVERTY

The introductory comments were not intended to suggest that poverty and its related problems were not a concern of governments and social scientists before the sixties. [4] Rather, governmental focuses upon poverty at times of general national affluence gave an impetus to a great deal of research, writing and discussion of poverty, its causes, manifestations and cures. This interest, along with the availability of consistent and regular socio-economic data on the characteristics of the population and on their incomes, meant that researchers could attempt to examine poverty in a more concrete way than was feasible in previous times. However, although official data have been published on the low income population in both Canada and the United States, this has not meant that there has been a consensus about the magnitude and the nature of the poverty problem. Rather, individual perceptions, biases and ideologies have influenced the positions which have been taken as to whether poverty exists and the nature and extent of poverty. Before discussing the various approaches which have been used to measure poverty, it might be useful to discuss the perceptions of what constitutes poverty which have been behind the attempts to define poverty.

Definitions of poverty have been characterized as either socio-cultural or economic. Socio-cultural definitions are exemplified by the definition given by Michael Harrington in his book The Other America, a book which had a considerable impact on American consciousness of poverty. His definition of poverty was:

"Poverty should be defined in terms of those who are denied the minimal levels of health, housing, food, and education that our present stage of scientific knowledge specifies as necessary for life as it is now lived in the United States.

Poverty should be defined psychologically in terms of those whose place in the society is such that they are internal exiles who, almost inevitably, develop attitudes of defeat and pessimism and who are therefore excluded from taking advantage of new opportunities.

Poverty should be defined absolutely in terms of what man and society could be. As long as America is less than its potential, the nation as a whole is impoverished by the fact. As long as there is the other America, we are, all of us, poorer because of it." [5]

A similar view was expressed by the authors of The Real Poverty Report, the researchers who left the staff of the Special Senate Committee on Poverty to produce their own report and who started the introduction to the report with the statement, "To be poor in our society is to suffer the most outrageous kinds of

violence perpetrated by human beings on other human beings." The authors go on to portray the poor as helpless victims of an uncaring society which does not concern itself about the poor and which by its treatment of the poor perpetuates poverty. [6] Proponents of the view that poverty is a socio-cultural or behaviouristic phenomenon have often produced eloquent and moving studies of poverty. However, the characteristics that they have described to identify the poor are characteristics that are difficult or impossible to quantify and measure and thus they have not contributed to any empirical studies of poverty. Proponents of the socio-cultural view have described poverty as a way of life perpetuated by a lack of mobility, economic opportunity and self-respect and persistently passed along from generation to generation. This view of poverty has been described as a culture of poverty. Oscar Lewis, the anthropologist who is well-known for his studies of poverty in developing nations, believes, however, that in a country like the United States, there is relatively little of the culture of poverty. He attributes this to "advanced technology, the high level of literacy, the development of mass media, and the relatively high aspiration level of all sectors of the population." [7] His comments are probably equally applicable to Canada.

ECONOMIC DEFINITIONS OF POVERTY

In many examinations which have been made of poverty in North America as well as elsewhere, economic definitions of poverty have been dominant and have been the basis for most empirical research on poverty. There has been no consensus as to the best approach to use and all methods which have been tried have had disadvantages as well as advantages. Most approaches have arbitrary elements in them and often have embodied subjective as well as objective judgments.

Economic approaches have seen poverty as a lack of access to goods and services resulting in levels of living which are far below the norm of the society. [8] There is now a general agreement that within the context of the present-day levels of living in developed countries, poverty is seen as a level of living which represents deprivation relative to the level of living enjoyed by the majority of the population in the society. Income has been the commonly used criterion to attempt to delineate such poverty, but as one expert has stated: "The possession by individuals and families of relatively low resources does not automatically mean that they are in poverty but only if they are thereby unable to have the types of diets, participate in the activities and have the living conditions and amenities which are customary in the society." [9] Poverty thus is seen as an inability to satisfy basic needs but also as a lack of access to goods, services and activities which enhance daily living and which provide variety to life.

Early attempts to measure poverty and even some current attempts to define and measure poverty have not used the norm of the level of living within a society as a standard to measure what might constitute poverty and what might constitute an unacceptable level of deprivation among segments of the population. Poverty was seen as a state of extreme deprivation which made the capacity to survive and to maintain some degree of physical efficiency difficult. Such poverty was associated with urbanization and industrialization and was a type of poverty associated with extremely low levels of earnings among urban workers. Poverty was considered to consist of social problems correlated with low income.

Efforts to measure and analyze poverty and its characteristics began at the end of the last century with studies in Great Britain. Over time, many attempts to develop data have been made but, surprisingly, all studies have used variants of a limited

number of approaches and all approaches are subject to considerable criticism. Nearly all attempts to categorize poverty have involved definitions which have been formulated in either absolute terms or in relative terms.

Under the economic view of poverty, in which poverty was characterized as an inadequate command over resources relative to needs, poverty was usually defined in terms of income levels. Resource inadequacy has been viewed as a reasonable proxy for the full set of poverty attributes. A commonly used approach has been to define components of "needs" in some quantitative way, estimate the cost of meeting these needs and then define as poor that part of the population which had incomes which were insufficient to acquire the specified necessities. In early studies, needs were usually defined as the basic necessities of food, shelter and clothing with little or no allowance for other aspects of living. Needs were also usually defined in a very minimal fashion so that incomes at the level specified denoted a very subsistence existence. [10]

This method of delineating poverty has been categorized as an absolute approach to its measurement. That is, some income level or set of income levels are considered to be poverty levels and the poor are defined as those in the population whose incomes fall below these levels and who thus do not appear to have the resources to obtain those levels of consumption. In attempting to measure poverty by this approach, that is, by defining needs in some fashion, account may or may not be taken of prevailing levels of living in the society as to what should be considered needs or essential components of living. As real incomes have risen over time, even subsistence needs have come to be viewed more generously and subsistence budgets have been set in more ample terms than was the case in earlier decades. Critics of the subsistence budget approach to defining poverty have argued that account should be taken of prevailing levels of living in defining needs. However, there is no general agreement on what constitutes a need. The most progress has been made in establishing some sort of standards for food requirements by sex and age groups but even these standards have proved to be controversial because caloric requirements differ by degree of activity. Concepts of needs do not remain static and it has been suggested that the luxuries of yesterday become the comforts of today and the necessities of tomorrow. A variant of the absolute or budget approach is currently used in the United States and Canada to calculate low income lines, although Canadian low income lines do incorporate some aspects of relativity.

The alternative or relative approaches to defining poverty have been to define as poor those whose incomes place them at some distance from the income levels prevailing in the society. Proponents of this view argue that any segment of the population which has substantially less access to the goods and services a society can provide than is the societal norm, should be considered poor. They argue that fixed standards become obsolete over time and that poverty should be defined relative to the current income structure. Commonly proposed poverty levels are levels of income below half the median income or the bottom quintile of the income distribution. [11] In Canada and the United States, the two are reasonably coincident.

POVERTY LINES IN THE U.S., CANADA AND GREAT BRITAIN

In the United States the original poverty line set by the Council of Economic Advisers was a family income of less than \$3,000. Subsequently, the Social Security Administration developed a more elaborate series of low income lines which showed a sliding scale of income requirements which took into account farm and nonfarm residence as well as family size and the age composition of the family, in total some 124 different low income lines. These lines were adopted by the Office of Economic

Opportunity as the official U.S. poverty lines. Subsequently the term "low income" lines was adopted, although now they are again called "poverty lines." Only minor changes have been made to these lines since they were adopted, such as changes in the method of adjusting for price increases and changing somewhat the relationship of the poverty lines for farm families relative to nonfarm families. [12]

The U.S. poverty lines are an example of an absolute minimum, and its retention over a decade and a half has shown that "poverty" in the United States appears to be halved. The U.S. poverty line was developed using relationships observed in the data collected in a 1955 food expenditures survey. This showed that, on average, families spent one-third of their total income on food. The Department of Agriculture developed a series of food plans for families of different compositions. The lowest cost food plan was called an Economy Food Plan: it was described as suitable for temporary or emergency use when funds were low. These plans were priced and costed. It was acknowledged that a housewife spending no more than the cost of the plan had about an even chance of providing her family with a diet that was fair or better than that specified in the Economy Plan. U.S. poverty lines came to be set at incomes of three times the annual cost of the Economy Food Plan for families of different compositions. The rationale for three times the food budget as an annual poverty line was that families who spent on food only the amount implied by the Economy budget would have the same share of income available for nonfood expenditures as the average family in 1955. [13]

The U.S. lines have been criticized as too low and inadequate for a country as affluent as the United States. Although plans were announced for revising and updating the lines and although other lines have been tested, in fact, the original lines have not been revised. One suspects that the decision not to revise has been influenced by the view that incomes no longer adequately reflect the real situation of the poor because many of the government programs of the recent decade, such as the introduction of medicare and the food stamps program, provide important in-kind supplementation to the low income groups and, if these are taken into consideration, the amelioration of the levels of living of the poor has been greater than the statistics suggest. In any case, it appears, at present, as if the poor will at least be statistically if not really eradicated in the United States as the poverty rate has more than halved since 1963. As might be expected, the U.S. "poor" are shown to an increasing extent to be the aged, the disabled, and single-parent families headed by women.

Great Britain has no official poverty or low income lines but a recent study used income data from the national household expenditures to examine historic trends. [14] The maximum social assistance levels were used as the poverty lines which were applied to the income data. Not unexpectedly, using such conservative standards, the researchers concluded that the poverty problems in Great Britain were concentrated among special groups -- the elderly and the families headed by women -- and that poverty was not a problem among the working population.

In Canada, as part of some ongoing research at the then Dominion Bureau of Statistics, low income lines were developed to delineate the population which might be in poverty. These lines were adopted and used by the Economic Council as poverty lines. [15] Low income or poor families were defined as those families whose incomes fell into those income groups in which, on average, most of the income received had to be spent on food, clothing and shelter. These lines were developed after an examination of family expenditures data collected for 1959 -- from a sample of approximately 2,000 spending units living in urban cities of 15,000 or more in population -- showed that, on

average, families of different sizes allocated about half of their income to these components of expenditure. It was assumed that where expenditures on these components were well above average, that is, where they accounted for 70 per cent or more of family income available, such families might be in straightened circumstances. They would have little "discretionary income" left after expenditures on basic essentials or income for the education of children, recreation or savings. The expenditures data suggested that a single person with an income below \$1,500, a family of two with less than \$2,500, and families of three, four, five or more with incomes of less than \$3,000, \$3,500 or \$4,000, respectively, had such expenditure patterns. These limits were expressed in 1961 dollars and were used for all families, rural as well as urban.

Although these levels were more generous than the U.S. lines for family units of five or less, criticisms were levelled at the lines for being too low for poverty lines, especially for larger families. The Senate Committee on Poverty produced a higher set of poverty lines using their own methodology. [16] The Canadian Council on Social Development also produced their own version of poverty lines, again set at higher levels than the ones developed at DBS.

During the sixties the lines remained unchanged except for an annual adjustment to take account of changes in the Consumer Price Index. In 1969-70, a national survey of family expenditures was carried out, the first national survey in some 20 years. This provided more current data on expenditures representative of all family units, and not simply those living in larger urban areas as was the case in 1959. Over the decade, incomes had risen substantially both in real terms as well as current dollars. The 1969 data showed that the effect of this was to reduce, on average, the proportion of income spent on food, shelter and clothing. The data showed that the percentage of income spent on these essentials dropped from an average of 50 per cent to 42 per cent. The decision was made to set the low income lines at the point where 62 per cent or more of income was spent on these necessities, thus maintaining the 20 per cent differential of the earlier lines, an admittedly arbitrary decision. However, the new lines were a means of taking some account of improvements in levels of living over the decade. Further, lines were developed for an expanded number of family sizes (seven or more persons) by size and place of residence (five categories) for a total of 35 lines. [17] Higher lines were set for larger centres than for rural areas, with the low income lines for cities 500,000 or more some 38 per cent higher than those for rural areas. With some exceptions these revisions raised the new "poverty" lines relative to the old lines. The exceptions were that the introduction of size of place of residence, as a variable in setting low income lines, lowered some lines for families resident in rural areas. Statistics were published on both bases for several years but the old lines were eventually dropped and the statistics currently published use the lines developed from 1969 data. National family expenditure data were collected for the year 1978 in early 1979, although on a smaller scale than the last national survey. This will provide new data which will allow for a review of the current validity of the low income lines now in use. A decision to be faced is whether to continue with the existing lines and to let "poverty" statistics atrophy as is occurring in the U.S. or to revise them in the light of new data.

In summary, different approaches can be taken to define and measure poverty. In reviewing various approaches to the problem, an ILO study reached the following conclusion:

"It will be seen that there is no question of defining poverty (or its positive counterpart, a minimum standard of living or a condition in which minimum needs are

satisfied) in a way that is right or wrong. All we need is a definition that is useful. For various purposes distinguished above, a serviceable definition might be formulated either in absolute or in relative terms or in a combination of both. We could say that a family was in poverty if it had an income of less than x per head (with appropriate allowance for differences in age and sex composition) or if it had less than y per cent of the average income of families of the same composition. If we defined poverty differently, more or fewer families would be said to be in poverty, but we could still carry out the operations of diagnosis, target-setting, selection of policy instruments and review of progress towards objectives. These are important tasks which cannot be performed or cannot be performed with the degree of precision that is desirable, without a serviceable definition of poverty and attempts to measure its extent." [18]

This statement sums up the view of many researchers who have grappled with the problem of identifying and describing poverty lines.

INCOME AND ADEQUACY

The current Canadian low income lines have now been in use for seven years. Except for the last several years, incomes have risen more quickly than the Consumer Price Index so that, as might be expected, the proportion of families falling below the low income lines has declined, although this has not been as true for unattached individuals.

It should perhaps be noted that although the incidence of poverty has declined since 1969, this decline has not been accompanied by any significant changes in the relative distribution of income. In 1969, for example, the lowest 20 per cent of families when ranked by size of income received only 6.2 per cent of family income while the highest 20 per cent received 39.7 per cent. In 1976 the same percentages were 5.9 per cent and 39.9 per cent respectively. Thus any improvements which have occurred in relative levels of living among the low income groups reflect the fact that they have generally shared in the overall improvements in real income rather than that their share of the total income available has increased. The comparative figures on the incidence of poverty for 1969 and 1977, the most recent years available, are shown below:

	<u>Incidence of Low Income</u>	
	<u>1969</u>	<u>1977</u>
	Per cent	
Families	21.1	11.9
Unattached individuals	42.8	37.9
Proportion of population	20.6	13.9

Source: Surveys of Consumer Finances.

As might be expected, the ranks of low income families have high proportions of families headed by women (36 per cent of all low income families), of families headed by the young and the old (nearly one-third), and of families with heads not in the labour force (over one-half).

If one accepts the premise that poverty is a condition of possible deprivation relative to prevailing levels of living or a state of inadequacy of resources to share equitably in accessing the goods and services that a society provides, then the question arises as to the kind of level of living which families with incomes below the poverty line do achieve in Canada. In recent years data from the Family Expenditures Survey and from the Household Facilities and Equipment Survey have allowed some

comparisons to be made of expenditure patterns, housing facilities and ownership of durable goods among low income families as compared with other families.

The data over time show that family units with incomes below the low income line, to a considerable extent, have attained levels of living which in many respects are similar to those of family units whose incomes fell above the line. Further, over time, incomes appear to have been sufficient to allow for the acquisition of facilities and equipment which improve levels of living. Almost all low income families in 1976 occupied dwellings with running water, bath facilities and flush toilets, and equipped with refrigerators, electric or gas stoves, radios, telephones and television sets. Although the housing units occupied by low income families were somewhat older than those occupied by other families, over 60 per cent were housed in dwelling units built since 1940 with some 37 per cent living in dwellings built in 1960 or later. The majority of these dwellings had furnaces. [19]

Although dwelling units occupied by low income families were smaller than those occupied by other families, family size was also smaller, so that the differences in the persons per room ratio were not significantly greater. The majority of low income families owned their own homes, although ownership was less prevalent than among other families (52 per cent in contrast to 73 per cent). Amenities enjoyed by the majority of families in the higher income levels but not by the majority of low income families were freezers and clothes dryers. Low income families were less likely to own automobiles although nearly 60 per cent owned one or more in contrast to a 90 per cent ownership among other families. Record playing equipment was also not as prevalent among low income families, although two-thirds owned such equipment.

Information is not available on the quality or age of these possessions, but the above itemization gives some indication of what must be considered now to be the Canadian standard of living. It seems obvious that, despite an apparently unchanging income distribution when examined in terms of income inequality, improvements in the real incomes of segments of the population have allowed for the majority of families to improve their levels of living.

Although national data are not available on family expenditure patterns of low income groups as compared to other groups, some data are available for urban families. The data show that, where food is concerned, per capita spending on food to eat at home varies very little across income deciles and that food purchased shows similar degrees of variety at different income levels. The major difference between low income and higher income families is in expenditures on meals away from home as these do rise with income. Although on a per capita basis there is little variation among deciles, such spending accounted for a much higher percentage of total expenditures for the low income families. In 1974 these families spent 31 per cent of total family income on food. Other families only spent 17 per cent. Other categories of expenditure where low income families likely spend less than other families are clothing, recreation expenditures and transportation. Since low income families contain an overrepresentation of the elderly and single parent families headed by women, these may also be factors in these differences in spending patterns. [20]

Few Canadian families live in accommodation in which they double up with other families. The number of families sharing accommodation has declined steadily in the post-war period so that sharing is now relatively rare and in most cases involves sharing with other relatives. On the other hand, a substantial proportion of the population who are unattached individuals share

accommodation with other persons to whom they are not related. In total, over 2 million of the population are not members of families and a very high proportion of these fall into the low income category. In 1977, some 38 per cent were below the low income lines. In contrast to families, a substantial percentage (40 per cent) of all unattached individuals do not maintain their own homes but double up with other people. Although the percentage with low incomes is high in all age groups the probability of having a low income is greatest in the oldest age group.

Some data are available on the levels of living of unattached individuals in low income groups who maintain their own homes, but nothing is known about the very substantial proportion who share accommodation with others. The majority of those who maintain their own residences are 45 years of age or older; in fact, nearly 40 per cent are 65 or over. This suggests that unattached individuals who attempt to maintain a house or apartment in which they live by themselves tend to be an older population likely to be widowed, divorced or separated. Unattached individuals in low income groups are, in the majority of cases, renters of accommodation, although 40 per cent of the older age groups do own the accommodation in which they live. The data suggest that, unlike low income families, this segment of the population is much less likely to have access to the goods which are the norms in the levels of living of families. A majority do not own washing machines or automobiles, although almost all have refrigerators. Although almost all own radios, some 12 per cent in 1976 did not own television sets while two-thirds did not own record players. In 1976 some 35 per cent of unattached individuals who maintained their own dwellings had incomes below the low income line. This suggests that a very substantial proportion of such individuals may have incomes barely adequate to maintain their own residence.

AGE AND POVERTY

In discussions of poverty in western industrialized countries, the aged population is usually identified as a very important element in the problem. With the very substantial declines in the birthrate in the past decade and with a curtailment in immigration, the Canadian population will be a progressively aging one. However, it should be noted that even by the end of the century the proportion of the Canadian population aged 65 and over will still be considerably lower than the proportion aged 65 and over at the present time in countries such as Austria, Sweden and Great Britain.

In the last 25 years a series of government transfer programs have been implemented to improve the economic status of the elderly. In 1952, payment began of flat rate benefits to the population aged 70 and over so that, for the first time, this population was guaranteed a minimum income. Beginning in 1966, the age at which these benefits were paid was progressively lowered so that by 1970 nearly the total population aged 65 and over was in receipt of the universal old age pension. [21] In 1967 the government began to supplement the basic income of those elderly with no income other than the old age pension or whose nonpension income fell below a certain limit. A third tier was added to the social security system with the introduction of the Canada and Quebec Pension Plans in 1966. Payments of pensions from these plans commenced in 1967, with the phasing in of such pensions completed in 1976.

One might expect that these improvements in the social security system would have a substantial impact on the extent of poverty among the elderly. The data confirm that there has been considerable improvement, but the data also suggest that the elderly will constitute a growing portion of the low income

population. The first statistics on the low income population were published for 1961 and involved an analysis of 1961 Census income data which was restricted to the nonfarm population. In 1961, under the previous low income criteria, 44 per cent of families with heads aged 65 and over fell below the low income lines while 70 per cent of persons not in families fell below the low income lines. If data had been available on the rural population as well, these percentages would have been higher. Families with aged heads constituted 23 per cent of all low income families and 44 per cent of all low income unattached individuals.

In 1977, under the revised low income lines, the incidence of low income among families with older heads had dropped to 20 per cent but the proportion of unattached individuals who were below the new lines was still 60 per cent. Although the aged constituted a somewhat lower proportion of low income families and individuals in 1976 than in 1971 (20 per cent of families and 41 per cent of unattached individuals), the probabilities would appear to be that they will constitute a growing proportion of the low income population, especially of the low income individuals who are not members of families.

There is a wide range of factors which are likely to perpetuate the problem of poverty among the elderly. As has already been mentioned, the elderly constitute a growing proportion of the population. In 1901, only 5 per cent of the population was 65 and over. By 1976 this ratio had increased to 8.7 per cent and it is expected to increase to 11 to 12 per cent by the end of the century. Not only are the aged a growing proportion of the population, their life expectancy has been increasing and their composition has been changing. Until the mid-fifties, older males outnumbered females, while women now constitute an increasing majority of the older population. By the end of the century, women are expected to constitute some 60 per cent of the population aged 65 and over and will constitute an even larger percentage of the population aged 75 and over because of their greater life expectancy.

Because of the changing composition, a growing proportion of the elderly will no longer be members of a family group.

Table 2 indicates what the 1971 and 1976 Censuses showed about the family attachments of the elderly. Table 3 indicates the household status of the elderly.

As Table 3 shows, there has been little change in the family status of the elderly male population over the recent decade. The majority are married or live with other relatives. Less than one-half of elderly women are living with a husband or unmarried children and the proportion is dropping. The proportion living with other relatives, such as married children, is also on the decrease while the proportions living alone in their own home or in institutions is on the increase. In 1966, approximately one-quarter of elderly women lived alone or were institutionalized. By 1976, this ratio had increased to one-third.

INCOME DISTRIBUTION OF THE ELDERLY

The elderly, to an increasing extent, are dependent upon incomes which originate elsewhere than from employment. Labour force participation rates among the elderly have been dropping steadily so that currently only one-quarter of males aged 65 to 69 still work while this ratio drops to less than 10 per cent of males aged 70 and over. Less than 10 per cent of females aged 65 to 69 work while the ratio for those over 70 is only 2 per cent. The elderly then are a population primarily dependent upon private and public pension income, government transfer payments, investment income, or assistance from relatives. In 1976, income from pensions associated with previous employment, exclusive of

the Canada Pension Plan and the Quebec Pension Plan, accounted for only 16.5 per cent of total income reported by older male tax filers in 1977. Such pension income played an even less significant role in income among older women filers accounting for only 10.9 per cent of their incomes. Table 4 shows the income sources of elderly tax filers in 1975.

Only two-thirds of the older population file a tax return but these would represent the older population in the middle and higher income brackets rather than the low income population. Thus it is likely the income from pensions, other than pensions paid under social security programs, is likely to be even of less significance for the population not filing tax returns. Although a substantial proportion of the working population is covered by pension plans, there are many reasons why employment-related pensions are not a significant component of the incomes of the elderly. In many industries pensions are not portable so that workers changing jobs cannot transfer pension credits; thus pension rights are not built up for the whole career. Given the degree of job mobility in the Canadian labour force, it is thus difficult for workers who change jobs to build up pension credits over their working lives. Further, although provincial legislation in some provinces now has some provision for vesting of pension rights, the vesting provisions are conservative ones and are only operated for a specified minimum years of service and sometimes a minimum age. In addition, a substantial portion of the labour force is still not covered by employer pension plans, especially workers employed by small employers.

Approximately three-quarters of workers currently covered by pension plans are members of contributory plans. That is, they share contributions with their employers. In 1976, taxation data show that, of the 10 million tax filers reporting employment income (wages and salaries and some type of commission income), 3.1 million contributed to pension plans. After making allowances for workers who are in noncontributory plans, this means that less than half of employees were covered by pension plans. Table 5 shows the proportion of employees contributing to pension plans, by employment income level.

The proportion of workers covered by plans is some one-third higher than the above ratio in Table 5 (30.8 per cent) shows. It is probable that the noncontributing workers covered by plans are more likely to be in the better paying occupations. Nearly two-thirds of workers in noncontributing plans are members of plans with 2,000 or more employees. It is obvious from taxation statistics that lower-earning employees have limited pension coverage; still, even in higher brackets it would appear substantial gaps exist.

Aside from employment income and pension income, other sources of income available to the aged are investment income from assets, Old Age Security (including the Guaranteed Income Supplement) and pensions from the Quebec and Canada Pension Plans. It was forecast that, when the latter plans matured, the older population would become less dependent upon Old Age Security and the Guaranteed Income Supplement. In fact, in 1967, when supplementation started, 41 per cent of the elderly receiving Old Age Security required full or partial supplementation of the pension because of low private income, with 27 per cent having no outside income whatsoever. By 1977, some 55 per cent of elderly pensioners needed partial or full supplementation, although the percentage with no other income dropped to 21 per cent. This is probably attributable to the fact that women constitute a growing proportion of elderly pensioners. Again taxation data show that less than half of the older population filing tax receives income from private pensions. While over 40 per cent of male tax filers reported such pension income, on average the size of pensions received was relatively modest in the majority of cases. Income from private

pensions was rarer among women, with only one-third of women reporting such income. The pensions were also lower on average than those of males. Among tax filers of both sexes, relatively more received the CPP or the QPP than received private pensions, but in 1975 these pensions were not yet an important component of tax filers' income. The taxation data show that to a very considerable extent higher incomes among tax filers are due to a continuation of employment, especially among males, and the receipt of incomes from investments, with government transfer payments next in importance. Pension income related to previous employment is of greater importance to males than to females, but for both sexes it does not account for a substantial proportion of income receipts. In examining the data by age groups it does not appear that those who may have retired recently (aged 65-69) are benefiting more from employee pensions than are older retirees. Unpublished data for males show that 44 per cent of male tax filers aged 65 to 69 reported pension income for an average pension of \$3,200. The ratio of pension recipients in the older age groups was similar although average pension receipts were lower. Among female tax filers only 31 per cent of those aged 65 to 69 report employment pensions with this ratio dropping to 20 per cent in the oldest age group. Thus employment-related pensions still do not play a major role in providing income maintenance to the elderly.

FAMILY INCOMES OF THE ELDERLY

Taxation data have been discussed in the previous sections because they provide the only sources of data on pension coverage of the labour force by earnings characteristics as well as the most detailed data on the income composition of the older population in the higher income bracket. However, only 64 per cent of the aged population filed tax returns in 1975. Further, under the Canadian tax system, tax returns are filed on an individual and not on a family basis. Thus the tax return data are not satisfactory indicators of the total income available to an elderly person. The Surveys of Consumer Finances provide more comprehensive data on the older population, although the surveys are restricted to the civilian noninstitutional population. Table 6 presents data on the income distribution of families with heads 65 and over and of unattached individuals 65 and over while Table 7 presents data on the composition of the income.

The data suggest that where a family is still intact the income position of the elderly is relatively better than for the elderly who are no longer part of a family unit. These families are less dependent upon transfer payments and pensions. Nearly 40 per cent of family income still originates in earnings, either of the head or of other family members who may be adult children. About 30 per cent is accounted for by various government pensions with another 10 per cent originating in other pension income. The remainder is primarily investment income. Unattached individuals, on the other hand, have much less access to earned income, which only accounted for 10 per cent of all income received. Nearly one-half of all income reported was received in the form of government pensions while other pensions accounted for a further 12 per cent. Investment income accounted for the balance. A disaggregation of the data for unattached individuals by sex shows that women in these age groups have lower incomes than do males, although for both sexes incomes decline for the very older age groups relative to those in the 65-75 age group.

In summary, where the elderly are still part of a family group, improvements in the social security structure over the past decade as well as the ability of some family members to be labour force participants appear to allow these families to maintain what is possibly an adequate income. Such families may also own their own homes outright. Data from the 1977 Survey of Consumer Finances show that 90 per cent of elderly home-owning family units have no mortgage indebtedness on their homes, and

where mortgage debt exists the data show that incomes are above average for that group.

The major problems with income adequacy are found among the elderly who are alone. The majority have very low incomes and the older the age group, the lower the income -- with the incomes of women lower than the incomes of males. The great majority of this group are overwhelmingly dependent upon government pensions for their income. As Table 2 showed previously, in 1976 one-third of the older population did not live with another family member or other relatives. This percentage has increased since 1971 primarily among women. Thus there is a growing older population whose financial resources are low and who have no relatives with whom they can share their old age. Many maintain their own home with difficulty, with some 20 per cent of this population living entirely alone with no one else present in the household. A substantial proportion must share with others, while others become residents of nursing homes, hospitals and homes for the aged, often because no means can be found of helping them maintain their own homes. Often hospital beds at active treatment hospitals are tied up with elderly patients for whom alternative care is not available. In 1973, for example, the elderly accounted for 37 per cent of all hospital care days used.

As Table 6 shows, the income position of elderly females who are unattached individuals is especially low with a median income of only \$3,395, although the median income of males was not much higher at \$3,759. The census data show that in 1976 there were nearly 200,000 elderly males and 500,000 females who had no family attachments. As Table 7 indicates, these women were primarily dependent upon government transfer payments and such pensions were also the most important income component for males as well. Families, on the other hand, are much more likely to contain members who are in the labour force and so are not as dependent upon government transfers as are the elderly survivors who are left alone. Given the projected growth in the older population, one can forecast that the elderly will remain a conspicuous part of Canadian poverty problems.

FEMALE-HEADED FAMILIES

Another low income group whose relative position has not improved are female-headed families. As in other countries, Canadian data show that despite the overall improvements in the income distribution, the proportion of female-headed families who fall below the low income lines has changed little over time. In 1961 some 42.6 per cent of families headed by women fell below the low income lines, while in 1976 the ratio was almost identical, 42.8 per cent. The majority of such families below the low income line consist of women with dependent children and the number of such families has been growing over time because of factors such as rising divorce rates. Not only do a substantial proportion of these families persistently fall below the low income lines but the absolute numbers are growing at a significant rate. Between 1971 and 1976, for example, the number of families headed by women under 55 increased by 29 per cent. These are the families still likely to contain young children.

Table 8 shows the income distribution of single-parent families headed by women and the income distribution of all families in 1975. It is estimated that in 1975 there were 412,000 census families which consist of a female parent and unmarried children in Canada. Of these, 372,000 lived as independent family units while the remainder lived with other relatives. As Table 8 shows families headed by females had an average income which was only 52 per cent of the overall average family income. An examination of trends over time shows that their circumstances have been deteriorating. In 1967 the average income of female-headed families was 64 per cent of the overall average.

Almost all of the single-parent families below the low income lines are headed by women. Table 9 shows the distribution of all low income single-parent families by number of children under 16. As the data show, the majority of such families contain children under 16. Table 10 shows the work experience of single-parent family heads in 1975. It is obvious from the two tables that the majority of such families are dependent upon government transfer payments and that these family heads are largely outside the labour force or, if working, working for very low incomes. It is estimated that there were 316,000 children under 16 in these 180,000 families. [22]

The composition of income received by low income single-parent families has also changed over time. On the average, government transfer payments as a ratio of total income are increasing significantly for low income single-parent families. In 1967, approximately half of all their income was from transfer payments while by 1975 it was some three-quarters.

CONCLUSION

In Canada, the majority of families who fall below the low income or poverty line appear to still have incomes which allow for the consumption of more than simply the very basic necessities of life. The levels of living reported by these families suggest that the growth in real income in the post-war period improved levels of living among the lower income brackets so that they too participated in the growing Canadian affluence. However, the data also show that two groups in the population present persistent problems for the alleviation of poverty; the elderly who no longer have a family attachment, and low income families headed by women. Both these groups are growing in numbers and both groups are not in a position to improve their economic position to a great extent -- unaided by society. Future generations of the elderly can perhaps be aided by improvements in pension planning in both the private and public sector but such solutions may be very long term. Further, as the population ages more assistance will probably be needed in the form of services. For example, other countries such as Sweden are providing medical and home maintenance care which will allow the elderly to remain in their own homes rather than to move into institutions such as homes for the elderly. In the case of single-parent families, further assistance might take the form of retraining to allow reentrance into the labour force; additional assistance might also come in other forms, such as the subsidization of child care. These two categories of the population account for over one million of the "poor." As in other countries they seem to constitute the hard core of the poverty problem, despite the improvements in our social security programs in recent years.

Table 1

Incidence of Low Income Among Families and Unattached Individuals
by Age, 1977

Age of Head	Families	Unattached Individuals
24 and under	17.1	36.8
25-34	11.4	14.8
35-44	10.1	22.6
45-54	9.1	32.2
55-64	10.2	45.3
65-69	16.3	50.3
70 and over	22.3	63.2

Source: Income Distributions by Size in Canada, Preliminary Estimates,
1977.

Table 2

Family Membership of the Population Aged 65 and Over, Canada, 1971 and 1976

	1971			1976		
	Males	Females	Total	Males	Females	Total
Family member ¹	69.1	42.2	54.3	71.2	42.0	54.7
Lived with other relative ²	8.5	19.0	14.3	6.6	15.0	11.4
Other ³	22.4	38.7	31.4	22.2	43.0	33.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

1 Aged persons who were members of a family consisting of a husband, wife and possibly never-married children or a father or mother and never married children.

2 Aged persons who lived with married children or other relatives.

3 Aged persons living alone, or with nonrelatives or in institutions.

Source: Census of Canada, 1971, calculated from Report No. 93-772, 1976 calculated from Report No. 93-835 and unpublished data on the institutional population. Census data on the household status of the elderly are shown in Table 3.

Table 3

Household Status of the Population Aged 65 and Over, Selected Years, Canada, 1966, 1971 and 1976

	Males	Females	Total
	per cent		
1966			
In families			
Head	67.6	9.0	36.2
Wife		36.2	19.4
Not in families			
Household head	14.8	27.2	21.5
Relative	6.8	15.6	11.5
Lodgers, employees, partners	6.6	6.4	6.5
Inmates of institutions	4.2	5.5	4.9
Total	100.0	100.0	100.0
Number ('000)	708	813	1,521
1971			
In families			
Head	69.0	6.6	34.8
Wife		35.5	19.6
Not in families			
Household head	15.2	31.2	24.0
Relative	6.2	15.0	11.0
Lodgers, employees, partners	6.1	6.8	6.4
Inmates of institutions	3.5	5.0	4.3
Total	100.0	100.0	100.0
Number ('000)	772	950	1,722
1976			
In families			
Head	70.0	6.7	33.9
Husband or wife	1.1	34.3	20.0
Not in families			
Household head	15.0	33.8	25.7
Relative	4.8	11.1	8.4
Lodgers, employees, partners	3.6	5.7	4.8
Inmates of institutions	5.4	8.6	7.2
Total	100.0	100.0	100.0
Number ('000)	867	1,143	2,009

Source: Census of Canada 1966, Table 93; 1971, Report No. 93-712; and 1976, Report No. 93-810 and unpublished data on the institutional population in 1976.

Table 4

Income Sources of Tax Filers Aged 65 and Over, 1975

	65-69	70-74	Age 75-80	81 and over	Total
	per cent				
Males					
Income from employment	39.2	21.4	13.3	8.2	28.8
Investment income	21.6	31.5	41.8	49.6	28.8
Government pensions and transfer payments	22.8	27.6	25.6	25.8	24.7
Employer pensions	15.0	18.7	18.6	15.7	16.5
Miscellaneous income	1.2	0.8	0.7	0.5	1.0
Total	100.0	100.0	100.0	100.0	100.0
Females					
Income from employment	19.1	6.7	3.5	2.1	10.1
Investment income	37.0	46.3	52.4	57.3	45.7
Government pensions and transfer payments	30.3	34.7	33.5	33.1	32.5
Employer pensions	12.4	11.9	10.0	7.1	10.9
Miscellaneous income	1.2	0.5	0.5	0.3	0.7
Total	100.0	100.0	100.0	100.0	100.0

Source: Taxation Statistics. Calculated from a special tabulation.

Table 5

Pension Plan Contributors by Employment Income Level, Canada, 1976

Employment Income Level	Per Cent of Employees	Per Cent Contributing
Under \$5,500	26.6	5.1
\$ 5,500 - \$ 7,499	11.7	14.7
7,500 - 8,499	5.8	24.2
8,500 - 10,999	13.5	34.2
11,000 - 13,999	14.0	45.3
14,000 - 49,999	27.9	54.5
50,000 - 99,999	0.5	34.8
100,000 and over	0.1	24.8
Total	100.0	30.8

Source: Taxation Statistics, 1978.

Table 6

Income Distribution of Unattached Individuals Aged 65 and Over and of Families With Head Aged 65 and Over, 1976

Income Group	Unattached Individuals			Families
	Male	Female	Total	
	per cent			
Under \$3,000	26.3	40.4	36.4	1.7
\$ 3,000 - \$ 4,999	43.6	35.6	37.8	13.3
5,000 - 6,999	9.3	11.2	10.6	25.7
7,000 - 8,999	4.2	4.5	4.4	14.2
9,000 - 10,999	()	9.1
	(7.4	6.6	6.8)
11,000 - 14,999	()	12.0
15,000 and over	9.4	1.8	4.0	23.9
Total	100.0	100.0	100.0	100.0
Average income	\$ 6,672	4,332	5,009	11,848
Median income	\$ 3,759	3,395	3,521	8,272

Source: Income Distributions by Size in Canada, 1976, Statistics Canada (Catalogue No. 13-207).

Table 7

Percentage Composition of the Incomes of Elderly Family Units, 1976

Income Group	Unattached Individuals			Families
	Male	Female	Total	
	per cent			
Employment income	13.5	7.6	9.9	39.0
Investment income	31.8	24.3	27.2	16.4
Old Age Security	30.5	45.1	39.4	25.3
Canada/Quebec Pensions	5.6	5.0	5.2	4.8
Retirement pensions	13.1	11.5	12.2	10.0
Other govt. transfers	2.8	4.9	4.0	3.6
Other money income	2.6	1.6	2.0	0.9
Total	100.0	100.0	100.0	100.0

Source: Unpublished data, Survey of Consumer Finances, 1977.

Table 8

Percentage Distribution of Single-parent Families with Female Heads and All Families by Income Size Groups, 1975
(Economic Family Definition)

Income Size Group	Female	All
	Head	Families
	per cent	
Under \$2,000	6.5	1.6
\$ 2,000 - \$ 2,999	4.9	1.2
3,000 - 3,999	9.7	2.4
4,000 - 4,999	11.9	3.2
5,000 - 5,999	10.0	4.0
6,000 - 6,999	7.6	3.7
7,000 - 7,999	6.7	3.3
8,000 - 8,999	5.3	3.6
9,000 - 9,999	5.6	3.5
10,000 - 10,999	5.1	4.2
11,000 - 11,999	4.5	4.7
12,000 - 12,999	3.0	4.9
13,000 - 13,999	3.4	4.8
14,000 - 14,999	3.5	4.9
15,000 - 16,999	3.2	9.3
17,000 - 19,999	4.0	11.8
20,000 - 24,999	3.1	14.1
25,000 and over	2.0	15.0
Total	100.0	100.0
Estimated numbers ('000)	372	5,610
Average family income	\$ 8,577	16,604
Median family income	\$ 7,096	15,058

Source: Single-parent Families in Canada, Statistics Canada, Consumer Income and Expenditure Division (uncatalogued, forthcoming 1979).

Table 9

Selected Statistics on Low Income Single-parent Families by Number of Children Under 16 years, 1975

Number of Children Under 16 Years	Number of Families	Average Family Size	Average Income	Average Transfer Payments
	Per cent		Dollars	
None	15.7	2.3	3,591	2,488
One	32.8	2.3	3,304	2,276
Two	27.7	3.3	4,273	3,023
Three	13.5	4.3	4,757	3,153
Four or more	10.3	5.9	5,842	4,493
All families	100.0	3.2	4,076	2,864
Estimated numbers	180,000			

Source: Single-parent Families in Canada, Statistics Canada, Consumer Income and Expenditure Division (uncatalogued, forthcoming 1979).

Table 10
 Low Income Single-parent Families by Presence or Absence of Children and Work Experience of Family Head in 1975

Work Experience of Family Head	Families with children under 16			Families without children under 16				
	Number of Families	%	Average Family Income \$	Average Family Size	Number of Families	%	Average Family Income \$	Average Family Size
Did not work	63.5		3,958	3.4	79.3		3,597	2.2
Worked in 49 weeks or less	25.7		4,059	3.2	12.8		(1)	(1)
Worked in 50-52 weeks	10.8		5,638	3.7	7.9		(1)	(1)
All families	100.0		4,166	3.4	100.0		3,591	2.3
Estimated numbers ('000)	151				28			

(1) Sample size too small for reliable estimates.

Source: Single-parent Families in Canada, Statistics Canada, Consumer Income and Expenditure Division (uncatalogued, forthcoming 1979).

Footnotes

- 1 See Chapter 2 of the 1964 Economic Report to the President.
- 2 Robert H. Haveman in A Decade of Federal Antipoverty Programs, Achievements, Failures and Lessons, edited by Robert H. Haveman, Institute for Research on Poverty, Academic Press, 1977.
- 3 These papers were released under the general title of The Measurement of Poverty. There are 18 papers in total and they constitute an excellent set of documents on the definitions and measurements of poverty, poverty concepts, reprints of important articles on poverty measurement, etc.
- 4 One can trace governmental concern with the poor back to Elizabethan times. It was in Britain as well that Booth and Rowntree made the first rigorous studies of the extent and nature of poverty. The methodology they pioneered is a forerunner of some of the approaches which have been used in more recent times to measure and delineate poverty.
- 5 Michael Harrington, The Other America, page 179 (New York: The MacMillan Company, 1963).
- 6 I. Adams, W. Cameron, B. Hill, P. Penz, The Real Poverty Report (Edmonton: M.G. Hurtig Limited, 1971), Introduction.
- 7 Oscar Lewis, "The Culture of Poverty" in On Understanding Poverty, edited by Daniel P. Moynihan (New York: Basic Books Inc., 1968), page 187.
- 8 In this paper the term "level of living" will be used to describe the level of consumption of goods and services actually attained by a particular segment of the population or the population as a whole.

The term "standard of living" is sometimes used interchangeably with the term "level of living" but the term "standard of living" if used rigorously, should be used to describe societal goals for access to or consumption of goods and services rather than the actual level of attainment. Thus, if an objective is the elimination of overcrowding in housing and overcrowding is defined as more than one person per room, then that can be described as a standard of living which has been set in respect to housing. However, if only 80 per cent of households occupy accommodation which provides this amount of space or better per household member, then this is a measure of the level of living.
- 9 Peter Townsend, ed., The Concept of Poverty (New York: American Elsevier Publishing Company Inc., 1970), page 42.
- 10 For a review of some of the historic work on poverty, see Dorothy Brady, A Historical Survey of Family Budgets, Monthly Labour Review (February 1948), Vol. 66, No. 2 and Helene H. Lamale, Poverty: The Word and the Reality, Monthly Labour Review (July 1965), Vol. 88, No. 7.
- 11 For example, see Victor Fuchs, Redefining Poverty and Redistributing Income, Public Interest 8 (Summer 1967).
- 12 The methodology is described in Counting the Poor: Another Look at the Poverty Profile by Mollie Orshansky, Social Security Bulletin (January 1965).
- 13 Although the U.S. lines are categorized as absolute poverty lines there was, in fact, some relativity at the time they were constructed in that 1955 consumption patterns were used. A similar methodology using data for an earlier period would probably have produced a set of absolute lines with lower income levels.

- 14 G.C. Fiegehen, P.S. Lansley and A.D. Smith, Poverty and Progress in Britain, 1953-1973 (Cambridge: Cambridge University Press, 1977).
- 15 See Chapter 6, Fifth Annual Review, The Challenge of Growth, Economic Council of Canada (September 1968) and Jenny R. Podoluk, Chapter 8, Incomes of Canadians (Dominion Bureau of Statistics, 1968).
- 16 The Report of the Senate Committee on Poverty was released in 1971.
- 17 More details and the rationale for the methodology may be found in Revisions of Low Income Cut-offs, unpublished staff paper of the Research and Analysis Section, Consumer Income and Expenditure Division (Statistics Canada, December 1973). The 1978 lines are shown in the Appendix.
- 18 N.N. Franklin, The Concept and Measurement of "Minimum Living Standards," International Labour Review, Vol. 95 (January-June 1967).
- 19 Household Facilities by Income and Other Characteristics, 1974 (Catalogue No. 13-565), Statistics Canada. See also Household Facilities by Income and Other Characteristics, 1976 (Catalogue No. 13-567).
- 20 See Urban Family Food Expenditure, 1976 (Catalogue No. 62-545). Statistics Canada and Urban Family Expenditure, 1974 (Catalogue 62-544).
- 21 Exceptions were persons who did not meet minimum residence qualifications.
- 22 Unpublished estimates from the Survey of Consumer Finances.

APPENDIX

Revised Low Income Lines

Family size	Size of area of residence				
	500,000 or More	100,000 -499,999	30,000 -99,999	Small Urban	Rural (Farm and Nonfarm)
			1969		
1	2,599	2,434	2,363	2,174	1,890
2	3,769	3,529	3,426	3,152	2,741
3	4,809	4,503	4,372	4,022	3,498
4	5,719	5,355	5,199	4,783	4,159
5	6,393	5,986	5,812	5,347	4,650
6	7,018	6,571	6,380	5,870	5,104
7 or more	7,695	7,205	6,995	6,435	5,596
			1978		
1	4,844	4,534	4,403	4,050	3,520
2	7,020	6,574	6,384	5,871	5,108
3	8,957	8,390	8,142	7,494	6,516
4	10,654	9,976	9,684	8,910	7,747
5	11,909	11,149	10,826	9,963	8,663
6	13,074	12,241	11,886	10,935	9,507
7 or more	14,336	13,419	13,031	11,987	10,424

CPI: (1971 Base) = 100.0

CPI: 1969 = 94.1

CPI: 1978 = 175.2

THE PRICE, EMPLOYMENT, AND REDISTRIBUTIVE EFFECTS
OF THE MINIMUM WAGE: LESSONS FROM THE
QUEBEC EXPERIENCE

by

Pierre Fortin*

INTRODUCTION

In Quebec as elsewhere in Canada, the demographic, industrial and regional importance of the minimum wage regulation can hardly be overestimated. Demographically, somewhere between 5 per cent and 10 per cent of the labour force are minimum-wage workers. The actual impact of the regulation is much stronger, however, due to institutional linkages with decrees and labour contracts and to market wage emulation effects. Available estimates [1] indicate that about 20 per cent of minimum-wage workers are young men aged 15 to 24, 30 per cent young women aged 15 to 24, 40 per cent adult women 25 and over and 10 per cent adult men 25 and over. This is a predominantly youth (50 per cent) and female (70 per cent) segment of the labour market. Minimum-wage workers are concentrated in hotels and restaurants (45 per cent), in retail trade (20 per cent) and in the so-called "soft" industries of clothing, leather and knitting (15 per cent), where the low-wage bill is also a significant proportion of total value added. Due to the preponderance of hotels and restaurants, over 40 per cent of minimum-wage workers also earn tips. Regionally, the low-wage sector is particularly visible in the important tourist and clothing industries of Montreal and Quebec City and also in a few soft-industry towns, most notably in the Eastern Townships.

The Quebec Government has recently become increasingly concerned about the price, employment and redistributive effects of the minimum wage regulation, and for good reasons. Firstly, the Quebec minimum wage has increased from about 90 per cent of the Ontario minimum wage in 1970-1972 to about 120 per cent of the Ontario minimum wage in 1978 -- and 115 per cent as of May, 1979. This has resulted both from a substantial rise in the ratio of minimum to average wage in Quebec, which increased from 44 per cent in 1972 to 51 per cent in 1976, and from a simultaneous decline in the corresponding ratio in Ontario, which decreased from 46 per cent in 1974 to 41 per cent in 1978. Given the competitive nature of the two economies, important political pressures from industry groups developed, especially after 1976, which urged the Quebec Government to revise its minimum wage indexation policy. Secondly, the concern over the high unemployment rates among the youth was inevitably linked to the minimum wage regulation, among other factors. And thirdly, as many others, the Quebec Government has welcomed a closer scrutiny of the several elements of the reforms which have been implemented in the area of social policy over the last ten to fifteen years thus reacting to widespread public dissatisfaction with rapidly rising expenditure and suspected inefficiency in this field of public policy.

With this background perspective, I was commissioned in the spring of 1978 by the Minister of State for Economic Development to study the price, employment and redistributive effects of the Quebec minimum wage. The main difficulty of such an endeavour was to produce a low-key report [2] which could approach the problem with cold, statistical arguments and allow the debate to be freed from the intense economic and political battles which discussion over the minimum wage usually provokes. The following description provides a nutshell summary of the report.

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METHODOLOGY

To start with, it is useful to emphasize the apparently trivial point that the minimum wage regulation is only one among several available policy instruments, and that its assigned goal of improving income distribution is only one among several policy goals. This point is fundamental, though, because it serves to underline that a complete appraisal of the efficiency of the minimum wage regulation must not only examine how well the regulation actually redistributes income, but also what impact it has on other policy goals such as price stability and full employment and whether there are more efficient alternative policy instruments, which can better redistribute income and have less undesirable or more desirable side-effects on other goals than the minimum wage.

Roughly, this is the framework around which the study was organized. The first step has been to evaluate the probable impact of the minimum wage regulation on wages and prices. Then, a second step consisted of a statistical study of the employment effect of the regulation. The third step has aimed at measuring the income-redistributive effect of the minimum wage as a result of the first two steps (since wage income is the product of the wage rate and employment), and at appraising the family income needs of the low-wage workers. The last step has been the study of the interaction of the minimum wage with social assistance, and of the alternatives offered by guaranteed family income plans and wage subsidies.

EFFECT ON WAGES AND PRICES

The easiest part of the task has been to measure the effects of a minimum wage increase, say of 10 per cent, on the overall sectoral wage bills, before any disemployment effects take place. This involves simply computing how much more Quebec industries have to disburse in order to pay out the higher minimum wage to their employees, which is readily done with the help of Labour Canada's annual survey of wages, salaries and hours of work. In 1978, this would have meant raising the overall wage bill, or the average industrial wage rate, by about 0.4 per cent. However, this is only the direct effect of the increase, since there is, in addition, an indirect wage emulation effect which is due either to institutional indexing of several decrees and labour contracts to the minimum wage, or to plain wage competition in the external labour market. Most studies indicate that wage emulation amplifies the direct effect by 20 per cent to 120 per cent depending on the industry, with an average of about 60 per cent, so that, in the end, a 10 per cent increase in the minimum wage would raise the average industrial wage by at least 0.6 per cent instead of 0.4 per cent. This total (direct and indirect) effect varies widely across industries. It is of course most important in the minimum-wage industries like hotels and restaurants (8 per cent) and the soft industries (2 per cent to 4 per cent).

Given the weight of the wage bill in total costs of production (wages, cost of capital and cost of imported materials), the potential inflationary effect of an increase of 10 per cent in the minimum wage on the consumer price index (after taking account of interindustrial trade) is between 0.3 per cent to 0.5 per cent. Once again, the incidence of the raise varies across industries, for example ranging from 4 per cent to 5 per cent in hotels and restaurants and from 1 per cent to 2.5 per cent in the soft industries.

The upshot of these results is, first, that the overall inflationary potential on the Quebec CPI of the 10 per cent to 15 per cent minimum wage differential between Quebec and Ontario is relatively small. And this is the more so because the Quebec economy is so open within Canadian and international markets,

which has the crucial consequence of inducing Quebec firms to adjust to an increase in the minimum wage through reductions in the employment and hours of work of low-wage workers more frequently and more intensely than through passing the buck to the consumer, as compared with a relatively closed economy like the U.S. economy. Secondly, for the minimum wage sectors like hotels and restaurants and the soft industries, which are in many instances in a difficult competitive position with other Canadian and foreign firms, the high Quebec minimum wage, while certainly not a decisive factor in the long run, certainly does not help at the margin.

EFFECT ON EMPLOYMENT

There can be no doubt that a minimum wage increase reduces employment and hours of work among the low-wage workers and thus creates unemployment, as employers attempt to economize on a resource which has become more expensive in the production process. The real question is: how much?

This question is difficult to answer because so many factors influence the trend of employment and unemployment over time and across industries. The only way out of this multi-causal dilemma is simply to attempt to measure statistically the extent of the fluctuations in employment or unemployment attributable to minimum wage changes only after taking all the other factors into account in the most meticulous way, so that neither too much, nor too little importance can be given to the minimum wage in the explanation of labour market events.

The procedure that I have followed in this respect is to assume in the first instance that the most important disemployment effects of the minimum wage are felt by young people aged 15 to 24 and by adult women aged 25 and over, and that the adult men's unemployment rate is quite insensitive to the minimum wage. This is of course "allowed" by the very small proportion of adult men among minimum-wage and low-wage workers. Then, the adult male unemployment rate can be considered as reflecting the overall slack or tension in the labour market which arises from cyclical and other influences; it has actually been used to "explain" part of the fluctuations in youth and female unemployment rates.

Other causal factors have been taken into account in the explanation of youth and female unemployment rates; these include, most notably, demographic changes, the 1971 reform of the Unemployment Insurance Act, changing seasonal factors, and, of course, the ratio of the minimum wage to the average industry wage.

The empirical results of the time series macroeconomic study that I have performed are conveniently summarized as follows. A 10 per cent increase in the minimum wage relative to the average industry wage in Quebec would seem to raise the unemployment rate of young men by 2.5 to 3.5 percentage points, that of young women by 1.5 to 3.0 percentage points, and that of adult women by 0.4 to 0.7 percentage points. If the unemployment rate of adult men is unaffected, then the upward effect on the overall unemployment rate ranges from 0.6 to 1.0 percentage point.

These impact figures are quantitatively important, but not surprising, when compared to the results obtained by U.S. studies [3], and for four main reasons. First, the coverage ratio of the minimum wage law in Quebec is close to 100 per cent among nonfarm workers, whereas it is only slightly above 60 per cent in the U.S. Secondly, it is well-known that the effect of the minimum wage on unemployment is strongly nonlinear, in that, say, if the minimum wage index increases from 100 to 120 for a given average industry wage, it would create much more

unemployment when raised from 110 to 120 than from 100 to 110, because the number of workers previously earning between 110 and 120 is substantially higher than the number of those previously earning 100 to 110. This nonlinearity, which has been confirmed in my empirical study, is particularly relevant to the Quebec-U.S. comparison, since, to caricature only a bit, the minimum wage is 110 in Quebec and 100 in the U.S. Thirdly, the same argument as made earlier concerning the relative weight given by firms to employment decreases and price increases in the face of a minimum wage increase apply here, in that the greater openness of the Quebec economy induces Quebec firms to place more weight on employment decreases than in the U.S. And fourthly, since unemployment insurance in Canada is more universal, more easily accessible and more generous than in the U.S., decreases in employment from any source in Canada would raise the measured unemployment rate more than in the U.S. because the unemployed persons have a greater tendency to stay in the labour force rather than to leave it. The "discouraged worker effect" is smaller to that extent.

EFFECT ON INCOME DISTRIBUTION

The disemployment effects of the minimum wage, which are most significant for young men and least important for adult women (there might in fact occur employment substitution of the latter for the former), have profound consequences for the redistributive impact of the regulation. If a 10 per cent increase in the minimum wage reduces annual hours of work by more than 10 per cent, then annual earned income will decrease. The minimum wage is not the same thing as the minimum income.

An assessment of the redistributive effects of the minimum wage on earned incomes on the basis of the above estimates of the disemployment effects and of conservative estimates of the hours of work effects obtained from other sources (including industry surveys) shows that this is indeed largely the case in the youth segment of the market. According to the estimates, a 10 per cent raise in the minimum wage would tend, on the average, to change the earned incomes of workers earning close to the minimum wage (up to 15 per cent more) as follows: a decrease of up to 13 per cent for young men, a decrease of 2 per cent to an increase of 4 per cent for young women, and an increase of 4 per cent to 6 per cent for adult women. However, since unemployment insurance benefits are able to cushion up to 85 per cent (75 per cent starting in 1979) of the net wage loss from unemployment, the sum of earned income and UI benefits usually increases after a minimum wage raise, except perhaps in that part of the hotel and restaurant sector where tips are important (since unemployment insurance does not replace tips). To summarize, the high minimum wage in Quebec does seem to increase the total incomes of the low-wage workers, but in many cases this is as a result of the higher unemployment insurance benefits resulting from longer and more frequent spells of unemployment, since without the UI benefits their incomes would decrease most often among young men, frequently among young women, and sometimes even among adult women. This is a strange way to improve the fate of low-wage workers. Young, less educated persons have the most to lose from a regulation which tends to keep them away from good steady jobs, to concentrate them in seasonal, occasional or part-time jobs and to delay their normal progress in the work and income hierarchy.

Moreover, the minimum wage is not a selective measure and it affects all low-wage workers independently of their family income needs. Evidence from the Boutin survey referred to in note 1 shows that over 80 per cent of minimum-wage workers are either young persons, unattached individuals or the second wage-earners of childless families whose family incomes are typically 50 per cent to 100 per cent higher than Statistics Canada "low-income levels", before any account is taken of property income

(40 per cent are property owners) and tips (40 per cent earn tips). Half of the minimum-wage workers are young persons aged 24 or less who are generally in transition towards income categories closer to the median (and even higher in the case of students) and for whom the minimum wage can be a serious drag on good work experience. About 70 per cent of young people live with their parents in families with incomes close to or higher than the median. The large majority of households (about 80 per cent) who benefit from the minimum wage are unattached individuals and families with more than one breadwinner.

The empirical evidence reported here makes it hard to escape the conclusion that the high minimum wage not only has significant and harmful disemployment effects, particularly on young persons whose income can then be sustained only by frequent recourses to unemployment insurance, but also that it is a general, indiscriminate measure which is very inefficient for income redistribution purposes.

INTERACTION WITH SOCIAL ASSISTANCE AND ALTERNATIVES

One of the most important aspects of minimum wage policy in Quebec has been the maintenance of a sufficient differential between social assistance benefits, which are indexed to the cost of living by statute, and the minimum wage in order to avoid the deterioration of work incentives and the swelling of the cost of SA benefits to the Quebec Government. Indeed, for 1978, a straightforward comparison of figures shows that the net annual income from full-time work at the minimum wage was smaller than or equal to the scale of net SA benefits in all kinds of families except the one-adult-no-children families, in which case work at the minimum wage had a 50 per cent advantage over SA benefits.

The real question here is therefore whether the Quebec Government could temporarily slow down the rate of increase of the minimum wage relative to SA benefits without important adverse effects on work incentives and social assistance costs. Available evidence indicates that this question must be answered affirmatively, because even a 20 per cent reduction in the minimum wage relative to SA benefits would not change the scale of incentives by much, and because the potential for a larger number of social assistance beneficiaries is actually small, given the important proportion of young persons and of second wage-earners of childless families among low-wage workers and the considerably reduced scale of SA benefits (one-third of the full scale) for unattached individuals aged 30 or less. Under extremely liberal assumptions, the maximum increase in SA costs resulting from the work disincentive effect of a 20 per cent minimum wage reduction would amount to no more than 4 per cent of total SA costs.

Furthermore, the reemployment effect of the lower minimum wage can be estimated to bring an economy of no less than 2 per cent of total SA costs, so that the maximum net increase in total SA costs to the Quebec Government would be no larger than 2 per cent. One interesting consequence of the reemployment effect is that the federal unemployment fund would at the same time save an important sum of money, which can be very conservatively estimated at 6 per cent of total Quebec SA costs. The conclusion of this exercise is clear enough. A 20 per cent minimum wage reduction relative to the scale of SA benefits in Quebec would induce some work disincentive effect, but the reemployment effect would offset part of the corresponding increase in SA benefits, so that the likely outcome would be a small additional cost for the Quebec Government and a comparatively huge unemployment insurance saving for the federal government. One is led here to speculate on the adverse incentive and implicit intergovernmental transfers that the current separation of jurisdictional power among the two levels of government in the realm of social policy creates in the case of minimum wage policy. There can be no

doubt that the traditional claim of Quebec governments for control over unemployment insurance and the recent interest of the federal government in control over minimum wage policy are related to this question.

One alternative to the present system of social assistance cum minimum wage is of course the widely discussed guaranteed family income plan (GFIP) [4] which would reestablish equity between income needs of the working and nonworking poor, reduce or suppress the impact of a potential reduction in the minimum wage on the family incomes of the true working poor, and simplify the administration of the social security system.

I shall leave full discussion of the behavioural and financial implications of the GFIP to others and make only a few remarks concerning its relation with the minimum wage. For low-wage workers, under a GFIP the minimum wage would lose much of its attractiveness because, over and above disemployment effects, any increase in their incomes would be taxed at rates varying, say, from 25 per cent to 90 per cent. This raises, secondly, the question of whether the GFIP should replace the minimum wage regulation entirely. The traditional arguments against abolition of the minimum wage are that such a drastic measure would cause the costs of the GFIP to skyrocket and that it would constitute an unconditional disguised subsidy to the low-wage industries. These arguments may have some political appeal, but they are analytically weak. Contrary to intuition, the abolition of the minimum wage would not necessarily increase the total cost of social security because the resulting increase in weekly hours of work would moderate the reduction in weekly wages and because the reemployment effect would give rise to a significant decrease in unemployment insurance costs (which again involves an implicit intergovernmental transfer. The net effect would be a decline in the total cost to governments if the GFIP taxation rate was small enough (but not unreasonably so). On the other hand, the assimilation of the abolition of the minimum wage with a subsidy to the low-wage industries crucially depends on the implicit assumption that these industries will not pass the subsidy to the consumer, whereas there is a strong empirical case to make that markup pricing over costs is generalized enough and competition is keen enough among them, as is competition with Canadian and foreign firms to cast serious doubt on this assumption, at least in its extreme form.

Rather, I would personally object to complete abolition of the minimum wage on the ground that the legislator should save the initial objective of the regulation, namely the protection of those low-wage workers who, for any reasons, are implied in a very unequal exchange with their potential or actual employers.

The principal difficulty with the GFIP is its very high cost, and one may wish to revert at least temporarily to more modest alternatives like wage subsidies, or the work income supplement (WIS) aimed at poor working families with children now being considered in Quebec City. [5]

CONCLUSION

Increases in the minimum wage relative to the average industry wage have a pervasive effect on wages above the minimum wage through important emulation effects. While the overall inflationary potential of the high Quebec minimum wage is not a source of great concern, its relative price effects on the low-wage industries is far from negligible and has not helped them in the face of the many difficulties they have been confronted with recently.

The unemployment effects of the Quebec minimum wage must be characterized as very serious, especially among young persons, as compared with the analogous effects discovered by U.S. studies.

This is due to the higher coverage ratio in Quebec, to the strong positive association between the importance of the disemployment effects and the initial level of the minimum wage, the greater openness of the Quebec economy on external markets, and to the smaller "discouraged worker effect" in Canada, which is related to the different nature of our unemployment insurance legislation.

That a higher minimum wage may actually reduce the earned incomes of minimum-wage workers is a distinct possibility which the Quebec experience has revealed, again especially in the youth segment of the labour market. However, given that unemployment insurance replaces a substantial fraction of income lost from unemployment, it is not a usual occurrence that a higher minimum wage causes a decline in total income, except for workers earning tips. Hence, one most important way in which the minimum wage "helps" low-wage workers is by placing them more often on the unemployment rolls. This is, to say the least, a strange and inefficient way of redistributing income.

The inefficiency of the minimum wage as an income redistributor is further underlined by the fact that over 80 per cent of minimum-wage workers are members of households whose incomes are typically 50 per cent to 100 per cent higher than the most generously defined poverty levels in Canada, even if one does not take property income or tips into account.

The obvious policy conclusion is that, in order to restore the lost employment, the Quebec minimum wage should be raised at a slower pace than the average industry wage over the next few years, so that it can be brought back in line with North American standards, and that more selective measures to help the true working poor replace the indiscriminate instrument which the minimum wage is. There are objections to temporary deceleration of the minimum wage in terms of the resulting work disincentive created by the comparison with the scale of social assistance benefits, and in terms of the higher total SA costs to the Quebec Government. However, these disincentives and these costs have been found potentially very small. One institutional problem is that the most important public beneficiary of a reduced minimum wage is the federal unemployment insurance fund, whereas the authority which is responsible for minimum wage policy and has to absorb the cost of lowering the minimum wage is the provincial government.

The most widely discussed income-selective measure which could at least partly replace the minimum wage in its redistributive goal for the low-wage workers is some guaranteed family income plan. Implementation of such a plan even raises the question of the abolition of the minimum wage. Arguments against abolition, which include the need to keep the cost of the guaranteed income plan under control and the implied subsidy to the low-wage industries, have been found weak, but there still exists a rationale for keeping the minimum wage based on the concept of unequal exchange.

The main objection to a full guaranteed income plan so far has been its substantial cost, given the huge sums of money already locked in other social security programs (like unemployment insurance and old age pensions and income supplements), which the federal government has favoured since the early 1970s -- perhaps inefficiently in some cases, and given the financial constraints of the second half of the 1970s.

The more modest alternatives for which the Quebec Government has opted so far are: (1) an apparently decelerating rate of increase in the adult minimum wage relative to the average industry wage; (2) a much lower minimum wage for those employed in hotels and restaurants, and for other tip-earners; (3) a freeze in the minimum wage for teenagers below 18; and (4) a work income supplement for families with children to be implemented in 1979.

Footnotes

- 1 Boutin, Jean-Guy, Enquête sur les caractéristiques socio-économiques des travailleurs rémunérés autour du salaire minimum (Quebec: Ministère des affaires sociales, 1974).
- 2 Fortin, Pierre, Une évaluation de l'effet de la politique québécoise du salaire minimum sur la production, l'emploi, les prix et la répartition des revenus (Quebec: Ministère du travail et de la main-d'oeuvre, June 1978); and Idem, Une évaluation de l'effet de la politique du salaire minimum sur la production, l'emploi, les prix et la répartition des revenus: annexe technique. Mimeographed (Quebec: Ministère du travail et de la main-d'oeuvre, November 1978).
- 3 See especially Gramlich, Edward M., "Impact of Minimum Wages on Other Wages, Employment, and Family Incomes". Brookings Papers on Economic Activity 1976, 2, 409-51; Mincer, Jacob, "Unemployment Effects of Minimum Wages". Journal of Political Economy 84, 4, Part 2, August 1976, S87-S104; and Ragan, James F., Jr., "Minimum Wages and the Youth Labor Market". Review of Economics and Statistics 49, 2, May 1977, 129-36.
- 4 An operational proposal for such a plan is contained in Comité interministériel sur la révision de la sécurité du revenu, Analyse d'un programme québécois de revenu familial garanti (Quebec: Gouvernement du Québec, January 1976).
- 5 The proposal is described in Groupe de travail sur la sécurité du revenu, Les diverses hypothèses d'implantation d'une première étape de revenu minimum garanti (Québec: Ministère du conseil exécutif, 1979).

POVERTY, POLICY AND SOCIAL EXPERIMENTATION
IN CANADA: BACKGROUND AND CHRONOLOGY

by

Derek P. J. Hum*

1. INTRODUCTION

Canada is an affluent society in which a great deal of poverty also exists. Begging for the moment the difficult question of defining, measuring or understanding the causes of poverty, the simple fact of the matter is that many Canadians are poor because they have either low or inadequate incomes. The Economic Council of Canada in its Fifth Annual Review (1968) was influential in making the general public in Canada more fully aware of this situation, initiating much discussion, and producing guideline calculations for a poverty line in income terms which, though not acceptable to everyone, most now take as a reference or starting point. Further analysis of the theme of poverty in Canada was continued in the Economic Council of Canada's Sixth Annual Review (1969), and dialogue in earnest began in 1970 when the federal government indicated its increasing concern about the state of the overall social security system by publishing its White Paper, Income Security for Canadians (1970, National Health and Welfare). Also towards the end of the sixties the concept of a guaranteed income as a means for combatting poverty was receiving much attention. The White Paper (1970) specifically addressed the issue of replacing current Canadian income security programs with a guaranteed annual income (GAI). It called for further research into the consequences of an overall GAI for the entire Canadian population, particularly singling out the need to study the work disincentive effects. Note was made of the income maintenance experiments being conducted in the United States, with the suggestion that until the work disincentive question was satisfactorily answered, the introduction of an overall GAI in Canada could not be seriously entertained (p. 41).

The next decade -- the seventies -- saw some sharpening and crystalization of discussion concerning income security issues and the GAI in Canada and culminated in what will surely be recorded in Canadian social policy history as two major and significant events. One was the occasion of the Federal-Provincial Review of Social Security, a politically-directed, three year review which set out to comprehensively evaluate the Canadian system of social programs, including financial and jurisdictional responsibilities. The second undertaking was the Manitoba Basic Annual Income Experiment (Mincome Manitoba), a jointly-funded project of the governments of Canada and Manitoba designed to evaluate, in true experimental fashion, the economic and social consequences of a guaranteed annual income based on the idea of a negative income tax (NIT). Of paramount importance in establishing the experiment's objectives and design was the work disincentive effect of a negative income tax. The Mincome Manitoba experiment was noteworthy for its attempt to seriously study one option respecting income maintenance in Canada, particularly against the backdrop of an overall social security review. At the same time, the Mincome Manitoba project marked the first time in Canada that the method of social experimentation was used to assist in the development of public policy.

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Although small scale policy experiments can be traced back to the early sixties in the United States, the character and consequences of the more recent large scale social experiments are entirely different. These experiments pose a distinct set of advantages, difficulties and issues for policy makers and researchers alike. The purpose of this paper is to provide an overview of some income maintenance policy issues and a chronology of the events leading to social experimentation in Canada. It is concerned primarily with the decade of the seventies in Canada. Section 2 describes the central issue underlying income maintenance experimentation by juxtaposing both the policy and research viewpoints that eventually converged to make the work incentives question the prime issue. Section 3 provides the historical background to the NIT experiments. Section 4 comments on one aspect of the Social Security Review pertaining to the development of income maintenance policies.

2. WORK INCENTIVES, COST AND EXPERIMENTATION

The design parameters of a guaranteed income program can be described in terms of a basic support level or guarantee, G , to which the family is entitled if it has no other income, and some provision for a taxation rate by which the guaranteed amount is reduced for each dollar of earned income. The NIT is no exception and can also be characterized in this fashion as, indeed, can almost any income maintenance scheme. Supporters of the NIT concept have at various times stressed the mechanism's equity, objectivity, cost effectiveness, social advantages and simplicity. Its critics draw attention to the scheme's high cost, impracticality, social disintegration tendencies, cumbersome bureaucratic demands and damaging effects on work effort. Central to both the political acceptability and economic feasibility of the negative income tax idea was the controversy concerning the labour supply disincentive effect of a guaranteed minimum income.

It is clear that the more generous the program, as measured by high support levels and low taxation rates, the larger will be the total program costs of a GAI. This results because non-workers would receive larger amounts, low-income workers would keep a larger proportion of their earnings, and a larger proportion of the population would be recipients since high guarantees and low tax rates have the effect of raising the income level (called the breakeven point) below which NIT payments are made by the government. Consequently, attempting to eliminate poverty by providing income payments to the poor through a GAI can be very costly, depending upon the support level and tax rate chosen. At the same time attitudes towards Canada's social security system in general, and towards the poor in particular, are strongly conditioned by the work ethic and the institutional fact of labour markets. A guaranteed income would lessen work incentives, perhaps to the point of net social detriment. Just how much less Canadians would work in response to a guaranteed income no one can confidently say. And it is not clear that Canadian nonexperimental data can provide answers to this very important question.

The idea of an experimental test was the next logical step. Despite the many tangible benefits to policy makers of having answers to the work disincentive question, and cost estimates for a GAI, an explicit policy experiment held tremendous appeal for researchers. Frustrated with more conventional research approaches using ex post facto data, researchers saw the immense potential of a social experiment in negative income tax. Such an experiment would permit researchers to select the sample size required, the composition of the sample, and to induce treatment effects of the magnitude necessary to effect a measurable response. [1] A NIT experiment could also provide guarantee levels and tax rate combinations not possible in any real-life public program. A true experiment would then allow superior inferences concerning the causal effect of a guaranteed income on work behaviour.

In sum, policy concerns and research interests collided favourably in a happy combination of need and opportunity. These circumstances led to the mutual identification of the issue of labour supply response to a guaranteed income as all important.

3. HISTORICAL BACKGROUND TO THE NIT EXPERIMENTS

Origins of the American Experiments

No one looking back at the experience of the income maintenance experiments -- be they researchers or policy makers -- can fail to be impressed by the sense of historical occasion. Some sympathy for those "best of times and worst of times" is necessary. The mid-sixties is a convenient place to start. President Lyndon Johnson had called for a War on Poverty in his State of the Union address in 1964. In that same year the U.S. Congress passed the Economic Opportunity Act, establishing the Office of Economic Opportunity (OEO) as the headquarters and vanguard for the antipoverty effort. The set of programs discussed by the research planners of the OEO aimed at eliminating poverty comprised three major components; namely, public employment strategies, community action programs and income maintenance. Although the crucial role of income maintenance to combat poverty was recognized and readily accepted, a negative income tax approach to delivering cash transfers to the low-income groups was more controversial.

The negative income tax idea was reasonably novel and initially met both opposition and neglect. For example, some, like Alvin Schorr, Deputy Director of Research for OEO, favoured an alternative proposal based upon children's allowances payable to all families with children regardless of income. On the other hand, Joseph Kershaw, Director of the Research Office of OEO, stressed the distributional efficacy of income conditioned payments and recommended the NIT proposal to Sargent Shriver, Director of the OEO. Shriver was won over by the strong advocacy of the research group and the antipoverty plan that was submitted to the White House in September 1965 contained the NIT as a component. The OEO also forwarded in October 1965 to the Bureau of the Budget a NIT proposal costing \$4.7 billion as the centrepiece of its antipoverty plan. The White House, however, being preoccupied with the Vietnam War and the falling popularity of some of the OEO's social programs, did not take the NIT proposal seriously (Levine, 1975) and the only response from the President was to appoint a commission on income maintenance programs (Lampman, 1974).

Despite the lack of political and general government support, the negative income tax did not die. Partly because of the OEO's unwavering faith and strong support, and partly because of the continuing war on poverty, the negative income tax was regarded by its proponents as an idea whose time had come. A slight unscheduled delay was tolerable. Besides OEO's support, additional factors contributed to the eventual success in launching the series of negative tax experiments in the United States.

The OEO continued to single out the NIT for attention as part of its mandate concerning antipoverty strategies. Additionally, the research staff and OEO bureaucrats were very heavily influenced by what Lampman (1974) has called the "ascending discipline of the Program Planning Budget System" (PPBS). Prominent within the OEO were a key group of individuals -- many recruited from RAND or the Pentagon, new to social welfare, and without sharply defined loyalties to specific agencies or proposals. These individuals accepted the application of normal evaluation techniques. Accordingly, the goal of eliminating poverty was stated in income maintenance terms, alternative proposals were arrayed, and cost effectiveness scores were assigned to different schemes on the basis of the "most bang for a billion

bucks". Under this exercise the negative income tax received high marks and consequently had the effect of focusing further discussion on particular aspects of the NIT approach such as the cost sensitivity and work disincentive effect of guarantee amounts and tax rates. The effect of general cash transfer mechanisms on the work effort of the nonaged, able-bodied individual therefore emerged as the (now clarified) prime empirical issue.

Although many felt that the negative income tax would cost more than existing welfare programs since the objective of the NIT was to extend cash transfers to the working poor -- a group largely ineligible for most other programs -- the proponents of the NIT perceived that the major stumbling block was political. The belief, on the part of politicians as well as the general public, that a NIT would increase idleness among the able-bodied poor was strongly held and no amount of argument "without hard facts" was likely to dispel such beliefs. This then became the dominant issue -- pushing all other disagreements concerning the cost of the NIT, the administrative practicality and mechanics of the scheme, the lack or otherwise of stigmatizing effects, and other issues into the background.

Perception of the central problem of the NIT as one of potential work disincentive effectively translated the issue into one for which economists could claim special competence. In the jargon of the economics discipline, the NIT was restated as a controversy concerning evidence regarding wage rate (price) and income elasticities pertinent to labour-leisure choice. The economics discipline provided a theory and economists themselves readily demonstrated that existing data sources could not answer the incentives issue with confidence. However, the necessary information and evidence could be gained with an experiment. The proposition seemed breathtakingly simple. If you want to find out something new about which present knowledge is wholly inadequate -- try it out! The credit for the initial idea and proposal goes to Heather Ross, a graduate student in economics at the Massachusetts Institute of Technology who was working with the Council of Economic Advisers during the summer of 1965. Although Heather Ross' specific proposal was not accepted, it received wide circulation within the OEO and many econometricians strongly endorsed the idea of an experiment (Orcutt and Orcutt, 1968). Proposal for an experiment received strong support from OEO, which initiated work and serious planning on the design for an experiment in 1966. The final proposals were also endorsed by the OEO research staff as well, and Sargent Shriver added his approval in 1967. Shriver was able to counteract political opposition [2] and by the fall of next year families had been selected for enrollment in a negative income tax experiment, payments were being made, and the first of the large scale social experiments in North America -- the New Jersey Graduated Work Incentive Experiment -- had begun. The undertaking was not called a negative income tax experiment but instead, for political purposes, a "work incentive experiment", connoting a happy rather than unhappy anticipated outcome. As well, the experiment now emphasized the purely scientific dimensions of the project, - as evidenced by the (deliberate) funding of the experiment through the Institute for Research on Poverty in Wisconsin.

The first negative tax experiment in the United States was therefore forged out of sharply different motivations and interests. Undoubtedly, the antipoverty program was a major stimulus and factor in setting the climate for political discussion and policy debate. Equally, the cost effectiveness apparatus of the PPBS and the strong advocacy of OEO's research staff for the NIT were also ingredients. As well, academic econometricians "raring to take social science over the threshold into the realm of controlled experimentation" played an influential role (Lampman, 1974). It remains that no single statement can fully capture the subtleties of how and why the

New Jersey experiment came to be. Neither did the matter end with the birth of an experiment, as Haveman and Watts (1976) observed:

"(The) tension between the motivations of those who supported the experiment for 'general-political-demonstration' reasons and those who desired it for 'technical-economic-experimental' reasons persisted throughout the (New Jersey) experiment. It affected all of its primary characteristics from technical design to duration to selection of sites and finally to interpretation of results."

Other income maintenance experiments in the United States rapidly followed. The OEO awarded a further grant to the Institute for Research on Poverty for a negative tax experiment in rural areas. The Department of Health, Education and Welfare (HEW) also funded one in Gary, Indiana and others in Seattle, Washington and Denver, Colorado. Each of these other experiments had slightly different foci and often incorporated additional research objectives but the New Jersey experiment remains distinctive in setting the precedent for the series of carefully controlled, scientific field tests of different negative income tax or benefit formulas on work behaviour. [3]

The Canadian Chronology

The discussions concerning the American War on Poverty and the various action-oriented programs that evolved as part of its antipoverty strategy did not go unnoticed in Canada. At about the same time the first families were being enrolled in the New Jersey experiment in the summer of 1968, the Economic Council of Canada released its Fifth Annual Review (1968). One particular chapter of this document outlined the extent of poverty in Canada, proposed certain poverty guidelines, and informed Canadians generally about the pervasiveness of poverty amid our affluent, growth-oriented society. The Economic Council of Canada proceeded in its Sixth Annual Review (1969) to outline the economic implications of poverty, and to reiterate its call for a national commitment to eliminate poverty. Canadian policy makers also began to direct serious attention to the overall state of the social security system in Canada and, unavoidably, to investigate the possibilities concerning a guaranteed annual income. In November 1970, the Department of National Health and Welfare issued a White Paper, Income Security for Canadians, which, while rejecting the guaranteed annual income (GAI) as a panacea, nevertheless emphasized the potential utility of a guaranteed income as an antipoverty measure. The White Paper mentioned the NIT experiments underway in the United States and declared that until the question of work incentives was answered, no general guaranteed income plan was likely to be introduced in Canada.

The next year, 1971, saw the publication of three important documents. The Report of the Special Senate Committee on Poverty (the Croll Report) was released and recommended that a GAI program based upon the NIT method be implemented on a uniform, national basis, and be financed and administered by the Government of Canada. Dissenting staff members of the Croll Committee issued their own analysis and generated much debate. The Real Poverty Report (Adams et al.) also advocated a guaranteed annual income, declaring that the case for it was "unassailable". The Castonguay-Nepveu Report, one of the most comprehensive and insightful studies of Canada's social security system, also appeared in 1971. Among the issues addressed was an innovative two-part guaranteed income program: one plan with a high support level and high tax rate for those without much potential for additional work-related income; and a second plan with a lower support level and a lower tax rate for those with a significant attachment to the labour force. [4]

The Throne Speech on January 4, 1973 opening the Twenty-Ninth Parliament called for a review of the nation's social security system by both the federal and provincial governments. The previous year, 1972, a Conference of Welfare Ministers had urged that a federal-provincial conference be called to initiate and develop better policies and programs towards rationalizing Canada's social security system. On April 18, 1973 the federal Working Paper on Social Security in Canada was released by Marc Lalonde. Thus the Federal-Provincial Social Security Review was launched. This "Orange Paper" reviewed many of the deficiencies of the present social security system and advanced five general strategies for achieving reform. These were (1) an employment strategy, (2) a social insurance strategy, (3) an income supplementation strategy, (4) a social services strategy, and (5) a federal-provincial strategy; that is, the perennial and distinctly Canadian obsession with constitutional questions of jurisdiction and the harmonization of federal-provincial policies. [5]

The potential work disincentive question was prominent in all discussions during the review in the area of income maintenance strategy. The U.S. guaranteed income experiments were often cited as relevant evidence and agreement was reached that a Canadian guaranteed income system should involve two parts. The income maintenance strategy was to provide support for those unable to work or for whom employment could not be found, and supplementation for those working poor with inadequate incomes. This two-tiered approach to income maintenance was referred to as income support and supplementation and owed much to the intellectual innovations of the Castonguay-Nepveu Report. Further, support levels could be set by individual provinces and income supplementation plans were to contain work incentives. [6] These ideas were pursued by the federal economic specialists associated with the Social Security Review in almost endless combinations, as witnessed by the work on the various technical options concerning income support and supplementation set out in the background paper of the federal-provincial social security review (1975). [7]

Coinciding with this interest in social security reforms and the federal-provincial review, interest was being shown in the guaranteed annual income approach, particularly as a demonstration project or administrative test. Manitoba's Premier E.R. Schreyer stated in a speech in September 1971: "The Government of Manitoba is committed to launching a pilot project -- strictly on an experimental basis, in designated urban and rural areas -- to determine if the concept of a GAI can be translated into effective action." [9] Meantime research interest was growing in Ottawa and the Minister of National Health and Welfare announced the establishment of a fund to cover 75 per cent of the cost of such experiments. In March 1973, Manitoba submitted to Ottawa a detailed research proposal for a negative income tax experiment which was subsequently approved, along with certain cost sharing arrangements and agreement regarding the respective roles of the Canadian and Manitoba governments. Federal and provincial personnel, together with research consultants, commenced design for an income maintenance experiment in Canada, and on June 4, 1974 Canada and Manitoba signed a formal agreement. The Manitoba Basic Annual Income Experiment (Mincome) was to cost approximately \$17 million, involve payments to over a thousand Manitoba families and last three years. Experimental sites were selected and negative income tax payments began for enrolled families in the first months of 1975.

4. CANADA'S SOCIAL SECURITY REVIEW: A COMMENT [9]

The Federal-Provincial Review of Social Security was an attempt to evaluate the system of uncoordinated programs that exist in Canada with a view towards developing an integrated approach which would correct many of the deficiencies listed in the "Orange Paper" (1975). The National Council of Welfare (1976)

simply states that "the goal of the social security review (was) the establishment of a guaranteed annual income".

The course of the review and its outcome is well known. The three-year review comprised a policy decision and program design stage, culminating in May 1975, and an operational design stage from May 1975 to June 1976. Writing at the end of the policy design stage in June 1975, Johnson (1975) could note that "there is agreement that a guaranteed income system should be implemented in Canada, and agreement as to the general form it should take" (p. 463). Writing after the review's formal end, others consider prospects for tangible change in Canada's social security system "dead" (Doyle, 1978; Reuber, 1978).

Those familiar with the design characteristics of a guaranteed income based upon the NIT concept must have felt uncomfortable about the early sequence of events during the Social Security Review. From the standpoint of developing a comprehensive and co-ordinated system of income maintenance, one would be particularly dismayed to see the priority accorded to such existing demogrant programs as Family Allowance and the Canada Pension Plan in the initial meetings of the Working Party on Income Maintenance (WPIM). As well, changes involving increased benefits in family allowances were announced and brought in (January 1974) before any serious discussion of income security options had taken place. Yet, when confronted with the bewildering choices for a future comprehensive income maintenance system, the options selected by the ministers were those which required an "integrated" system rather than a "child-related" system. (Options 1, 2, 3 rather than options 4, 5, 6 of the six options specified by WPIM, February 1975). Though some question the "desirability" of these events in terms of strategy, conscious or otherwise, (Reuber, 1978), nevertheless a weak consensus was reached at the end of the policy review. A single omnibus program was rejected, the guaranteed income system was to comprise two tiers, support levels were to be set by the provinces, strong work incentives were to be present and the federal government was willing to outline its proposals for cost-sharing.

Having achieved policy agreement on "the broad features of a new guaranteed income system" [10] the complex issue of work incentives and the detail specifics of program design and costs (including provincial costs) of the guaranteed income system now became chief concerns. From this point onwards, the progress of the Social Security Review rapidly lost momentum and proved disappointing, dashing hopes of tangible reform in income maintenance.

Attention turned to the work incentive question, previously identified (in 1974) as the issue of importance in deciding between a purely income-conditioned option and one in which some work-related eligibility requirement is present. [11] The issue of program costs lurked ominously, with Ontario claiming the costs of the federal proposals to be three times the federal estimates. [12] In the face of a lacklustre Canadian economy, federal and provincial ministers of welfare agreed on the "necessity to bear in mind the current economic circumstances in the country, and to design a system so that it will not be too costly." [13] Individual provinces were noted as expressing "reservations about the cost implications of the program" as well as agreeing that certain "design features (had) to be worked out and clarified." [14]

These were some of the many unanswered questions facing the Social Security Review -- the extent of the work disincentive, the costs of the envisioned program of support and supplementation, and the manner in which a guaranteed income delivery mechanism would be operated. The Manitoba Basic Annual Income Experiment was in an unique position to potentially answer these questions but, unfortunately, "time was out of joint". As these

policy decisions were being undertaken by the Social Security Review, the experiment was just getting underway. [15]

From the strict viewpoint of income maintenance policy development in Canada, one could characterize the Social Security Review as having achieved some fleeting consensus towards the easier, safer, design principles involved with a guaranteed income. On the whole, the Review moved very little towards the more difficult items of work disincentives, integration details, and cost issues. These statements, intended as descriptive rather than critical, amount to something like speculating that had some evidence for Canada been available concerning work incentives and program costs, discussions at the Social Security Review might well have progressed further. However, one should not necessarily conclude that the Social Security Review floundered for lack of answers to these specific questions.

Footnotes

- 1 A simple illustration can make these points more concretely. Consider the standard linear regression model $Y = \alpha + \beta X + e$ estimated by OLS with a data set of N observations. Whether or not some public policy X has a causal effect on behaviour Y may be posed in terms of the estimated parameter for β . The objective for research and public policy is to draw "correct" (unbiased) and "reliable" (consistent, precise) conclusions about the program in question. Experimentation accomplishes this. It is well known that $\hat{\beta}$ is unbiased if $\text{Cov}(X, e) = 0$ which is certainly possible since X can be fixed. Additionally, $\text{Var}(\hat{\beta}) =$

$$\sigma^2 / \sum_{i=1}^N (X_i - X_N)^2 \text{ where } E(e^2) = \sigma^2.$$

- Because an experiment can control both N and X it follows that an adequate degree of precision can be obtained by choosing N large enough and the range of variation in X sufficiently wide. Note also that precision increases proportionally with sample size but with the square of the treatment intensity (placement of X), so that a doubling of the treatment intensity is equivalent to increasing the sample size fourfold.
- 2 For a description by an "insider" of some of the politics and institutional involvements in the development of the New Jersey experiment, see Levine (1975) who views the experiment as part of OEO's strategy for Congressional approval. Skidmore (1975) provides an account of the decision-making setting regarding the experiment's actual design. The role of the noneconomist and the internal politics of the experiment are discussed briefly by Rossi (1975) and Rossi and Lyall (1976).
- 3 A series of income maintenance experiments, each focusing on different sub-populations, was more or less assumed in the planning discussions in 1967 on the New Jersey experiment.
- 4 A number of nongovernmental organizations also addressed the issue of Canada's national social security system as well. Some, like the National Council of Welfare in 1971 explicitly advocated a GAI. I confine myself to major government documents since my concern is to trace the development of "official" thinking.
- 5 Although the "Orange Paper" outlined five strategies for welfare reform, three working parties of officials were formed. They were: the working party on employment strategy, the working party on social services, and the working party on income maintenance. These categories correspond almost identically to the anti-poverty program components of the OEO. The issue of jurisdiction in income security matters was also the subject of a Working Paper on The Constitution, Income Security and Social Services (1969).
- 6 It is noteworthy that the "Orange Paper" advocated a guaranteed income only for those who could not work; that is, the issue of income guarantees on work incentives becomes irrelevant since the guarantee only applies to those for whom no work response is possible. Family allowance changes were also a major part of the recommendations of the "Orange Paper". The nature of the discussion concerning family allowances in Canada was distinctly different from that in the United States. To a large extent the OEO viewed family allowances and the NIT as competing alternatives. On the other hand, Canada had a long history of monthly payments to families with children irrespective of income originating with the passage of the Family Allowances Act in 1944. The "Orange Paper" proposals recommended higher amounts for family allowances, that these allowances be taxable, and that there be provincial discretion, within limits, to vary the benefits formula.
- 7 I shall be concerned here only with events and the course of the Social Security Review up to 1975, the time when the Manitoba experiment began. For a description of the background to the Social Security Review to 1975 see Johnson (1975).

- 8 Speech to the Canadian Institute of Chartered Accountants, "A pilot project in Manitoba on a Guaranteed Annual Income proposal by the Government of Manitoba". It is not clear whether a demonstration or a truly scientific experiment was being proposed but that doesn't matter. Heather Ross' initial proposal was, technically speaking, also a demonstration. Manitoba would have been undoubtedly prepared to effect policy decisions on the basis of a demonstration as would perhaps some quarters in the federal government. Nevertheless, the idea of a true experiment was readily accepted by both parties.
- 9 This comment is limited solely to the income support and supplementation proposals of the Review and its relation to questions connected with the Mincome Manitoba experiment. Not only are these remarks from this special perspective incomplete in the sense of a detailed critique of the Social Security Review, they are also "premature" as the author is currently studying other aspects of the Review.
- 10 Communique of meeting of Federal and Provincial Ministers of Welfare, April 30 - May 1, 1975.
- 11 Communique of meeting of Federal and Provincial Ministers of Welfare, November 19-20, 1974.
- 12 "Cost of the Federal Guaranteed Annual Income Proposal", Ontario Tax Studies, No. 10. Ministry of Treasury, Economics and Intergovernmental Affairs, April 1976.
- 13 Communique of meeting of Federal and Provincial Ministers of Welfare, February 3-4, 1976.
- 14 Communique of meeting of Federal and Provincial Ministers of Welfare, June 1-2, 1976. Proposed design features were given in a lengthy appendix to this communique.
- 15 The chronology deserves emphasis. The Manitoba proposal for an experiment was submitted to Ottawa in March 1973, two months after the January 1973 Throne Speech calling for a social security review and one month before the release of the "Orange Paper". During the last year of the Review (May 1975 - June 1976) Mincome Manitoba was busy still enrolling participants in the experiment and making initial payments.

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WEALTH

What is the real wealth of economic families? While the statistical evidence suggests that, from 1970 to 1977, the average net worth or wealth of Canadians has more than doubled (in current dollars), the accurate and detailed measurement of wealth remains fraught with problems. The presented papers and the ensuing discussions addressed the levels and trends in light of these problems.

While all agreed that improved data on wealth are needed, there are also questions as to the joint distribution of wealth and income and how wealth is accumulated. In fact, there were advocates of a combined measure of income and wealth as well as opponents of this approach among delegates. In summary, however, it was agreed that an improved understanding of wealth, and its various forms, would assist in the design and implementation of policies aimed at improving current economic well-being; assistance to those most in need requires more information on assets which generate current income, such as pensions, insurance and savings, as opposed to assets which are more clearly "fixed".

THE 1970 SURVEY OF CONSUMER FINANCE,
NONSAMPLING ERROR, AND
THE PERSONAL DISTRIBUTION OF WEALTH IN CANADA

by

James B. Davies*

1 INTRODUCTION

This paper presents a critical review of the results of Statistics Canada's 1970 Survey of Consumer Finance ("SCF"). This survey, like those conducted in 1955, '58, '63, and, very recently, in the Spring of 1977, examined not only the incomes of Canadian families but their assets and net indebtedness as well. Since the 1970 SCF was more comprehensive than earlier surveys and the 1977 results have not yet become available, the 1970 SCF has provided the best evidence on patterns of asset and debt-holding in Canada. This evidence is potentially useful in a wide range of applications. First, it can be used to help construct "broad" measures of annual income. Second, a satisfactory appraisal of the impact of changes in our tax system -- alterations to estate and capital gains tax, the treatment of owner-occupied housing, and provisions affecting saving for retirement, for example -- depends on the availability of accurate information on the distribution of a wide variety of assets and debts. Finally, of special concern in this paper, the range of assets and debts covered by the SCF is sufficiently broad to allow estimation of the size distribution of personal wealth in Canada. This distribution is of interest not only because of the possible association of wealth and power in our society, but because, other things equal, where the dispersion of wealth-holding is greater, so also may be economic inequality.

Given the importance of evidence on the distribution of assets and debts it is of concern that sizable discrepancies between many aggregate holdings implied by the SCF and independent totals have been observed. These discrepancies are well-known, and are similar to gaps observed for surveys conducted in the U.S. and U.K. Since the discrepancies -- which take the form of apparent survey underestimation in almost all cases -- are typically large, before making any use of the survey results one should clearly ask whether they provide at all reliable information. The contribution made by this paper is a close examination of this question. A careful assessment of errors in all aggregates is made, and evidence on the possible importance of sampling and nonsampling errors in generating the apparent biases is reviewed. It is concluded that the impact of pure sampling error is likely slight and that most responsibility for any 1970 SCF underestimation must lie with nonsampling error. Those assets for which SCF data may be least subject to error, as well as those where SCF evidence should not be taken at face value are identified. This is important not only as a guide to those making use of 1970 SCF data, but as an aid in evaluating and interpreting studies which have made use of this data, and as an indication of the areas in which the 1977 SCF should be looked to most hopefully for improved results.

*This paper is largely based on Chapters 4 and 5 of my thesis presented to the University of London. I have benefitted from the comments of Tony Shorrocks and John Whalley, as well as the help of Gail Oja of Statistics Canada and Michael Wolfson of the Department of Finance, who provided the detailed tabulation of 1970 SCF data required for this project. A special word of thanks is due to Alan Harrison, whose comments on a previous draft, especially with regard to international evidence, were extremely helpful. James B. Davies is an Associate Professor of Economics at the University of Western Ontario.

The final contribution of the paper is the use of Canadian and foreign evidence on nonsampling error to make experimental revisions to the overall size distribution of wealth. It is clear, first, that our view of mean wealth-holding should be revised upwards considerably. It is not clear, however, whether the 1970 SCF view of wealth-inequality is strongly biased, as offsetting effects of different aspects of nonsampling error can be identified. After investigating a range of possible revisions making use of upper and lower bound assumptions on the severity of different types of nonsampling error, it is concluded that a fairly small upward revision in estimated wealth-inequality would take place if nonsampling error were completely corrected. Surprisingly, the extent of this required revision is negligible in comparison to the required change in our view of the relative importance of different assets and debts, the net worth of different income groups, and the overall scale of wealth-holding.

The paper is organized as follows. Section 2 sets out the 1970 SCF estimate of the distribution of net worth among Canadian families, and compares the estimated level of wealth-inequality with levels observed in other countries. Section 3 then presents a full independent balance sheet for the household sector in Canada at the time of the survey, which is compared with that implied by the SCF. In Section 4 I then examine the plausibility, and possible causes, of the underestimation of assets and debts attributed to the SCF in Section 3. It is found that while sampling error likely explains little of the overall underestimation, nonsampling error may easily have been sufficiently severe to explain the apparent errors in aggregates. Finally, Section 5 presents the experimental corrections to the SCF estimate of the overall distribution of wealth referred to above.

2 THE 1970 SCF ESTIMATES AND INTERNATIONAL COMPARISONS

Table 1 sets out the shape of the SCF-estimated distribution of personal wealth in Canada in the Spring of 1970. "Wealth" is the sum of financial and tangible assets minus all debts. Equity in life insurance plans, pension rights, and consumer durables other than cars and houses, are excluded, as it is difficult to obtain evidence on such holdings by survey means. "Family units" are defined as groups of persons related by blood, marriage or adoption sharing a common dwelling unit, and therefore range in size from the unattached individual to the large extended family. The survey results are based on interviews with the members of about 10,000 such units.

The statistics presented by Table 1 -- except for mean or median -- show the "shape", or, to use an unfortunately value-laden term, the "degree of inequality", exhibited by the estimated size distribution. [1] Attention frequently focuses on the shares of top groups in the study of wealth-inequality since a remarkable aspect of wealth distribution is the high concentration in the upper tail. To those accustomed to the shares shown by cross-section income data, those of Table 1 will seem high indeed. However, by the standards of international evidence on wealth distribution -- mainly from the U.S. and U.K. -- they are not exceptional. The principal source of evidence in other countries are estimates obtained by applying "mortality multipliers" to the observed distribution of estates left at death. If care is taken quite good estimates of the upper tail of the distribution of wealth can be obtained in this way. [2] As reported in the recent survey by Harrison (1979a) such "estate multiplier" estimates place shares of the top 1, 5 and 10 per cent of adult individuals at about 22-25, 44, and 53 per cent respectively in the U.S. in 1969. [3] Shares of the equivalent groups in Britain estimated by Atkinson and Harrison (1978, p. 123) were 33, 56, and 69 per cent in 1970. [4]

Unfortunately the 1970 SCF and foreign estimates are not directly comparable for two reasons. First, both the U.S. and British figures, unlike the Canadian, include all consumer durables and the cash surrender value of life insurance policies. Second, the SCF estimates are for families, the foreign for individuals. Since both consumer durables and insurance equity are of declining relative importance as wealth rises [5] their inclusion in the foreign estimates likely reduces apparent concentration relative to the SCF. On the other hand use of an individual basis in the foreign estimates raises apparent concentration relative to the SCF. The net result of eliminating assets excluded from the SCF and adopting a family basis could therefore either be a rise or decline in the estimated top shares in the U.S. and Britain. While in view of the offsetting nature of the corrections it seems likely the British shares when adjusted would remain well above the SCF, there is insufficient evidence to judge whether the U.S. shares would still stand above the SCF after adjustment. With available evidence the 1970 Canadian SCF cannot therefore be claimed to have displayed a low level of wealth-inequality by international standards.

3 THE BALANCE SHEET OF THE HOUSEHOLD SECTOR

The main indication of possible error in the 1970 SCF estimates is the discrepancy between the balance sheet aggregates they imply for households and independently-estimated totals. These were first noted in Emmerson's appendix to Podoluk (1974). Emmerson presented figures for total financial assets and debts of the personal sector at the time of the survey. This paper goes a step further by presenting a full independent balance sheet, including figures for tangible as well as real assets, for the household sector. [6] SCF and independent balance sheets are compared in Table 2.

The figures shown in the independent balance sheet of Table 2 were obtained using a variety of methods. The most important source was Statistics Canada's own Flow-of-Funds year-end levels statement. This embraces all financial assets and debts, but is on a personal sector basis. Using Canadian data in some cases, and relationships drawn from U.S. balance sheets in others, deductions from the Flow-of-Funds figures were made to obtain the "institutional" totals shown here. In some cases the figures are not highly reliable since Flow-of-Funds estimates for the personal sector are obtained by deducting from estimated global totals the holdings of other sectors. Errors can therefore arise from a number of sources -- that is, from error in the global total, in the deductions for other sectors, or in deductions made here for the nonhousehold elements of the personal sector. In cases where global totals are well-known and the deductions for other sectors are small (e.g. Canada Savings Bonds and savings deposits) the error in institutional totals is likely acceptable. However for other items the error may be very large. A striking case is that of domestic share-holding. Here the Flow-of-Funds global total was estimated by taking the book value of all Canadian corporations. In the short-run, of course, the market's evaluation of firms in aggregate may differ widely from this total.

In view of the limitations of the institutional estimates, in deriving the independent balance sheet of Table 2 a check was obtained wherever possible by the "investment income multiplier" method. National accounts data on incomes from certain assets can be multiplied up by the inverse of observed average yields to obtain estimated household aggregate holdings. Only in the case of shares, however, is the resulting figure judged comparable to, or of higher quality than, the institutional total. [7] For shares the independent balance sheet therefore uses a simple average of the institutional and multiplier estimates of \$27.6 billion and \$25.1 billion respectively for domestic stock, and adds \$0.4 billion (multiplier estimate) for foreign stock.

The multiplier method was also useful in providing estimates for business equity and the value of nonowner-occupied real estate, for which no other independent totals were available. Again national accounts data on income flows were used. Unincorporated business income was multiplied up by the ratio of equity to net income of unincorporated business in the U.S., while rents were multiplied by the inverse of an estimate of the rate of return on nonowner-occupied real estate. [8]

A third class of estimates, obtained by the perpetual inventory method, were used to check SCF totals for owner-occupied houses and autos, and to gauge the importance of omitted durables. This method cumulates the value of past expenditures on the durable in question, correcting for price changes, and assuming straight-line depreciation. For houses, assuming a service life of 60 years, a total of \$51 billion is obtained while for cars a service life of 11 years implies a total of \$14.6 billion. [9] Finally for omitted durables, assuming service lives used by the Federal Reserve Board in its perpetual inventory estimates, one obtains a 1970 total of \$22.6 billion. As can be seen from Table 2 the SCF figures for both houses and cars have been retained in preference to the perpetual inventory. Price indexes for housing are very poor, the estimate omits the value of land, and aggregate housing values reported in surveys have been proven strikingly accurate in validation studies. For autos the SCF used a standard reference work on used car values rather than owner-evaluation and there are other reasons to expect accuracy. [10] The discrepancy between the SCF and perpetual inventory figures likely reflects the inadequacy of the straight-line depreciation assumption. Finally, the figure for omitted durables has been reduced by the same proportion as the SCF total for cars falls below the perpetual inventory figure, on the assumption that the proportionate error introduced by the straight-line depreciation assumption for other durables might be similar to that for cars.

If we accept the independent estimate of the household balance sheet as an accurate representation of the wealth-holding of Canadian families in 1970 for the moment, it appears that overall the SCF underestimated household net worth by 46 per cent. If we restrict the comparison to assets and debts covered by the SCF the apparent error falls to 35 per cent. If all types of assets and debts, and the wealth of all families, had been underestimated by about this proportion the damage would not be serious. [11] However, the degree of underestimation varies widely between asset and debt categories. At one extreme we have an apparent overestimation of one item, mortgages, by 10 per cent, while at the other we have underestimation of bonds (other than Canada Savings Bonds) and shares by 78 and 80 per cent, respectively. If the indicated pattern is correct, one should become quite cautious in using SCF evidence on the distribution of most assets and debts. The only information from the survey which could possibly be taken at face value would be that concerning home and car ownership and (to a lesser extent) mortgages.

A preliminary indication that the independent balance sheet does not exaggerate underestimation in the 1970 SCF results is given by the similar discrepancies observed for comparable sample surveys in the U.K. and U.S. Underestimation of liquid assets (all deposits and bonds) averaged 39 per cent in four U.K. surveys, and 49 per cent in two U.S. surveys where careful comparisons with independent balance sheets were made. [12] These errors are not much less than that of 59 per cent attributed here to the SCF. Apparent shortfalls of corporate stock in the 1958 Federal Reserve SFC of 74 per cent, and of total debt in the 1958 and 1963 Federal Reserve SFC's of 17 per cent, are similar to those of 80 and 25 per cent found here. [13]

4 NATURE AND POSSIBLE IMPORTANCE OF DIFFERENT TYPES OF SURVEY ERROR

The balance sheet discrepancies set out in the previous section must be interpreted with caution since there are numerous possible sources of error in the independent estimates. Although it is hard to believe these would cause such one-sided bias, one should therefore not jump immediately to the conclusion that the SCF estimates are fundamentally flawed. The purpose of this section is to see whether the degree, and pattern, of underestimation attributed to the SCF by the independent balance sheet are plausible.

Survey biases may arise due to sampling or nonsampling error. It has often been pointed out that in sampling from a highly skewed distribution mere sampling variation could cause error in estimated aggregates much greater than would otherwise be obtained. The possible severity of this problem was investigated in Davies (1979a) by taking 100 repeated random samples of SCF size from a theoretical frequency distribution given a realistic degree of positive skewness. [14] Although it was found that, as expected, in a majority of cases mean hypothetical net worth was underestimated, the degree of underestimation never exceeded 12 per cent, and was less than 10 per cent in 96 cases. It therefore seems unlikely that sampling error could explain more than a small part of the underestimation attributed to the SCF in the previous section. [15]

The second type of survey bias, caused by nonsampling error, may arise from two distinct sources. First, those who respond to the survey ("respondents") may not form a representative sample. For example, it has been observed that there is a systematic relation between family income and the likelihood of response. Such "differential response" could clearly also be present by size of wealth. In surveys of consumer finance the impact of this type of error is reduced by weighting units according to characteristics like age, region, employment status of head and sometimes income, whose population distribution has previously been estimated. Since such characteristics are correlated with wealth, in a survey like the 1970 SCF the problem of "differential response" is corrected to some extent. The second type of error is misreporting (usually under-reporting) by respondents.

The possible importance of differential response according to size of wealth is hinted at by Table 3. This shows the variation of response rates to the 1970 SCF by region and urbanization category. A clear indication of negative association of response rates and levels of income and wealth emerges. (The correlation of the response rate and mean Census income across cells is $-.73$.) As stated above, however, since wealth is correlated with weighting characteristics -- family size, region, and sex and employment status of head [16] -- if there is a problem of differential response according to size of wealth it will have already been partly removed in the 1970 SCF estimates.

A second indication of the pattern of differential response, according to income, is shown in Table 4. The 1963 Federal Reserve SFC, referred to above, used prior information from Census and tax sources to ascertain the income of respondent units. [17] As the table shows, it was found that the response rate, although increasing slightly at the lowest income levels, declined continuously with income thereafter -- from a high of 89 per cent to a low of 37 per cent. If a similar pattern held for differential response according to wealth in the 1970 SCF, significant error in the estimated distribution of wealth may have been introduced.

Further information on differential response and reporting error has been obtained in a large number of "validation studies"

conducted in connection with surveys of consumer finance mainly in the United States. [18] Prior information is usually obtained from institutional sources on actual holdings of assets like bank deposits or shares, and various types of debt. It is then possible to study the influence of differential response and misreporting in detail. A major conclusion of these studies is that both differential response and reporting errors are typically large, but vary widely between different types of assets and debts.

Validation studies have shown repeatedly that differential response and reporting problems in total cause little error in estimates of the value of owner-occupied housing, but underestimation of up to 30 per cent, and from 14 to 67 per cent, for new car debt and bank deposits respectively. [19] These patterns are strikingly similar to those implied by the balanced sheet comparison of Section 2. A single validation study has also been performed for corporate shares, in connection with the 1963 Federal Reserve SFC. This found underestimation of 35 per cent -- sizable, but much less than that apparent in the 1970 SCF (according to Table 2) or the other surveys referred to in the previous section. [20] The explanation for this difference appears to lie in unusually careful survey procedure. [21]

More detailed insights are provided by the validation studies in the U.S. First, differential response alone in some cases has tended to cause overestimation (e.g. for new car debt), but normally accounts for about 20-50 per cent of total underestimation. The most important insight that has been gained concerning the more important reporting error, is that it is largely caused by complete nonreporting by some respondents. [22] In addition, there is some evidence that both such nonreporting by some, and underreporting by others, increase in relative severity as the size of financial holdings rises. [23] In contrast, such a pattern is not observed for the reporting of housing values. [24]

5 CORRECTING THE 1970 SCF FOR NONSAMPLING ERROR

The previous section has shown that the pattern of underestimation attributed to the 1970 SCF in Table 2 accords closely with independent evidence on the nature of survey error. In addition, it has been made clear that the responsibility for underestimation must lie largely with nonsampling error. This section assesses the quantitative impact of such error on the 1970 SCF estimate of the distribution of wealth in Canada. The goal is to place upper and lower bounds on the possible extent of bias, using the evidence provided by the independent balance sheet of Table 2 and foreign studies of survey error discussed above. "Best guess" estimates are also presented, but these should be viewed in the light of the range of plausible figures indicated by the upper and lower bounds.

Correcting differential response according to size of wealth in the 1970 SCF is a speculative venture. As this section shows that the impact of such error on estimated inequality is likely small, this is not damaging. A plausible upper bound on the impact of this error can be obtained by assuming that the pattern of differential response by size of wealth was similar to that according to income in the 1963 Federal Reserve SFC (see Table 4), and that none of this differential response was corrected by the survey weighting procedure. [25] A natural lower bound is provided by the assumption that all differential response had been corrected.

A lower bound on the influence of reporting error can be obtained by assuming that after differential response is corrected, all remaining balance sheet discrepancies are due to uniform asset- (and debt-) specific underreporting across wealth classes. As indicated in the previous section, there are strong

indications that for some financial assets the relative severity of underreporting increases with the true size of holding. Since it ignores this likely important source of equalizing bias the uniform proportional underreporting correction almost certainly provides a lower bound. An upper bound can be obtained by assuming that proportional underreporting increases at a steady rate with the true size of holding for all financial assets, and debts. It is assumed for this purpose that the elasticity of reported holdings with respect to true holdings is constant at 0.9. [26] Clearly, the actual pattern of underreporting could be even more damaging than reflected in this assumption. One must therefore be less certain of the limit set by this "upper bound" than of that set by the lower bound discussed.

The results of five alternative corrections to the SCF estimates, using the upper and lower bound assumptions on nonsampling error, are shown in Table 5. One striking aspect of these results is the indication that differential response, if not completely corrected by the survey weighting, may have caused the estimated distribution to be more, rather than less, unequal. The explanation is that we assume low wealth-holders had higher than average response, as well as that the wealthy had low response. While correcting the latter tends to make the estimated distribution more unequal, removing the former hypothetical bias is strongly equalizing. Although the net effect could differ with slightly different assumptions, differential response clearly does not necessarily reduce estimated inequality as measured by conventional indexes.

Table 5 shows that the plausible range of impacts of non-sampling error, given our basic assumptions, is surprisingly narrow. The difference between the top shares and summary indexes in the most extreme corrections does not exceed 15 per cent. Under the fundamental assumptions made -- that the Table 2 balance sheet is accurate, that differential response by wealth size after Statistics Canada's weighting would be no more severe than that according to income before weighting in the 1963 Federal Reserve SFC, and that underreporting would never decline in severity with rising true holding -- the re-estimated distribution is strikingly robust. It is therefore very interesting that the "best guess" figures indicate only a small required upward revision in the 1970 SCF view of wealth inequality in Canada. [27] The explanation is that although nonsampling error, which there is no doubt is large, appears at first to introduce a strong equalizing bias, there are in fact important offsetting influences. The low response of the rich, for example, may be offset by the high response of the poor, while the severe underreporting of assets like bonds and shares competes with that of popular assets like cash and savings accounts.

6 CONCLUSION

This paper has investigated the reliability of the 1970 Survey of Consumer Finance estimate of the distribution of wealth in Canada. Although it is shown that with available foreign evidence the estimated level of wealth-inequality cannot be rejected as implausible by international standards, we have seen that there are alarming discrepancies between the SCF-implied balance sheet for the household sector, and the balance sheet which can be estimated from independent evidence. There is apparently severe underestimation of most asset and debt totals, with the extent of underestimation varying considerably between different assets and debts. These discrepancies are strikingly similar in both pattern and extent to those observed for surveys in both the U.S. and U.K. In addition, numerous validation studies of response to surveys of consumer finance, conducted mainly in the U.S., show that nonsampling error can create discrepancies on the scale, and of the pattern, suggested. Sampling error has been dismissed as an important contributor to

this underestimation, on the basis of a Monte Carlo study. Using the pattern of differential underestimation indicated by the balance sheet comparison and information gained from foreign studies of nonsampling error, the paper has concluded by making experimental corrections to the SCF estimate of the distribution of wealth. These place tentative upper and lower bounds on the extent of required revision in estimated wealth-inequality. Under the assumptions that the balance sheet of Table 2 is accurate, that differential response by size of wealth after Statistics Canada's weighting is no more severe than according to income before weighting in the 1963 Federal Reserve SFC, and that underreporting never becomes less severe (proportionally) as true holdings rise, the range of plausible impacts of nonsampling error is narrow. The "best guess" re-estimated distribution presented is therefore surprisingly robust, and it is extremely interesting that it indicates a fairly small required upward revision of estimated wealth-inequality in Canada. As pointed out in the final section the reason is not that the 1970 SCF did not suffer badly from nonsampling error. Rather, the errors are severe, but their separate impacts on estimated inequality appear to have been largely offsetting.

The exercise carried out in this paper has important implications for current and future research. First, users of 1970 SCF data on all assets and debts, with the possible exceptions of data on owner-occupied housing, cars, and mortgage debt, must exercise caution. Estimates of the impact of changes in tax provisions depending on asset and debt-holding, for example, cannot be accurately made without some correction to the survey data. Secondly, while the experimental corrections of the final section have shown that in the case of the 1970 SCF the effects of nonsampling errors on estimated wealth-inequality may have been largely offsetting, reliance on this kind of "self-correction" is clearly dangerous and unreliable. Since other methods of assessing the distribution of wealth are not likely to become available in Canada in the foreseeable future it is important that there should be a constant search for new means of reducing survey error. It is therefore gratifying that Statistics Canada has taken steps in its 1977 SCF to attack differential response and other problems more effectively than in the 1970 survey. We must look forward to the presentation of the new results with anticipation and hope that further surveys will be taken at frequent intervals in the future.

Table 1

The SCF Estimate of the Personal Distribution of Wealth,
Family Units, Canada, 1970 ¹

Share of top 1%	18.0%
5	39.2
10	53.1
20	70.7
next 40	28.6
bottom 40	0.7
Coefficient of Variation	2.315
Gini Coefficient	.715
"Exponential" Inequality Measure ²	.527
Mean	\$18,164
Median	7,581

¹ Approximately 2 per cent of families, for whom the value of business equity could not be ascertained, are excluded. This accounts for the difference in mean wealth between this table, and Table 2.

² See text for explanation.

Source: Computations described in the Appendix A using tabulations provided by Dr. M.C. Wolfson.

Table 2

SCF Estimate of the Balance Sheet of the Household Sector, End of the First Quarter, 1970, and an Independent Estimate

	SCF Estimate	Independent Estimate Amount	Method ¹
Financial Assets			
Cash	\$ 484m	\$ 1,000m	I
Bank Deposits	9,650	20,600	I
Savings Deposits in Other Institutions	4,101	11,600	I
Bonds	6,581	17,000	I
- Canada Savings Bonds	4,259	6,600	
- Other	2,322	10,400	
Shares	5,416	26,700	(I+M)/2
Life Insurance and Funded Pension Plans	n.a.	26,500	I
Other Financial Assets ²	5,709	12,100	O
Equity in Business Interests	24,069	29,400	M
Tangible Assets			
Owner-Occupied Houses and Vacation Homes	67,496	67,500	SCF
Other Real Estate	9,123	18,000	M
Automobiles	5,663	5,700	SCF
Other Consumer Durables	n.a.	8,800	P
TOTAL ASSETS	138,292	244,900	
Debts			
All Mortgages	14,121	12,800	I
Personal Debt	6,773	15,200	I
- Consumer	5,027	10,700	
- Other Bank Loans	425	1,700	
- Other Loans	1,321	2,800	
TOTAL DEBTS	20,894	28,900	
NET WORTH	117,398	216,900	
NET WORTH PER FAMILY UNIT	18,225³	33,672	

1 I = institutional method,
M = investment income multiplier method,
O = altered in same proportion as all other financial assets,
SCF = SCF estimate retained after examination of alternatives,
P = perpetual inventory method.
(See text for explanation of these methods.)

2 Includes annuities, mortgage holdings, interest in trust funds or estates, loans to persons, and royalties, copyrights, etc.

3 This figure differs from mean wealth in Table 1 since Table 1 excludes families for which the value of business equity was not ascertained.

Source: Most of the SCF estimates are from Podoluk (1974, p. 207). The remainder are calculated from mean values given in Statistics Canada (1974, #13-547). The independent estimates are derived by procedures described in the text.

Table 3

Response Rates to the 1970 SCF by Region and Urbanization Category

Region	Urban Areas 15,000 +	Small Urban Areas	Rural Areas	Total
(per cent)				
1. Atlantic Provinces	75.0	77.7	81.6	78.0
2. Quebec	76.4	78.3	85.1	78.1
3. Ontario	68.9	80.2	73.7	70.8
4. Prairie Provinces	76.0	79.0	79.2	77.3
5. British Columbia	68.6	72.5	74.5	69.9
Canada	72.7	78.3	79.7	74.9

Source: Statistics Canada (1973, #13-547, Table 1, p. 80).

Table 4

Response Rates to the 1963 Federal Reserve Board
Survey of Financial Characteristics, by Income Class

Income Class \$,000	Response Rate (per cent)	Income Class \$,000	Response Rate (per cent)
0 - 3	86.9	15 - 25	72.9
3 - 5	89.1	25 - 50	65.5
5 - 7.5	85.0	50 - 100	50.3
7.5 - 10	82.9	100+	37.1
10 - 15	74.1	All	82.9

Source: Calculated from Projector and Weiss (1966, Table 15, p. 52).

Table 5

Experimental Corrections to the 1970 SCF Estimate of the Distribution of Wealth¹ in Canada

Differential Response Assumption ²	Lower Bound	Upper Bound	Lower Bound	Upper Bound	"Best Guesses"
Underreporting Assumption ³	Lower Bound		Upper Bound		
	(per cent)				
Share of top 1%	19.2	18.4	21.2	20.2	19.6
5	42.8	41.6	45.7	44.6	43.4
10	57.5	56.6	59.8	59.0	58.0
20	74.2	73.2	75.3	74.4	74.0
next 40	25.9	26.5	24.7	25.2	25.8
bottom 40	-0.1	0.3	0.0	0.4	0.2
Coefficient of Variation	2.463	2.403	2.686	2.620	2.519
Gini Coefficient	.748	.737	.758	.747	.746
"Exponential" Index	.562	.551	.573	.562	.560
Mean ⁴	\$27,600	27,600	27,600	27,600	27,600
Median	\$10,900	11,200	10,200	10,800	11,000

1 "Wealth" is defined as in the 1970 SCF except that consumer durables omitted from the survey have been imputed.

2 Lower bound assumes all differential response has been corrected by SCF weighting procedures, upper bound that none has been corrected, and "best guess" that one-half has been corrected.

3 Lower bound assumes the percentage reporting rate for a given asset or debt is uniform across families; upper bound that it declines with respect to the true holding with an elasticity of -0.1 for financial assets, real estate, business equity and debts (no decline for homes and durables); and "best guess" that it declines with elasticity of -0.05.

4 Re-estimated mean wealth differs from mean net worth of the independent balance sheet of Table 2 since (a) the re-estimated distributions omit families for which the value of business equity was not ascertained, and (b) insurance equity and pension rights are excluded here.

Source: Computations described in text.

Table 6

Frequency Distributions -- 1970 SCF and "Best Guess" Re-Estimated
Distributions of Wealth

Wealth Class	1970 SCF (per cent)	"Best Guess" Re-Estimate
Negative	12.6	15.4
Under \$4,999	31.2	23.3
\$5,000 - \$9,999	11.6	9.7
\$10,000 - \$19,999	17.8	16.8
\$20,000 - \$49,999	19.6	22.4
\$50,000 - \$100,000	5.3	7.1
\$100,000 and over	2.0	5.2
Mean	\$18,200	\$27,600
Median	7,600	11,000

Sources: Same as for Tables 1 and 5.

Footnotes

- 1 See Appendix B for the corresponding frequency distribution. Note that the inequality indexes shown all have the desirable property of "mean independence", and satisfy the "principle of transfers". (The values of the indexes do not change if all holdings are altered in equal proportion, and the result of a transfer from richer to poorer is always viewed as equalizing.) The coefficient of variation is most sensitive to the upper tail of the distribution, the Gini coefficient to the middle range, and the "exponential" measure to the lower tail. The "exponential" measure differs from that presented by Wolfson (1977) in being normalized to vary between 0 and 1. It is given by

$$E = \log \left\{ \frac{1}{n} \sum_1 \exp \left(1 - \frac{w_i}{m} \right) \right\}$$

where w is the wealth of the i th unit, m stands for mean wealth, and n units are considered. (See Davies (1979a, Chapter 3).) For a lucid discussion of inequality indexes and the issues involved in inequality measurement see Sen (1973).

- 2 In the "estate multiplier" approach decedents are viewed as a sample of those living at the beginning of a year, where the sampling rates are death rates, usually assumed constant within groups defined by age, sex, marital status, and (normally) social class. The method has never been applied in Canada. The best account of the approach is perhaps that given by Atkinson and Harrison (1978).
- 3 As indicated by Harrison there are two alternative estimates of the share of the top 1 per cent for this year -- the official Internal Revenue Service figure presented by Natrella (1975) and the independent estimate of Smith (1974). Due to the use of lower mortality multipliers and other differences in procedure Smith obtained the lower figure of 22 per cent. Harrison calculates the shares of top 5 and 10 per cent implied by Natrella's data. These are the figures mentioned in the text. Smith did not present data making the calculation of these further shares possible.

Additional U.S. evidence is available from the 1963 Federal Reserve board Survey of Financial Characteristics ("SFC"). This suggests a much higher level of concentration. The estimated share of the top 1 per cent of families, for example, is reportedly 37 per cent. (Lindert and Williamson (1977, p. 85)). Lindert and Williamson explain the discrepancy between the SFC and estate multiplier estimates by reference to survey bias. Their position is basically that nonsampling error caused greater underestimation of net worth in the lower range of the distribution than in the upper tail, although this is not stated explicitly. (Lindert and Williamson (1977, p. 87)). This explanation is not implausible in view of the correction for differential response by different income groups and detailed listing of share-holdings required. (The latter would help to prevent underestimation of net worth for the wealthy.) Serious consideration should perhaps be given, however, to the possibility that the full discrepancy between estate multiplier and SFC estimates is not due to the deficiencies of the latter.

- 4 As in the U.S., there are alternative estimates of the distribution in Britain. I refer to the estimates of Atkinson and Harrison since they are the most advanced. It should perhaps be pointed out that somewhat lower shares were obtained earlier by the Royal Commission on the Distribution of Income and Wealth (1975).
- 5 See, e.g., Natrella (1975, p. 14) for insurance, and Davies (1979a, Chapter 5) and Projector and Weiss (1966, p. 110) for durables.
- 6 The personal sector includes nonprofit organizations and unincorporated business in addition to households.

- 7 The investment income multiplier estimates may err due to error in the estimated flows or, especially, in the estimated average yields. Only in the case of shares would I consider the institutional total as unreliable as the investment income estimate.
- 8 This estimate was obtained as follows. The ratio of national accounts imputed rental income of persons to the independent balance sheet figure for housing equity was assumed to show an equilibrium after-tax rate of return in housing markets (7.6 per cent). Adding an allowance for tax, a rate of 9 per cent was obtained for the gross return on real estate let in the market.
- 9 The 60 year service life for houses is perhaps low, but is imposed by data constraints. An estimate of the average service life of cars in Canada was obtained by cumulating sales in years prior to 1970 until a total equal to the number of cars in service in 1970 was reached.
- 10 Some of the important causes of survey underestimation, as noted in Section 4, are complete nonreporting of an asset by many respondents, and lower response rates for owners of larger holdings. These factors are likely much less important for cars than for many other assets.
- 11 That is, accurate figures could be obtained by uniform upward revision.
- 12 The U.K. surveys (the Oxford Savings Surveys) were conducted in 1952, '53, '54, and '55, while the U.S. studies are the 1958 and '63 Federal Reserve SFC's. For the comparisons quoted see Ferber (1966, pp. 26 and 35), and Projector and Weiss (1966, p. 61).
- 13 Note that apparent underestimation of shares in the 1963 Federal Reserve SFC was only 21 per cent. This survey implemented special procedures to obtain reliable information on shareholding not used in the 1970 SCF. (See footnote 2.)
- 14 Details are also given in Davies (1979b).
- 15 On the other hand, greater variability in sample measures of dispersion than in those of central tendency was found in the Monte Carlo exercise. From the point of view of obtaining an accurate view of the shape of the distribution, sampling error may therefore be quite important. This is partly why it is important to oversample in the upper tail of the distribution, as in the 1963 Federal Reserve SFC, and the 1977 Canadian SCF.
- 16 Statistics Canada (1973, #13-547, p. 182).
- 17 This allowed it to weight according to income, and therefore remove more differential response than has been corrected in the 1970 SCF estimates.
- 18 These are reviewed in detail in Davies (1979a, Chapter 5), and Davies (1979b, Section 4).
- 19 See Davies (1979a, and 1979b). The studies referred to are reported in Ferber (1966), and Ferber et al. (1969a, and 1969b), Kish and Lansing (1954), and Kain and Quigley (1972).
- 20 The shortfall of 35 per cent in the validation study differed from that of 21 per cent in the 1963 SFC itself since a) the validation study figure is for number rather than value of shares, and b) separate interviews (using SFC interviewers, questionnaires, etc.) were used.
- 21 Detailed lists of shares held were required and values were assigned by reference to published share prices.
- 22 See Ferber et al. (1969a, p. 436).

- 23 See Ferber et al. (1969a, p. 437 and pp. 441-442), and (1969b, p. 417).
- 24 See Kish and Lansing (1954, p. 529).
- 25 Above the lowest income class there is a strong linear relation between response rate and log income in the 1963 Federal Reserve SFC. A linear relation between response rate and log wealth was therefore assumed for the 1970 SCF (except for the lowest few groups), and was parameterized by assuming the proportional deviation of response rates from the mean rate in Canada the same as in the U.S. at median and upper quartile. See Davies (1979a, Chapter 6), and Davies (1979b, Section 5).
- 26 The hypothetical level of reported holdings was determined as follows in each re-estimation. The differential response correction was made first in each case. This resulted in a per cent change in mean wealth which could be compared with the required upward movement of about 52 per cent. The hypothetical per cent reporting rates for each asset and debt were then uniformly adjusted so that the correction for underreporting would just complete the required 52 per cent rise in overall mean wealth.
- 27 See Appendix B for a comparison of the 1970 SCF and "best guess" re-estimated frequency distributions.

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APPENDIX A

COMPUTATIONAL METHODS

This appendix describes the method used to calculate the inequality indexes presented in this paper. A detailed tabulation giving the composition of wealth for eighteen wealth classes, with seven age and two family-size groups, was made available by Dr. M.C. Wolfson (now with the Canadian Department of Finance). Micro data from the 1970 SCF is unavailable as the survey is subject to the restrictions on data dissemination imposed by the former Statistics Act.

Estimation of inequality indexes on the assumption of degenerate distributions within wealth classes was rejected as liable to introduce significant bias. Instead a theoretical frequency distribution suggested by Singh and Maddala (1976) was fitted for each age -- family-size distribution by the method of x^2 minimization. (Inferior fits were obtained with other theoretical distributions, such as the three parameter Champernowne, which have previously been noted to approximate distributions of income and wealth fairly well.) Samples of size five hundred were then taken for each age-family-size group in such a way that the SCF-indicated frequencies, and means, were retained within wealth classes. The purpose of the fitted distribution is merely to interpolate within wealth classes and allow extrapolation into the open-ended upper and lower extreme classes.

Samples of size five hundred were used in the research reported here as this is the sample size employed in the simulations of Davies (1979a). Using a uniform sample size helped to reduce the importance of grouping error in that study.

APPENDIX B

1970 SCF AND "BEST GUESS" RE-ESTIMATED FREQUENCY DISTRIBUTIONS

Table 6 shows the frequency distributions for the 1970 SCF estimate and "Best Guess" re-estimate. Note that the 1970 SCF distribution here diverges slightly from that given in Statistics Canada (1973, #13-547, Table 97, p. 153). This is likely due to minor key punch error in the preparation of tabular material for computer use.

INEQUALITY OF THE WEALTH DISTRIBUTION IN CANADA
1970 AND 1977

by

Gail Oja*

INTRODUCTION

During the last decade, the income distribution in Canada has received a lot of attention. Availability of annual data on money incomes and policy concerns in respect to the distribution of such income have generated a substantial body of research. Unfortunately, the findings have been less than fully explanatory in respect to the apparent lack of change in the inequality of the income distribution. In addition to the puzzle of the unchanging income distribution, policy-makers and researchers have consistently expressed concern about the limited nature of the money income concept on which most of this research is based. The addition of the wealth dimension has always been considered a valuable expansion of the data in order to assess more fully the "well-offness" of Canadian families and unattached individuals.

Until now, the latest data on incomes and wealth refer to 1970 and this paper will review the situation based on preliminary data for 1977 and attempt to evaluate the changes that have taken place in the distribution of wealth over the 7-year period. These changes will have to be viewed in the light of rapid inflation and changing institutional arrangements. During the 7-year period, the Consumer Price Index rose by more than 60 per cent. In two of the years (1974 and 1975), Canada experienced double-digit inflation. During the period a major tax reform was brought in in 1972 and subsequently, other significant changes in tax treatment were introduced. For the first time in Canada, realized capital gains became taxable, changed provisions for Registered Retirement Savings Plans (RRSP's) opened this savings device to numerous wage earners, and favourable treatment of investment income was introduced. At the same time, private pension plan coverage was expanding, and the CPP and QPP continued to mature and started to make payments to an ever-increasing segment of the older population. One would expect that all these circumstances (plus likely some others) have made a difference to the savings behaviour of Canadians and one would expect to find some changes in the wealth portfolios of households if one compares 1977 with 1970. That the savings behaviour has undergone some major changes is apparent from the high and ever-rising personal savings rate -- during the period the ratio of personal savings to personal disposable income increased from levels of roughly 5 per cent to more than 10 per cent.

DATA SOURCES AND CONCEPTS -- LIMITATIONS OF STUDY

In Canada, household surveys are the only data sources for reviewing changes in the wealth position of the household sector. Due to the discontinuation of federal estate taxes, it is not possible to construct alternative estimates from this source. Current international literature contains a great deal of research on estimates based on the estate tax multiplier method which seems to be the preferred method for deriving wealth estimates. Household surveys are notoriously inadequate for producing satisfactory estimates of aggregate assets and debts. [1] However, this method has numerous advantages. Indeed, estimates by other methods do not normally yield joint income-

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wealth distributions nor any other socio-economic information about wealth holders. Although the underestimates that plague household surveys may have some effect on the distributions, the historical readings indicate that a fairly consistent and reasonable picture emerges from repeated surveys.

In the spring of 1977, the fifth household survey requesting information on balance sheets of families and unattached individuals was conducted. Historically, these surveys have been gradually expanded from covering only liquid assets in 1956 to a fairly complete balance sheet in 1970. Some qualifications and explanations will follow to describe the limitations of the presently used concepts. The only point being made here is that for 1970 and 1977 the data collected were conceptually very comparable and the latest survey, if anything, was an improvement on that taken in 1970. The sample size was expanded and yielded in 1977 over 12,700 usable records as compared to 9,800 in 1970. In 1977 a multiple sample frame design was used in order to improve the coverage of the upper tail of the wealth distribution. Some 184 records were obtained from the supplementary frame of known high-income households. This represents a much lower response rate (about 45 per cent) than that for the general sample -- the total response rate is calculated to have been 79.7 per cent. [2] The additional records obtained from the supplementary sample have mainly affected the share of income held by the tenth decile. The share falls from 26.9 per cent to 26.6 per cent if the records from the second frame are excluded. It should be noted that most of these high-income, high-wealth records were collected in Ontario and belonged to either self-employed or incorporated business people and professionals. [3] Due to this improved representation of business people, it was possible to introduce an improvement in the processing of the survey -- whereas in 1970 answers on business equity were accepted as given by respondents (*i.e.*, nonresponse on this question was treated in tabulations and analyses as nonascertained cases), the 1977 survey applied an imputation technique to eliminate nonresponse on this question if the rest of the data were adequate and enough information existed about the type and size of business. Except for these differences, the two surveys can quite readily be compared -- at least for purposes of so general a review as is attempted here.

The data became available only at the end of 1978 and have been subjected to a limited evaluation. The data are labelled as preliminary for reasons explained in the Technical Appendix. Due to the shortage of time, it has not been possible to apply more sophisticated techniques in comparing inequality of the wealth distribution in the two years. Throughout writing the paper, it became apparent that standardizations or decompositions of the data were essential in order to arrive at more meaningful conclusions. The current paper should only be considered as a very quick and preliminary review and that future work will be required to examine the changes in greater detail -- after the estimates have been finalized.

The Technical Appendix gives detailed definitions of wealth, assets, debts and income as well as some explanatory notes. It is, however, useful to summarize at this point that the wealth definition is, of course, a limited one encompassing only personal nonhuman wealth. Human wealth and collectively owned wealth is excluded as are personal contingent rights to expected income flows. This latter component in the form of pension rights and future insurance receipts plays, no doubt, an important role in the total wealth picture and savings behaviour of individuals. Technical problems have made us exclude it from the surveys. Some limited data about the coverage of pension plans are available and will be presented as a qualifying factor to the main data.

Neither did the survey cover personal nonhuman wealth completely. For example, data were collected only on passenger car(s), whereas all other consumer durables were ignored. Although, in principle, respondents should have reported futures and gold held for speculative purposes, there were no explicit questions on such specialized types of assets and it is likely that a great deal of such items were missed. Respondents simply did not report these items under "other" assets -- a catch-all question. Conceptually, the survey excluded the value of jewellery, art, stamps, coins, etc. The main reason for these exclusions was not only the difficulty of valuation but also the relatively low incidence of significant holdings of this type. Reporting of all assets was to have been at market value; this introduces an element of subjectivity into the estimates as some of the most important assets -- homes, vacation homes, cars -- were accepted as valued by respondents themselves.

In the paper, the term net worth or wealth will be used interchangeably implying that debts as collected in the survey have been subtracted from assets.

WEALTH DISTRIBUTION IN CANADA

The preliminary data indicate that average net worth or wealth of Canadian families and unattached individuals has more than doubled over the seven-year period in current dollars. Due to conceptual difficulties with deflating wealth, it is more useful to look at other measures such as incidences of owning assets or reporting debts and ratios of debt to assets, debt to income, etc. [4] A fairly uniform pattern emerges from such an examination -- incidences of reporting are up for all types of assets (with the exception of publicly traded stocks) and average holdings have increased by a factor of 2.0 to 2.5. No drastic change in the overall relationship of total debts to total assets has occurred. The ratio of consumer debt to income is up by 2 percentage points (from 9.9 per cent in 1970 to 11.7 in 1977). Consumer debt to liquid assets has also risen on the average by approximately 2.5 points (from 24.1 per cent to 26.6 per cent).

Looking at the distribution of wealth or net worth in terms of decile shares (Table 1), the usual pattern of finding more inequality in the distribution for unattached individuals than for families shows up. However, over the seven-year period there appears to be a decrease in the inequality in the wealth distribution for both types of family units. The paper will from now on concentrate on the overall wealth inequality ("all units" in Table 1) and only in a subsidiary way refer to families and unattached individuals separately.

Based on Table 2, overall inequality in the wealth distribution shows a modest but clear decrease. The eight lower wealth deciles gain and the two highest ones lose if 1977 is compared with 1970. The Gini coefficient shows a decline that may not be very large but should be considered as not insignificant -- if compared, for example, with the observed changes in the Gini coefficient for the income distribution. Also, as the sample design in 1977 was more representative of the higher income-wealth tail, these results should be considered particularly important due to the built-in "bias" in the 1977 survey.

It should be noted that the other narrower asset concepts (Table 2) show changes quite consistent with greater equality in the wealth distribution. In all cases shares of the two or three highest deciles fall and shares of the other deciles rise. This is in sharp contrast with the income distribution where the comparison of 1969 and 1976 incomes indicates an increase in inequality in the latter year. One is more reluctant to accept this observation as a "real" phenomenon knowing: (i) that there is considerable variability in the annual measurements of income

inequality for intervening years; and (ii) that the 1977 survey compared to 1970 has a built-in "bias" towards such results due to oversampling high income recipients.

Reasoning employed in (i) raises serious problems. As there are no more frequent measurements for wealth and the comparison here is based on two isolated observations, why consider these readings as trustworthy? The only feeble defence is that there is no known evidence to the contrary. Although asset and debt data have always been considered to be of poorer quality than income data (at least as collected in household surveys), it is possible that the biases are stable and that comparisons of cross-sectional patterns are quite reliable. Clearly, questions can be raised about the reliability of the data and these reservations must be kept in mind. [5]

Table 2 shows decile shares of income, assets and wealth based on ranking families and unattached individuals each time anew by the respective variable (*i.e.*, size of income, asset or wealth). From the figures displayed in the table one can construct "true" Lorenz curves. A different view is presented in Table 3 where records were only ranked once (by the size of the family unit income) and readings were taken of the share of assets, debt and wealth going to each income decile. Here the observed changes seem to contradict the findings from Table 2. It appears that the first four income decile groups have lost in terms of their relative shares of net worth (as well as total assets), the fifth, sixth and seventh deciles show gains, the eighth a loss and the ninth income decile shows the strongest gains in terms of assets, as well as net worth shares. For the top income decile, the situation is mixed -- showing a small share loss in terms of total assets and a small gain in terms of wealth -- changes that are small enough to be possibly within sampling error.

At the same time, the distribution of debts among income deciles has also undergone some change and interacts with the change in the asset distribution to produce the above mentioned redistribution of net worth. Family units with incomes below the median were responsible for 18.4 per cent of total debt in 1970; in 1977 this proportion had risen to 19.8 per cent. There appears a relatively large shift of debt away from the top decile that explains the situation quoted above -- a gain in net worth in spite of a loss of assets.

It is difficult to come up with any other summary conclusion than that the wealth holdings of the lower income groups have relatively speaking decreased from 1970 to 1977. If families and unattached individuals with an income below the national median income held 30.9 per cent of measured wealth in 1970, their share had dropped to 28.9 per cent in 1977.

A partial explanation for the contradiction emerging from Table 2 and Table 3 is the fact that the income distribution in 1976 is more unequal than in 1969 and if wealth is highly correlated with income, this in itself may produce results that point to a less equal wealth distribution in terms of shares of wealth by income groups.

At the same time, one can hypothesize that the correlation between income and wealth is changing. Such would be the case if, for example, a sizable group of younger family units moved from their traditional middle income-middle wealth position up the wealth scale (*e.g.*, possibly due to capital gains accruing on owner-occupied homes) without their income increases in relative terms keeping pace. There is some evidence that something like this is taking place. The two explanations are, by the way, not contradictory but could be both operating simultaneously and producing the conflict between Tables 2 and 3.

Part of the preceding analysis is not very helpful as "gains" and "losses" are discussed as if wealth and income deciles were closed compartments containing the same (or at least the same type of) families. This, of course, is not the case. Not only do constant shifts and changes in relative positions of given families take place but also groups of family units may experience changes in their relative position in the income and wealth distribution -- and not necessarily in the same direction at the same time in respect to these two distributions.

CHARACTERISTICS OF WEALTH HOLDERS

In order to relate the changes in the wealth distribution to particular groups of families and unattached individuals, Tables 4 and 5 show the distribution of family units with selected characteristics by national wealth quartiles for 1970 and 1977, respectively. [6] Table 6 has been added where similar information is shown by income quartiles for 1977 in order to highlight some differences in the income and wealth distributions for that year.

By comparing data in Tables 4 and 5 conclusions can be drawn about the changing relative position of the selected groups in respect to the national wealth distribution. Strictly speaking, conclusions about the internal inequality of the wealth distribution within a group should not be drawn from these data; for such analysis, independent rankings within each group of family units should be established.

Even the crude distributions by quartiles are difficult to summarize as in many cases the group under examination distributes differently when the two years are compared but it is not necessarily clear whether their position is improving or deteriorating.

There seems to be little doubt, however, that family units with heads in the 35-44 and 45-54 age bracket have substantially improved their position. The oldest group of family units, however, appears to be losing ground. The distribution of the youngest group of family units has relatively speaking become worse and that for units with heads aged 25-34 marginally better.

The same changes can be more easily seen by looking at the average wealth holding by age group and relating it to the estimated overall national average. The same conclusions emerge except for the youngest age group where the relationship of the means does not support the statement made above about the worsening relative position of this group.

1970

<u>Family Units with Head</u>	<u>Ratio B/A*</u>	<u>Rank</u>
24 and under	0.07	6
25-34	0.48	5
35-44	1.01	4
45-54	1.50	2
55-64	1.51	1
65 and over	1.17	3

1977

<u>Family Units with Head</u>	<u>Ratio B/A*</u>	<u>Rank</u>
24 and under	0.12	6
25-34	0.51	5
35-44	1.23	3
45-54	1.59	1
55-64	1.51	2
65 and over	1.02	4

* A = average wealth for all units (in 1970, \$18,189; in 1977, \$47,104)

B = average wealth per age group

From the above data it is clear that the ranking by wealth has somewhat changed; relatively large gains in the wealth position of the 45-54 and 35-44 make them now the first and third ranking group, whereas before they occupied the second and fourth spot. The between group differences appear to have shrunk somewhat contributing a minor component towards the observed equalization in the wealth distribution.

We also see from Tables 4 and 5 that family units whose income came mainly from wages and salaries, net income from self-employment or pensions were in 1977 in a better wealth position than in 1970. Those whose income came mainly from transfer payments are worse off in 1977 than in 1970 in terms of national wealth distribution.

The regional distribution by wealth quartiles shows changes that are difficult to interpret with the possible exception that family units in Ontario are continuing to shift into the highest wealth quartile. On the other hand, family units in the Atlantic region seem to be shifting out of the lowest quartile into the two middle quartiles and although they seem to have lost some representation in the top quartile, it all amounts to an improvement in their overall position vis-à-vis the national wealth distribution.

A most puzzling change can be observed in the relative position of homeowners and renters. In 1970, the latter were already concentrated at the lower end of the wealth distribution and have since then lost further ground.

Homeowners, at the same time, do not seem to have experienced an unqualified improvement. Although a smaller proportion of homeowners can be found in the lowest quartile in 1977, the two highest wealth quartiles account for only about 67 per cent of all homeowners, whereas in 1970, 80 per cent of homeowners had wealth in excess of the median wealth holding. An unexplained shift into the second quartile seems to have occurred.

As the equity in owner-occupied homes occupies such a dominant position in the wealth portfolios of families and unattached individuals, it will be further examined in Section 5 of the paper. Here it may be helpful to transpose the same data presented in Tables 4 and 5 and view it as distributions within wealth quartiles:

<u>1970</u>	1st Q.	2nd Q.	3rd Q. (per cent)	4th Q.	Total
Homeowners	12.4	31.9	84.5	91.3	55.1
Renters (and others)	87.6	68.1	15.5	8.7	45.0
Totals	100.0	100.0	100.0	100.0	100.0

1977

Homeowners:					
without mortgage	1.3	16.5	39.6	52.6	27.4
with mortgage	4.2	34.2	50.4	42.5	32.8
	}5.5	}50.7	}90.0	}95.1	}60.2
Renters (and others)	94.5	49.3	10.0	4.9	39.7
Totals	100.0	100.0	100.0	100.0	100.0

After one standardizes for the increase in homeownership from 55 per cent to 60 per cent the apparent increases of homeowners in the two top quartiles disappears and one is left with the same result -- an increased concentration of homeowners in the second quartile.

Comparison of Tables 5 and 6 warrants some attention as the same groups of family units are distributed by wealth quartiles in Table 5 and income quartiles in Table 6. This analysis is limited to 1977 here but should have been pursued for 1970 as well, as in it may lie some clues as to the puzzle of a more equal wealth distribution combined with a perverse change in the shares of wealth going to income deciles. [7]

A brief summary of the comparison of the selected groups in respect to their relative standing in respect to the national income and wealth distribution can be presented in terms of the two following lists. Groups of family units that in 1977 held a more favourable position in terms of wealth are listed in list 1 and those whose position is more favourable in the income distribution are included in list 2, based on comparison of data in Tables 5 and 6.

List 1

(Wealth Position Better Than
Income)

List 2

(Income Position Better Than
Wealth)

Units by Size Classification:

unattached families with two and more members

Units with Heads in Age Groups:

45-54	24 and under
55-64	25-34
65 and over	35-44

Units with Major Source of Income From:

net income from self-employment	wages and salaries
transfer payments	
investment income	
pensions	

Place of Residence:

Ontario	Atlantic
Prairies	Quebec

Tenure:

Homeowners (especially without mortgage)	Renters
--	---------

These results were obtained by examining one characteristic at a time; some interesting multivariate analysis has to wait for final estimates and further analysis. That the "major source - no income" and "below low income line" groups have a better wealth position is pretty much a tautology as the groups are constructed using zero or low income as the classification criterion. It is, however, of considerable interest to observe to what degree low income families have wealth and over what type of assets they have command. This is not a new question and has been examined before in respect to previous surveys. [8] It is, however, not possible to review this question in respect to 1977 data in this paper.

WEALTH COMPOSITION

The introduction to the paper anticipated that some changes in the wealth composition had taken place between 1970 and 1977. In order to examine this aspect, Tables 7 and 9 present a picture of the different wealth components and their importance in the two years. The overall implication is that surprisingly little has changed. The overall ratio of net worth out of total assets remains at roughly 85 per cent, *i.e.*, debts being roughly 15 per cent of the total value of assets. On a quartile basis, some shifts and changes can be observed but the overall stability is surprising indeed.

If one considers the market value of owner-occupied houses, vacation homes, cars and the equity in other real estate as representing the real assets of households, then one can observe a moderate increase in the proportion for which these real assets account. In both years, the two middle quartiles seem to show the highest proportion of holdings in such assets, particularly the estimated value of homes for the second quartile has risen very substantially and is consistent with the previous finding that a higher proportion of home-owners is now found in the second quartile of the wealth distribution.

In both surveys business equity was reported by a surprisingly high proportion of family units; in 1970, 14 per cent and in 1977, 13.3 per cent of units reported such an asset. [9] In comparison with the proportion of self-employed in the labour force (about 8 per cent) this appears high. However, as this proportion is calculated on an economic family unit basis, one expects it to be higher due to a smaller denominator. Also, since the questions on the asset-debt questionnaire elicited reporting from people holding equity in private corporations (less than 50 share holders, usually family held incorporated businesses) or wage earners involved in secondary activities, this high incidence cannot be discounted as incorrect. Business equity also accounted for a very high proportion of total assets in both years: 20.4 per cent in 1970 and 19.5 per cent in 1977. In the latter survey the supplementary sample contained a disproportionately high number of business people and professionals; it is therefore interesting to observe that the weighted results are much in line with the 1970 survey. Although the special sample overrepresented the "rich", the weighting scheme assigned these records appropriately low weights. In this fashion, the objective of improving the reliability of the estimates could be met without biasing the overall picture.

After real estate, cars and equity in business the remaining assets are nearly all financial and their importance in the total asset portfolio shows a minor drop in 1977. Tables 7 and 9 indicate that liquid assets, other financial assets and miscellaneous assets [10] together accounted for 20.0 per cent of total assets in 1977 compared to 22.3 per cent in 1970. Liquid assets have dropped from 14.7 per cent to 12.8 per cent. The category of "other financial assets" in the two surveys has undergone a major composition change. If in 1970 the dominant

asset in this grouping had been the value of publicly traded stocks and mutual fund shares, its importance by 1977 had declined and RRSP's (and to some extent registered homeowners savings plans -- RHOSP's) were now of equal importance in terms of aggregate value. (See Technical Appendix for detailed definitions.)

Canada Savings Bonds (CSB's) are considered as part of liquid assets and the surveys show that there is a rising incidence of these holdings -- the proportion of family units reporting that they hold CSB's is up to 24 per cent in 1977 from 20 per cent in 1970. In terms of aggregate value, however, they do not seem to have kept up with the rise in value of other assets. Even after trying to obtain reporting of uncashed coupons in 1977 the survey estimates that in aggregate CSB's and accrued interest on them accounted for about 2.6 per cent of total assets, down from 3.0 per cent in 1970.

It should be noted that although consumer debt in relation to income and liquid assets is up (as mentioned earlier in the paper), as a proportion of total assets it amounts to a lower proportion in 1977 than in 1970. Particularly for the two lowest wealth quartiles consumer debt shows a decline in respect to total assets. This may not be a very appropriate view of the situation as consumer debt is of a more or less short-term nature and total assets contain large components (such as owner-occupied homes) that are very "nonliquid". Indeed, it very much looks like the rising value of real estate in the portfolio of households produces the result of consumer debt being a lower proportion of total assets in 1977 than in 1970.

Corresponding to the observed change in the second wealth quartile -- increased homeownership and greater proportion of total assets accounted for by market value of homes -- the distribution of mortgage debt has also changed. For the second wealth quartile mortgage debt has become a more important (negative) component of net worth and even viewed on a net basis mortgage debt has increased more than the market value of homes -- possibly implying the movement of new homeowners with high mortgages into the second quartile.

Tables 8 and 10 show the same data in a transposed format. Categories of assets and debts are distributed among the four wealth quartiles. As the very last line in the table, total money income has also been distributed to the four wealth quartiles and one can compare the distribution of, for example, assets, debts and money income for the four wealth quartiles.

Considering the topical nature of mortgage indebtedness it should be noted that the distribution of mortgage debt is here shown by wealth quartiles. Comparing the two years, third and fourth quartiles account for more mortgage debt in 1970 than in 1977 and the first and second quartiles account for more in 1977 with a large jump in the share in the second quartile's share particularly noticeable. In respect to the income position of families and unattached individuals, the shares of mortgage debt of the four quartiles in 1977 were estimated as follows:

Share of Mortgage Debt on Owner-Occupied Homes, 1977

	Families and Unattached Individuals	Families
	(per cent)	
1st income quartile	3.8	7.9
2nd income quartile	16.0	18.9
3rd income quartile	21.4	36.9
4th income quartile	58.8	36.3
All units	100.0	100.0

As discussed in Section 2 above, the survey estimates do not encompass all types of assets. An important exclusion are employment related pension plans and life insurance. Conceptual problems in valuing these assets as well as difficulties in collecting the detailed data for purposes of valuation makes it impossible to integrate these components into the overall wealth picture. Data collection difficulties in this area seem at present insurmountable. The 1977 survey asked a question about the cash surrender value of life insurance policies. The high nonresponse rate to this question suggests that respondents are unaware of the cash surrender value of their policies and as a consequence the data collected are unusable. The limited information that exists in the area of pensions and insurance is presented with serious reservations in mind as to its relevance and quality.

Proportion of Family Units in 1977 Reporting

	Pension Plan Coverage ¹	Life Insurance Coverage ² (per cent)
1st wealth quartile	22.9	28.4
2nd wealth quartile	40.2	43.8
3rd wealth quartile	46.0	50.7
4th wealth quartile	41.9	54.3
All family units	37.7	44.3

- (1) One or more members of the family unit replied in the affirmative to Q: "Are you covered by a pension plan connected with your present or past work?"
- (2) One or more members of the family unit reported having a life insurance policy (other than group or term insurance).

Although life insurance and pension coverage increases with the wealth of the family unit, for pensions it seems to peak in the third quartile and shows a decrease in the 4th. Examining the data by deciles (not presented here) reveals that for pensions the low coverage is concentrated in the 10th decile and must be largely due to the overrepresentation of self-employed persons in the top decile.

CONCLUSIONS

This quick review of the preliminary data obtained from the Survey of Consumer Finances 1977 and its comparison with the last similar survey in 1970 indicates that a minor decrease in the inequality of the wealth distribution has occurred. Wealth distributed by size of income shows, on the other hand, a relatively worse situation for lower income families and unattached individuals.

The time available and the analytical techniques used were clearly inadequate to disentangle the complex relationship between the wealth and income distributions, and to identify the observed changes with different types of family units and the corresponding composition change that contributed (and "caused") the changes in the wealth distribution. Each one of these aspects is complex in its own right and trying to deal with them simultaneously or analyze them separately and then integrating the analysis properly is for future research efforts.

In respect to the wealth composition, it is remarkable how little change there has been since 1970. Although some increased importance for real assets can be observed and a corresponding decrease for financial assets, it is on the whole rather marginal. There appears to be remarkable stability in asset and debt holding patterns which is not even affected by a drastically changing environment.

Table 1

Distribution of Wealth of Families and Unattached Individuals, 1970 and 1977

Wealth Decile	1970			1977		
	Unattached Individuals	Families	All Units	Unattached Individuals	Families	All Units
	per cent shares of wealth					
1	- 1.3	- 0.9	- 1.0	- 1.1	- 0.6	- 0.6
2	- 0.0	0.1	- 0.0	0.0	0.3	0.1
3	0.0	0.8	0.3	0.1	1.4	0.6
4	0.3	2.2	1.3	0.4	2.8	1.7
5	0.9	4.0	3.0	1.0	4.6	3.6
6	2.0	6.1	5.4	2.3	6.5	6.0
7	4.7	8.4	8.3	4.9	8.7	8.6
8	10.7	11.5	11.8	11.2	11.6	12.0
9	20.3	16.9	17.6	21.3	16.5	17.5
10	62.4	50.8	53.3	60.0	48.1	50.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Gini coefficient	0.811	0.681	0.716	0.794	0.644	0.686
Mean wealth	\$ 9,069	21,281	18,189	20,742	56,153	47,104
Median wealth ¹	\$ 1,235	10,565	7,575	3,120	31,118	22,298
Mean assets	\$ 9,717	25,337	21,382	22,593	66,898	55,576
Mean debt	\$ 648	4,056	3,193	1,851	10,745	8,472
Mean income ⁴	\$ 3,980	8,927	7,686	7,632	19,000	16,095
Estimated number of family units 000's	1,595 ²	4,706 ²	6,302 ²	1,988 ³	5,790 ³	7,778 ³

1 As medians in this table were calculated by a special retrieval program (SQUIRTS), they may differ marginally from other published and to be published estimates.

2 Excluded are approximately 15,000 family units who had equity in businesses or professions but could not estimate the value of these holdings.

3 Subject to revision in light of more detailed data from 1976 Census. See note in Technical Appendix (Preliminary nature of estimates).

4 Incomes for 1969 and 1976 respectively.

Source: Statistics Canada, Surveys of Consumer Finances 1970 and 1977.
Unpublished data 1977 estimates subject to revision.

Table 2

Shares of Income and Assets of All Family Units Ranked by Size of Income or Assets, 1970 and 1977

	Income		Liquid Assets ¹		Financial Assets ²		Total Assets ³		Net Worth ⁴	
	1969	1976	1970	1977	1970	1977	1970	1977	1970	1977
1st Decile	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	- 1.0	- 0.6
2nd Decile	3.0	2.9	0.2	0.1	0.1	0.1	0.2	0.3	- 0.0	0.1
3rd Decile	4.7	4.3	0.6	0.3	0.4	0.4	0.6	0.9	0.3	0.6
4th Decile	6.4	6.1	1.1	0.7	0.9	1.4	2.3	1.3	1.3	1.7
5th Decile	8.0	7.8	1.9	1.2	1.5	3.2	5.0	3.0	3.6	3.6
6th Decile	9.6	9.5	3.2	2.2	2.6	6.3	7.4	5.4	6.0	6.0
7th Decile	11.3	11.3	5.3	4.0	4.5	9.6	9.6	8.3	8.6	8.6
8th Decile	13.3	13.5	9.10	7.3	8.0	12.7	12.2	11.8	12.0	12.0
9th Decile	16.2	16.4	17.4	15.1	15.0	17.5	16.8	17.6	17.5	17.5
10th Decile	26.2	26.9	61.0	69.1	67.0	48.5	45.6	53.3	50.6	50.6
Total	100.0	100.0	100.0	100.0	100.0	100.00	100.0	100.0	100.0	100.0
Gini Ratio	.383	.398	.752	.805	.790	.668	.626	.716	.686	.686

1 Deposits, cash and bonds.

2 Liquid assets, stocks, mortgages and miscellaneous financial assets.

3 Financial assets, real estate, automobiles and equities in business and practices.

4 Total assets less total debts.

5 Data not available.

Source: 1970 - Table 6, Podoluk (1974) except net worth; 1977 - unpublished data from Survey of Consumer Finances 1977.

Table 3

Shares of Assets, Debts and Net Worth of Deciles of Family Units Ranked by Size of 1969 and 1976 Incomes

Incomes Deciles	Net Worth		Total Assets		Total Debt	
	1970	1977	1970	1977	1970	1977
1st	4.4	4.0	3.9	3.7	1.0	2.0
2nd	6.0	5.0	5.4	4.5	2.1	2.1
3rd	7.0	6.4	6.4	5.9	3.2	2.9
4th	6.8	6.4	6.5	6.2	5.0	5.1
5th	6.7	7.1	6.8	7.2	7.1	7.7
6th	7.3	7.9	7.6	8.5	9.7	11.7
7th	8.4	9.0	9.0	9.5	12.7	12.5
8th	10.6	10.0	11.4	10.8	16.1	15.7
9th	11.5	12.7	12.5	13.5	17.6	18.2
10th	31.3	31.6	30.4	30.2	25.4	22.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada Surveys of Consumer Finances 1970 and 1977, unpublished data.

Table 4

Percentage Distribution of Selected Groups of Family Units by Wealth Quartiles,¹
1970

Selected Characteristics	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Total
All family units	25.0	25.0	25.0	25.0	100.0
Type of family unit:					
Unattached individuals	41.5	30.6	16.0	11.9	100.0
Families	19.4	23.1	28.1	29.4	100.0
Age of head:					
24 and under	59.2	35.3	4.5	1.1	100.0
25-34	34.4	33.7	22.1	9.8	100.0
35-44	19.4	23.6	31.2	25.9	100.0
45-54	18.3	18.3	28.0	35.4	100.0
55-64	16.8	18.6	26.8	37.8	100.0
65 and over	15.9	23.2	27.6	33.3	100.0
Major source of income:					
No income	88.5	100.0
Wages and salaries	24.7	27.8	26.4	21.1	100.0
Net income from self- employment	17.3	7.5	16.9	58.3	100.0
Transfer payments	32.7	26.2	26.0	15.1	100.0
Investment income	4.7	3.7	13.1	78.5	100.0
Pensions	15.0	21.2	24.8	39.0	100.0
Miscellaneous	53.4	13.3	18.3	15.1	100.0
Region:					
Atlantic	27.6	34.4	26.6	11.4	100.0
Quebec	29.7	31.5	22.7	16.1	100.0
Ontario	23.2	21.7	24.6	30.5	100.0
Prairies	22.3	20.4	28.7	28.7	100.0
British Columbia	21.8	20.5	25.0	32.7	100.0
Tenure:					
Owned	5.6	14.5	38.4	41.5	100.0
Rented (and other)	48.7	37.8	8.6	4.8	100.0
"Poverty" status ² :					
Below low income lines	37.9	24.4	21.4	16.4	100.0
Above low income lines	21.4	25.2	26.0	27.4	100.0

.. Sample inadequate for usable estimates.

1 National cut-offs for the wealth quartiles were estimated at \$400, \$7,037 and \$20,835.

2 Based on SCF updated low income lines (prior to revision).

Source: Statistics Canada, SCF 1970, unpublished data.

Table 5

Percentage Distribution of Selected Groups of Family Units by Wealth Quartiles,¹ 1977

Selected Characteristics	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Total
All family units	25.0	25.0	25.0	25.0	100.0
Type of family unit:					
Unattached individuals	47.6	27.2	14.7	10.4	100.0
Families	17.2	24.2	28.5	30.0	100.0
Age of head:					
24 and under	68.8	25.9	3.4	1.9	100.0
25-34	30.4	36.5	22.2	10.9	100.0
35-44	17.3	22.6	30.2	30.0	100.0
45-54	14.2	16.2	29.0	40.6	100.0
55-64	14.1	19.5	28.0	38.4	100.0
65 and over	18.1	23.1	30.4	28.4	100.0
Major source of income:					
No income	69.3	19.8	100.0
Wages and salaries	24.5	27.1	25.7	22.7	100.0
Net income from self- employment	4.7	10.5	19.8	64.9	100.0
Transfer payments	37.7	25.2	24.3	12.9	100.0
Investment income	3.1	10.3	25.1	61.5	100.0
Pensions	8.2	19.0	32.3	40.6	100.0
Miscellaneous	37.4	20.0	23.8	18.8	100.0
Region:					
Atlantic	24.4	36.0	28.5	11.0	100.0
Quebec	32.2	30.6	26.0	11.2	100.0
Ontario	22.4	21.5	23.9	32.2	100.0
Prairies	22.4	20.5	24.0	33.1	100.0
British Columbia	21.3	21.9	25.1	31.7	100.0
Tenure:					
Owned	2.3	21.0	37.3	39.4	100.0
Without mortgage	1.2	15.0	36.0	47.8	100.0
With mortgage	3.2	26.1	38.3	32.4	100.0
Rented (and other)	59.6	31.1	6.3	3.1	100.0
"Poverty" status ² :					
Below low income lines	52.2	20.8	16.1	10.9	100.0
Above low income lines	19.4	25.9	26.8	27.9	100.0

.. Sample inadequate for usable estimates.

1 National cut-offs for the wealth quartiles were estimated at \$2,590, \$22,298 and \$56,625.

2 Using SCF revised low income lines.

Source: Statistics Canada, SCF 1977, unpublished data.

Table 6

Percentage Distribution of Selected Groups of Family Units by Income Quartiles,¹
1977

Selected Characteristics	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Total
All family units	25.0	25.0	25.0	25.0	100.0
Type of family unit:					
Unattached individuals	56.9	29.3	10.8	3.0	100.0
Families	13.7	23.7	29.9	32.7	100.0
Age of head:					
24 and under	42.4	35.3	17.1	5.2	100.0
25-34	13.0	26.8	34.4	25.8	100.0
35-44	10.7	19.3	33.1	36.8	100.0
45-54	12.9	20.0	26.2	40.8	100.0
55-64	21.9	29.5	21.1	27.4	100.0
65 and over	60.6	22.9	9.8	6.7	100.0
Major source of income:					
No income	100.0	--	--	--	100.0
Wages and salaries	10.4	26.0	32.0	31.7	100.0
Net income from self- employment	19.5	25.7	23.5	31.2	100.0
Transfer payments	81.3	17.2	1.4	0.1	100.0
Investment income	38.1	34.0	14.1	13.8	100.0
Pensions	33.8	47.1	11.3	7.8	100.0
Miscellaneous	53.7	36.4	3.6	6.3	100.0
Region:					
Atlantic	29.2	30.0	25.1	15.7	100.0
Quebec	24.4	27.0	25.5	23.0	100.0
Ontario	22.9	23.9	25.2	28.0	100.0
Prairies	28.3	24.3	23.0	24.3	100.0
British Columbia	24.7	21.4	26.1	27.8	100.0
Tenure:					
Owned	16.0	20.5	28.5	35.0	100.0
Without mortgage	28.7	26.7	21.6	22.9	100.0
With mortgage	5.3	15.3	34.2	45.1	100.0
Rented (and other)	38.7	31.8	19.7	9.8	100.0
"Poverty" status ² :					
Below low income lines	92.9	7.1	--	--	100.0
Above low income lines	11.0	28.7	30.1	30.1	100.0

1 The cut-offs for income quartiles were estimated at \$7,024, \$14,000 and \$21,600.

2 Using SCF revised low income lines.

Source: Statistics Canada, SCF 1977, unpublished data.

Table 7

Composition of Wealth¹ of Families and Unattached Individuals Within Wealth Quartiles 1970

	Components as percentage of total assets				
	1st Q.	2nd Q.	3rd Q.	4th Q.	Total
1. Liquid assets	22.0	22.8	12.5	14.6	14.7
2. Other financial assets	2.9	3.3	2.5	8.4	6.7
3. Est. value of home(s) ²	34.3	53.4	73.2	38.4	46.9
4. Equity in other real estate	2.9	1.7	2.6	8.0	6.4
5. Est. value of cars	39.3	14.8	4.9	2.3	4.0
6. Business equity	- 2.2	3.1	3.8	27.4	20.4
7. Miscellaneous assets	0.8	1.0	0.4	1.1	0.9
8. Total assets	100.0	100.0	100.0	100.0	100.0
9. Consumer debt	121.6	12.4	3.4	1.1	3.6
10. Other personal debt	23.9	2.3	1.1	0.9	1.3
11. Mortgages ³	23.5	24.4	21.3	5.1	10.1
12. Total debt	169.0	39.1	25.8	7.1	15.0
13. Net worth or wealth	- 69.0	60.9	74.2	92.9	85.0

1, 2, 3 - See footnotes at end of Table 8.

Table 8

Percentage Distribution of Wealth Components¹ by Wealth Quartiles, 1970

	1st Q.	2nd Q.	3rd Q.	4th Q.	Total
	percentage				
1. Liquid assets	1.6	9.8	18.6	70.0	100.0
2. Other financial assets	0.5	3.1	8.2	88.3	100.0
3. Est. value of home(s) ²	0.8	7.2	34.2	57.8	100.0
4. Equity in other real estate	0.5	1.7	9.1	88.7	100.0
5. Est. value of cars	10.3	23.3	26.7	39.7	100.0
6. Business equity	- 0.1	1.0	4.1	95.1	100.0
7. Miscellaneous assets	1.0	7.1	10.1	81.9	100.0
8. Total assets	1.1	6.4	21.9	70.7	100.0
9. Consumer debt	35.7	21.8	21.0	21.5	100.0
10. Personal debt	20.4	11.7	19.2	48.7	100.0
11. Mortgages ³	2.5	15.4	46.4	35.8	100.0
12. Total debt	12.1	16.7	38.1	33.1	100.0
13. Total net worth	- 0.9	4.6	19.1	77.2	100.0
14. Total money income	17.9	21.5	26.0	34.5	100.0

1 See Technical Appendix for definitions.

2 Including vacation homes. Market value as estimated by respondent.

3 On owneroccupied homes and vacation homes.

Source: Statistics Canada, Survey of Consumer Finances, 1970, unpublished data.

Table 9

Composition of Wealth¹ of Families and Unattached Individuals Within Wealth Quartiles, 1977

	Components as percentage of total assets				
	1st Q.	2nd Q.	3rd Q.	4th Q.	Total
1. Liquid assets	21.9	15.2	12.1	12.5	12.8
2. Other financial assets	2.6	2.4	2.2	5.9	4.7
3. Est. value of home(s) ²	36.3	66.3	71.7	40.9	49.9
4. Equity in other real estate	0.7	2.0	4.5	7.9	6.5
5. Est. value of cars	35.5	11.3	5.4	2.5	4.3
6. Business equity	2.6	2.4	3.9	27.0	19.5
7. Miscellaneous assets	0.4	0.6	0.3	3.5	2.5
8. Total assets	100.0	100.0	100.0	100.0	100.0
9. Consumer debt	71.4	8.9	3.4	1.5	3.4
10. Other personal debt	16.8	1.5	0.6	0.6	0.9
11. Mortgages ³	38.2	37.2	17.4	4.8	10.8
12. Total debt	126.4	47.6	21.4	6.9	15.1
13. Net worth or wealth	- 26.4	52.4	78.6	93.1	84.9

1, 2, 3 - See footnotes at end of Table 10.

Table 10

Percentage Distribution of Wealth Components¹ by Wealth Quartiles, 1977

	1st Q.	2nd Q.	3rd Q.	4th Q.	Total
	percentage				
1. Liquid assets	2.0	10.9	20.5	66.6	100.0
2. Other financial assets	0.6	4.7	9.9	84.8	100.0
3. Est. value of home(s) ²	0.9	12.2	31.2	55.6	100.0
4. Equity in other real estate	0.1	2.9	15.1	81.9	100.0
5. Est. value of cars	9.4	24.4	27.3	38.9	100.0
6. Business equity	0.2	1.1	4.4	94.4	100.0
7. Miscellaneous assets	0.2	2.2	3.0	94.7	100.0
8. Total assets	1.1	9.2	21.7	67.9	100.0
9. Consumer debt	23.9	24.0	21.6	30.4	100.0
10. Other personal debt	21.7	15.1	14.8	48.4	100.0
11. Mortgages ³	4.1	31.4	34.6	29.9	100.0
12. Total debt	9.5	29.0	30.6	30.8	100.0
13. Total net worth	- 0.3	5.7	20.1	74.6	100.0
14. Total money income	13.9	22.3	26.7	37.0	100.0

1 See Technical Appendix for definitions.

2 Including vacation homes. Market value as estimated by respondent.

3 On owneroccupied homes and vacation homes.

Source: Statistics Canada, Survey of Consumer Finances 1977, unpublished data.

Footnotes

- 1 See Podoluk (1974).
- 2 See Technical Appendix. Also see Statistics Canada (1978) for a more detailed explanation of the sample and data collection techniques. See Statistics Canada (1973) for similar explanations for the 1970 survey.
- 3 See pages 349 and 350 for more discussion about the special sample.
- 4 These data will be shown in forthcoming Statistics Canada publications.
- 5 See Technical Appendix for notes on data quality.
- 6 See Technical Appendix for an explanation how these tables were constructed as well as for the limitations of this analysis.
- 7 Possibly other analytical techniques such as annuitizing wealth and "combining" it with income should also be attempted in order to evaluate the change in the income plus wealth position.
- 8 See Statistics Canada (1974) and Love and Oja (1977).
- 9 See Statistics Canada (1973) and (1979 forthcoming).
- 10 This latter component contains some minor "impurities" that are not really financial assets. See Technical Appendix for definitions.

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- Statistics Canada, Income Distributions by Size in Canada, 1976, Catalogue No. 13-207, 1978.
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TECHNICAL APPENDIX

Sources and Methods

For a more detailed description of the sample, data collection, processing and estimation methods, see Statistics Canada (1978) and the forthcoming publication The Distribution of Income and Wealth in Canada, 1977 (Statistics Canada Catalogue No. 13-570, to be published in fall 1979).

Concepts and Definitions

All data are presented on an economic family unit basis. A family unit can be an unattached individual or a family with two or more members. An unattached individual is a person living by himself or rooming in a household where he is not related to other household members. A family is defined as a group of individuals sharing a common dwelling unit and related by blood, marriage or adoption.

Total assets as defined for this study consist of:

1. Liquid assets: Cash on hand, current and personal checking accounts, savings accounts and certificates with chartered banks, trust companies, credit unions, etc., Government of Canada savings bonds, other bonds.
2. Other financial assets: Publicly traded stocks and mutual fund shares, shares in investment certificates, mortgages, Registered Retirement Savings Plans, [1] Registered Home Ownership Savings Plan. [1]
3. Estimated market value of owner-occupied homes and vacation home(s).
4. Equity in other real estate is calculated by deducting outstanding mortgages from the estimated market value of all other real estate except owner-occupied homes and vacation homes.
5. Estimated value of cars.
6. Business equity: Net investment (estimated market or book value of assets less liabilities) in business or professional practices.
7. Miscellaneous assets: Financial assets other than those in (2) including any held in trust or estate as long as respondent had right to draw on the capital of the fund, loans to other persons and businesses, other assets including oil royalties, patents, copyrights, etc.

Total debts as defined for this study consist of:

1. Consumer debt: Money owed on credit cards, charge accounts, installment debt, loans from chartered banks unsecured or secured by household goods, loans from sales finance and consumer loan companies, credit unions, caisses populaires, etc.
2. Other personal debt: Bank loans secured by stocks and bonds, home improvement loans, [2] institutional loans other than those in item (1), student loans, [3] unpaid medical and dental bills, loans from persons, unpaid debts and loans.
3. Mortgages outstanding on owner-occupied homes and vacation homes.

Net worth or wealth is defined as total assets minus total debts.

Income is defined as total money income received by all family members in 1969 or 1976. For more details on income definition and the characteristics used in Tables 4, 5 and 6 see Statistics Canada (1973) and (1978).

Data Quality

Response Rate and Imputation

The 9,800 usable records for 1970 and 12,734 for 1977 represent a response rate of 74.9 per cent and 79.7 per cent respectively. Not all these records contained complete information on assets and debts and the assignment or imputation procedure used for 1970 is described on pp. 175-177 in Statistics Canada (1973). The 1977 data were subjected to a similar procedure, but it should be noted that 72.3 per cent of the usable records were complete and required no imputation. The one major change in the imputation procedure introduced in 1977 affects business equity and is explained on pp. 2-3 above.

For purposes of this paper, the 1970 data were retabulated excluding the 212 records where respondents had business investments but did not report the estimated value of it. The sample base for most of the tabulated data presented is thus 9,588 and not 9,800 records. [4] Only Tables 2 (except net worth column) and 4 are based on all 9,800 records and are thus slightly noncomparable with the rest of the data.

Sampling Errors

Standard errors for the 1977 data will be estimated taking into account the complex multistage nature of the sample design. These estimates will be published in Statistics Canada 1979 (forthcoming). Similar estimates for 1970 are available on request.

As is the case with many household surveys, the sampling errors may not be the most significant type of errors. It is recognized that nonresponse error (and possibly nonresponse bias) and response error affect the reliability of the estimates more than sampling errors.

Evaluation Against Outside Estimates

There are hardly any estimates for assets and debts held by the household sector originating from other independent sources that would provide convenient control totals against which the survey aggregates could be compared.

The National Accounts in Canada have no developed wealth accounts, the Flow of Funds estimates treat households as part of the residual personal sector. Even estimates from institutional sources that at first glance appear to measure the same asset and cover the same population, turn out at closer examination to be far from perfect. Most likely, the "purest" of the institutional data refer to Canada Savings Bonds outstanding but even here substantial (but unknown) amounts of bonds are held in estates or by persons who are no longer resident in Canada and thus outside the coverage of the survey. Also, one would expect that savings accounts are exclusively used by individuals in their private capacity. However, one finds that some large accounts are held, e.g., for nonprofit making institutions and trusts which are again outside the survey universe.

Although these difficulties prevent us from constructing a reasonable reconciliation statement against independent outside estimates, it is clear from the rough comparisons that can be

made that the survey underestimates both assets and debts. For example, for 1977 the aggregate estimate of Canada Savings Bonds from the survey was 60 per cent of the value of bonds outstanding as reported by the Bank of Canada. Although some of the difference is due to the coverage problem mentioned above, the major part of the shortfall must be due to nonreporting or underreporting. There is no reason to believe that this is one of the "better" balance sheet components, it just happens to be the one with the most credible outside estimate. Although bank deposit (in total, all types of accounts) as reported by the Bank of Canada may contain a larger component that belongs to economic agents outside the survey coverage, the survey aggregate accounts for 65 per cent of the institutional total.

Preliminary Nature of 1977 Wealth Estimates

At the time of writing this paper, the weighting scheme used to inflate the 1977 sample observations to national totals was under scrutiny. The income estimates for 1976 had been published in Statistics Canada Catalogue No. 13-207 at a time when only the first estimates from the 1976 Census were available. The weighting scheme was adjusted to these new benchmarks and the estimates in the above cited income report and in this paper were released on this basis.

Detailed data that have subsequently become available from the 1976 Census indicate that unattached individuals are likely underrepresented in the weighted estimates. After this paper was completed, the decision was reached to effect a reweighting but the corrected estimates could not be made available in time for inclusion here. The likely effect of the adjustment is to raise the aggregates (and marginally improve correspondence with outside estimates) and to lower the overall averages.

It is also possible that as the wealth data are being tabulated and analyzed inconsistencies will be found that need correction. For these reasons, the estimates used in this paper are labelled as preliminary, subject to revision.

Ranking and Measures of Inequality

All data on inequality of the wealth distribution were retrieved by an in-house program (Squirts) that ranks all sample records in ascending order by size of the main variable (e.g., income or wealth). Records were re-ranked at the micro-level each time the main variable changed.

The paper utilizes data grouped at the decile and quartile level for economy of space and reliability reasons, although computer printouts were available at percentile levels. As interesting as the data may be for the top ranges (e.g., for top 1 per cent or 5 per cent of wealth holders), it was judged to be of inadequate reliability for the purpose at hand. It should also be remembered that due to the 1977 special sample design some improvement in the reliability of data for top wealth holders was achieved but that the 1970 data that depended on an area sample are more deficient in this respect.

The Gini coefficients used throughout the paper were calculated by the computer from data at the 1 per cent level and thus are subject to uniform and minimal grouping errors. The Theil-Bernoulli measure could not be utilized due to the substantial number of records with negative net worth. The coefficient of variation was not used because of its sensitivity to the few high observations and the lack of comparability in the two surveys in this area.

Dissemination Plans for 1977 Wealth Data

After a decision is reached on finalizing the estimates, a major report (using the wealth concept employed in this paper but

based on revised estimates corrected for underweighting of unattached individuals) will be prepared. It is hoped to publish Catalogue No. 13-570, The Distribution of Income and Wealth in Canada, 1977 in the fall of 1979. At the same time, a micro data tape will be prepared which will, of course, suppress the identity of wealth holders. Subject to approval by Statistics Canada's Micro Data Release Committee, and the usual conditions that have applied to previously released Survey of Consumer Finance public use tapes, it is hoped to release this tape also in 1979.

In 1980, another major report will be published that will update the information in Statistics Canada Catalogue No. 13-547, Incomes, Assets and Indebtedness of Families in Canada, 1969. This report will examine in greater detail the different components of the household balance sheet by income classes and other socio-economic characteristics. Further special studies will follow.

It is hoped that the data base and the different access arrangements will prove to be useful to policy-makers and researchers in the immediate future.

Appendix Footnotes

- 1 In 1970, no special questions were asked and the few respondents who had such assets to report would have reported them in item 7 under "Other".
- 2 No separate question in 1977 and such loans reported under "other bank loans" and included in consumer debt.
- 3 Not a separate question in 1970 but conceptually included under "other bank loans" and grouped with other unsecured bank loans in consumer debt.
- 4 It is a minor technical shortcoming that the 9,588 records were not reweighted to represent the total universe.

THE DISTRIBUTION OF PERSONAL WEALTH IN
CANADA, THE U.K. AND THE U.S.A.

by

Alan Harrison*

1. INTRODUCTION

In common with the position in Canada, knowledge of the distribution of personal wealth in the U.K. and the U.S.A. is far less detailed than that which is known about the way personal incomes are distributed. This reflects, among other things, the fact that the tax system does not, as it does with income, automatically provide a source of information on virtually the complete distribution, and also the lesser attention which has typically been paid in the past to the distribution of wealth. Whatever the reason, the implication is that a great deal of caution must be exercised when attempting a comparison of the distributions in different countries such as is offered in this paper. In particular, great care is needed to assess the validity of apparent differences even where estimates are derived from essentially similar sources.

There are three well-known methods of deriving estimates of the distribution. Perhaps the most widely-used is the estate multiplier method which in essence treats the dead as a random sample of the living, the sampling being of course 'without replacement'. Alternatively, recourse can be made to statistics on investment incomes, from which estimates of the wealth which generated these incomes can be calculated. Finally there exists the most direct and at the same time arguably the most problematical method, that of sample surveys. [1] For the countries considered in this paper, estimates based on all three methods can be found, and in the U.S.A. alone all of the methods have been used in the last fifteen years or so. In Canada, on the other hand, we have to rely exclusively on sample survey figures. As a result, a comparison between Canada and the U.K. or the U.S.A. of the degree of inequality in the distribution of wealth is a very difficult exercise, and extreme caution is urged against reading too much into the outcome.

All three of the countries under consideration here publish "official" statistics with varying degrees of regularity. [2] In the U.K. these are estate-based and appear annually in Inland Revenue Statistics, as well as being further developed by the Royal Commission on the Distribution of Income and Wealth (hereafter the Royal Commission) in reports on its standing reference. [3] The U.S.A. figures are also estate-based and are published as supplemental reports to the statistics on income. Only estimates for three years, 1962, 1969, and 1972, [4] are available however. In other ways also they are very limited, for instance covering only the top 5 per cent of the total population, compared with over 30 per cent in the U.K., although the difference in the coverage of total wealth on the other hand is, as one would expect, less dramatic. The official estimates

*This paper is largely based on Chapter 2 of Harrison (1979), a report of work commissioned by the U.K. Royal Commission on the Distribution of Income and Wealth, and I should like to thank the Royal Commission for permission to make use of the material. The views expressed in this paper are my own, and do not necessarily represent those of the Royal Commission. I am grateful to members of the staffs of the Royal Commission and the U.S. Internal Revenue Service for many valuable comments on my work, and to Jim Davies who read an earlier draft of this paper and suggested a number of improvements. Any remaining errors are mine. Alan Harrison is a Professor of Economics at McMaster University.

for Canada, based on household surveys, exist for 1956, 1959, 1964 and 1970, the years in which the Survey of Consumer Finances (SCF) was extended to cover assets. [5] As with all sample surveys, it seems, misreporting and nonresponse of a nonrandom nature are significant problems, and, overall, even the coverage of total wealth in the 1970 survey, the most comprehensive of the four, is quite low: "in the area of 50 per cent or so" (Podoluk, 1974, p. 208).

Reports of unofficial research in the U.K. have appeared fairly regularly with estate-based estimates at approximately ten-year intervals, plus occasional use of the investment income and sample survey methods. In the U.S.A. also, examples exist of work using all three techniques, with perhaps less emphasis than in the U.K. on the use of estate data -- the first systematic application of the estate multiplier method did not occur until the early 1950s (Mendershausen, 1956) -- and more emphasis on the other two methods. Indeed survey evidence dates from the period when the census enumeration included wealth declarations, and Soltow notes, for example, that the 1860 census records Abraham Lincoln as having a total wealth of \$17,000 (1975, p. 233). In Canada there have been no attempts to estimate the distribution of wealth other than the official surveys, although Davies (forthcoming) makes use of various sources to assess the reliability of these data.

The remainder of this paper is organised as follows. In the next section we discuss the most recent estimates for each country, paying particular attention to the different data sources and methods of estimation, and the effect of these on the comparability of the estimates. Following this, and drawing upon the previous section, we attempt to adjust the figures so that they can be more easily compared. Finally, we speculate briefly on factors which may be responsible for the differences we identify between the countries.

2. DATA SOURCES AND METHODS OF ESTIMATION

Canada

As we have noted already, the only data available in Canada on the distribution of wealth are those collected when the SCF has been extended to cover assets. Only limited data ever existed on estates, and the federal government has "vacated the field of estate duties" (Podoluk, 1974, p. 203), so that the sample surveys assume an importance far in excess of that of equivalent surveys in the U.K. and the U.S.A. where there are well-developed estate data. Of the four surveys, the first three were restricted to the nonfarm population, and this and other differences render comparison over time very difficult. For example, the types of assets covered have expanded from primarily liquid assets in 1956 to what Podoluk (1974, p. 204) calls "a very comprehensive list of wealth components" by 1970. Nevertheless this "comprehensive list" still omits consumer durables, except for automobiles which are included separately, and insurance equity and pension rights. These exclusions, given that the assets are among the more widely-held types, undoubtedly cause the estimated distribution of wealth to appear more unequal than it actually is.

The sample for the 1970 SCF [6] consisted of 12,626 occupied households, of which 2,664 were not interviewed for various reasons, including a complete refusal to respond, or were interviewed, but provided incomplete information. The remaining 9,962 were those which supplied complete income information, a response rate of 74.9 per cent, but, as is usually found, the response rate for assets was lower. Of the 23,576 individuals aged 14 or over in the 9,962 households, 67.8 per cent (30.8 per cent) provided full details of assets (debts), 28.7 per cent (68.8 per cent) had no assets (debts), and 3.7 per cent (0.7 per

cent) refused to answer some or all of the asset (debt) questions. Where refusal at this stage was encountered, missing asset and debt data were assigned to a nonrespondent from the record of a respondent considered to be similar. The criteria used to locate a similar individual included the requirements that he or she should have a residence in close proximity to the nonrespondent, have a similar income, be of the same sex and in the same age-group, have similar "labour force status" and the suchlike (Statistics Canada, 1973, p. 176). Slightly different procedures were used for home-owners who refused to reveal the market value of their homes or the amount owing on their mortgages. For business assets, no such assigning was possible, so that tables relating information on these include a category of "not ascertained".

As with all sample surveys, the estimates from the 1970 SCF are subject to sampling error and nonsampling error, the latter including such aspects as nonresponse. Ferber et al. (1969a, 1969b) found evidence of significant error associated with nonresponse in the U.S.A. Survey of Financial Characteristics of Consumers, so that the remark that "it is hoped that no serious nonresponse bias exists in the [Canadian] estimates" (Statistics Canada, 1973, p. 178) is less convincing than Podoluk's observation that, because of the greater skewness of asset distributions, "samples designed to measure the overall income distribution with reasonable reliability may be inadequate for the measurement of asset holdings" (1974, p. 206). This whole question is extensively addressed by Davies (forthcoming), who notes, for example, the wide variation in under-estimation. He then attempts to establish the relative contributions to this under-estimation of sampling error, differential response and under-reporting. The first of these is demonstrated to be relatively unimportant, on the basis of a Monte Carlo exercise. A correction for differential response has little effect, but Davies argues that the third factor, and specifically complete nonreporting by some respondents, is very important. When this and the omission of consumer durables are taken account of, a significant increase in the percentage shares of top wealth-holders results.

United Kingdom

In the U.K., the primary sources of recent estimates of the distribution of wealth are the Royal Commission's report on its standing reference (1975, 1976, 1977) and Atkinson and Harrison (1978). Although the latter study does contain estimates based on the investment income method, the major part of it is devoted to use of the U.K. estate data, [7] and as with the Royal Commission's reports, many adjustments are made to the basic results of the estate multiplier method to overcome some of the problems which arise in the use of the method. The construction of Atkinson and Harrison's estimates, which cover the period 1966 to 1972, and the comparability of the figures with those of the Royal Commission, for 1972 to 1975, can most easily be discussed under three headings. This categorisation is also used below when we turn to consideration of the estate-based estimates in the U.S.A.

Mortality Multipliers

One of the primary adjustments to the mortality multipliers is that made to accommodate the assumed correlation between wealth and social class, and the observed one between social class and longevity. This is usually achieved by applying a social class differential to the basic multiplier, where the latter is the simple result of dividing the population in a particular age/sex group by the number of deaths reported for the group. The differentials used by Atkinson and Harrison, and by the Royal Commission, are calculated from census data on mortality by social class. Unlike the Royal Commission, however,

Atkinson and Harrison graduate the differentials with estate size, interpolating between a value of unity (i.e. unadjusted multiplier) at the mid-point of the population of the relevant age/sex group, and the differential for social classes I and II at the mid-point of the joint social class interval. [8] The resulting differentials are regarded as the best compromise between, on the one hand, those applied, without graduation, to all estates above a certain level (as the Royal Commission does), and, on the other, completely independently derived differentials. The effect of the graduation is however, relatively small (Atkinson and Harrison, 1978, pp. 74-75).

Missing Wealth

Because of the incomplete coverage of estates the estimated number of wealth-holders is less than the total adult population, and as well as adding in these missing persons, some account must be taken of their wealth. Also, some wealth is missing from included estates, or, as it is expressed by the Inland Revenue, "certain elements are omitted because no duty is payable on them either because of special exemptions or because they fall outside the scope of estate duty law" (Inland Revenue, 1974, p. 175). To make allowance for these omissions, both the Royal Commission and Atkinson and Harrison refer to balance sheet totals for different assets, comparing these with the amount of each asset accounted for by the multiplied estate data. The difference is then allocated in part to the missing persons and in part to the included estates, the nature of the allocation between these groups and within the latter group depending on the asset. [9] The Royal Commission's stated view is that the residual can entirely "be attributed to the error introduced by the various deficiencies in coverage and valuation" (1975, p. 85), although Atkinson and Harrison argue that such an uncritical use of the balance sheet data "runs the risk of replacing the admittedly incomplete estate estimates by a series which might be at least as inaccurate and possibly more so" (1978, p. 80).

A further difference between the approaches of the Royal Commission and Atkinson and Harrison is that the latter authors vary the allocations to generate a range of estimates. The intermediate allocation, "based on [the] best available information", plus lower and upper bounds, allow some indication of how sensitive the results are to the extent of the adjustments for missing wealth. For our purposes, however, we confine ourselves here to the set of central estimates.

Valuation

For certain assets, the estate duty valuation is inappropriate for the wealth of living persons. For instance, life policies are valued at death at the sum assured, whereas in the hands of the living they are worth less than this amount. Also some assets have zero value if a realisation basis is adopted, but a positive value as a "going concern", for example pension rights, so that in a number of cases, and depending on the valuation basis adopted, adjustments may be necessary.

The practice of the Royal Commission is to group the first type of valuation adjustments together with those for missing wealth resulting in a set of estimates labelled series C, and to make further alterations to the figures to include occupational pension rights (series D) and state pension rights (series E). The procedure followed by Atkinson and Harrison is more systematic and involves adjustments from the estate duty valuation to a realisation basis, and from this to a going concern valuation, where the latter adjustment covers land and buildings, household goods, trade assets, and pension rights and life policies. In Section 3, however, we consider only the estimates based on realisation values.

United States

In the U.K., unofficial estate-based estimates exist alongside official figures, and in the U.S.A. we find a similar picture with the work of Smith (1974, 1978) and Smith and Franklin (1974) on the one hand, and that of the Internal Revenue Service (1976) on the other. [10] Again the research is most easily discussed in terms of the mortality multipliers used, and the adjustments made for missing wealth and inappropriate valuation.

Mortality Multipliers

Three sets of differentials are used by the Internal Revenue Service to adjust the basic mortality multipliers, all derived from information on the mortality of the Metropolitan Life Insurance Company's predominantly male "Whole Life" policy-holders. The three sets are based on different groups of policy-holders, and the question of which set to apply is decided with reference to certain characteristics of each estate tax return. Smith, following Lampman (1962), makes use of data on the mortality of upper occupational groups, as well as mortality rates from insurance data, when estimating the appropriate differentials to apply to the basic multipliers. In line with the findings of Revell (1967) for the U.K., the mortality rates from insurance data are lower than the rates of upper occupational groups, so that Smith's adjusted multipliers are lower than those of the Internal Revenue Service, although the effect of this on the estimates is not always appreciated. Smith and Franklin, for example, refer to the "significant overstatement of the wealth of persons with over \$60,000 gross assets" (1974, p. 163) but make no mention of the correspondingly higher estimate of top wealth-holders.

Atkinson and Harrison (1978, ch. 3) have investigated the influence of mortality multipliers on estate-based estimates of the distribution of wealth in some detail. They show that, when all wealth missing from the estate statistics is allocated to missing persons, as is done in the U.S.A. (see below), higher multipliers always raise the estimated shares of top wealth-holders. The percentage shares implied by the Internal Revenue Service figures have been calculated by Natrella (1975), and these are indeed higher than those of Smith (1978) for equivalent years, although a problem with this comparison is that the control total used to calculate the amount of excess wealth to be allocated also differs, a point discussed further below.

Missing Wealth

The publications of the Internal Revenue Service on wealth estimated from estate returns only present figures for the numbers of persons in various wealth groups with gross wealth in excess of \$60,000, and for the amounts of total wealth of these persons. The additional step of relating these numbers and amounts to control totals in order to estimate percentage shares is, as we have mentioned, taken by Natrella (1975), although, as we also noted above, the total net worth is different from that used by Smith (1978). For instance, the 1969 estimates of Natrella are based on a total net worth of \$2,716 billion, which is nearly 8 per cent lower than that of Smith. The effect of this on the estimates can be easily established, however, since the practice of both Natrella and Smith is to allocate all of the excess to those missing from the estate returns. Consequently the higher total net worth of Smith results in lower estimates of the percentage shares of top wealth-holders than those calculated by Natrella, a result which reinforces the influence of the lower multipliers used by Smith.

Valuation

Until very recently the published Inland Revenue estimates of the distribution of wealth in the U.K. paid no attention to the major valuation problem posed by life policies. In the U.S.A. on the other hand, an adjustment has been made to all the official estate-based estimates, and Internal Revenue Service (1976) describes the procedures used in the case of the 1972 figures. In cooperation with the Institute of Life Insurance, ratios of the cash value to the full value of policies were computed for each of 11 age groups, and these were applied to the amounts of life insurance in the estate statistics. The ratio rises with age, from 0.038 for those aged under 30, for example, to 0.263 for ages 60-64, and to 0.773 for those aged 80 or over.

Smith's procedure is essentially the same, although, following Lampman (1962), he also makes a number of further adjustments for problems of valuation, notably an addition to estate tax wealth to compensate for under-reporting. Estate valuations are unaudited and for 1941 Harriss estimates that auditing reveals an undervaluation of 10 per cent (1949, p. 329); both Lampman and Smith adopt this figure. The Internal Revenue Service calculates that Harriss' technique, in a modified form, does indeed justify retaining the estimate of 10 per cent undervaluation (1967, p. 76), although the official estimates are not adjusted to take account of this.

3. ESTIMATES OF THE DISTRIBUTION

In this section we present the estimates of the distribution of wealth in Canada, the U.K. and the U.S.A., the derivations of which were described in the previous section. In the form that the estimates appear in the original publications, they do not at all represent a true basis for conclusions on the relative degree of wealth inequality in the three countries, so, in what follows, we attempt to move towards a greater degree of consistency which will allow some limited comparisons.

The first point to note is that the population under consideration differs between the countries. For Canada, the top 1 per cent, 5 per cent and 10 per cent refer to families; in the U.K. the estimates are in terms of the adult population; and for the U.S.A., the figures give the share of the top 1 per cent of the total population. It is a simple matter, however, to convert the U.S.A. estimates so that they refer instead to the adult population, and the effect is, as we would expect, to lower the shares of the top 1 per cent. Natrella's estimate for 1972, for instance, falls from 30.3 per cent to 25.8 per cent. [11] The adjustment necessary to bring the Canadian figures onto a comparable basis is a little less clear-cut. Davies (forthcoming) presents estimates in terms of both individuals and families, but the former distribution is constructed by splitting the wealth of a married couple equally. This produces the result that wealth among families is more unequally distributed than wealth among individuals. The reverse is, however, more likely. Atkinson and Harrison, for example, experiment with the 1970 estate-based U.K. estimates for individuals, and suggest that the effect of switching to a distribution among family units would be to reduce the share of the top 1 per cent by, at most, 5 percentage points, and quite probably considerably less. On this basis, Davies' figures would have to be adjusted upwards to make them comparable to those for the U.K. and the U.S.A., but not by a substantial margin.

The remaining considerations refer exclusively to the U.K. and U.S.A. figures. First, the percentage shares of the groups below the top 1 per cent in the U.S.A. can be calculated for Natrella's estimates from the table in his paper on which the share of the top 1 per cent is based. [12] The share of the top

6½ per cent adult wealth-holders is given from which the top 5 per cent can be interpolated, as can the share of the top 10 per cent, given that the share of the top 100 per cent is necessarily 100 per cent. [13] Smith (1978) does not unfortunately provide the tabulated information to enable the same calculation to be carried out for his estimates, so that we concentrate primarily on Natrella's estimates in the remainder of this section. Smith's work remains useful for two reasons nevertheless. The lower mortality multipliers he uses are more in line with those of the Royal Commission and Atkinson and Harrison in the U.K. so that his figures give some indication of the adjustment necessary to make Natrella's estimates more closely comparable to those for the U.K. Also his estimate of total net worth differs from Natrella's. As we noted above, Smith's is around 8 per cent higher in 1969, although strangely Natrella's figure is slightly higher in 1972; this difference allows us to assess the sensitivity of the U.S.A. estimates to the extent of missing wealth.

Finally we must briefly mention a further difference not previously discussed -- the discrepancy between the two sets of estimates for the U.K. The shares calculated by Atkinson and Harrison (1978) are systematically higher than those of the Royal Commission (1975), and although a small part of this gap is probably attributable to the use of graduated multipliers by Atkinson and Harrison, much of the difference must be due to other factors. The most likely explanation seems to be the more conservative approach to the allocation of missing wealth by the Royal Commission. That this is so can be seen from a comparison of Tables 5.2 to 5.4 in Atkinson and Harrison (1978) and Table 34 in Royal Commission (1975). The latter shows the effect of moving to series C estimates [14] from the unadjusted Inland Revenue figures, and the percentage shares all fall. By contrast, as Atkinson and Harrison move towards the set of estimates most closely comparable to the Royal Commission's series C, the effect is to raise estimated percentage shares except for their "first stage" which involves allowing only for the wealth of missing persons.

We are now in a position to present a version of the various estimates incorporating some of the points raised in our discussion above. These are presented in Table 1 and illustrated in Figure 1. Although some differences remain -- notably the fact that the Canadian figures refer to families rather than individuals, since there seemed no firm basis for selecting the appropriate upward adjustment -- the table nevertheless enables us to reach some conclusions about relative wealth inequality in Canada, the U.K. and the U.S.A.

First, the shares of the top 1 per cent, 5 per cent and 10 per cent all appear substantially higher for the U.K. than for either Canada or the U.S.A. [15] Second, the estimated share of the top 1 per cent in Canada is below that for the U.S.A., whereas the share of the top 5 per cent is almost the same and that of the top 10 per cent is higher. The same results, stated in terms of Lorenz curves, are that the Canadian and U.S.A. curves intersect, although both lie inside the curve for the U.K. If we confine our attention to the top 1 per cent and 5 per cent, since the share of the top 10 per cent in the U.S.A. is likely to be less reliable (see footnote 13), and consider the effect of remaining problems of comparability between the estimates, the use of lower multipliers and a higher net worth total by Smith brings the share of the top 1 per cent in the U.S.A. closer to the Canadian figure, and probably reduces the share of the top 5 per cent in the U.S.A. below that of Canada. At the same time an upward adjustment in the Canadian figures to convert them to an individual basis would further narrow the gap between the shares of the top 1 per cent in the U.S.A. and Canada, and perhaps even close it, while also reinforcing the effect on the shares of the top 5 per cent in each country. A fairly safe set

of conclusions, therefore, based on Table 1, is that (i) the shares of top wealth-holders were significantly higher in the U.K. than in either Canada or the U.S.A. at the beginning of the 1970s; and (ii) there was little difference between the percentage shares in Canada and the U.S.A.

This latter conclusion is contrary to the one arrived at if the 1970 Canadian SCF estimates are compared with those from the 1963 Survey of Financial Characteristics of Consumers in the U.S.A. (Projector and Weiss, 1966). On the basis of this comparison, wealth in the U.S.A. appears markedly more unequally distributed: the share of the top 1 per cent, for instance, is calculated as 36.9 per cent. Lindert and Williamson (1977) devote a lengthy discussion to the "anomalous discrepancy" between this figure and that reported by Smith and Franklin (1974), [16] and suggest that "the key to the puzzle must lie with competing estimates of the total net worth of the entire personal sector" (1977, p. 93). The survey figure is estimated as \$1,198 billion, calculated by multiplying the mean net worth by the population in the survey, compared with \$1,779.9 billion for the same year, 1962, used by Smith and Franklin. Thus the survey estimate of the share of the top 1 per cent is a significant overstatement, and an adjustment reduces it from 36.9 per cent to 20.6 per cent, thereby eliminating the whole of the difference between the U.S.A. and Canadian survey estimates. It should be mentioned, however, that this adjustment allocates all of the missing wealth to groups below the top 1 per cent, thereby implying that the survey correctly measured the wealth of those in the top 1 per cent. This seems highly unlikely -- indeed the work of Davies (forthcoming) suggests that, in Canada, the 1970 survey estimates require upward revision -- so that some part of the anomaly probably still remains unexplained.

4. POSSIBLE EXPLANATIONS OF THE DIFFERENCES

Reports of research on the distributions of wealth in the U.S.A. and the U.K. have sometimes commented briefly on possible explanations for the differences between the two countries. Lampman (1962), for example, citing work by Straw (1956), who made a comparison of the 1953 U.S.A. Survey of Consumer Finances and the Oxford Saving Survey in the U.K. the same year, mentions the higher proportion of the population aged over 60 in Britain (16 per cent against 12 per cent in the U.S.A.), and the greater tendency for families in the U.S.A. to own their own homes. This latter aspect is also stressed by Lydall and Lansing (1959) who point in particular to the fact that many more lower-paid workers in the U.S.A. than in Britain were home-owners in the 1950s, and remark that, "in respect of property ownership there is more difference between the social classes in Britain than in the U.S.A." (1959, p. 64). Associated with this, of course, is the much greater prevalence of publicly owned rental housing in Britain; in the 1950s, for example, about 20 per cent of the total housing stock was publicly owned in Britain, while in the U.S.A. the figure was very small at about 1 per cent.

Assuming, for the moment, that these factors are important, it is relevant to note that some of these differences still persist today, and that similar contrasts exist between the U.K. and Canada. In 1971, 13 per cent of the total British population was aged over 65 and a further 37 per cent was aged between 45 and 64. In Canada the equivalent figures were 8 per cent and 19 per cent and, in the U.S.A., 10 per cent and 20 per cent, so that there is clear evidence of a British population much older than that in Canada and the U.S.A. Turning to the question of housing tenure, in U.K. in the early 1970s the proportion of the total stock which was owner-occupied had risen to over 50 per cent. In the U.S.A. the proportion of all occupied units which were owner-occupied in 1970 was 63 per cent, and in Canada the figure was only slightly lower -- 60 per cent in 1971. In this case then, the U.K. has moved much closer to the U.S.A., although

it is relevant to bear in mind that this increase merely offsets the decline of the private rented sector. Publicly-owned rented accommodation is still very important in the U.K. (particularly in Scotland where the extent of owner-occupation is correspondingly lower at around 30 per cent in 1971), and this latter feature is regarded by some as a more powerful explanation of some part of the difference between the countries' distribution of wealth.

Finally we should ask what other factors might be responsible for the differences in concentration between the U.K. on the one hand, and the U.S.A. and Canada on the other. Perhaps the most likely one, but one which is certainly just as difficult to quantify as those already discussed, is inheritance. The work of Barlow, Brazer and Morgan (1966), for the U.S.A., suggests that, except for the wealthiest individuals, inheritance is not an important determinant of wealth-holdings. Also for the U.S.A., Projector and Weiss (1966) examine this question, and although their results give only a poor indication of the importance of inheritance in value terms, it is clear that they broadly support the finding of Barlow, Brazer and Morgan (1966). Turning to Canada, there is less evidence for such a conclusion than exists in the U.S.A. The report of the 1970 survey (Statistics Canada, 1973) does argue that "the role of inheritance is significant only in a few individual cases", and mentions particularly "individuals with very large portfolios" (1973, p. 21). The basis for this observation is not made clear however, and one is forced to the conclusion that the report is extrapolating from the findings for the U.S.A. of Barlow, Brazer and Morgan (1966) and Projector and Weiss (1966), both of which it cites. Davies (1978) has re-examined the basis for the findings of these sample surveys, and comparison with estate tax records in the U.S.A. indicates that surveys detect "only a small part of the total" (1978, p. 31). He estimates the level of inherited wealth as $2\frac{1}{2}$ - $3\frac{1}{2}$ times the figures conventionally quoted for the U.S.A., and cites three reasons for this result: the high positive skewness of the distribution of inherited wealth which causes an under-estimate of the sample mean and level of dispersion; under-reporting caused by a variety of factors; and differential nonresponse with the wealthy families responding less readily than less wealthy families.

Research on this question for the U.K. suggests, in fact, that there is indeed a substantial impact on the wealth of top wealth-holders. In particular the work of Harbury (1962), Harbury and McMahon (1973) and Harbury and Hitchens (1976) has painstakingly traced the estates of fathers of wealthy people who have died, and yields evidence on the proportion of top wealth-holders in one generation who were preceded by top wealth-holders in the previous generation. In a further article, Harbury and Hitchens (1977) summarise the results: the proportion was a relatively stable two-thirds from the 1920s to the 1960s but more recently has declined slightly so that "approximately threefifths of top male wealth leavers (leaving over £200,000 in 1973 prices) were preceded by fathers who were at least moderately rich" (1977, p. 125). There are, it must be said, a number of difficulties with this general approach which are documented by the Royal Commission (1975, p. 120) and which Harbury clearly acknowledges. However, it does appear that inheritance has indeed played an important role, and this in spite of increased estate duty rates which were expected to prevent large fortunes from passing largely intact between generations. This conclusion is supported by an interesting investigation of a sample of estates, carried out by the Royal Commission (1977, pp. 166-197). In particular, it finds that the ratio of inherited wealth to total wealth in 1973 was of the order of 20 per cent, and that, taking account of other transmitted wealth such as gifts inter vivos, exempt from estate duty if made more than seven years before death, and exempt settled property, the ratio of the total of all transmitted wealth to total wealth was around 25 per cent

(1977, Tables 90 and 91). While these results are heavily qualified by the Royal Commission, they are nevertheless in stark contrast to even the re-estimated figures of Davies for the U.S.A. His estimate is that inherited wealth accounted for "about 12 per cent of 1959 household wealth" (1978, p. 29), approximately half the figure calculated by the Royal Commission. [17] We therefore feel it is quite likely that the greater concentration we observe in U.K., compared with the U.S.A. and Canada, can be partly attributed to the fact that inheritance continues to feature prominently as a cause of persistent large fortunes.

Table 1

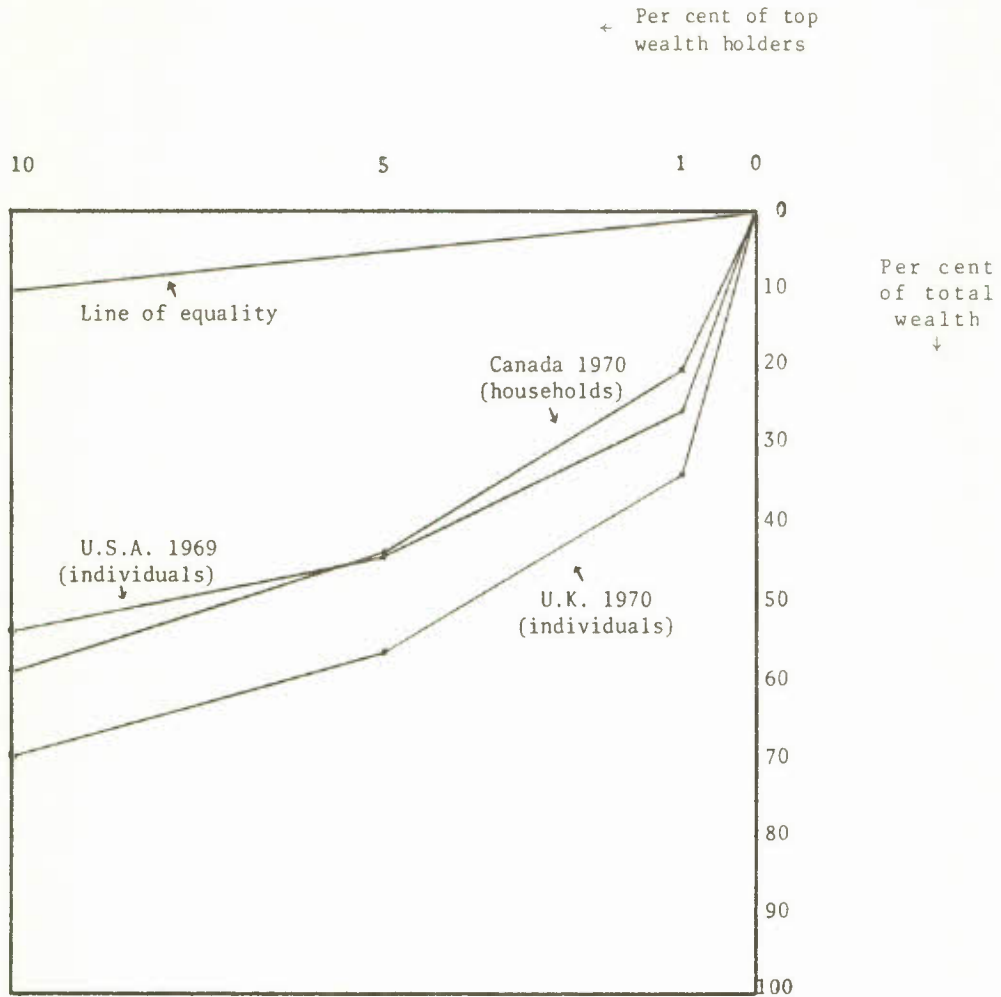
Estimates of the Distribution of Wealth in Canada, the U.K. and the U.S.A.

Source	1969			1970		
	Share of top			Share of top		
	1%	5%	10%	1%	5%	10%
Canada Davies (1979)				19.6	43.4	58.0
U.K. Atkinson and Harrison (1978)	34.2	58.0	69.0	33.3	55.6	69.2
U.S.A. Natrella (1975)	25.1	43.7	53.0			
[Smith (1978)]	[21.9]					

Source: The figures for Canada and the U.K. are taken directly from the original source publications (respectively Davies (1979, Table 5) and Atkinson and Harrison (1978, Table 5.4)). Those for the U.S.A. are from Natrella (1975, Table 6), but incorporate an adjustment for the fact that the original figures referred to the total population rather than the adult population. The same is true of Smith's estimate (1978, Table 2).

Figure 1

Lorenz Curves for the Distribution of Wealth, Canada, the U.K. and the U.S.A.



Source: Table 1.

Footnotes

- 1 This is not the place for a detailed discussion of the different methods. The interested reader may refer to Atkinson and Harrison (1978).
- 2 The word "official" is used solely to distinguish estimates prepared and published by government agencies from "unofficial" estimates of private researchers.
- 3 See, for example, Inland Revenue (1978) and Royal Commission (1977).
- 4 The 1972 estimates are to be found in Internal Revenue Service (1976).
- 5 The asset data for 1970, for instance, are in Statistics Canada (1973).
- 6 The 1970 survey actually collected information on incomes for 1969 whereas the data on assets refer to the spring of 1970. The publication containing the asset data (Statistics Canada, 1973) is, however, rather misleadingly entitled Incomes, Assets and Indebtedness of Families in Canada, 1969.
- 7 Although U.K., rather than Great Britain, is used throughout this paper, the estate data only cover Northern Ireland for 1974 and later years.
- 8 These classes are, broadly speaking, the managerial and professional workers.
- 9 See Royal Commission (1975, pp. 237-39) and Atkinson and Harrison (1978, pp. 88-89) for further details.
- 10 It is worth noting that, in the U.S.A., the investment income method has recently enjoyed a revival of interest with estimates being made on this basis by Lebergott (1976) and Wolff (forthcoming). However, our view is that the estate-based figures still provide the most reliable indication of the distribution of wealth, at least in the upper tail, and that, at best, information from other methods can only provide a valuable supplement to these estimates.
- 11 For the U.S.A. adult is defined here as aged 20 and over, since this is the nearest we can approximate to 18 and over (as used in the U.K. figures) given the population figures published in United States Government (1977, p. 217). The different definitions for the U.K. and the U.S.A. are unlikely to hinder seriously our comparisons. Atkinson and Harrison show, for example, that the British estimates are sensitive to the definition used, but the effect is relatively small when the group considered is the top 1 per cent (1978, p. 126). From their results we can see that the lower is the age used to define an adult, the higher is the percentage share of the group under consideration, so that to the extent that there is an effect, it will overstate the share of top wealth-holders in the U.K. relative to that in the U.S.A. This is confirmed by estimates which Natrella supplied to the Royal Commission in correspondence. For 1972 he calculates the share of the top 1 per cent in the U.S.A. at 26.5 per cent, where adult is defined as aged 18 or over, which compares with the figure of 25.8 per cent which we have estimated.
- 12 Natrella (1975, Table 4).
- 13 The share of the top 10 per cent calculated on this basis is likely to be understated, however. For example, the U.K. figure of Atkinson and Harrison for the top 10 per cent in 1972, if it were interpolated on the same basis as the U.S.A. figure, would be 66.0 per cent instead of the actual figure of 71.2 per cent.
- 14 See above, p. 5, for a description of this series.
- 15 If the U.K. figures were based on going concern values rather than realization values, the same conclusion would be appropriate but the differences would be slightly less dramatic.

- 16 The paper by Smith (1978), referred to above, revises and extends the estimates of Smith and Franklin.
- 17 Brittain (1978) also makes estimates of the extent of inherited wealth in the U.S.A., although only as a proportion of the wealth at top percentiles. These ratios are typically much higher than 12 per cent, for example nearly half of the wealth of those at or above the second percentile (\$165,000 in 1972), but are not in direct contradiction to Davies' 12 per cent figure. Brittain does not unfortunately extend his analysis to the overall impact of inheritance.

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FEMALE INCOMES

The labour market experience of women differs from that of men in a variety of ways including income, occupation (and its location), and promotion patterns, among others. These papers are primarily related to incomes considerations.

Discussions of the papers revolved around the objectives of equalizing income attainment; should they be orientated to equal outcome or to equal opportunity? While time lags would be great in either case, the latter objective, as a matter of principle, has been assigned the higher priority. The child-bearing role, for better or worse, does have a differential life-cycle influence on the realization of equal opportunity between the sexes. Indeed, hiring practices and information networks for female workers, particularly the unskilled, must be better researched and understood. Clearly, evidence points to a difference in public attitudes towards women's work (compared to men and as between different professions). The special role, and adequate consideration of it, of women's work in the family should not cloud over the requirement for improved opportunities for female career attainment and development outside the home. It was also noted that women's "employment problems" continue into retirement where pension and social security provisions reflect the inadequacy or inequities of the system. This consideration is also clearly related to a number of considerations related to poverty.

SEX DIFFERENCES IN SOCIOECONOMIC ACHIEVEMENT:
AN OVERVIEW OF FINDINGS AND EXPLANATIONS

by

Rachel A. Rosenfeld*

INTRODUCTION

Within the last decade, sociologists and economists have paid increasing attention to comparisons of the locations of men and women in the labor market and of the rewards they receive there. Remarkably consistent results have been found by researchers in both the United States and Canada. In both countries the locations of men and women in the job structure differ considerably. Women are concentrated in certain sex-typed industries. In Canada, by 1971, over three-quarters of the female labor force was in trade, finance and real estate, service, and public administration and defence industrial categories (Armstrong and Armstrong, 1978). [1] Women are also, to a larger extent than men, concentrated in relatively few, sex-typed occupations. In Canada in 1971, almost one-third of the female labor force was in the clerical category. Large proportions were also in service and semi-professional occupations. About half of the twenty-five detailed occupations employing the largest number of women were predominately female, i.e., over 80 per cent female (Gunderson, 1976).

Despite the sex segregation of occupations, however, several studies in the United States and the few in Canada on status attainment processes by sex found that employed men and women have about the same average status and attain this status through similar effects of education and family background variables. Boyd (1977), using data from the 1973 Canadian National Mobility Study on full-time paid native born workers aged thirty-five to forty-nine, found that men had an average Blisshen score of 44, while women had an average score of 45.2. The standard deviation for women, however, was less than that for men, indicating that women have a more narrow distribution on either side of the mean. The process of attainment, with the exception of the effect of father's status, was approximately the same by sex. [2]

When income, rather than status, rewards in the labor market are compared by sex, the finding is of difference rather than of similarity. In 1971, full-year, full-time employed Canadian women earned on the average 59 per cent of the earnings of full-year, full-time employed men (Gunderson, 1976). Adjusting for broad occupational categories reduced the percentage to 54. [3] The effects of variables such as marital status, place of residence, and education on earnings differ by sex (Gunderson, 1976; Holmes, 1976). [4]

Few studies in either Canada or the United States have been done on sex differences in other types of occupational rewards. One of these studies, Wolf and Fligstein (1977), examined differences in power at the workplace, using data from a follow-up study of 1957 Wisconsin high school students. They found that women had slightly less control over the work of others and

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slightly more control over their own work than men at the same level of education and occupational status. Marchak's (1977) survey of white-collar workers in British Columbia revealed that 51 per cent of the women, as compared with 26 per cent of the men, had no control over the pacing of their work while 26 per cent of the women (and 57 per cent of the men) had a fair to high amount of control.

At any particular time, then, men and women differ in their location within the occupational and industrial structures. Women receive, on the average, about the same status as men and achieve it in about the same way, but receive lower average earnings, in part because of differences in returns to various characteristics, and perhaps have less authority and control at work.

Comparisons by sex at given dates do not tell one about careers, i.e., employment, jobs, and job rewards over time. Such cross-sectional comparisons may be misleading for a number of reasons. If the data come from a sample with a range of ages (as is usually the case), differences in achievements (or lack of differences) could simply reflect age compositional differences. Even if a cohort provides the data, cross-sectional results will not give an indication as to whether similarities and differences are enduring. Certainly, one will not be able to say anything about advancement (or lack of advancement) or mobility over the work life with data from one time point.

Unfortunately, relatively little research has been done on women's careers, especially in Canada. Some things are known, however. Over the worklife, women tend to have intermittent labor force participation, while men tend to remain in the labor force continuously between leaving school and retirement. This can be seen in Figure 1, which traces patterns of labor force participation by age for cohorts of Canadian men and women. Women born between the two world wars seem to have a pattern of withdrawal from the labor force during the childbearing ages and return thereafter. [5] Boyd (1977) also found that Canadian women tended to have spent fewer years in the labor force than men of the same broad cohort. Although employed women at some date have the same average status as men, their pattern of status gains over their careers differ: men move up in status, especially early in their worklives; women do not (Boyd, 1977; Sewell, et al., 1977; Wolf, 1976; Rosenfeld, 1978). At the same time, women seem to remain attached to a general occupational category to a greater extent than men. (See Rosenfeld, 1976, for U.S. married women.)

Various explanations to account for differences by sex in occupational location and rewards, and, to a greater or lesser extent, to account for differences in careers have been discussed. These are of three general types: (1) those (especially human capital theory) which posit that individual characteristics, and in particular, individuals' employment histories, affect career advancement and level of reward; (2) those (e.g., the split labor market approach) which focus on competition between groups to explain differences in levels of reward (and only indirectly in advancement opportunities); and (3) those (e.g., dual labor market theory) which suggest that the segmentation of the labor market results in some groups having less opportunity for advancement than others. This paper will review these explanations and the empirical evidence which supports them. Such a review is important, since the different types of explanations, which may all be true to some extent, have different policy implications, given the aim of equalizing chances for achievement in the economic realm. If individual characteristics such as employment patterns are important determinants of career patterns, then attention should turn toward retraining women as they re-enter the labor force and toward provision of child care and part-time jobs so that women

can continue to work outside the home even when they have responsibility for children. If, as the competition approaches suggest, there are differences in the price of male and female labor, as well as sex segregation, then equal pay and equal opportunity legislation should be enacted and enforced. If the labor market structure is the most important factor affecting women's careers, then more attention should be concentrated on equal opportunity and, especially, affirmative action programs. If no one explanation predominates, then a range of programs is indicated.

INDIVIDUAL LEVEL EXPLANATIONS

The most coherent individual-focused explanation of difference by sex in career patterns and rewards is human capital theory. Human capital theory suggests that people (and their employers) invest in education and training. This education and training brings about increased productivity which in turn is rewarded by higher income or status. Time in the labor force (or more roughly, for men at least, age) then can be thought of as representing human capital gained on the job. Age and time in the labor force influence the decision as to whether to invest in human capital. The economically rational individual (employee or employer) decides whether to invest in human capital by comparing the cost of the investment with the returns, discounting both costs and returns to the time at which the investment is made. The older a person and the less time she/he will remain in the labor force, the less time over which to receive returns and the greater the opportunity (and perhaps other) costs. Investment in human capital then would occur at relatively young ages. This is one explanation for the rise and then leveling off of the income and prestige profile corresponding to men's careers. [6]

The human capital approach argues that the discontinuity in women's employment histories will result in early decisions to invest less in human capital, in less time to accumulate human capital while in the labor market, and in depreciation over breaks in employment of previously acquired human capital. In general, then, women would be expected to have less effective human capital than men. To the extent that continuity of employment is important for success within the occupational structure, the evidence on women's employment suggests that women will be at a disadvantage relative to men. To the extent that continuity of employment is especially important early in the worklife, i.e., during the years which are also the peak childbearing years, women will be especially at a disadvantage relative to men.

There is empirical support for the human capital argument. The literature on the relationship between fertility and labor force participation decisions suggests that women make an early choice between commitment to the labor force and commitment to a family, such decision being perhaps accompanied by decisions as to training and education. Waite and Stolzenberg (1976), using data from the U.S. National Longitudinal Survey (NLS) of Young Women, found that plans to participate in the labor force had considerable negative effect on the number of children expected, while the number of children expected had only a small effect on expectations of being employed at age thirty-five. On the other hand, in looking at fertility and labor force participation behavior of a slightly older cohort (approximately age thirty in 1970), Smith-Lovin and Tickamyer (1978) found a negative effect of fertility on labor force participation, though not an effect of labor force participation on fertility. They suggest that the problem of actually trying to cope with a family and employment might be unanticipated to a large extent and result in child-rearing influencing work behavior rather than vice versa. This would suggest that employers are indeed acting rationally to anticipate that women will not remain with a firm, regardless of their stated intentions. Inclusion of sex role attitudes in the

Smith-Lovin and Tickamyer analysis did not change their conclusions with respect to the work-fertility relationship.

Looking directly at the relationship between employment patterns and level of earnings, sociologists and economists have found some evidence supporting the hypothesis that differences in length and continuity of employment account for sex differences in wages. Mincer and Polachek (1974), using NLS data on women aged thirty to forty-four in 1967, concluded that home time does result in depreciation of earning power. Further, their results showed that nearly half of the male-female wage gap was due to differences in work histories. Sandell and Shapiro (1978) replicated Mincer and Polachek's analysis, using improved estimation techniques, corrected data, and a clearer conceptualization of components of human capital. They did not find strong evidence for depreciation of women's human capital over periods spent outside the labor market and estimated that only about one-fourth of the differences in wages by sex were due to differences in work experience. Corcoran and Duncan (1979) had available to them data from the ninth wave of the U.S. Panel Study of Income Dynamics, which covers a broader age range than the NLS and which contains very direct measures of human capital accumulation and work history. Consistent with Sandell and Shapiro, they failed to find evidence for the notion that human capital depreciates during periods of labor force withdrawal and found that labor force attachment and work history accounted for only around 30 per cent of the wage gap between white men and women.

Bibb and Form (1977), using data on blue collar workers from the 1972-73 U.S. Quality of Employment Survey, examined differences by sex in effects on earnings of tenure with a given employer (representing the opportunity to acquire human capital specific to the firm) and of general attachments to the labor force. Tenure was a significant determinant of earnings. However, women had only slightly shorter average tenure, but received only about 60 per cent of the return on it that men received. Attachment to the labor force was significant for neither sex.

Preliminary analysis of career (earnings) profiles by sex for members of the young NLS cohort who had been in the labor force each survey date over seven years produced results consistent with Bibb and Form. These young women had earnings profiles that were concave over time but at a lower level than men's (Rosenfeld, 1979). That is, they had been in the labor force for approximately the same length of time as men, but received lower returns to that experience over time.

This research with respect to income (and primarily level of income) shows some effect of employment history on socioeconomic rewards, but not as much as might be expected if the human capital approach adequately modeled the process. It is possible, however, that income does not correlate highly with other of women's socioeconomic achievements. Women's career patterns (in the sense of occupational rank over time) might be differentiated by their employment histories, but women's incomes might be relatively insensitive to individual behavior. Indeed, Bibb and Form (1977) found that human capital variables explained almost twice as much as the variance in income for men as for women. We, therefore, need to see to what extent career patterns indexed by other than income, i.e., status, can be explained by individual employment patterns.

A model of status gains which included measures of employment patterns is estimated in Rosenfeld (1978) using the NLS mature women data. Extent of employment experience was significant only for white women, and for them explained a relatively small additional 3 per cent of the variance. Wolf (1976), using women's fertility and work histories in the 1967-1968 Rhode Island Health Survey, also found a statistically significant but

small effect of employment (proportion of birth intervals employed) on prestige gains (from occupation held before first birth to that held after last birth). Boyd (1977), roughly controlling for potential time in the labor force by limiting her sample to those age thirty-five to forty-nine (the age range included in the NLS of mature women), found significant effects on gains from first job of number of years worked, of about the same magnitude for men and women. The effect differed by marital status for women: married women received almost twice the returns to years worked as men; women of other marital status received essentially no return. As was true in Rosenfeld (1978) and Wolf (1976), inclusion of years worked eliminated any negative effect of number of children on status gains.

Although employment history has not been found to strongly affect women's status gains (at least with U.S. data), the breaks in their employment that women experience do affect their occupational career. Rosenfeld (1977) compared NLS women with and without breaks in their employment. She found that the length of the breaks did not affect women's status at the time of re-entry relative to that at the time of exit from the labor force, a result consistent with Wolf's (1976). However, women with breaks in employment had greater discontinuity in their occupational location. Further, these women received lower returns to their earlier occupational level, as compared with relatively continuously employed women, and depended more on their formal education and training. These results are consistent with Boyd's comparison of differences by marital status in attainment processes, assuming married women have the least and single women the most continuous employment. (See also Hudis, 1976.)

This review suggests some association between women's employment behavior and their socioeconomic achievements. At the same time, much of the difference between men and women and among women is left unaccounted for. Alternative explanations for sex differences in careers focus on factors other than individual characteristics. Until recently, most empirical studies of sex differences have been, at least implicitly, from a human capital perspective. In the last few years, however, not only have competition and labor market structure explanations of sex differences been put forth, but also research testing the strength of such theories has been done.

COMPETITION EXPLANATIONS: THE SPLIT LABOR MARKET

Another set of explanations focuses not on individual characteristics which differ by sex, but on competition between men and women in the labor market and on differences by sex in group bargaining strength. There are several variations on this theme, some of which are reviewed by Blau and Jusenius (1976), and by Snyder and Hudis (1976). Bonacich (1972) has developed the idea of the split labor market, an idea which incorporates many elements of other competition and bargaining power approaches, to explain ethnic antagonism. This model seems particularly applicable to the positions of men and women in the labor market.

In the split labor market, there is potentially unequal pay for equal work.

To be split, a labor market must contain at least two groups of workers whose price of labor differs for the same work, or would differ if they did the same work. The concept "price of labor" refers to labor's total cost to the employer, including not only wages, but the cost of recruitment, transportation, room and board, education, health care (if the employer must bear these), and the cost of labor unrest. (Bonacich, 1972:549)

The initial price of labor is lower for groups with lower standards of living, less information, lower political resources, and for groups who are only temporary workers (who may enter the market to supplement the family's income or make a specific purchase and whose standard of living does not depend on the particular job's income). Given that women often live in families with adult men, it is difficult to say that women have lower standards of living (though, see Boyd, 1976, on the earnings of divorced and separated women). Women do tend to have less information about the labor market (see argument in Rosenfeld, 1978: 62), and to have lower political resources, [7] and tend to be intermittently employed, although their employment may be an important supplement to family income (Armstrong and Armstrong, 1975; Oppenheimer, 1977). Within this approach, differences in skills are not themselves important, given the possibility of on-the-job training.

Business wishes to pay as little as possible for labor, but is limited in this desire by resources and motivations of the two groups of workers. One response of the stronger, higher-paid workers may be the exclusion of the cheaper group from certain occupations. The differently priced workers, then, may never occupy the same occupations. The occupational structure would be completely segregated. [8] However,

...caste systems retain the underlying reality of price differential, for if a member of a subordinate group were to occupy the same position as a member of a stronger labor group, he would be paid less (Bonacich, 1972:555).

On the basis of this model, one would expect to see sex segregation with unequal pay for equal work, with the stronger group gaining in general from the split in the labor market. That there is sex segregation is clear. Whether there is unequal pay for equal work is not, in part because of the difficulty in finding men and women in the "same" job. A review of the literature on sex differences in income in the United States concluded that these differences seemed due more to between job differences than to within job differences (Kohen, et al., 1975). Snyder and Hudis (1976), trying to determine whether differences by race and sex in wages resulted from exclusion or from an increase in minority workers depressing wages for white males, found some evidence using 1950-1960 U.S. Census data that an increase of women in a given occupational category did depress the wages of white men. [9]

The evidence with respect to Canada is less clear. McDonald (1977) states that half of the male-female wage gap is due to unequal pay for the same work, the other half being due to differences in jobs. However, it is not clear how she obtains this figure. Labour Canada (1977) presents comparisons of male and female weekly salaries for fairly detailed jobs by city which show consistently lower pay for women, in keeping with McDonald's statement. Gunderson (1975) found men receive higher earnings than women in the same firm and same occupation in Ontario manufacturing firms. On the other hand, Dussault and Rose-Lizée (1979) give evidence that at least for Montréal office workers, job segregation within and across firms rather than unequal pay for the same job is the most important factor leading to the wage gap between the sexes. Although there is equal pay legislation in Canada, it does not seem very effective (McDonald, 1977; Gunderson, 1975) and is probably less effective than such legislation in the United States. Wilson (1978) has suggested that the split labor market model is applicable only at certain stages in the relationship between two groups. Differences between the United States and Canada in the extent to which the split labor market model is useful may result from differences in the stage of male-female competition in the labor market.

Although the split labor market approach potentially accounts for differences in levels of income, it does not account for differences in careers except to the extent that the jobs left open to the lower paid group are those without promotion potential. A third type of explanation for sex differences in careers and levels of rewards focuses directly on differences in rewards and opportunities associated with the jobs open to different groups.

STRUCTURAL EXPLANATIONS

Recently there has been increasing discussion of the extent to which the labor market fails to meet the neoclassical assumption of homogeneity (see, for example, Horan, 1978). Various typologies of labor market segments have been developed. In these discussions, it is argued that there are differences in rewards and opportunities among labor market sectors which exist even after controlling for differences in composition. For example, Doeringer and Piore (1971) have proposed that the labor market consists of "primary" and "secondary" markets.

Jobs in the primary market possess several of the following characteristics: high wages, good working conditions, employment stability, chances of advancement, and due process in the administration of work rules. Jobs in the secondary market, in contrast, tend to have low wages and fringe benefits, poor working conditions, high labor turnover, little chance of advancement, and often arbitrary and capricious supervision (Doeringer and Piore, 1971:165)

Jobs in the primary labor market tend to be of two sorts: entry level jobs and jobs which are part of internal labor markets and filled from within a firm. In part because of specificity of skills and on-the-job training required by jobs in the internal market, employers want to fill these sets of jobs with stable employees. [10] They will want to screen out from such positions those who work unreliably and intermittently. One relatively inexpensive way to do this is by "statistical discrimination" (Phelps, 1972). [11] If persons with certain demographic characteristics are known to have generally low market attachment (e.g., women, blacks, teenagers), then all members of such groups may be barred from jobs which are the entry to sets of jobs allowing on-the-job training, job security, and upward mobility. At least some of those channeled into secondary jobs will behave as the employers expect members of their group to behave. Some will not, but their individual behavior will not affect their chances for advancement, given the structure of the labor market. Further, some of the expected behavior of secondary workers may be a response to being in the secondary market (Gordon, 1972). Since continuity of employment is not expected or rewarded, secondary workers may be more likely to leave their jobs. Since one job can be replaced by another offering similar rewards, less value is placed on job security in a given set of jobs.

Rather than segmenting the labor market by characteristics of jobs within the market, typologies of sectors of the economy tend to be derived in terms of the development of a capitalist economy, which results in one sector defined by large, centralized capital, and another defined by small, decentralized capital. However, the nature of those sectors is such that jobs in the monopoly (Hodson, 1978) or core (Bluestone, 1970) sector tend to have characteristics similar to those in the primary labor market, while those in the competitive or periphery sector tend to be like those in the secondary market. Hodson (1978) has shown that markets (primary and secondary) crosscut economic sectors, although primary jobs tend to be in the monopoly sector and secondary jobs in the competitive sector.

Somewhat related to the dual labor market and segmented economy arguments is that in the "reserve army" theory of women's participation in the economy, which focuses on forces affecting women's entry into the labor market. This theory suggests that capitalism needs the work of women within the home in providing personal services, bearing children, socializing them to fill the needs of the labor force, providing emotional support, and consuming. At the same time, capitalism needs a flexible labor supply, one that can be easily drawn into the labor force in times of labor shortage and easily expelled when the labor is no longer needed. Women, it is argued, function as part of this "reserve army" of labor. The ideology that women are wives and mothers -- not "workers" -- even when they are employed makes their labor market behavior easily manipulated. One could argue, then, that women have discontinuous employment and histories of unrelated jobs because their occupational careers (to a greater extent than those of men) represent the needs of the economy rather than individually motivated "careers." The segmented economy approach elaborates the "reserve army" theory by proposing that the competitive sector is the principal sector of the economy demanding a flexible labor supply provided by women, youths, and minority group members. Milkman (1976), concentrating on sex segregation in the labor market, criticized the "reserve army" theory for neglecting the extent to which women are segregated from men into female occupations. While women are drawn into the labor market with economic expansion (Oppenheimer, 1970; Armstrong and Armstrong, 1978) or in times of crisis and while women tend to lose temporarily-held male jobs (Gray, 1971; Acton, et al., 1974), Milkman found that they usually did not lose their "women's" jobs to men during periods of contraction.

Given the employment behavior of women as a group, it is not surprising that they have been found to be over-represented in the secondary labor market and the competitive sector (Hodson, 1978; Bibb and Form, 1977; Beck, et al., 1978). Further, within sectors and labor markets, there is sorting by sex and race (Hodson, 1978), this sorting being the focus of segregated labor market approaches (e.g., Oppenheimer, 1970; Milkman, 1976). The nature of this sorting has been discussed by a few authors. Among these is Blau (1977). As Blau points out, within the primary market, women may be denied certain entry level jobs and thus denied whole career ladders. Even within internal markets, they may be slower to advance because of real or perceived differences in job-relevant characteristics (such as "leadership potential" or "commitment"). Further, the job structure of primarily female jobs even within the primary market or monopoly sector might be organized to reflect the supposed or actual characteristics of the incumbent, having more entry level jobs and fewer possibilities for advancement. Even within occupations, there may be differences across firms within the same industry in pay and sex composition. Higher wage firms may use more rigid hiring standards (which might tend to screen out women) than lower wage firms such that lower wage firms are likely to have disproportionately women workers.

Capitalists seeking to "divide and conquer" the working class (Reich, et al., 1973), employers practicing statistical discrimination, and white male workers keeping the better jobs out of reach of other groups (Hartmann, 1976) have all been portrayed as those perpetuating differences by sex and race in career opportunities. The structural arguments, however, do not require that one believe that women are somehow forced into certain types of jobs. Because of "socialization" or a "rational" decision made weighing time required for home and family responsibilities, women might choose such jobs. The point is rather than once in such secondary, female jobs in the competitive sector, women will be limited in their opportunities for advancement in a way unrelated to their individual employment behavior.

This sort of structural argument differs from an income discrimination argument (where there are said to be differences in income by sex within jobs) in that it assumes a tight connection between job and rewards, regardless of the characteristics of the incumbent. From this perspective, the labor market location of the job is the primary predictor of advancement, although sex might predict to a large extent labor market location. The literature on sex differences in income in the United States is consistent with the structural approach: as noted in the previous section, these differences seem related to between-job differences in wages, rather than to within-job differences.

The continuity of women's occupational location (e.g., Boyd, 1977) is consistent with the idea that women's careers are influenced to a larger extent by the types of occupations open to them than by their individual employment patterns. Continuity of general occupation, however, is not alone strong evidence for either the individual or the structural explanation of women's lack of upward status mobility, since one could speculate either that women continue in occupations compatible with their interrupted employment or that women are committed to (because of socialization) or limited to occupations which do not allow upward mobility regardless of employment history.

Bibb and Form (1977) found that by including variables which were proxies for labor market location, in addition to human capital variables, they explained just about the same amount of variance in earnings attainment for men and women. Differences by sex in effects of human capital variables (and locations variables) remained, perhaps representing the effects of additional sex sorting. Rather than examine the effects of labor market location on earnings by sex, Beck et al. (1978), using 1975-1976 General Social Survey data, looked at the effects of sex on earnings within sectors, net of various other personal characteristics. They found that, net of other characteristics, the average worker suffered an approximate \$1,000 loss by being in the periphery rather than the core, while women suffered an additional income disadvantage within the core sector. Within the core (in contrast to within the periphery), there were significant age returns for women of about the same magnitude as for men in the core. Beck et al., suggest that this perhaps implies that, within the core, women can get a return to experience. The lack of return to experience for women in general would result from their concentration in the periphery. Using data from the 1973 Canadian National Mobility Study, Boyd and Humphreys (1979) show women received greater returns to their labor force participation in the core than in the periphery, although even in the core, women received less of a return than men. In general, Boyd and Humphreys found that women suffered more from differential returns on their resources in the core than in the periphery, although location in the core still gave women a greater income than location in the periphery. They also separated the public administration from the rest of the core sector. The income gap by sex was narrowest in this location.

These results with respect to income attainment suggest that labor market location is important in explaining women's socioeconomic achievements. Halaby (1977) focused not on the occupational structure as a whole, but on men and women in essentially the same job category within a particular U.S. firm. He found that differences between men and women in wages within this category resulted more from segregation of women in the lower-paying ranks than from differences by sex in pay at the same rank. Further, this rank segregation did not seem to be associated with male-female differences in human capital, including seniority and work experience. Malkiel and Malkiel (1973), using 1966-71 data on professional employees in one corporation, also found that if there is discrimination against

women in internal markets, it occurs in the form of assignment to different ranks, not in the form of unequal pay for the same job.

They found that differences in level of human capital accounted for about half of the difference by sex in rank.

In another study within a particular firm, Kanter (1977) found some evidence in support of the idea that location in a "secondary" job can produce the behavior expected. Within the firm she studied, the chance for upward mobility led women to reorganize their home responsibilities to enable them to take advantage of such opportunity. This contrasts with the Smith-Lovin and Tickamyer (1978) failure to find effects of work experience on sex role attitudes in their analysis using national data.

Blau (1977) and Dussault and Rose-Lizée (1979) investigated another aspect of sex segregation and consequent wage differences. They found considerable sex segregation by establishment, with attendant differences in pay and job opportunities, in three large Northeastern cities in the U.S. (Blau) and in Montréal (Dussault and Rose-Lizée). Investigation at the firm or establishment level within labor markets and economic sectors clearly is important in increasing understanding of the way in which the difference in wages and opportunities develops between groups.

Research done on occupational and status mobility by sex and on mobility from sex segregated occupations offers further support for a structural explanation of women's careers. Using 1970 Census data, Rosenfeld and Sorensen (1979) found that, controlling for occupational distribution in 1965 and 1970, men and women did not differ substantially in the probability of making a particular move between occupations. In other words, if men and women had the same occupational distribution at any particular time, then their opportunity for mobility between occupations would be the same. This suggests that the difference by sex in careers is the result of channeling into certain types of occupations rather than the result of differences in chances to move net of distributional differences. Again using 1970 U.S. Census data, Wolf and Rosenfeld (1978) studied directly the effects of sex structure of occupations on chances for upward status mobility. These results showed that, even controlling for age, education, and status at the beginning of a five-year period, persons (especially women) qualified for a certain level in the hierarchy of predominantly male occupations lose in status by job shifts which leave them in a predominantly female occupation five years later, while those (especially women) qualified to fill a certain level within the female occupations could improve their status by leaving it. [12] This suggests that women are especially under-rewarded in terms of status relative to the rewards they could receive in male occupations. Again, these results imply that it is the channeling of women into predominantly female occupations which limits their status mobility.

Rosenfeld and Sorensen (1979) found that though patterns of mobility between occupations did not differ by sex once the differences in distributions had been controlled, exit and re-entry patterns did differ, perhaps because men and women interrupt their employment for different reasons (e.g., because of seasonal unemployment or for military duty versus for family reasons). Wolf and Rosenfeld (1978) found that female occupations were easier to re-enter for females with some minimal level of education and for men in general. These results are consistent with the idea that women's continuity of occupation is the result of the responsiveness of "female" occupations to the intermittency of women's employment. Characteristics of "female" occupations, especially those requiring some training acquired off the job, are in part at least a result of the general employment patterns of women.

CONCLUSIONS

In both the United States and Canada, men and women differ in their occupational and industrial location at any time, in the income they receive, and in their patterns of advancement over their work lives. Human capital theory suggests that these differences are the results of differences in individuals' education and training, especially training received while on the job. There is some evidence for this, but it is not strong. The split labor market theory suggests that reasons for differences in levels of rewards by sex are the result of competition within the labor market between weaker and stronger groups. This process of competition leads to sex segregation (with women in those jobs with lower pay and perhaps less opportunity for advancement) and unequal pay for the same work. This model seems to fit the Canadian case to some degree. A third approach, that of segmented labor markets, suggests that differences in rewards and opportunity are the result of differences in the types of labor markets in which men and women are able to obtain jobs. Women tend to be over-represented (perhaps, in part, because of the tendency of women as a group to have intermittent labor force participation) in those labor markets which do not offer high wages or chances for advancement. Recent research in the United States gives some support for this approach. The few studies in Canada from this perspective give results consistent with those from the U.S. studies.

For the moment, this review leads to a reiteration of the concern of other researchers that equal pay and equal opportunity legislation be effectively enacted, while acknowledging other important needs of women in Canada such as for child care, better labor organization, and affirmative action.

Beyond this, the review suggests the need for further research which includes both individual level and group and structural level variables. Data are needed in Canada on careers by sex, in order to see to what extent there are differences in patterns of employment mobility and advancement over the work life and to try to explain these differences. Enough detail should be gathered on firm, industry, and occupation to begin to see to what extent men and women are located in different types of labor markets or are paid differently for the same work. This research in Canada should take into account the factors peculiar to the Canadian situation such as the presence of multinational corporations and the competition not only between men and women, but also among different ethnic groups and between native-born and immigrants (e.g., Boyd, 1975).

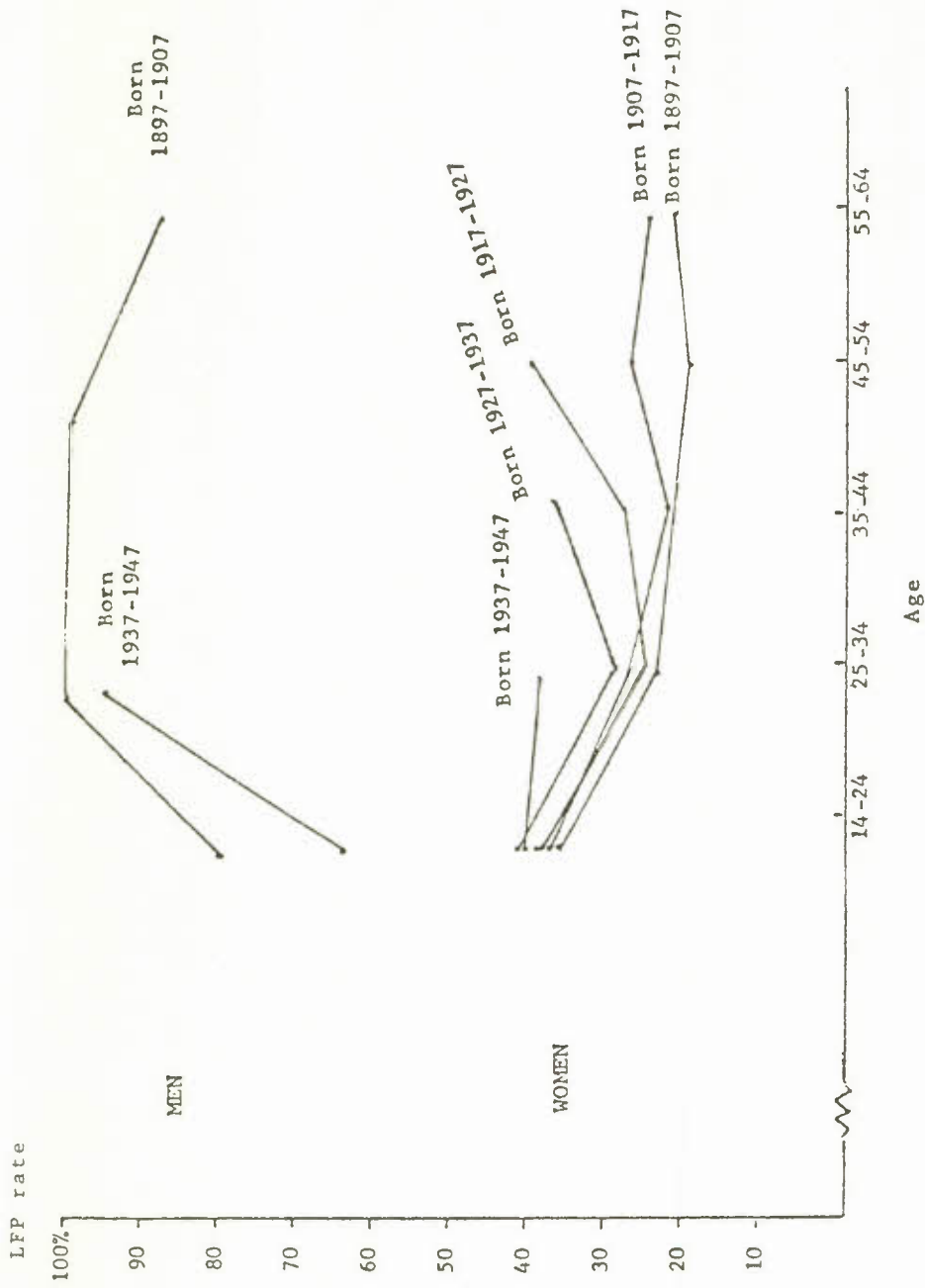


Figure 1. Age Patterns of Employment for Birth Cohorts of Canadian Men and Women.
 Source: Frank T. Denton and Sylvia Ostry, Historical Estimates of Canadian Labour Force, 1961 Census Monograph, Ottawa: Queen's Printer, 1967; Labor Canada, Women's Bureau, Women in the Labor Force, 1975.

Footnotes

- 1 See also Gunderson (1976).
- 2 For status attainment comparisons by sex in the United States, see Featherman and Hauser (1976); Treiman and Terrell (1975); McClendon (1976); Sewell, et al. (1977). Marsden et al. (1975), found differences in occupational attainment processes by sex, but use only data from a sample of Ontario university graduates for first job.
- 3 See also Holmes (1976) who, using data from the 1967 Statistics Canada Survey of Consumer Finances, found a gap of about the same magnitude. These findings are roughly the same as those for the United States, e.g., in Sawhill (1973).
- 4 For U.S. results, see Treiman and Terrell (1975); Featherman and Hauser (1976).
- 5 For evidence that this pattern holds in the United States, see Kreps and Leaper (1976) and Rosenfeld (1976).
- 6 See Thurow (1970) for a more rigorous discussion of human capital theory and of the conditions under which employers rather than employees make the investment.
- 7 As of 1975 in Canada, 80 per cent of women paid workers compared with 60 per cent of men paid workers did not belong to a union (Heppner 1978).
- 8 See Hartmann (1976) for a discussion of the process during the emergence of capitalism whereby women were excluded from certain jobs by organized male workers who saw them as a threat to the male wage.
- 9 See also Szymanski (1976) for evidence that white males do not gain from racial discrimination.
- 10 See Doeringer and Piore (1971) and Thurow (1975) for a discussion of the development of primary markets.
- 11 See also Spence (1974).
- 12 Most persons, however, remain within predominantly female or male occupations over a five-year period and remain at the same status level.

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SEX DIFFERENCES IN CANADA:
INCOMES AND LABOUR MARKETS

by

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INTRODUCTION

In recent years, the emphasis on worker characteristics as factors underlying sex differences in income has been modified by inputs largely from institutional economics. Reflecting the renewed interest in the role which labour markets play in generating income differences, sociologists in particular have incorporated various measures of labour market segmentation in their models of income attainment and in their studies of sex differences in income (Beck et al., 1978a, 1978b; Bibb and Form, 1977; Hodson, 1978; Roos, 1978; Stolzenberg, 1975). Utilizing data from the 1973 Canadian National Mobility study, this paper adopts this approach and seeks to determine if sex differences in the income of native born full time employees are conditioned by location in core and periphery labour markets.

THE STATUS ATTAINMENT MODEL AND LABOUR MARKET SEGMENTATION

The origins of the question which this paper addresses arise from a growing dissatisfaction in sociology with the explanations of income inequality provided by the status attainment model. Arising as it does from the functionalist paradigm, the status attainment model views education as representing the achievement of credentials used to allocate individuals to occupational positions (Blau and Duncan, 1967). Although primary emphasis is given to occupational attainment, the status attainment model has been extended to include income. The theoretical relation between income and occupational positions is not yet well developed in sociology (Featherman and Hauser, 1978:289-290), but generally income is seen as a reward which accrues to occupational positions which individuals have achieved on the basis of family background, education, first job, and labour force experience (Featherman and Hauser, 1976; Hudis, 1976; McClendon, 1976; Suter and Miller, 1973; Roos, 1978; Treiman and Terrill, 1975).

The status attainment models of occupational and income attainments assumes a competitive and undifferentiated market (Beck et al., 1978a, 1978b, Bibb and Form, 1977; Horan, 1978). Status attainment models do not deny the existence of income inequalities, but hold that income differences between individuals or sub-populations reflect differences in characteristics which are associated with income. Specifically, in a perfectly competitive market, rates of return to income relevant characteristics should be identical across racial, ethnic or sex-defined populations. If incomes do differ, it is due to the compositional differences between groups with respect to their stock of education, and other income relevant

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characteristics. In recent years, this emphasis on the supply side of the income attainment process and the related assumption that workers compete for jobs within a homogenous market has been criticized by economists and sociologists. Notwithstanding the theoretical gulf between some of the critics (e.g., Bowles and Gintis, 1975; Hodson, 1978; Wright and Perrone, 1977 versus Bluestone et al., 1973; Stolzenberg, 1975), the criticisms all emphasize the need to consider the existence of multiple labour markets in models of income determination and in studies of income differentials between groups.

The labour market segmentation literature is replete with models developed by a number of authors, each of whom has added some unique views to its conceptualization. However, labour markets are generally seen as the arena in which workers exchange their labour power for job rewards (Kalleberg and Sorenson, 1978:1). The economic structure is conceived of as consisting of distinct sectors within which workers face fundamentally different conditions and operate under different rules affecting the distribution of workers among jobs and the distribution of wages. Most models of labour market segmentation conceptualize economic sectors as structural entities which derive from the nature of modern industrial capitalism (Beck et al., 1978a) although there is considerable disagreement between radical and institutional economists as to whether the source of segmented labour markets is endogenous or exogenous to the economic system.

The criteria most often used in order to identify labour market segments include characteristics of occupations (Piore, 1971; Osterman, 1975; Rosenberg, 1975), industries (Bluestone et al., 1973; Averitt, 1968; Beck et al., 1978b), or some combination of both (Freedman, 1976; Andrisani, 1973; Hodson, 1978). The analysis in this paper is based on those models of labour markets which rely on industrial criteria as the delimiting characteristics. Two sectors of the economy are generally distinguished in such models and labelled as core and periphery sectors or as monopoly and competitive sectors. The core sector consists of industries noted for high productivity, high profits, capital intensitivity, and a high degree of unionization. Industries in the periphery sector are noted for their small firm size, labour intensitivity, low levels of unionization and low profits.

Of specific concern to this study is the impact of such industrial labour markets on the income attainment process. A persistent finding is that industrial labour markets have significant effects in earning regressions, net of human capital variables (Beck et al., 1978a, 1978b; Bluestone et al., 1973; Hodson, 1978; Wachtel and Betsey, 1972). Although there are significant differences in social and economic statuses of workers in core and periphery labour markets, sectoral differences in earnings cannot be explained away by differences in labour market composition (Beck et al., 1978a, 1978b; Hodson, 1978).

Beck et al. (1978a) are particularly concerned with sex discrimination in earnings arising from the differential allocation of men and women to core and periphery labour markets in the United States and the differential evaluation of their human capital within these labour markets. Theoretically central to their study is the evaluation of a dual economy which has different manpower requirements for the core and periphery sectors. The core sector requires a work force that is trainable and stable while the periphery sector requires a work force that is willing to accept inferior work conditions, lower wages and a higher risk of work instability. Beck et al. (1978a) argue that these labour force requirements underlie two discriminatory mechanisms affecting the occupational and income attainments of minorities such as blacks and women. First, there is a

differential allocation of minorities to labour market sectors and second, there is a differential evaluation of workers' human capital within labour market sectors depending on race or sex. Both of these discriminatory mechanisms result in the inferior wages of minorities in the labour force. Beck et al. (1978a:10) present several arguments to suggest that "while there is a differential evaluation of human capital within both sectors, such differential evaluation is a more important component in the core sector than in the periphery." The core sector largely consists of highly bureaucratized firms exhibiting a wider range of occupations and incomes than is evident in the periphery sector. Within both sectors employers may allocate women to less desirable jobs on the basis of minimizing risk and uncertainty. But, the relative costs of such occupational segregation may be expected to be substantially greater in the core than the periphery sector because of sectoral differences in unionization and bureaucratic structures and which operates to the advantage of males (Beck et al., 1978a; Freedman, 1976). The preceding arguments have been supported by the research of Beck et al. (1978a) which shows that differential evaluation of the human capital of males and females exists within both sectors but that the economic costs for women as a consequence of this differential evaluation are greater in the core than in the periphery sector.

Overall, these findings of Beck et al. (1978a) and others (Bibb and Form, 1977; Hodson, 1978) concerning the differential allocation of men and women to labour markets and the differential evaluation of the education and experience within these markets suggest the need to consider labour market location in any comparison of male-female income attainments. Accordingly, this paper investigates Canadian sex differences in income utilizing a model of income attainment which includes core-periphery location. The study examines the extent to which sex differences in income reflect sex differences in characteristics and/or differences in the rates of return which men and women receive for their educational attainments and years in the labour force. In addition, the paper asks if core-periphery location adds to our understanding of the income attainment process in general and it examines how sex differences in rates of return to income relevant variables vary according to labour market location.

DATA AND METHODOLOGICAL CONSIDERATIONS

Sex differences in income are investigated in this study with data from the Canadian National Mobility study of inter-generational occupational mobility of the Canadian population. This study, which is similar in design to the 1967 and 1973 United States' studies on occupational changes in a generation (Blau and Duncan, 1967; Featherman and Hauser, 1975), was funded by a Canada Council research grant, and it involved the assistance of Statistics Canada which arranged to distribute an eight page questionnaire as a supplement to their July 1973 Labour Force Survey (Boyd and McRoberts, 1974). Although social and economic data are available for nearly 45,000 noninstitutionalized respondents age 18 and over, this paper investigates the income attainments of a more restrictive population, notably native born men and women aged 25-64 who were in the July 1973 labour force as full time employees, and who had worked 40 weeks or more and 35 hours or more a week during 1972, which was the year for which income was reported. Only native born men and women are included in the income attainment analysis because research suggests that the occupational and income attainment experiences of foreign born workers differ enough from that of native born Canadians to warrant a separate analysis (Boyd, 1976; Li, 1978; Richmond, 1967; Tandon and Tandon, 1977). The additional selection of full time employees who worked 40 or more weeks and 35 hours or more a week in 1972 is made for several reasons. First, it permits comparisons of men and women

while holding constant the type of labour force involvement. Secondly, there is a high nonresponse rate and selectivity of responses to the current occupation question for women in self employment, part time or unpaid family work, and location of respondents into the coreperiphery sectors requires knowing the occupations of the respondents. (The methodology for constructing the typology is discussed later in this section and in Humphreys, 1979.) Further, as part of a larger report submitted to the Economic Council of Canada, the analysis is conducted on the population reporting first and current occupations in addition to education and years in the labour force. As a result of all these considerations, the analysis of sex differences in income is conservative with respect to sex differentials in the income returns to the variables discussed below.

Education is derived from a 18 category classification used in the Canadian National Mobility study, and in this paper it is scaled to approximate years of schooling. Years spent in the labour force data are based on a question concerning the number of years which the respondents had spent in the labour force full time since beginning their first full time job.

Core and periphery industries generally are defined by economists according to such criteria as the labour/capital ratio, productivity, unionization, scale of production and scope of market product (see Bluestone et al., 1970; Edwards et al., 1975; Averitt, 1978; O'Connor, 1973) and the basis for the creating of a core-periphery typology range from a univariate to a multivariate approach (Tolbert et al., 1978). In this paper, concentration ratios provided by Marfels (1978) are used to locate industries into either the core or the periphery labour markets. In addition to using the concentration scores, the core-periphery typology is based on reassigning workers in mining and some workers in selected manufacturing industries. Further, workers in education, social work and health occupations are assigned to the Public Administration sector (Humphreys, 1979). Some writers maintain that the Public Administration industry should be treated as a separate and third sector in the core-periphery framework because it is largely controlled by the state (Hodson, 1978; O'Connor, 1973). As Hodson (1978:4) argues, "the state acts in three economic capacities - first, as a regulator of economic activity, second as a consumer of material goods ... and third as a direct producer of material infrastructure, social services, welfare and social control. The state sector of employment includes workers in all three capacities." However, public administration also can be considered a core industry, and initially it is treated as such in this paper. Core sector industries include: (1) Utilities, Transportation and Communication, (2) Finance, Insurance and Real Estate, (3) Mining, (4) Public Administration, and (5) Selected Manufacturing. Periphery sector Industries include: (1) Trade, (2) Construction, (3) Personal, Business and Community Services, (4) Agriculture, Forestry and Fishing, and (5) Selected Manufacturing. The resulting classification closely follows that of Beck et al., (1978b) and thus it differs slightly from the typologies created by Bibb and Form (1977) and Hodson (1978).

Data on 1972 income are derived from the following question which appears in the Canadian National Mobility Survey: "what was your income (before taxes) from employment during 1972? (Include wages, salaries, tips, commissions, etc., or if you have your own farm, business, or professional practice, give your net income after deducting business expenses but before taxes)." Respondents who indicated their employment income fell in a given precoded category were assigned category specific median incomes from the 1971 Census Public Use Tape of Individuals for full time employees who had worked 40 weeks or more and 35 hours or more in 1970.

The decision to focus the analysis upon the full time employee population and the need to assign a dollar value to categorical income data are factors which mitigate the need to transform the income distribution when used as a dependent variable in a regression analysis. It has become almost standard, particularly in human capital research, to take the natural logarithm of income and to express the relationship of income and human capital variables as a semi-logarithmic function (see Beck et al., 1978a, 1978b; Stolzenberg, 1975; Mincer, 1974). This transformation is based on the theory of human capital and the resultant use of the Taylor series expansion. Such a transformation is not demanded by the status attainment school except for interpretative or methodological reasons. In fact, such a transformation resulted in a much lower explanatory power of the independent variables than when income remained untransformed. Subsequent analysis revealed that such a semi-logarithmic transformation did indeed distort what was a linear relationship between income and occupation. Although these results appear surprising in light of the voluminous amount of research which examines income attainments as a semi-logarithmic function, it must be remembered that the selection of a full time employee population and the use of grouped income data minimize the analytical impact of those individuals who have unusual incomes in relation to their human capital skills and occupational statuses.

The analysis of the income attainments of men and women involved a listwise deletion of missing data and linear regression. Metric coefficients are not considered to be substantively interesting or significantly different from zero unless they are more than twice their estimated standard errors. The analysis uses a weighting system which permits the data to be representative but constrains the numbers to those of the original sample by downweighting the representative population by a factor of 1/320.

BASIC MODELS OF INCOME ATTAINMENT AND SEX DIFFERENCES IN INCOME

As discussed earlier, the analysis focuses upon the income attainments of men and women in the 1973 Canadian native born labour force who are full time employees with 1972 income and who worked 35 hours or more per week and 40 weeks or more in 1972. The data in Table 1 show the existence of considerable sex differences in income with men in 1972 receiving an average income of \$9,932 compared to the average female income of \$6,151. As outlined previously, the fact that female full time employees on the average earn only 62 per cent of the mean income earned by their male counterparts is frequently attributed to sex differences in variables known to affect incomes as well as to sex differences in the returns which men and women receive to these income relevant characteristics. But, as shown in the first two columns of Table 1, it cannot be said unequivocally that women on the average are disadvantaged by their stock of human capital skills, since, compared to men, women have similar levels of mean educational attainments. Although data are not presented here, women compared to men also have higher mean first and current occupational status scores.

The implication that there are sex differences in income returns is substantiated by the results from regressing income on education, labour force experience variables and first and current occupational statuses (Table 1). Although various functions expressing the relationship of education and experience to income exist in the literature (Beck et al., 1978a; Blinder, 1973, 1976; Mincer, 1974; Stolzenberg, 1975), this regression model depicts education as linearly related to income and as having effects on income which operate independently from the effects of experience, and it depicts the relationship between years of labour force participation and income as a curvilinear

one in that the rate of monetary returns to experience begins to diminish after a certain number of years in the labour force (Featherman and Hauser, 1976; Mincer, 1974). This decreasing rate of return to experience is depicted by including the term representing years in the labour force, which together with the linear representation of experience represents the relationship between experience and income.

The results of regressing the 1972 income of full time native born employees on education, and on labour force experience, tell a familiar story which appears in other Canadian research into sex differences in income (Gunderson, 1976; Holmes, 1976; Ostry, 1968; Robb, 1978; Tandon and Tandon, 1977). Canadian men and women differ in income earned from work in part because men and women obtain different rates of return on income relevant characteristics. As shown in Table 1, the increment in R^2 test (Cohen, 1968; Gujarati, 1970) reveals that the metric coefficients for years in the labour force and the decay term and education differ significantly for men and women, with women receiving lower monetary returns to these variables net of other factors.

The decomposition of differences in means technique (Althausser and Wigler, 1972; Winsborough and Dickinson, 1971) also indicates that women are disadvantaged, compared to males, in how socioeconomic characteristics are utilized in the income attainment process, and it shows that the small benefit which women derive from having slightly higher education, and first and current job statuses does not overcome this disadvantage. This technique decomposes the actual difference in mean income of \$3,781 between men and women into that attributable to differences in composition, differences in regression equations and a portion which reflects the interaction between the two components of income differences (see Table 4, column 1). As discussed by Althausser and Wigler (1972), and Winsborough and Dickinson (1971), among others, these results indicate that relative to their current mean income of \$6,151, if women had the same set of characteristics as men, women would lose \$161 in average annual 1972 income. But if women had their own characteristics and utilized them in the same way as did males, that is, according to the male specific regression equation, women would increase their mean income by \$3,716 (Table 4, column 1). In short, full time native born paid employees who are women earn less than men because they do not benefit from their income relevant characteristics in the same way as do men.

THE IMPACT OF CORE-PERIPHERY LOCATION ON INCOME ATTAINMENTS

As outlined by Cohen (1971), Hudis (1976), Stephenson (1975), and others, a number of explanations exist for the finding that women have lower incomes than men because they are not as efficacious as men in utilizing their socioeconomic characteristics to attain income, even when type of employment and hours and weeks worked are held constant. Beck et al. (1978a) suggests that differential core-periphery location with differential evaluations of characteristics between sectors, as well as between men and women within sectors, are all factors which contribute to sex differences in incomes in the United States. This section examines whether such factors underlie sex differences in income in Canada as well.

Examination of the full time paid native born labour force data for Canada reveal that worker characteristics differ according to location in the core or in the periphery sectors. For each sex, mean incomes, and educational attainments are higher in the core sector than in the periphery sector (Table 2, columns 1 and 2 versus columns 3 and 4). Since worker characteristics vary across the core and periphery sectors, the suspicion occurs that male-female income differences in part reflect the differential location of men and women in core and

periphery sectors, with males tending to locate in the more remunerative core sector of the economy and women tending to locate in the less remunerative periphery sector. However, the data do not support this argument. If anything, full time paid females are slightly more likely than men to be employed in the core sectors of the economy, with 52 per cent of the female workers in the core compared to 48 per cent of the males (Table 1, columns 1 and 2).

Although the near equal distributions of males and females across the core and periphery sectors indicate that sex differences in core-periphery locations do not account for income differences, [1] other questions remain to be answered. A general question arising largely from the work of the institutional economists is whether or not income relevant characteristics are differentially evaluated in the core and the periphery sectors. A second question asks if the sex differences in rewards which individuals receive on the basis of their education and years of labour force participation are sharper in the core than in the periphery.

The data on mean incomes by sector and on the effect of core-periphery location on income indicate that core-periphery location has an insignificant substantive impact on the incomes of full time paid males, but a larger effect on the incomes of females, net of variables such as education, occupational statuses and years in the labour force (Table 2). The average income for females in the core is \$1,443 greater or 26.7 per cent larger than the mean income of women in the periphery. In comparison, the average income of full time paid native born men in the core sector is \$642 greater, or 6.7 per cent higher than the mean incomes of the men in the periphery. The regression analyses tell a similar story. A detailed comparison between the model of income attainments of males in the core and in the periphery shows that there is no statistically significant core-periphery difference in the evaluation of income relevant characteristics for males (Table 2, column 9). These findings are surprising in light of the empirical studies in the United States which have observed differential returns to human capital skills across core-periphery labour markets (Beck et al., 1978a, 1978b; Bluestone et al., 1973). The findings for the Canadian data may well reflect the conservative nature of the comparison, which is based on full time paid workers only and omits those self employed and part time workers who tend to concentrate in the periphery. Further, the finding of differences is methodologically attenuated by the reliance on grouped income data which reduces the income variability.

However, core-periphery differences in the conversion of socioeconomic characteristics into income do exist for paid full time native born females in Canada. Sorensen (1973) cautions against the use of cross sectional data to infer the effect of a variable such as labour force experience, which changes over time; but the data in Table 2 suggest that for women in the periphery the relationship between years in the labour force and income is better described as an almost flat, linear function rather than as the curvilinear relationship which holds for males in both sectors and for women in the core. Tests for interaction (Table 2, column 10) show that women in the core receive higher returns for years spent in the labour force and for their educational attainment as compared with women located in the periphery industries. In addition, the test for differences in intercepts indicates that there is a significant effect of being in the core as compared to location in the periphery net of these differential returns to education and labour force experience.

Overall, location in the core has a more favorable impact on the income attainments of women than does location in the periphery. This impact again is shown by decomposing the 1,443

dollar difference in mean income earned by women in the core and periphery. According to this decomposition (Althausser and Wigler, 1972), women in the periphery would gain \$417 if they had their own sector specific way of converting socioeconomic characteristics into income, but had the characteristics of women in the core sector. If women in the periphery had their own set of characteristics, but the model of income attainment which exist for women in the core, they would gain \$469.

CORE-PERIPHERY LOCATION AND SEX DIFFERENCES IN INCOME

Thus far the analysis of the income attainments of native born full time paid workers indicates: 1) the existence of differences between males and females with respect to income and socioeconomic characteristics; 2) the existence of some sex differences in the income returns to those characteristics; 3) the existence of differences between core and periphery workers with respect to income and socioeconomic characteristics, with the differences in income being the greatest for female workers; and 4) evidence that income relevant characteristics are differentially evaluated across the core and periphery sectors, but only for female workers. This section combines this attention paid to sex differences in income attainment and that paid to core-periphery differences in income attainment by asking if sex differences in the returns which individuals receive on the basis of their education and labour force experience are greater in the core than in the periphery. Such differences are expected to the extent that unionization and bureaucratization, which are more prevalent in the core industries, operate in favour of male occupational and income attainments.

This question concerning the extent of sex differences in income returns within the core and within the periphery initially can be answered by comparing the regression models of income attainment for men and women in the core (Table 2, column 5 versus column 6) and for men and women in the periphery (Table 2, column 7 versus column 8). The tests for interaction (Table 2, column 12) indicate that men and women in the periphery differ in the returns to their socioeconomic characteristics with women getting less of a return on education and experience. The same conclusions are reached with respect to sex differences in the core with respect to the labour force experience variables (Table 2, column 11).

Table 4 (column 2 versus column 5) indicate that the cost of sex differences in income are higher for women in the periphery than in the core. If women in the periphery had their own mean characteristics but the regression equation of males in the periphery, they would gain \$3,983. Women in the core would gain \$3,493 if they had the income attainment model of male core workers. This finding contradicts the expectation that women in the core should be most disadvantaged compared to males because of the roles which unions and bureaucratic regulations play in preserving male-female inequities in income and career mobility (Beck et al., 1978a; Piore, 1971; Spilerman, 1977; Wolf and Rosenfeld, 1978). However, this contradiction is resolved by remembering that the core industrial sector includes the public administration industry (Humphreys 1979), which differs from other core industries in the extent to which the workers there are either employed by the state or monitored by the state. If federal equal opportunity programs are any indication, monitoring of sex inequities occurs in the state sector. But in Canada, monitoring of sex inequities in the private sector is relatively weak, particularly in comparison to the equal opportunity legislation which the United States government has enacted and to which private industries must respond (Bennett and Loewe, 1975).

These differences between the public administration and other industries are important because of the differential allocation of men and women into the public administration industry. Of the

native born full time paid workers included in the analysis, 12.6 per cent of the males and 25.9 per cent of the females are in the public administration industry, and of the workers in the core sector 30.5 and 57.6 per cent of the males and females respectively are in the public administration industry. In short, the data suggest that the different income attainment models for men and women in the core reflect in part the differential concentration of men and women in the public administration industry where male-female income differences may be more attenuated relative to those existing in other core industries.

Table 3 shows this to be the case. The ratio of female mean income to male mean income is 56 per cent in the periphery, 66 per cent in the core (Table 2), but 70 per cent in the public administration industry compared to 57 per cent in the remaining core industries (Table 3). Further, a comparison of the metric coefficients reveals that with respect to education, women obtain higher rates of return to their education if they are located in the public administration industry than if they are found in other core industries. However returns to education net of labour force experience does not differ significantly for men and women in the public administration industry (Table 3, column 9).

Overall, several findings emerge from the analysis of male-female differences within core-periphery sectors. First, across the core and periphery, full time paid native born women get lower returns to their education and to years in the labour force compared to men. A second finding which emerges is that compared to workers in other core industries or in the periphery, men and women in the public administration sector are more likely to have similar rates of return to their education. This latter finding is particularly interesting since it occurs in the state funded and monitored sector of the Canadian economy.

These findings suggest income relevant characteristics are differentially evaluated for men and women within both the core and the periphery sectors. This can be shown most easily by decomposing the sex differences in mean income within sectors into components representing: 1) their average stock of socioeconomic characteristics; 2) sex differences in regression equations, or in the way in which men and women utilize their characteristics in obtaining income; and 3) the residual difference (Althausser and Wigler, 1972; Winsborough and Dickinson, 1971). Table 4 shows that differences in the socioeconomic characteristics of native born full time paid men and women account for very little -- in the range of 5 percent -- of the male-female mean income differences found in each industrial sector. Most of the sex differences in mean income specific to each sector arise from the fact that men and women differ in how these characteristics are utilized in obtaining income, with women usually receiving lower rates of return when male-female differences in metric coefficients exist (Tables 2 and 3). Table 4 also provides an estimate of this cost to women, specific to each sector since the component due to differences in equations is calculated by substituting the mean characteristics of women into the male equation and then subtracting the known female average income. This procedure is equivalent to asking by how many dollars would the average income of women increase if their mean characteristics did not change, but if they converted these mean characteristics into income according to the income attainment models of males. Comparisons of this hypothetical gain in income across various core-periphery sectors shows that the amount of income foregone to women because they differ from men in the process of income attainment, is lowest (\$3,038) in the public administration industry, and highest (\$4,032) in the other core industries. In keeping with the Beck et al., (1978a) study in the United States, the data in Table 4 show that dollar costs of the sex differences in income attainment processes are higher for women in the core sector, excluding the public sector, compared to the periphery sector.

SUMMARY

The results of this study both confirm and extend the findings of earlier investigations into sex differences in Canadian incomes. The analysis into the income attainments of full time paid members of the 1973 Canadian native born labour force indicates that the mean income received by women was 62 per cent of that received by males in 1972. This income gap almost totally reflects sex differences in the utilization of income relevant characteristics, with women receiving lower returns to years in the labour force, and current occupational status. Research conducted largely in the United States explores these sex differences in income attainments by examining the differential allocation of males and females into various industrial sectors which differ not only with respect to work conditions, job stability and wages but also with respect to the evaluation of male and female income relevant characteristics. In keeping with such research, this study asks if sex differences in the income and income attainment processes of native born full time paid men and women are conditioned by location in core and periphery labour markets. The analysis indicates that 1) such men and women are almost equally distributed into the core and into the periphery industrial sectors of the Canadian economy; 2) the income attainment process of male workers in the core does not differ from that of male workers in the periphery, whereas female workers in the core industries receive a higher rate of return for their years in the labour force and education when compared to females in the periphery; 3) differential evaluation of characteristics by sex remains a major source of the lower income of women within labour markets. However, the extent to income discrepancy and the impact of such differential evaluation varies by core-periphery location.

Although the analysis presented here focuses on the relationship of industrial labour markets and sex inequities in income, there is considerable evidence to suggest that a model of labour markets which includes both industrial and occupational dimensions may add further insights into our understanding of such inequities (Freedman, 1976; Hodson, 1978). Research by Doeringer and Piore (1971) and others suggests that internal labour markets are more highly developed in the core than in the periphery sector and that women are less likely than men to benefit from these internal labour markets both because women are generally more concentrated in periphery industries but also because, within the core sector, these internal labour markets function to insulate male and female labour pools and facilitate the segregation of women into clerical and service occupations with a few promotional opportunities. Further studies of male-female income inequities should not only consider the role played by industrial labour markets but also the effect of internal labour markets which take account of career trajectories (Humphreys, 1977; Spilerman, 1977).

Notwithstanding the need for more focused research, the results of this paper indicate that differential evaluation of the characteristics of men and women exist in the core and periphery, with the dollar cost of the differential being the smallest in the public administration sector, and the largest for workers in the other core industrial sector. Sociologists frequently interpret such differentials as indicating the existence of discrimination, with its operation left indeterminate. Although the exact nature of discrimination cannot be specified with the data used in this paper, at least two findings of this study support the interpretation that women are disadvantaged relative to men in obtaining income. First, the analysis shows that sex differences in worker characteristics do not account for the income gap which exists between native born full time paid men and women. Secondly, the income gap, measured as a ratio of mean female income to the average income of males, is narrowed in the public administration industry. This narrowed

sex differential in income may be indicative of closer and more effective monitoring of sex differentials in incomes in this industry as compared with other core industries. It may also reflect the fact that women in the public administration industry are highly concentrated into professional and clerical occupations and the structure of these occupations is such that sex differentials in incomes are minimized by the effects of unionization and professional associations. Clearly, further research is required, however, before the relatively low sex differences in incomes in the public administration industry can be fully understood.

These explanations, however, have several policy implications. First, the standard ameliorative policies of upgrading human capital skills, which were stressed by North American social scientists in the 1960s, will have little impact on closing the income gap between native born full time paid men and women in Canada. Secondly, to the extent the narrower income gap and the greater similarity of male-female income attainment processes in the public administration industry reflect the monitoring of the state, the data suggest that sex disparities in income will attenuate in Canada only when stronger legislation regulating the private sector is enacted. What kind of legislation should be enacted is subject to considerable debate; minimum wage legislation is seen as ineffective (Bluestone et al., 1973) as are equal pay laws in the absence of other legislation (Sawhill, 1973). In her discussion of the United States, Sawhill suggests that the optimal strategy may well be one of a well enforced equal opportunity legislation combined with equal pay legislation.

In addition to the role played by state monitoring, the lower income differentials in the public administration industry may also reflect the nature of occupational organization in this industry. Women are highly concentrated by occupation in this sector. These female dominated occupations, professions (e.g., nursing and teaching) and clerical work, are monitored by both unions and professional associations and it is likely that these organizations act in the interests of their members in reducing sex differentials in incomes. The joint effects of state and occupational monitoring may well operate to more effectively eradicate male-female income differences in the public administration industry as compared to other core industries or periphery industries. This would suggest that ameliorative action concerning male-female income inequalities will not only entail the strategies proposed by economists concerning governmental expenditures in core and periphery industries (Bluestone et al., 1973) but also may require a more active intervention on the part of unions, governments and occupational associations in the establishment and monitoring of equal pay and equal opportunities policies.

Table 1

Characteristics and Models of Income Attainment of Full Time Wage Earners, Age 25-64, Who Worked 35+ Hours Per Week, 40 or More Weeks in 1972, by Sex, Canada 1973

Variables	Means and Standard Deviations		Metric Coefficients and Standard Errors		Significance Levels Interaction Tests
	Males (1)	Females (2)	Males (3)	Females (4)	
1972 Income	9,932.0 (4,574.8)	6,151.3 (2,724.0)	-----	-----	-----
Education	11.124 (.403)	11.800 (2.581)	684.926 (16.165)	589.576 (21.250)	.025
Years in the Labour Force	20.603 (11.172)	15.371 (9.555)	367.177 (18.796)	128.603 (20.958)	.0005
Years in the Labour Force, Squared	549.278 (517.265)	327.517 (388.495)	-6.283 (.402)	-1.960 (.514)	.0005
Core Location, Proportion	.477	.524	-----	-----	-----
Intercept	-----	-----	-1,801.408	-2,140.759	.75
R ²	-----	-----	.254	.321	-----

Source: The Canadian National Mobility Survey.

Table 2
 Characteristics and Models of Income Attainment of Full Time Wage Earners, Age 25-64, Who Worked 35+ Hours Per Week, 40 Weeks or More in 1972 By Sex and Core-Periphery Location

Variables	Means and Standard Deviations						Metric Coefficients and Standard Errors				Significance Levels of Interaction Tests					
	Core		Periphery		Core		Periphery		Core		Periphery		Core		Periphery	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)	Male (9)	Female (10)	Male (11)	Female (12)	5 vs 6 (11)	6 vs 7 (10)	7 vs 8 (12)	
1972 Income	10,268.4 (4,449.0)	6,838.3 (2,835.9)	9,625.7 (4,666.1)	5,395.3 (2,377.6)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Education	11.430 (3.433)	12.504 (2.315)	10.846 (3.351)	11.026 (2.637)	694.739 (22.446)	774.361 (31.908)	668.870 (23.332)	364.409 (28.441)	.50	.0005	.25	.0005	.0005	.0005	.0005	.0005
Years in the Labour Force	20.317 (11.148)	14.172 (8.969)	20.864 (11.190)	16.691 (10.001)	376.540 (26.374)	186.626 (29.496)	357.682 (26.814)	91.213 (28.584)	.75	.025	.005	.0005	.0005	.0005	.0005	.0005
Years in the Labour Force, Squared	536.997 (506.117)	281.196 (342.211)	560.463 (527.048)	378.494 (428.217)	-6.373 (.574)	-3.077 (.770)	-6.180 (.566)	-1.110 (.667)	.90	.10	.025	.0005	.0005	.0005	.0005	.0005
Intercept	-----	-----	-----	-----	-1,900.112	-4,623.690	-1,627.467	274.874	.75	.0005	.005	.025	.0005	.0005	.0005	.025
R ²	-----	-----	-----	-----	.272	.411	.234	.195	-----	-----	-----	-----	-----	-----	-----	-----

Source: The Canadian National Mobility Survey.

Table 3
 Characteristics and Models of Income Attainment of Full Time Paid Native Born Workers, Age 25-64 Who Worked 35+ Hours Per Week, 40 Weeks or More in 1972 by Sex and Location in Public Administration or Other Core Industries

Variable	Means and Standard Deviations				Metric Coefficients and Standard Errors				Significance Levels of Interaction Tests	
	Public Administration		Core Without Public Administration		Public Administration		Core Without Public Administration		Columns 5 vs 6	Columns 7 vs 8
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)	(9)	(10)
1972 Income	11,010.20 (4,616.00)	7,700.20 (3,051.60)	9,908.70 (4,321.40)	5,680.80 (2,003.20)	-----	-----	-----	-----	-----	-----
Education	12.887 (3.569)	13.206 (2.210)	10.724 (3.131)	11.560 (2.110)	826.634 (38.465)	924.893 (45.391)	626.689 (29.415)	365.451 (43.639)	.25	.01
Years in the Labour Force	19.095 (11.395)	14.042 (9.211)	20.909 (10.981)	14.346 (8.643)	481.950 (43.604)	217.886 (37.312)	335.188 (33.057)	101.433 (41.291)	.005	.01
Years in the Labour Force, Squared	494.320 (500.313)	281.846 (352.376)	557.690 (507.751)	280.322 (328.522)	-8.935 (.972)	-4.097 (.974)	-5.338 (.710)	- .578 (1.081)	.01	.05
Intercept	-----	-----	-----	-----	-4,428.482	-6,418.920	-843.549	162.878	.10	.50
R ²	-----	-----	-----	-----	.359	.463	.221	.230	-----	-----

Source: The Canadian National Mobility Survey.

Table 4

Decomposition of Male-Female Differences in Income, for Native Born Full Time Paid Workers, Age 25-64, Who Worked 35+ Hours Per Week or More and 40 Weeks or More in 1972, by Core-Periphery Location

Income Gap and Decomposition	Core-Periphery Location				
	Total	Core			Periphery
		Total	Public Administration	Other Core Industries	
Mean Income Gap (Male-Female)	\$3,780.70	\$3,430.10	\$3,310.00	\$4,227.90	\$4,230.40
Amount due to Composition	- 160.59	- 471.63	- 64.72	207.91	- 436.84
Equation	3,715.51	3,492.82	3,037.73	4,032.42	3,983.17
Interaction	225.78	408.91	336.99	12.43	684.07

(a) For a description of the technique see Althausser and Wigler (1972), and Winsborough and Dickinson, (1971).

Source: Tables 1, 2 and 3.

Footnote

- 1 Although men and women are comparable with respect to their distributions across core-periphery, the possibility remains that the processes of allocation into core and periphery sectors differ by sex, thereby indirectly affecting sex differences in income. This paper does not test for such a possibility.

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DISCRIMINATION AGAINST WOMEN AND LABOUR MARKET SEGREGATION:
THE CASE OF OFFICE WORKERS IN MONTREAL

by

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SUMMARY

Discrimination against women takes two main forms: first of all, the payment of lower wages to women than to men even after variables such as years of schooling, experience and seniority (which usually reflect differences in qualifications) have been taken into account; and, secondly, widespread segregation of men from women in the labour market. In fact, it is this second form of discrimination which makes the first possible because, for the most part, the payment of different wages for exactly the same work or substantially similar work within the same firm is becoming a thing of the past.

Recently, Francine Blau made a major contribution to our understanding of the mechanism by which segregation operates and its consequences for the wage and salary income of women. [1] She showed that even in office occupations where a significant number of both men and women are found, there is widespread segregation in the sense that a given firm tends to hire either only women or only men for a given occupation (intraoccupational segregation). Furthermore, an establishment which hires mainly men in one of the particular occupations studied tends also to hire mainly men for the whole range of office occupations (establishment segregation). The proportion of women hired by an establishment is negatively correlated with the average level of wages paid by that establishment for office occupations. Finally, Blau attempted to verify the hypothesis that the propensity of a firm to pay higher wages and to hire men is linked to the kind of industry to which it belongs (industry segregation) as well as to other variables normally associated with the determination of wages, in particular, the degree of unionization and the size of the firm.

Starting from a theoretical framework similar to Blau's, the purpose of this paper is to contribute to our understanding of both the form which discrimination against women takes and the reasons for its persistence. Our basic theoretical assumptions are as follows:

- (i) Because of different degrees of monopoly power and their particular positions on product markets, different firms are able to pay different levels of wages. In contrast to neoclassical theory, we assume that there is no mechanism which tends to equalize the net advantages of various jobs and that employers who pay high wages do not, in general, pay a penalty as a consequence. On the contrary, they are usually the firms who are able to protect high levels of profits as well.
- (ii) Under most circumstances, except during war and very short periods of economic boom, firms operate below their absolute capacity limit and the economy supports

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more or less high levels of unemployment. This excess supply of manpower is one of the factors which permits wage differentials to persist over long periods of time.

- (iii) In this context, the best jobs, and therefore the best incomes, can either be distributed by chance or in accordance with certain prejudices, customs and traditions prevailing in society among both employers and workers. In the case of women, it is the real and imaginary constraints imposed by their roles as wives, mothers and housewives which condition the kinds of jobs offered to them. The application of these prejudices or customs results in segregation in labour markets, segregation which in turn serves to confirm and maintain the prejudices.
- (iv) There may exist situations where, for all kinds of historical reasons, certain employers do not take full advantage of their potential to pay high wages. In such situations, employers benefit from the possibility to pay a part of their workers lower wages. These are the situations in which concerted efforts on the part of workers to improve their wages and their working conditions are most likely to succeed.

In order to better understand the mechanism of discrimination, we have constructed a sample of office employees in four major public service sector companies (transportation, communications, utilities, etc.) and four banking institutions in the Montreal area. In order to ensure comparability among the different firms, the sample was drawn from the accounting departments of the public service companies. It represents the entire range of jobs found in these departments (from messenger or office boy/girl through the various levels of accounting clerks). The sample taken in the banks represents all the kinds of jobs found in a bank branch and provides a range of jobs comparable to those studied in the public service companies. The data gathered include detailed information on the personal characteristics and job qualifications of employees as well as their work history at the company. Information on firm policies concerning recruitment, training and promotion was also collected.

The following hypotheses were tested. As the data have not all been processed, the results should be taken as preliminary:

- (i) Intraoccupational and enterprise segregation do exist in the labour market for office workers in Montreal, at least among the eight companies examined. Three of the companies have an office staff which is in majority masculine and the five others have an office staff which is more than 75 per cent female although the range of jobs studied is roughly comparable among the eight companies.
- (ii) This segregation is linked to the level of wages paid: the firms which hire mainly men pay higher wages for this kind of work than those which hire mainly women. Qualifications of the workers involved are not substantially different.
- (iii) Segregation is associated not only with wage discrimination but also with discriminatory forms of work organization and promotion ladders, forms which reflect sexist stereotypes as to the kind of work women are best fitted to do and as to their degree of labour market stability.

- (iv) The way in which work is organized and the level of wages paid tend to confirm the sexist stereotypes because they effectively encourage high turnover rates among women. In contrast, women hired into male-type job structures manifest the same kind of stable behaviour as most of their male colleagues.
- (v) Five factors normally associated with the capacity to pay of a firm were examined. The three enterprises which hire a majority of men do have the characteristics usually associated with high wage levels: all three are in a position to exercise a considerable amount of monopoly power; two are public enterprises and the third is subject to a considerable amount of government control; in all three firms a majority of office and blue-collar workers are unionized; salaries of office employees represent a relatively small share of total costs; all three recruit a significant part of their management staff from within the ranks of office workers.

On the other hand, the situation of the five firms which hire mainly women is not symmetrical and raises a certain number of questions: all five have a considerable amount of monopoly power and two of them are unionized.

Most social policies to date which have attempted to reduce or eliminate discrimination based on sex have taken one or two approaches: payment of equal wages for equal or substantially equivalent work on the one hand, and nondiscrimination in hiring and promotion within a firm on the other hand. If our analysis of the mechanism by which discrimination operates is correct, these measures will have only a limited impact on the overall position of women in the labour market. The persistence of segregation in the United States in spite of more than a decade of "Affirmative Action" and the constitutional attacks on this kind of program which have begun to appear indicate that discrimination has deep roots in our labour markets. In a period of relatively high unemployment and poor business conditions, we can expect that resistance on the part of both male employees and employers will intensify. Furthermore, these approaches rely mainly on individual actions and individual advancement: they do nothing to improve the less attractive jobs at the bottom of the ladder which are characterized by low wages, few chances for promotion and little or no job security.

The policy conclusion which we would like to formulate is the following: the harmful consequences of discrimination against women can only be eliminated by substantially improving wages and working conditions in the type of jobs occupied mainly by women. Attaining this goal requires a three-pronged attack. First of all a policy of job creation and full employment is an absolute prerequisite to improving working conditions generally, to giving women access to stable jobs and to giving women as a group enough economic power to significantly improve their situation. Secondly, better and more adequately enforced minimum wage laws can have an effect on the working conditions of jobs on the bottom rungs of the ladder although, in the absence of workers' organizations to ensure enforcement, these laws are of limited value. Thirdly, and most importantly, the improvement of working conditions in the vast majority of women's jobs requires massive unionization and the involvement of women in their union organizations at all levels.

LABOUR MARKET SEGREGATION: A THEORETICAL EXPLANATION

Interoccupational Segregation: A Starting Point

We start from the observation that not only do women on average earn considerably less than men, but also that a major part of this difference in income can be attributed to the fact that women are largely confined to the least interesting jobs with the lowest wage levels. Although there still exist situations where women are paid less for equal or substantially equivalent work, these situations are rapidly disappearing under the attack of equal-pay legislation, and, in any case, they were never responsible for the major part of income differentials. [2]

The Blau Thesis:
Intraoccupational, Establishment and Industry Segregation

Starting from the observation that interoccupational segregation is widespread, Blau developed the concepts of intraoccupational, establishment and industry segregation which she related to the dual labour market theory.

Blau's model is based on three assumptions as to the factors which determine the level and the structure of wages paid by various firms:

- "(1) Within firms, uniform base pay rates are established for each occupational category, regardless of sex. Variation in rates of remuneration paid to individual workers within the same occupational category can only reflect differences in seniority and merit.
- "(2) Within the firm, relative wage structures are rigid (i.e., wage relationships among occupational categories tend to be relatively inflexible).
- "(3) Market forces and institutional factors determine a hierarchy of firms with respect to entry wage rates. The constraints postulated in (1) and (2) imply that the wage standing of the firm will be consistent across related occupations and across sex groups." [3]

In other words, she assumes that institutional constraints will prevent firms from discriminating directly with respect to wages by paying women less than men for the same work, at least as far as the entry wage is concerned. [4] The relative rigidity of the wage structure within a firm is consistent with the observations of a number of authors and with the internal labour market theory in general. [5]

On the basis of these assumptions, Blau formulates her definition of the different kinds of segregation as well as her specific testable hypotheses. [6] The hypotheses are tested by an examination of the sex composition and the wage levels paid to workers in seven office occupations and five professional and technical occupations in three large American cities.

Intraoccupational segregation exists when, within a given occupational category, men work with men and women with women in proportions greater than would be expected if firms hired randomly from the given labour pool for that occupation. This hypothesis is confirmed for all 23 cases examined and the results were statistically significant at the 0.5 per cent level in 21 of the cases and at the 5.0 per cent level for the other two cases. [7]

Blau also expects that within each occupational category, women will earn less on average than men, a hypothesis confirmed in all but one case where the differential is small. However, Blau also postulates that the wage differential between men and women in segregated firms will be much greater than the

differential within integrated firms. Similarly, wages of men in firms which hire only men will be higher than those of men in firms which hire both men and women. Wages of women in segregated firms will be lower than those of women in integrated firms. These hypotheses are derived directly from her assumptions that the wage structure of a firm is given and cannot be modified in order to discriminate directly against women but that firms which pay higher wages are in a position to exercise a preference for men. These hypotheses are confirmed in most cases although there seems to be some overlapping between the wage levels of firms which hire only men and wages paid to men in integrated firms especially for the professional and technical occupations. [8]

The hypothesis of establishment segregation [9] follows logically from the existence and the nature of intraoccupational segregation. Since it is the firm's capacity to pay which allows it to hire a given proportion of men in each occupational category, one would expect that the proportion of women in a given occupational category would be correlated directly with the proportion of women in the whole set of occupations and inversely with the position of the firm in the wage hierarchy. Blau establishes that there is, in fact, both a wage hierarchy of firms and a hierarchy with respect to the percentage of women employed and that in each of the three cities studied the Spearman rank correlation coefficient between these two hierarchies is negative and statistically significant at the 0.1 per cent level. [10]

The existence of industry segregation is the final hypothesis tested. Blau postulates that the capacity of the firm to pay is a function of a certain number of economic factors, in particular the industry to which it belongs (as an indicator of the degree of product-market competition), the presence of a union, and the size of the establishment. Although the data leave much to be desired, a number of interesting results are obtained. The two-digit industrial category to which the establishment belongs is significant in several cases and confirms the existence of industry segregation. The effect of unionization is less clear. In manufacturing industries, the presence of a union among both white-collar and blue-collar workers has a positive effect on wage levels. However, the presence of a union among blue-collar workers only in manufacturing industries or of a union among white-collar workers in other kinds of industries does not seem to have a systematic effect on wage levels of white-collar workers. Similarly the size of the establishment seems to be important in manufacturing industries but not elsewhere. [11]

Enterprise Segregation and the Organization of Office Work

Blau's study serves as a point of departure for our research. This paper presents an in-depth look at certain characteristics of a sample of office employees in eight large Montreal firms and at the firms' policies concerning recruitment, work organisation, and promotion. Although the range of occupations covered is largely comparable from one firm to the other (the occupations are also similar to the seven office occupations studied by Blau), our basis for comparison is not the occupational category per se but rather the whole structure of occupations within a given type of department. We, therefore, start from the assumption that there exists not only interoccupational segregation but also intraoccupational segregation.

The first hypothesis to be tested is the presence of segregation by enterprise, a test which will also serve as an indirect test of the presence of intraoccupational segregation. [12]

The second hypothesis is that the firms which hire a majority of women pay lower wages than those which hire mainly men. In verifying this hypothesis, we will attempt to standardize for the different variables that normally affect wages paid, in particular for years of schooling, seniority and age at entry (as a substitute for previous experience). These first two hypotheses are based directly on Blau's methodology and research.

In order to develop our other hypotheses, it is necessary to discuss the nature of the stereotypes prevalent in our society and which are used to justify discrimination against women. According to this stereotype, the role of women is to get married, to have children and to devote the main part of their energy to raising children and taking care of a household. It is assumed that women are naturally endowed for playing this housekeeper-mother role and that the kind of paid work for which they have special aptitudes should also resemble the work they do at home: care and education of children, serving at table, making garments, cleaning, any kind of work requiring repetitive, rapid and precise movements. It is also assumed that women's first loyalty is to their families, that young women will quit the labour market if not when they get married at least when they have their first child, that married women with children will have high rates of absenteeism in order to be able to take care of their children, and that women in general are unstable employees with little or no interest in a career.

This kind of stereotype is what lies behind at least two of the assumptions or hypotheses already made. The existence of interoccupational segregation is largely due to the confinement of women to those kinds of occupations which are identified as "women's work." Secondly, the popular view that women on the labour market are always either single persons or secondary workers in a family serves as a justification for paying them lower wages.

The third hypothesis we wish to test is that firms who intend to hire mainly women organize their work and more particularly their promotion ladders differently from those who intend to hire mainly men. The firms which hire men for office work structure their work like an internal labour market with a few entry points at the bottom of the ladder, and a long promotion ladder which may extend into management occupations. The criteria for promotion are clearly specified and seniority generally plays an important role. Firms recognize and reward firm-specific training. Firms which hire mainly women have promotion ladders which look like short, fat pyramids. There are a lot of people in the entry jobs, few chances for promotion, generally unspecified and nonobjective procedures for attributing those promotions. It is also relatively easy for management to hire for the higher-level jobs from outside the firm. Because it is expected that women workers will not stay long with the firm, there is little accent on firm-specific training and few rewards for those who acquire it. Management positions, for the most part, are filled from outside the unit rather than by promotion from within the ranks.

The fourth hypothesis we will test is that the assumptions made about women's behaviour tend to be self-fulfilling because of the way in which work and promotion lines are organized. Where women are integrated into male-type promotion lines, they manifest the same kind of career-orientation and stability as men and where men are subjected to the same kinds of limitations on promotions and advancement as women, they tend to be unstable workers also.

Our fifth hypothesis is really a set of hypotheses related to the notion of enterprise and/or industry segregation: what are the factors which determine whether a given firm will pay higher wages and hire principally men and another firm will pay lower

wages and hire mainly women. Five related variables will be examined here:

- (i) the nature of the industry in which the firm operates and more specifically its degree of monopoly power; the size of the firm will also be considered here;
- (ii) the extent to which the firm is publicly or privately owned, whether it receives government subsidies of one kind or another, and whether it is government-regulated or not;
- (iii) the presence or not of a union and the particular history of the union which represents the office workers in question as well as that of any other unions in the firm including those which represent blue-collar workers;
- (iv) the percentage of costs represented by wages and salaries (and related fringe benefits) for all workers and the percentage represented by office workers' wages.
- (v) the nature of the labour market from which management personnel are recruited: does the firm usually recruit university-trained people or people with a secondary education similar to those who perform office work.

This last set of hypotheses is related to our view of the way in which the labour market as a whole functions and will serve to distinguish our theory of discrimination from other theories. The assumptions on which it is based are set forth in the summary and will not be repeated here.

We subscribe to the general precepts of the dual labour market theory and in particular to the view that the key monopolistic and oligopolistic firms in the economy form a primary labour market characterized by protected internal labour markets, relatively high wages, long promotion ladders and an accent on firm-specific training and job security which encourages employee stability. [13] However, one of the anomalies of the dual labour market theory is that it cannot account for the way in which "women's work" is organized in firms which have all the characteristics of the primary sector and which, in many cases, pay high wages to men and organize their blue-collar work as an internal labour market. In these firms "women's work" nevertheless resembles a secondary labour market with low wages, no job security, routine work, little chance for promotion and high rates of turnover.

According to our theory, this phenomenon is due in large part to the particular history of a firm or a particular sector of the economy. Economic conditions determine whether or not a firm has a relatively high capacity to pay, but the particular historical circumstances determine whether workers, either through a union or through the potential threat of a union, or because of a particular management policy, have been able to exploit this capacity to pay.

In this context, the widespread presence of prejudices and discrimination against particular groups in the labour market provides pools of cheap labour by means of which certain firms are able to continue to avoid paying higher wages in spite of their capacity to pay those wages. Firms in economically competitive industries and with relatively low capacities to pay also get their labour supply from these cheap labour pools. We thus have the phenomenon of industry and establishment or enterprise segregation, but we also have a partial explanation for many of the exceptions found in the studies which attempt to explain wage levels by monopoly power, or by the presence or

absence of a union. Not all monopoly power is effectively exploited by the workers and not all unions are equally effective. [14]

According to our theory, the decision of a firm to hire women and to pay them low wages in jobs for which they would be able to pay high enough wages to recruit men serves two purposes for the firm. First of all, it permits the firm to cut labour costs and to take advantage of a discriminatory situation. Secondly, it may be a way to forestall union organization which would allow workers to take advantage of the firm's monopoly position, given that women historically have been much harder to unionize than men.

It is on this point that our theory differs from the Becker theory, in that Becker sees discrimination as a phenomenon for which firms must pay a penalty. [15] According to our theory, those firms which hire men and pay higher wages are in strong economic positions and are generally able to protect high profit positions as well. For various institutional reasons, including the presence of a union which limits their ability to set wages "according to the market", the firms are obliged to pay relatively high wages in any case. They are, therefore, in a position to exercise a preference for men. On the other hand, firms which take advantage of the discriminatory situation by hiring women (or other minority groups) get the direct benefit of paying low wages.

Our theory is also different from the theory of investment in human capital [16] as well as the statistical discrimination theory. [17] These theories explain the position of women in the labour market either as a reluctance on the part of women to invest in themselves because of their expected short attachment to the labour market or as a reluctance on the part of employers to invest in women because of their previous experience of high female turnover or because of their preconceived expectations of high female turnover. In our model, it is the form of organization of office-work promotion structures which largely determines the attitude of women (and of men) towards a career and towards their employer. Employers are often aware of this when they structure their office work. Johnson and Stafford's finding that women earn lower rates of return on investment in university training would be consistent with this finding in that the application of wage structures and promotion policies to women do not permit them to realize the same rates of return as for men, and therefore discourages them from making such investment. [18]

Our theory also differs from the "overcrowding" theory associated with the names of Fawcett, Edgeworth and Bergmann [19] since in our model the condition for the maintenance of segregated labour markets is the presence of overcrowding in all labour markets. It is the presence of an ample supply of men to the firms which wish to hire men which reduces the pressure on firms to hire women to fill the better-paying jobs. Contrary to the neoclassical thesis that competent workers are a scarce resource which the labour market will serve to ration optimally among the various firms, we must come to the conclusion that people capable of filling a given job are, except in rare periods of tight demand, in ample supply and that the phenomenon of over-qualification, particularly among women, is widespread.

Finally our theory is quite different from the monopsony theory associated with the names of Robinson and Madden [20] in that there is no evidence of a limited number of firms on the hiring side, and no evidence that the supply of female labour is less elastic than that of male labour. Furthermore, the monopsony theory comes to the conclusion that a firm must restrict the number of workers it hires in order to maintain low wages, whereas casual observation suggests rather that firms take advantage of low female wages by using women in labour-intensive ways (using secretaries to make coffee, etc.).

LABOUR MARKET SEGREGATION: THE CASE OF OFFICE WORKERS IN MONTREAL

The Sample

In order to test our hypotheses, we have constructed a sample of office employees in the accounting departments of four major public service sector companies (transportation, communications, utilities, etc.) and four banking institutions in the Montreal area. In each case, the sample was either drawn at random or includes all the employees in a selected set of offices or branches in the case of banks. Supervisory personnel were included in the sample. Although each company organizes its work somewhat differently, the range of tasks accomplished by the accounting departments or by the banks is essentially the same. The typical job, in the case of the public service companies, is that of accounting clerk and, in the case of the banks, it is teller or clerk.

Three of the companies have province-wide operations and the other five operate in other provinces as well. In some cases, the sample includes headquarters personnel and, in others, personnel in regional and local operations only. Where possible, data was gathered directly by an examination of personnel files; in other cases, it was furnished by the firm in order to protect confidentiality. The objective was to obtain at least 150 cases for each company, an objective attained except in the case of Firm 7 where only 108 files were included (see Table 1).

The data gathered on each worker include information on sex, age, years of schooling, marital status, experience prior to entering the firm, date of and post occupied at time of first hire, current salary and job title, training or additional years of schooling acquired while working for the firm. Also gathered was information on firm policies concerning recruitment, training and promotion as well as any relevant clauses in a union contract where such exists. Data represent the situation as of December 1977.

Hypothesis 1:Presence of Intraoccupational and Enterprise Segregation

Table 1 sets forth the composition of the sample by sex, firm and employment status. The firms divide themselves clearly into two groups: Firms 1, 2 and 3 where a majority of both nonmanagement and management personnel is masculine; and Firms 4 to 8 in which almost 90 per cent or more of the nonmanagement personnel and three-quarters of the total office staff are female.

This division confirms the presence of enterprise segregation and ipso facto that of intraoccupational segregation since the range of occupations covered is approximately the same from one firm to the other. It is this basic division which will be used subsequently to describe the nature and the consequences of enterprise segregation.

In all three of the predominantly male firms, men occupy most of the management positions and in proportions greater than their representation among nonmanagement personnel. Among the predominantly female firms, men occupy a large majority of the management positions except in Firm 4. Even there, 50 per cent of the men in the sample are in management positions compared to only 5.8 per cent of women. In all firms, therefore, there seems to be a clear form of occupational segregation by which women are largely excluded from supervisory jobs. The significance of these figures will be examined in greater detail later.

Only three of the firms use part-time personnel to any great extent and these are all firms which rely mainly on women for their office staff.

Hypothesis 2:
Relation Between Enterprise Segregation and Wages Paid

Table 2 sets out the distribution of full-time, nonmanagement employees by salary level for each of the eight firms. As can be seen, salary levels are much higher and the pattern of distribution is much more elongated in Firms 1, 2 and 3. Mean (see Tables 3 and 4), median and modal salary levels speak for themselves. Another figure which reveals the magnitude of the differences between these firms is the percentage of employees who earn \$10,000-\$10,499 or less: 20 per cent, 6 per cent and 12 per cent respectively in Firms 1, 2 and 3 compared to a minimum of 77 per cent and a maximum of 91 per cent in Firms 4 to 8.

But are the workers of comparable quality in the different firms? Although we have not yet tested the data in a statistically rigorous way, Tables 3 to 7 present a portrait of the employees with respect to their levels of seniority, and years of schooling. Data on age at first hire (as a proxy for year of previous experience) are also available.

In fact, Tables 3, 4, 5 and 6 reveal that a part of the phenomenon of higher wages in the predominantly male firms is due to the fact that the work force is considerably older and has acquired many more years of seniority. But what is cause and what is effect? Tables 3 and 4 set out average salary levels by years of seniority for women and men respectively. As can be seen, in Firms 1, 2, and 3, starting levels are significantly higher for both sexes than in the other five firms. What is even more significant is that progression on the salary scale is extremely rapid and maximum attainable levels are considerably higher. In firms 4, 5 and 6, maximum attainable levels seem to be on the order of \$11,000 and this level is attained after 5 or 6 years of seniority. In Firm 8, there are a few jobs at higher levels of salary but, most employees also seem to have attained maximum levels of about \$11,000 after 6 years of experience. In Firm 7, on the other hand, we see the beginning of a pattern of elongation. In contrast to the first three firms, entry levels are low and progression is slow. However, maximum attainable levels seem to be at the \$13,500-\$14,000 range and the progression is continuous. This is a special case to which we will return later.

The data also confirm another of Blau's hypotheses with regard to intraoccupational and enterprise discrimination: wage differentials between Firms 1, 2, and 3 on the one hand and the other five firms on the other hand are much greater than wage differentials between men and women within any one of the firms. In fact, in Firm 3 women seem to do a little better than men both in terms of the overall average and when wage levels are compared holding constant years of seniority. In Firms 1 and 2, the pattern of wage increases as a function of seniority is somewhat erratic in the case of women and particularly in Firm 1, women seem to have less chance of reaching the better-paying jobs. As will be seen, this may be linked to some slight differences in years of schooling. In the remaining five firms, the number of men is too small to justify detailed comparisons between the job ladders of men and women within this set of occupations. However, there does seem to be some evidence of discrimination against women in the case of Firm 6 in terms of unequal chances for promotion and lower wages for equal years of schoolings and seniority.

Tables 5 and 6 show the distribution of workers by years of seniority for women and for men respectively. Again the dichotomy is clear. In Firms 4 to 8, the median years of seniority vary from 2 to 3. Turnover rates are obviously high. In Firms 1, 2 and 3 there is a very elongated structure with people at all levels of seniority and a remarkable number of

long-service workers among both men and women. Considering the myths about the instability of women workers, especially predominant 15 or 20 years ago, the average seniority levels of more than 17 years for women in Firms 2 and 3 are especially striking.

What we are suggesting, and this is the heart of the argument to be made with our third and fourth hypotheses, is that it is the nature of the salary scale and the possibilities for advancement which encourage workers to stay on and to acquire seniority in the first three firms and which are the cause of high turnover in the other firms.

Table 7 shows that levels of schooling do not differ greatly from one firm to the next. [21] The vast majority of both men and women have only a secondary level or less. Exceptions to this rule include both women and men in Firm 1 but especially men where nearly a quarter of the men have at least some CEGEP training, [22] men in Firm 2 although there are a large number of unknown cases, and women in Firms 4 and 5. It is certainly not differences in years of schooling attained which justifies an almost 50% salary difference between women in Firm 5 and men in Firm 1.

Finally, data on age at date of first hire (not shown) indicate there is no discernible pattern among firms and that we cannot conclude that one or the other type of firm tends to hire more experienced workers than another type. It should be noted, however, that mean ages of hire for women in Firms 1, 2, and 3 are higher than for men in those firms and higher than for women in the other firms. A further examination of the data reveals that these firms tend to hire both young women (like the other firms) and older women in their thirties and forties and that both groups of women tend to acquire high seniority. In all other cases, except Firm 7 where mean and median ages of hire are around 19, the average and median ages of hire vary from 20 to 25.

In sum, we conclude that our second hypothesis is confirmed: the predominantly male firms pay higher wages to both men and women than the predominantly female firms and wage differentials between these two types of firms are considerably higher than wage differentials between men and women within any given firm. We also note that not only are wage scales higher in the predominantly male firms but also that they are structured in such a way as to encourage workers to stay with the firm and employees in these firms have high levels of seniority. Apart from differences in seniority, workers do not have significantly different levels of qualifications from one firm to the other.

Hypothesis 3: Work Organization and Sexist Stereotypes

An analysis of firm policies concerning recruitment, promotion and in-firm training also confirms the observation made in the previous section to the effect that firms which hire mainly men structure their work like an internal labour market and consciously attempt to retain their workers. Firms which hire mainly women make no attempt to retain their workers and some of their policies have the effect of actively discouraging workers to stay on.

In Firms 1, 2 and 3, all of which are unionized, there are a few, well-defined entry jobs and a relatively large number of salary classes. Procedures for filling job vacancies are specified in the collective bargaining contract and seniority takes precedence as a criterion for promotion. As can be seen from the salary scale, firm-specific training is rewarded by rapid and significant gains in salary.

In order to illustrate this kind of a job structure, we have shown, in Table 8, the distribution of both men and women in Firm 1 by salary class along with their present levels of seniority and the levels of seniority they had at the time at which they were promoted to their present salary class. In order to make the pattern clear, we have separated out four individuals (two women and two men) who have very high levels of seniority compared to the other people in their salary class and whose inclusion would make the picture less clear.

Women in this firm usually enter in class 5 or class 6 and stay in class 6 for a relatively long period of time. On average they accede to class 7 only after 5.4 years. Classes 7, 8, 9 are reached after about 5 years in the firm; classes 10, 11 and 12 require considerably higher levels of seniority and there are no women in the three highest classes. Nevertheless, there are considerable possibilities for promotion which indicates a desire on the part of management to reward firm-specific training. It is also significant that the bulk of women workers are found in the middle salary classes, 7, 8 and 9 rather than at the entry-level jobs.

As can be seen, the promotion line for women is shorter than for men - there are some differences in the jobs they perform - and men progress much more rapidly to class 10 than do women. This picture confirms the existence of a certain intra-firm discrimination that was suggested by a comparison of Tables 3 and 4.

Men usually enter at salary class 3 (mail delivery boy) but within less than a year they attain class 6 and within the first two years they normally attain classes 7 or 8. Thereafter progression is somewhat slower but regular. Classes 9-X and 10-X are a special case and will be discussed in connection with Hypothesis 4.

The firm may hire directly into classes 3 to 6 only (and 9-X); all higher-level vacancies must be posted. The contract specifies that the job must be filled by the applicant who has the most years of seniority provided that he satisfies the normal requirements of the job and that at the end of the period of probation, he is able to perform the work satisfactorily. There is currently a dispute between the union and management as to whether management has the right to judge *a priori* whether a candidate satisfies the normal requirements of a job or whether the senior candidate has the right to attempt the job and prove himself during the period of probation. Nevertheless, it is clear that seniority is a very important factor in determining promotions and that management latitude is quite limited.

Finally, it should be noted that promotion ladders extend right into management positions, especially for men, and that 78 per cent of the male management employees in the departments studied were promoted from among unionized personnel (see Table 10).

Firm 7 also has a structure similar to that of Firms 1, 2 and 3 in that it has 11 different salary classes, it is unionized, the firm must post notices of vacancies above the first three levels, and seniority is an important factor in determining promotions. It differs in that wage increments attached to promotions are smaller than in the first three firms and in that management personnel is hired almost exclusively from the outside (see Table 10). As we noted earlier, this is a special case where recent unionization seems to have the effect of beginning a transformation of the job structure from one similar to that found in the other predominantly female firms to one similar to that of the predominantly male firms. However, the great bulk of jobs are concentrated in the first three entry-level classes. This factor and the still relatively low salary levels have had the paradoxical effect of discouraging men from staying on and

the upper levels of the promotion ladder are occupied increasingly by women. We will return to this case in connection with Hypothesis 4 later.

In contrast to these four firms, job structures in Firms 4, 5, 6 and 8 include only three to six salary classes. In the banks entry jobs are either cashier jobs or clerk positions and the great bulk of employees are found in one or the other of these jobs. There are very few chances for promotion. In these firms, upper-level jobs which are vacant are not even posted but are filled at the sole discretion of the immediate supervisor. They may be, and frequently are, filled from outside the firm. In Firm 4, a representative of management explained that the main objective of promotions is to contribute to the personal development of those employees whom the employer feels is management material. It is only when such people are not available that promotions will be based on the technical qualifications of the other workers available to fill the position. The judgment as to who is "management material" is obviously subjective and likely to be coloured by all kinds of sexist prejudices. As can be seen from Table 10, this company prefers to promote men from blue-collar jobs to supervise white-collar women rather than to promote women from the ranks or to train men directly in the white-collar jobs.

These firms make no attempt to recognize or to reward firm-specific training among their lower-level personnel although they may in fact benefit from it. Most management positions are filled either from outside the firm or from special training programs within the firm and representatives of management seem surprised at questions concerning training and promotion of lower-level personnel. As we saw in Table 1, men make up the great bulk of management employees. In Firm 4 the top two salary classes available to nonmanagement, unionized personnel include a considerable amount of supervisory responsibilities. In fact, these people are used to train lower-level management personnel who normally spend six months in various departments in order to become familiar with the different operations. When such trainees are unavailable, the supervisor may be temporarily promoted to the management position. In spite of the obviously great responsibilities of these people, and the fact that they must have considerable knowledge of their own department, top salary levels are in the \$11,500 to \$12,000 range.

Hypothesis 4:

Sexist Job Structures Tend to Confirm Sexist Stereotypes

This hypothesis is extremely difficult to prove because it can always be argued that employers structure their promotion ladders in conformity with their past experience of high turnover rates among women workers and, therefore, that it is high turnover rates which are the cause of female-type job structures. In contrast, we will defend the argument that it is the job structure which encourages high turnover. Furthermore, to the extent that women themselves believe the sexist stereotypes, their employment experience tends to encourage them to conform to the stereotype, thus serving to reinforce and maintain prejudices. The evidence we will present is of an anecdotal nature.

The first and most obvious piece of evidence for our argument is the difference in stability of women workers in Firms 1, 2 and 3 in contrast with the other five firms as illustrated in Table 5.

Our hypothesis would also lead us to expect that turnover rates will begin to fall and that seniority levels will begin to increase in Firm 7 as a result of the development of a promotion ladder. The situation in this firm also lends some support to our hypothesis in a negative way. Formerly, men coming in at the bottom of the ladder were promoted over the women. Now they have no advantage and so they do not stay with the firm.

Firm 4 lends some evidence to the argument that the high turnover rate among women is not always due to a retirement to family responsibilities. There, management representatives boast that their firm serves as a training ground and that many other firms recruit from among their personnel.

Finally, the salary classes 9-X and 10-X in Firm 1 provide another example of negative evidence (see Table 8). These jobs are fairly high up on the salary scale and they do not require any particular qualifications. Men (and occasionally women) are hired directly into class 9-X with little or no previous experience. But the job is repetitive and dull and the only chance for promotion is into class 10-X for which it is normal to wait more than 13 years. Turnover rates are very high as the low levels of seniority among the present tenants of the job indicate.

In sum, we have shown that in cases where possibilities for promotion for women exist, women tend to stay on and acquire seniority like men. Where such possibilities do not exist, they tend to move on, often to other firms where their experience is recognized and rewarded. We have also presented two cases where men have high rates of turnover, including one where salary levels are fairly high, because of the absence of possibilities for promotion.

Hypothesis 5: Possible Explanations for Differences in Salary Levels and the Sex Composition of Employment

The evidence to be presented here is suggestive rather than conclusive because of the limited number of firms examined and the qualitative nature of the data. Nevertheless, we think it useful for suggesting areas for future research, and for adding some small bits of information to the larger debate on the determinants of wage levels.

The Degree of Monopoly Power

All of the firms in our samples have a considerable amount of monopoly power, although it would be more correct to say that the banking institutions operate in an oligopolistic industry with a certain amount of competition. Firms 1 and 4 are about as close to pure monopolies as real-world companies ever get while Firms 2 and 3 could better be characterized as oligopolistic companies. Based on this variable, therefore, the market position of Firms 1, 2, and 3 suggest that they do in effect have sufficient market power to justify the payment of high wages and this is a partial explanation for their preference for hiring male office workers. Firms 5 to 8 also have sufficient market power as a group, but it is probably very difficult for any one firm to set wages differently from the other firms. The reason for low wages and the predominance of women employees must be sought in the history and the nature of the industry rather than for each of the firms individually. This is clearly a case of industry segregation. Finally, Firm 4 seems out of line: it certainly has the capacity to pay higher wages based on its market position.

We did not take explicit account of firm size because of the difficulty of comparing firms which operate only in Quebec with those which operate in several provinces. Two of the firms operate on a scale of 1,000 to 3,000 employees; the others range from 15,000 to 65,000. The source of differences in capacity to pay does not lie with this variable.

Public Ownership and/or Control

A part of the explanation for differences in salary levels may lie with this variable in that Firms 1 and 2 are publicly owned and their wage and budgetary policies are subject to

government control. Parts of the operations of Firms 3 and 4 are also subject to government regulation, in particular as concerns rate-setting, but the government is not directly involved in the determination of wages. The same is true of the banking institutions which must be chartered either federally or provincially and which must respect certain regulations concerning their activities.

Again higher wage levels in Firms 1 and 2 may reflect the capacity and the willingness of government to pay. But, we would also expect Firm 4 to have this latitude, at least to the extent that Firm 3 does.

Effect of Unionization

Firms 1 to 4 and 7 are unionized. In Firm 1, about 70 per cent of office workers are unionized, excluding secretarial work which is mainly performed by women. The bargaining unit to which accounting employees belong does not include blue-collar workers. Firm 2 is an interesting case in that about 40 per cent of the employees of the firm are included in the same bargaining unit as the white-collar accounting department employees studied and this unit includes blue-collar workers. The promotion ladder is, therefore, even longer than appears initially because blue-collar workers can, and frequently do, move into white-collar jobs. In both Firms 2 and 3, a certain number of employees in certain jobs or certain offices are not unionized for particular historical reasons. In Firm 4, the office-workers studied are unionized in a union which includes white-collar workers only. Blue-collar workers and other white-collar groups have their own bargaining units. All employees in Firm 7 belong to the same unit.

Here again, unionization in Firms 1, 2 and 3 is undoubtedly related to the existence of structured job ladders and specified criteria for according promotions. We also saw the same kind of pattern beginning to develop in Firm 7. Firm 4 remains an anomaly which may be related to the weakness of the union which represents those workers.

Wages and Salaries as a Percentage of Costs

Table 9 presents some figures on the approximate percentage of costs which are represented by all wages and salaries (and related fringe benefits) in a firm and the percentage represented by wages and salaries of office workers. Figures were furnished approximately by the companies and should be taken as indicating an order of magnitude rather than as precise figures.

The first column is relevant to the extent that wages of white-collar workers are linked to those of blue-collar workers and that what interests a firm is its total labour costs. The only firm which differs significantly from the others is Firm 1 where 80 per cent of operating costs are labour costs. All of the others - presuming that Firm 6 does not differ greatly from the other banking institutions - lie in the 50-60 per cent range. This variable does not, therefore, serve to explain much about the determination of wage levels of office employees.

The percentage of employees who do white-collar or office-work is more revealing. In Firms 1 to 3, office employees are a small minority compared to almost 100 per cent in the banks (Firms 5 to 8). Firm 4 has significant numbers of blue-collar workers; we would estimate the percentage of white-collar workers to lie somewhere between 40 and 60 per cent.

The result of these two influences is shown in the third column. The firms fall into three groups: Firms 2 and 3 where office-worker wages represent less than 10 per cent of costs, Firms 1 and 4 where they represent 25-30 per cent of costs and Firms 5 to 8 where they represent 55-60 per cent of costs.

A comparison of these figures with the salary scales suggests that firms in which the proportion of office-worker wages in total costs is low (Firms 2 and 3 especially) are more willing to pay high wages to office workers than firms where the impact of these wages on total costs and therefore on prices is high (Firms 5 to 8). Again Firm 4 seems out of line in that wages of office employees represent about the same proportion of total costs as in Firm 1 and indicate a higher capacity to pay than is effectively realized.

Recruitment of Management Personnel

One possible explanation for the differences in job structures and the relative preference of a firm for male office employees may be the kind of people recruited for management positions.

Table 10 shows that Firms 1, 2 and 3 recruit most of their management personnel, at least in the accounting department, from inside the firm. The job promotion ladders extend beyond the immediate bargaining unit. In Firms 1 and 2, for which we have data, most of these people have only secondary schooling or less although a few have university training. We might hypothesize that the exercise of management functions in these firms requires specific knowledge of the firm's operations but little formal and general training.

In the other firms, most of the men are recruited from the outside. The women may be recruited from the inside but their numbers are small and they tend to occupy only the lowest management positions. Only in Firms 4 and 5 is there any evidence that the preference for outside people is linked to the need for advanced schooling and, in particular, a university degree. In Firms 6 and 8 most of the men have a secondary education or less and even in Firm 5 this is true of 14 of the 23 cases observed. The existence of in-firm training programs for men in all five of these firms indicates that firm-specific training is essential to the exercise of management functions.

We must, therefore, conclude that the choice of recruiting from the outside is a deliberate policy decision based partly on prejudices against women and, even more importantly, based on the objective possibility of discriminating between two groups of workers. The firm does not mind paying high wages to its executive personnel and investing in their training because it can recruit a sufficient supply of cheap female labour to fill its lower-level jobs. If it adopted a policy of promoting from the ranks, it would have to rethink the whole job structure and salary scale especially if it wanted to continue to exercise a preference for men. If it hired as many women as men into management positions and the management training program, it is possible that the women in the lower-level jobs, who are just as qualified in terms of years of schooling as most of the present candidates for management positions, might begin to raise questions about their own chances for promotion.

In sum, we cannot conclude that there is any significant difference in the nature of the qualifications required to occupy management positions in one firm compared to the other. Both types of firm use mainly men with secondary schooling and specific knowledge of the firm is important. We, therefore, conclude that the decision to recruit management personnel from the ranks is a result of the job structure for office workers rather than a cause.

Explanations for enterprise segregation: what can we conclude?

As is usual in attempts to explain why certain firms pay higher wages than others, our findings leave as many questions unanswered as answered. The portrait of Firms 1, 2 and 3 seems clear and corresponds to what we would expect. They have con-

siderable monopoly power; two of them are public corporations; all three are unionized; office-worker wages represent less than 10 per cent of costs for two of them and about 25 per cent for the third. All three recruit management personnel from the ranks of office workers but this we regard as an effect of the job structure rather than as a cause.

The qualitative description of the other firms leaves many puzzles, however, especially in the case of Firm 4. This firm resembles Firm 1 very closely in that it has strong monopoly power, about 25 per cent of its costs are related to salaries of office workers and it is unionized. In terms of size it is nearly three times as large as Firm 1, but both are large firms by Quebec and Canadian standards. The main difference is that it is not publicly owned. We must conclude that its capacity to pay is higher than what is reflected in current salary levels and that it actively benefits from its ability to find large numbers of cheap, competent women workers.

The situation of Firms 5 to 8 is somewhat easier to explain in that segregation of the sexes is an industry phenomenon rather than a characteristic of the individual firm. While the oligopolistic nature of the industry and the high levels of profits made by banks suggests that this industry would also be able to pay higher wages, it is difficult for the individual firm to break the pattern. The female-type job structure and the low level of wages can also be explained by the fact that unionization is just beginning to get a foothold in this industry and by the fact that the wages of white-collar employees represent close to 60 per cent of total costs.

CONCLUSIONS: THE EFFECTS OF LABOUR MARKET SEGREGATION AND WHAT WE CAN DO ABOUT IT

Building on Blau's findings for intraoccupational segregation, we have shown that one of the ways in which discrimination against women is exercised is by enterprise segregation. There is some evidence of discrimination against women within predominantly male firms in the form of shorter promotion ladders and exclusion from management positions. On the whole, however, women in predominantly male firms are far better off than women in predominantly female firms, not only because they earn higher salaries, but also because the chances for promotion and the recognition that goes with it are greater.

As a theoretical explanation for the presence of enterprise segregation, we have suggested that firms exercise a preference for men in higher-level jobs not because they do not like women but because the segregation of women and the maintenance of sexist stereotypes permits the maintenance of a cheap labour pool from which all firms can benefit to a greater or lesser extent. In this context the structuring of job ladders in such a way as to encourage high turnover serves to confirm and maintain the sexist stereotype.

We have also shown that while the predominantly male firms have characteristics usually associated with a high capacity to pay, so do the predominantly female firms studied. There is considerable room for the improvement of the status of women in these firms without putting their economic survival into question.

Given these results, what policy recommendations do we make? Equal-pay legislation is important as are laws prohibiting discrimination in hiring and promotion. Such an approach will contribute to reducing intrafirm discrimination of the kind observed in Firm 1. It may even contribute somewhat to reducing enterprise segregation in that predominantly male firms will hire a larger proportion of women.

However, it is our opinion that these measures will have only a minor impact on the position of women. Reducing the gap in income levels between men and women can only be accomplished by a massive improvement in the working conditions and wages in firms which hire mainly women. On the one hand, this will result directly in increased income levels for women. On the other hand, we are of the opinion that it will eventually eliminate sexual segregation because men will find these jobs more attractive and the distinction between "men's work" and "women's work" will be less rigid.

In the absence of a socialist state with a coherent national income policy, what contribution can government make to this objective of improving the wages and working conditions of a particular group of workers? A policy of job creation and full employment is the first essential condition. In a situation where there are not enough jobs to go around and a major function of the labour market is to ration these jobs, women will always get the short end of the stick. Better minimum wage laws with adequate enforcement can also have some impact especially on blue-collar and service jobs where exploitation is even greater than in the sample of office employees examined here.

Under the present system, however, the main instrument for the improvement of women's status is unionization. Government policy should do everything possible to encourage unionization among women including defining bargaining units of a variable size. In the case of banks, for example, individual branches are too small for a union to service properly, whereas, with nationwide banks, the firm is too large a unit for a union to try to unionize all at once. Intermediate units based on regional operations should be recognized as bargaining units. Similar problems are found in retail trade and office work in small firms, for example.

As unions begin to make changes in the objective conditions under which most women work, we expect to begin to find evidence, as we did in this research, which contradicts the predominant stereotype of women as unstable workers, with little interest in careers and responsible jobs. Such a stereotype can then no longer be used as a rationalization for discriminating against women.

Table 1

Composition of the Sample by Sex, Employment Status and Firm

	Nonmanagement Personnel			Management Personnel [a]			Total Personnel		
	Women	Men	% Women	Women	Men	% Women	Women	Men	% Women
Firm 1	52	100	34.2	5	32	13.5	57	132	30.2
Firm 2	41	113	26.6	2	26	7.1	43	139	23.6
Firm 3	99	108	47.8	-	6	0.0	99	114	46.5
Firm 4	170	5	97.1	10	5	66.7	180	10	94.7
Full-time	158	5	96.9	10	5		168	10	94.4
Part-time	12	-	100.0	--	-		12	--	100.0
Firm 5	106	9	92.2	11	23	32.4	117	32	78.5
Full-time	78	7	91.8	11	23		89	30	74.8
Part-time	28	2	93.3	--	--		28	2	93.3
Firm 6	104	12	89.7	5	26	16.1	109	38	74.1
Full-time	89	11	89.0	5	26		94	37	71.8
Part-time	15	1	93.8	-	--		15	1	93.8
Firm 7	88	12	88.0	--	8	0.0	88	20	81.5
Firm 8	119	1	99.2	9	21	30.0	128	22	85.3

[a] The management category includes related jobs such as professional jobs requiring a university degree and people in pre-management training programs.

Table 2

Distribution of Full-Time, Nonmanagement Personnel by \$500 Salary Interval and by Firm

	Firm 1		Firm 2		Firm 3		Firm 4		Firm 5		Firm 6		Firm 7		Firm 8	
	No.	Cum. %	No.	Cum. %	No.	Cum. %	No.	Cum. %	No.	Cum. %	No.	Cum. %	No.	Cum. %	No.	Cum. %
6,000											3	3				
6,500							8	5			2	5			1	1
7,000			2	1	10	11	10	11	7	12	2	7	13	13	5	5
7,500	4	3	2	2	2	9	17	17	20	7	29	6	19	19	21	
8,000	2	4	1	1	3	17	27	14	37	13	42	18	37	17	35	
8,500	6	8	2	1	4	19	39	12	51	7	49	16	53	16	48	
9,000	3	10	2	3	7	16	49	17	71	6	55	9	62	19	64	
9,500	8	15	1	4	4	10	55	7	79	11	66	9	71	19	80	
10,000	7	20	4	6	5	12	77	10	91	12	78	7	78	4	83	
10,500	7	24			3	13	96	2	93	7	85	6	84	9	91	
11,000	20	38	1	7	6	16		2	95	4	89	2	86	1	92	
11,500	15	47	1	8	18	25	7	100	4	100	1	90	2	88	1	93
12,000	8	53	8	13	33	41					5	95	1	89	4	96
12,500	8	58	18	25	10	45					1	96	5	94	2	98
13,000	10	65	37	49	32	61					4	100	1	95	2	99
13,500	17	76	14	58	23	72							3	98	1	100
14,000			46	88	14	79							1	99		
14,500	23	91	8	93	23	90										
15,000	12	99	7	97	8	94										
15,500			1	98	11	99							1	100		
16,000	1	99	1	99	2	100										
16,500	1	100	2	100												
No. of Observ.	152		154		207		163		85		100		100		120	
Median	12,000		13,500		13,000		9,500		8,500		9,000		8,500		9,000	
Mode	14,500		14,000		12,000		10,000		9,000		7,500		8,000		7,500, 9,000 and 9,500	

Table 3
Average Salaries by Years of Seniority and by Firm
Full-time, Nonmanagement Personnel, Women

Years of Seniority	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	Firm 7	Firm 8
0	8,727	9,604	9,117	8,321	7,460	7,940	7,656	7,914
1	10,283	—	10,478	8,256	8,435	8,062	8,323	8,405
2	10,720	—	—	8,682	8,740	8,545	8,679	9,068
3	11,473	12,280	11,769	9,417	9,100	9,349	8,946	9,299
4	12,097	—	12,090	10,326	9,658	9,662	9,602	9,491
5	12,177	—	14,404	10,586	9,470	10,148	9,225	10,347
6	—	13,584	12,428	9,536	10,600	10,811	9,841	10,960
7	12,262	14,425	12,506	10,643	—	11,233	10,450	10,428
8	12,818	12,656	11,934	10,904	9,733	9,591	10,441	11,229
9	—	—	—	10,920	11,366	10,537	10,775	—
10	12,787	—	—	10,227	—	—	11,233	—
11	13,971	12,650	13,191	9,425	10,633	—	12,068	11,549
12	—	13,449	12,709	11,622	10,550	10,460	12,812	—
13	12,733	11,831	13,416	10,920	—	—	12,950	—
14	11,950	13,059	12,272	10,166	9,400	—	—	13,261
15	14,157	14,270	—	10,504	—	—	12,125	10,965
16-20	12,550	13,934	13,449	10,725	—	—	14,325	11,359
21-25	—	14,067	13,743	10,409	9,400	—	13,475	10,685
26-30	15,366	14,373	14,218	10,920	—	—	15,675	13,390
31+	14,547	13,509	15,077	10,409	—	—	13,550	12,390
No. of Observ.	52	41	99	158	78	89	88	119
Average Salary	12,200	13,164	13,129	9,476	8,932	9,124	9,377	9,234

Table 4
Average Salaries by Years of Seniority and by Firm
Full-time, Nonmanagement Personnel, Men

Years of Seniority	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	Firm 7	Firm 8
0	9,243	10,042	8,717	7,020	7,200	--	7,662	--
1	10,175	8,996	9,464	8,073	8,475	9,550	9,375	--
2	10,501	--	--	--	--	8,320	8,725	9,976
3	11,855	11,736	11,554	--	9,700	10,965	--	--
4	12,652	11,621	14,352	--	--	12,350	8,900	--
5	13,745	12,048	11,613	10,491	--	10,067	--	--
6	13,342	13,489	12,792	--	10,400	--	10,700	--
7	13,572	12,934	13,208	--	--	--	10,075	--
8	14,060	13,738	12,064	--	--	--	10,800	--
9	14,157	14,343	12,022	--	--	13,338	--	--
10	14,060	14,091	--	--	--	--	--	--
11	13,572	13,441	12,324	--	--	--	13,875	--
12	14,850	13,723	12,740	--	--	--	--	--
13	14,547	13,850	12,870	--	--	--	--	--
14	14,547	--	13,475	--	--	--	--	--
15	--	13,881	12,995	--	11,350	--	--	--
16-20	13,837	14,242	14,047	--	--	--	--	--
21-25	14,802	13,960	13,374	--	--	13,338	--	--
26-30	14,485	14,108	14,414	--	--	--	--	--
31+	14,508	14,495	14,690	--	--	--	--	--
No. of Observ.	100	113	108	5	7	11	12	1
Average Salary	12,527	13,676	12,618	7,925	8,971	10,733	9,333	9,976

Table 5
 Distribution of Full-time, Nonmanagement Personnel
 by Years of Seniority, by Firm, Women
 (cumulative percentages)

Years of Seniority	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	Firm 7	Firm 8
0	8	10	6	20	19	14	25	19
1	12		10	29	32	32	44	45
2	21			41	51	52	51	55
3	29	17	13	57	68	63	59	68
4	37		21	65	76	74	69	76
5	48		23	72	82	79	72	79
6		22	25	73	85	88	75	81
7	56	24	31	75		92	77	83
8	58	27	33	78	88	94	81	86
9					92	99	82	
10	63			80			85	
11	69	34	36	81	96		90	88
12		39	41	82	97	100	92	
13	73	41	42	83			93	
14	75	46	44	85	99			89
15	81	49		88			94	90
16-20	92	56	59	95			95	93
21-25		80	73	97	100		98	98
26-30	98	88	85	98			99	99
31+	100	100	100	100			100	100
Median	7	19	18	3	2	2	2	2
Mean	9.1	17	16.9	5.8	3.5	3.2	4.7	4.6
No. of Observ.	52	41	99	158	78	89	88	119

Table 6
 Distribution of Full-time, Nonmanagement Personnel
 by Years of Seniority, by Firm, Men
 (cumulative percentages)

Years of Seniority	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	Firm 7	Firm 8
0	12	1	7	60	29		33	
1	23	3	16	80	57	27	42	
2	32					36	50	100
3	41	4	20		71	55		
4	50	7	22	100		64	67	
5	53	11	28		86	82		
6	56	13	31				75	
7	57	19	32				83	
8	59	24	36				92	
9	62	28	41			91		
10	64	30						
11	65	38	45				100	
12	71	41	47					
13	72	43	49					
14	73		56					
15		45	59		100			
16-20	81	52	73					
21-25	91	71	83			100		
26-30	96	84	94					
31+	100	100	100					
Median	4	20	14	0	1	3	2	2
Mean	9.6	18.6	13.9	1	3.6	5	3.6	2
No. of Observ.	100	113	108	5	7	11	12	1

Table 7

Distribution of Nonmanagement Personnel by Years of Schooling, by Sex and by Firm

	Incomplete Secondary	Completed Secondary	Incomplete CEGEP	Completed CEGEP	Incomplete University	Completed University	Unknown
<u>Firm 1</u>							
Women No.	13	32	4	3			
(52) %	25.0%	61.5%	7.7%	5.8%			
Men No.	15	58	20	4	1		2
(100) %	15.0%	58.0%	20.0%	4.0%	1.0%		2.0%
<u>Firm 2</u>							
Women No.	16	15					10
(41) %	39.0%	36.6%					24.4%
Men No.	20	30	4	1	1	1	56
(113) %	17.7%	26.5%	3.5%	0.9%	0.9%	0.9%	49.6%
<u>Firm 4</u>							
Women No.	34	123	6	3	1	2	1
(170) %	20.0%	72.4%	3.5%	1.8%	0.6%	1.2%	0.6%
Men No.		3	1	1			
(5) %		60.0%	20.0%	20.0%			
<u>Firm 5</u>							
Women No.	11	71	12	8	4		
(106) %	10.4%	67.0%	11.3%	7.5%	3.8%		
Men No.	1	5	1				2
(9) %	11.1%	55.5%	11.1%				22.2%
<u>Firm 6</u>							
Women No.	13	89		2			
(104) %	12.5%	85.6%		1.9%			
Men No.	2	9		1			
(12) %	16.7%	75.0%		8.3%			
<u>firm 8</u>							
Women No.	14	97				1	7
(119) %	11.8%	81.5%				0.08%	5.9%
Men No.	1						
(1) %	100%						

Table 8

Firm 1: Present Seniority Levels and Seniority at Time of Promotion by Salary Class and Sex for Unionized Employees. [a]

Salary Class	Women			Men		
	Number	Seniority at time of promotion	Present Seniority	Number	Seniority at time of promotion	Present Seniority
3				2	-	0.2
4	(1)	(18.4)	(19.8)			
5	1	0.1	0.1	5	0.2	0.8
				(1)	(5.0)	(16.4)
6	5	0.5	1.2	8	0.9	1.9
	(1)	(13.4)	(13.5)	(1)	(19.8)	(25.3)
7	5	5.4	8.8	2	1.8	3.3
8	10	4.9	6.4	4	1.5	2.7
9	12	5.7	6.9	4	2.3	4.2
10	1	9.3	10.3	17	5.4	7.1
11	7	10.4	17.4	21	12.6	17.4
12	2	18.9	24.5	6	12.7	21.2
13				1	13.9	23.7
TS 14 [a]				1	11.3	12.8
TS 15 [a]				1	19.9	21.6
9-X [b]	1	1.3	3.1	13	0.4	1.4
10-X				10	13.2	20.0

Notes: [a] A few employees with temporary status have been excluded whereas a certain number of professional employees included in the "Management and related personnel category" of Table 1 have been included. Categories TS 14 and TS 15 are categories formerly considered as management categories and recently included in the bargaining unit.

[b] Classes 9-X and 10-X form a separate line of promotion.

Numbers in parentheses indicate exceptional workers who seem to be blocked in the promotion lines and whose high levels of seniority are very different from the average of other workers in the same class.

Table 9

Percentage of Costs Represented by Wages and Related Costs, for all Employees and for Office Employees by Firm

	Wages as % of costs	Office employees as % of all employees	Wages of office empl. as % of costs
Firm 1	80	33	26
Firm 2	55	15	8
Firm 3	50	13	7
Firm 4	48	n.a.	n.a.
Firm 5	55	100	55
Firm 6	n.a.	n.a.	n.a.
Firm 7	60	100	60
Firm 8	57	100	57

Note: Data were given by a representative of management in each company and should be regarded as approximations indicating an order of magnitude.

Table 10

Years of Schooling of Management and Related Personnel and Whether Recruited from Inside or Outside the Company, by Firm

	% Recrtd. Inside Co.	Incompl. Second.	Compl. Second.	Incompl. CEGEP	Compl. CEGEP	Incompl. Univ.	Compl. Univ.	Unknown
<u>Firm 1</u>								
Women (5)	40		2		1		2	
Men (32)	78	8	17			1	6	
<u>Firm 2</u>								
Women (2)	100		2					
Men (23)	100	8	13			2		3
<u>Firm 3</u>								
Women (0)	-							
Men (6)	83							6
<u>Firm 4</u>								
Women (10)	80	1	7			2		
Men (5)	40 [a]					2	3	
<u>Firm 5</u>								
Women (11)	54 [b]	2	4	1			3	1
Men (23)	35 [c]	2	12	1	2	1	5	
<u>Firm 6</u>								
Women (5)	60	1	3		1			
Men (26)	27	3	19		4			
<u>Firm 7</u>								
Women (0)								
Men (8)	0.0							8
<u>Firm 8</u>								
Women (9)	n.a.	2	3			1	1	2
Men (21)	n.a.		19				2	

Notes: [a] These two men were promoted from blue-collar jobs and therefore from outside the accounting department.

[b] These six women occupy lower-level accounting jobs formerly considered as nonmanagement positions.

[c] This bank now has a management training program in which trainees perform most of the lower-level jobs for short periods of time. Employees hired directly as trainees are considered to be hired from the outside. The 35 per cent considered to have been hired from the inside are, in fact, older men who occupied lower-level positions as a form of training before the formal program was inaugurated. In a sense, therefore, they can be considered to have been hired from the outside also.

Footnotes

- 1 Francine Blau, "Pay Differentials and Differences in the Distribution of Employment of Male and Female Office Workers," unpublished Ph.D. Thesis submitted to the Department of Economics (Cambridge, Massachusetts: Harvard University, January 1975).
- 2 We have made no attempt to document these assertions here. The interested reader is referred to Blau, op. cit., pp. 19-29 for a description of the magnitude and the evolution of interoccupational segregation in the United States.

A good description of both wage discrimination and occupational segregation in Canada and Quebec can be found in Gail C.A. Cook, Editor, Opportunity for Choice, (Ottawa: Statistics Canada in association with the C.D. Howe Research Institute, 1976) and in Gilles Beausoleil and Francine Lepage (eds.), Étude sur la condition économique de la femme québécoise, préparée par le Laboratoire sur la répartition et la sécurité du revenu de l'UQAM en association avec le Conseil du Statut de la femme, (Québec, Editeur officiel du Québec, 1978).
- 3 Blau, op.cit., pp. 59-60.
- 4 It is, of course, possible that discrimination takes the form of more rapid promotion of men on the wage ladders and from one job category to another. To the extent that promotions imply a change of job category, this form of discrimination will contribute to interoccupational segregation. Blau, for example, finds that there was a larger proportion of men among Class A Accounting Clerks than among Class B Accounting Clerks. Blau's data did not permit her to examine this aspect of discrimination but it is one of the phenomena on which the case studies presented in this paper can throw some light.
- 5 See, for example, Peter B. Doeringer and Michael J. Piore, Internal Labor Markets and Manpower Analysis, (Lexington, Mass.: Heath Lexington Books, 1971).
- 6 Blau, op.cit., pp. 73-74.
- 7 Ibid., pp. 93-94. With 12 occupational categories and three labour markets, there are potentially 36 cases. However, the number of observations in some of the cases was too small to preserve confidentiality and statistical significance.
- 8 See ibid., Table 3.5, pp. 104-107 and accompanying text.
- 9 Blau uses the term "establishment" because this is the unit of observation in the Area Wage Surveys of the Bureau of Labor Statistics on which her study is based. However, in her theoretical explanation, she often uses the word "firm". We have, therefore, assumed that theoretically it is the nature of the firm which determines the level of wages which will be paid and we use the two terms as well as the word "enterprise" interchangeably.

In the present study, the unit of observation is neither the establishment, nor the firm, but rather the regional operations and sometimes the headquarter operations of a firm.
- 10 Ibid., pp. 132-133.
- 11 See ibid., pp. 134-158.
- 12 According to Blau's categorization, intraoccupational segregation is a necessary but not a sufficient condition for the presence of establishment segregation. See also footnote 9 for a discussion of the distinction between an "establishment" and a "firm" or "enterprise" as used in this paper.

- 13 See Doeringer and Piore, op. cit. and David M. Gordon, Theories of Poverty and Underemployment: Orthodox, Radical and Dual Labor Market Perspectives, (Lexington, Mass.: D.C. Heath, 1972).
 - 14 See Leonard W. Weiss, "Concentration and Labor Earnings", American Economic Review, LVI, March 1966, pp. 96-117 for a discussion of the interrelations between concentration, union effectiveness and the composition of labor supply.
 - 15 Gary S. Becker, The Economics of Discrimination, (Chicago: University of Chicago Press, 1957).
 - 16 For an application of this theory to the determination of women's wages, see J. Mincer and S.W. Polachek, "Family Investments in Human Capital: Earnings of Women", Journal of Political Economy, March/April 1974, 82, Part II, pp. S76-S108; and G.E. Johnson and F.P. Stafford, "Lifetime Earnings in a Professional Labor Market: Academic Economists", Journal of Political Economy, May/June 1974, 82, pp. 549-569.
- For an explicit rebuttal of this theory see Harriet Zellner, "The Determinants of Occupational Segregation", in Cynthia Lloyd (ed.), Sex Discrimination and the Division of Labor, (New York: Columbia University Press, 1975).
- 17 Kenneth Arrow, "The Theory of Discrimination" in Orley Ashenfelter and Albert Rees (eds.), Discrimination in Labor Markets (Princeton, N.J.: Princeton University Press, 1973); and Edmund S. Phelps, "The Statistical Theory of Racism and Sexism" American Economic Review, September, 1972.
 - 18 Johnson and Stafford, op. cit.
 - 19 See Barbara Bergmann, "Occupational Segregation, Wages and Profits When Employers Discriminate by Race or Sex", Eastern Economic Journal, April/July 1974.
 - 20 Janice Fanning Madden, "Discrimination - A Manifestation of Male Market Power?" in Cynthia B. Lloyd (ed.), op.cit.
 - 21 As can be seen, data on years of schooling were not always of good quality. Two firms had to be omitted and for Firm 2 there are a large number of unknown cases. Also, in most firms data took the form of years of schooling at date of hire plus any additional schooling attained while working at the firm and not all the firms kept equally complete records as to additional schooling acquired.
 - 22 "CEGEPS" (Collèges d'enseignement général et professionnel) are post-secondary institutions in the Province of Quebec which offer two-year pre-university programs and three-year technical and professional programs. A CEGEP diploma is generally considered to be equivalent to a 13th or 14th year of schooling.

THE RELATIVE ECONOMIC POSITION OF FEMALE-HEADED FAMILIES
IN CANADA, 1965-1975: SOME BASIC INFORMATION

by

J.C.R. Rowley and D.W. Henderson*

No discussions of poverty or sexual disparities in Canada would be complete without due recognition of the special status of female-headed family units. [1] These units are a major element affecting the incidence of low incomes and its evolution through recent years. Their proportionate growth has also clearly affected the values of aggregate measures of inequality among family incomes such as the Gini and Theil-Bernoulli indices. We thought that some data collected for the Surveys of Consumer Finances during the period 1965-1975 would provide a useful framework for describing the relative growth in significance of female-headed family units and the changes in their average total family incomes. Hopefully the characteristics of the samples for the Surveys are suitably accurate indicators of population characteristics. Unfortunately the choice of alternative sources of information is severely restricted. These particular survey data show changes since 1965 in the age of family heads and in the size of family units.

In 1965, 83.3 per cent of Canadian family units had male heads while 10.6 per cent consisted of unattached females. By 1975, these figures had shifted in opposite directions to 78.6 per cent and 15.3 per cent, respectively. The proportion of families with female heads (consisting of two or more persons) was 6.1 per cent in both years. Changes in these three components of family units during 1965-1975 are shown in Table 1. Eight other tables are provided below. The first four of these tables indicate the distributions of female-headed and male-headed family units in the Canadian population at two-year intervals. Two of them assign the population among six categories for family size. The remaining tables illustrate average total incomes of families classified in 1965 and 1975 by the sex and age of their heads and by family size. Tables 6 and 7 deal with female-headed families while Tables 8 and 9 deal with male-headed ones.

1. INCIDENCE OF FEMALE-HEADED FAMILY UNITS
IN THE CANADIAN POPULATION, 1965-1975

The distributions of female-headed family units by the age of their heads are shown in Table 2 for the period since 1965. Two major trends are clearly pronounced. First, the persistent prominence of families with old heads, aged 65 or more years, throughout the period accounts for over 30 per cent of the female-headed family units. Second, there occurred a marked shift toward younger heads, aged 34 or fewer years. In 1965, they accounted for less than a quarter of family units but this proportion rose to almost a third by the end of a decade. These trends can also be stated in terms of overall developments. Female-headed family units with young heads were 3.8 per cent of all family units in 1965. They were 6.9 per cent of these units in 1975. Female-headed family units with old heads were 5.1 per cent of all family units in 1965 and 6.7 per cent of these units in 1975. The growth of female-headed family units with young heads accounts for almost all of the proportionate increase

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female-headed family units revealed for the decade in the first table.

Although the relative proportions of heads aged in the intervals of 35-44 and 45-54 years among female-headed family units declined markedly from 1965 to 1975, their overall significance remained reasonably unaffected. They were 4.9 per cent of all family units in 1965 and 4.6 per cent of these units in 1975 due to the offsetting increase in the proportion of female-headed families among all family units.

Comparative data for male-headed families classified by age of their heads are recorded in Table 3. Here a similar shift toward younger heads is visible. From 27.8 per cent of male-headed family units in 1965, they increased to 35.5 per cent in 1975. This similarity, however, obscures important differences. First, the shift toward younger heads among male-headed family units occurred while the proportion of male-headed families was itself declining from 83.3 per cent of all family units in 1965 to 78.6 per cent of these family units in 1975. Second, the division of the young heads into two smaller age categories, indicates that only about a quarter of young male heads were aged less than 25 years while the proportion of young female heads aged less than 25 years was over a half for much of the period. This difference, related to family formation, reflects the more even distribution of family units across age categories, other than those with heads aged 65 and more years, among female-headed family units than occurred within male-headed families. The latter have tended toward a relative "bunching" in the prime age category of 25-44 years.

The proportion of family units with old heads among male-headed family units remained reasonably stable through the period. However, they represented only about one-eighth of such family units in marked contrast to their relative significance among female-headed family units. A final comparison involves those units with heads having ages in the 35-44 and 45-54 years categories. The relative proportions of heads in these categories declined markedly, as for female-headed family units.

Turning to the size of family units, the predominant position of unattached females is apparent from the entries of Table 4. They have formed about 70 per cent of female-headed family units since 1967. Although spread through all ages, unattached females were especially dominant among family units with very young heads, aged 24 or fewer years, and those with old heads. In 1965, 70 per cent of female-headed family units with old heads and 85 per cent of those with very young heads were unattached females. By 1975, these percentages had increased to about 83 and 88, respectively. These two subgroups accounted for 5.4 per cent of all family units in 1965 and for 8.6 per cent of them a decade later.

Table 5 is provided as a basis for comparisons. It presents the distributions of male-headed family units by size categories since 1965. Although the proportion of unattached males among male-headed family units has increased from 12.1 per cent to 16.2 per cent, it remains substantially below the figures for female heads. This is hardly surprising given the relative magnitudes of male-headed and female-headed family units. There is a further difference between the two groups of family units. Over the decade 1965-1975, female-headed family units in all size categories reveal a general pattern representing an overall decline in family size. This pattern is not consistently evident for male-headed family units although the proportion of family units with male heads and consisting of no more than two persons increased markedly from 33.5 per cent of all male-headed family units in 1965 to 43.9 per cent of these family units in 1975.

2. AVERAGE INCOMES OF CANADIAN FAMILIES

As indicated earlier, the final four tables present average incomes for various socioeconomic groups of families delineated by categories for sex of head, age of head, and family size in the two boundary years 1965 and 1975. The average total income of female-headed family units has declined from 47 per cent of the average income of male-headed family units in 1965 to 42 per cent in 1975. In absolute terms, the average sexual disparity for family units has increased from \$3,352 to \$9,229. Clearly a partial explanation of these relative values can be based on the different age-size proportions of the two groups and their evolution during the period. Female-headed family units, as we have already noted, have been markedly smaller relative to male-headed family units and have been clustered at the two tails of the age distribution. These features have become more pronounced in recent years. However, they cannot fully explain the very substantial sexual disparities for average total incomes.

Comparisons free from the confounding influences of different age-size proportions can be derived from the four tables when similar cells in different tables are considered. For example, from Tables 6 and 8, it appears that the average income of very young unattached females was \$1,928 in 1965 while the average income of very young unattached males was \$2,987. The only female-headed family units that were not notably disadvantaged in 1965 relative to male-headed family units with similar age characteristics for their heads and similar size were families of two or more persons with old heads. Although the figure of 47 per cent for the ratio of relative incomes by sex of family heads frequently exaggerates the experience for comparisons of like-with-like cells, the elements in the two tables clearly demonstrate a consistent pattern of large disparities.

This pattern is repeated when similar cells in Tables 7 and 9 are considered. These data for average total incomes in 1975 also clearly indicate subgroups for which the aggregate ratio of 42 per cent substantially understates actual levels of disparities in income. These groups tend to be those with larger family size, probably due to variations in the incidence of multiple male earners in such family units. The most extreme relative disparity (of the cells for which there are observations) seems to have affected family units with heads aged 25-34 years and consisting of four persons. Female-headed members of this subgroup received average total incomes about a third of those with male heads in 1975.

Entries in the two tables corresponding to family units with heads in the prime age range of 25-44 years illustrate a particular difference between those family units with female heads and those with male heads. As might be expected, the increase of average incomes for male-headed family units from unattached males to two persons was pronounced. A further increase to three persons with the male head's age in the same range may have lowered average incomes but they remained substantially above those for unattached individuals. Further increases in family size were seldom associated with reduced levels of average total incomes. This pattern for male-headed family units was markedly different from that revealed for female-headed family units. For the latter, the shift from unattached individuals to a family with two persons was associated with either increases and decreases in family incomes of no more than 10 per cent. Further increases in family sizes were linked with declines in average incomes. For family units with female heads aged 25-34 years, increases in family size were associated with monotone declines in average incomes to a level well below those for unattached individuals.

The final information that will be drawn from the four tables concerns growth rates in average incomes for the age-size cells. At annual rates, average incomes of female-headed family units grew in the range of 8.3 to 10.8 per cent. Those for maleheaded family units grew in the range of 6.9 to 12.0 per cent, with the lower values usually affecting some but not all unattached males. These annual growth rates reveal the widespread experience of increased income during the decade covered by the data. However, the only cells in which female-headed family units appear to have made substantial reductions in their relatively disadvantaged economic positions were those for unattached individuals with young heads aged less than 35 years and with older heads aged between 45 and 64 years.

Table 1

Proportions of Male-Headed Family Units, Female-Headed Family Units, and Unattached Females in Canadian Population of Family Units, 1965-1975

	1965	1967	1969	1971	1973	1975
	(per cent)					
Male-Headed Family Units	83.3	81.6	81.5	81.5	79.3	78.6
Female-Headed Family Units	16.7	18.4	18.5	18.5	20.7	21.4
Unattached Females	10.6	12.8	12.9	12.9	14.6	15.3
	(6.1)	(5.6)	(5.6)	(5.6)	(6.1)	(6.1)

Source: Surveys of Consumer Finances, Statistics Canada.

Table 2

Distribution of All Female-Headed Family Units by Age of Head, Canada, 1965-75¹

Age of Head	1965	1967	1969	1971	1973	1975
	(per cent)					
Less than 25	12.8	17.1	14.0	16.7	16.8	16.1
25-34	10.4	9.8	11.0	13.8	14.7	16.3
35-44	12.9	8.6	10.2	10.4	9.7	10.3
45-54	16.1	14.6	14.7	13.6	12.6	11.1
55-64	17.4	17.5	15.9	15.9	14.8	15.0
65 or more	30.4	32.4	34.2	29.7	31.4	31.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ The values recorded for 1967 remind us that we are dealing with characteristics of a sample rather than a population.

Source: Surveys of Consumer Finances, Statistics Canada.

Table 3

Distribution of All Male-Headed Family Units by Age of Head, Canada, 1965-75

Age of Head	1965	1967	1969	1971	1973	1975
	(per cent)					
Less than 25	6.8	7.8	8.2	9.3	8.9	9.4
25-34	21.0	21.4	22.8	22.8	23.9	26.1
35-44	24.3	23.7	22.6	21.7	21.0	20.1
45-54	21.8	19.4	18.6	19.4	18.7	17.8
55-64	13.9	14.4	14.4	14.3	14.4	13.4
65 or more	12.3	13.4	13.4	12.5	13.1	13.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Surveys of Consumer Finances, Statistics Canada.

Table 4

Distribution of All Female-Headed Family Units, by Size of Unit, Canada, 1965-75

Size of Family Unit	1965	1967	1969	1971	1973	1975
	(per cent)					
1	63.5	69.4	69.7	70.0	70.2	71.4
2	17.6	15.1	15.5	13.0	13.9	14.1
3	9.1	7.0	6.1	7.7	7.9	7.4
4	4.3	3.3	3.8	4.6	3.9	3.8
5	2.2	2.3	2.6	2.4	2.1	1.8
6 or more	3.3	2.9	2.3	2.4	2.0	1.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Surveys of Consumer Finances, Statistics Canada.

Table 5

Distribution of All Male-Headed Family Units, by Size of Unit,
Canada, 1965-75

Size of Family Unit	(per cent)					
	1965	1967	1969	1971	1973	1975
1	12.1	14.9	15.0	15.1	15.3	16.2
2	22.4	22.1	23.7	24.7	26.1	27.6
3	15.8	16.0	16.7	17.3	16.6	16.5
4	18.5	18.0	17.9	18.1	19.2	20.1
5	14.1	12.8	12.5	12.0	11.8	11.3
6 or more	17.0	16.2	14.3	12.9	11.0	8.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Surveys of Consumer Finances, Statistics Canada.

Table 6

Average Total Income of Female-Headed Family Units by Size of Family Unit and
Age of Female Head of Family Unit, Canada 1965

Age of Female Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
less than 25	1,928	*	*	*	*	*	2,164 (72.5)
25-34	3,151	*	*	*	*	*	2,990 (100.1)
35-44	3,426	3,674	3,373	*	*	*	3,486 (116.7)
45-54	3,123	3,677	3,876	*	*	*	3,772 (126.6)
55-64	2,399	3,919	*	*	*	*	3,201 (126.6)
65 or more	1,636	4,400	5,665	*	*	*	2,580 (86.4)
Average of Column	2,330 (78.0)**	4,017 (134.5)	3,996 (133.8)	3,634 (121.7)	4,979 (166.7)	5,152 (172.5)	2,986 (100.0)

Source: Surveys of Consumer Finances, Statistics Canada.

* Insufficient observations

** Average total income of female-headed family units by size of family unit and age of female head as a percentage of the average total income of all female-headed units.

Table 7

Average Total Income of Female-Headed Family Units by Size of Family Unit and Age of Female Head of Family Unit, Canada 1975

Age of Female Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
less than 25	4,780	5,842	*	*	*	*	4,911 (75.0)
25-34	8,209	7,230	6,377	5,387	*	*	7,595 (116.0)
35-44	8,331	9,287	9,236	8,514	*	*	8,792 (134.2)
45-54	7,096	8,962	10,790	11,831	*	*	8,819 (134.7)
55-64	5,318	10,219	11,380	*	*	*	6,808 (104.0)
65 or more	3,979	9,564	13,684	*	*	*	5,168 (78.9)
Average of Column	5,450 (83.2)**	8,770 (133.9)	9,054 (138.3)	9,947 (151.9)	10,691 (163.2)	11,845 (180.9)	6,549 (100.0)

Source: Surveys of Consumer Finances, Statistics Canada.

* Insufficient observations.

** Average total income of female-headed family units by size of family unit and age of female head as a percentage of the average total income of all female-headed family units.

Table 8

Average Total Income of Male-Headed Family Units by Size of Family Unit and Age of Male Head of Family Unit, Canada 1965

Age of Male Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
less than 25	2,987	6,098	4,818	4,998	*	*	4,528 (71.4)
25-34	4,810	7,548	6,219	6,131	6,091	7,112	6,371 (100.5)
35-44	4,194	6,885	7,304	7,694	7,785	7,565	7,404 (116.8)
45-54	4,391	6,567	7,334	8,273	8,791	7,552	7,404 (116.8)
55-64	3,441	5,683	6,628	7,274	6,844	8,236	6,012 (94.9)
65 or more	1,861	3,418	5,283	*	*	*	3,663 (57.8)
Average of Column	3,444 (54.3)**	5,476 (86.4)	6,483 (102.3)	7,213 (113.8)	7,472 (117.9)	7,503 (118.4)	6,338 (100.0)

Source: Surveys of Consumer Finances, Statistics Canada.

* Insufficient observations.

** Average total income of male-headed family units by size of family unit and age of male head as a percentage of the average total income of all male-headed units.

Table 9

Average Total Income of Male-Headed Family Units by Size of Family Unit and Age of Male Head of Family Unit, Canada 1975

Age of Male Head	Size of Family Unit						Average for Row
	1	2	3	4	5	6 or more	
less than 25	5,908	13,627	11,278	11,675	*	*	9,837 (62.3)
25-34	10,996	18,163	15,691	16,491	16,271	16,364	15,810 (100.2)
35-44	12,521	17,814	17,654	19,302	20,901	20,056	19,010 (120.5)
45-54	8,581	17,911	20,204	22,035	22,370	23,542	19,882 (126.0)
55-64	6,928	14,514	19,241	21,327	22,942	24,261	16,214 (102.8)
65 or more	4,599	9,246	14,316	16,879	*	16,123	9,053 (57.4)
Average of Column	7,964 (50.5)**	14,127 (89.5)	16,985 (107.6)	18,745 (118.8)	20,198 (128.0)	20,951 (132.8)	15,778 (100.0)

Source: Surveys of Consumer Finances, Statistics Canada.

* Insufficient observations.

** Average total income of male-headed family units by size of family unit and age of male head as a percentage of the average total income of all male-headed units.

Footnotes

- 1 Our family unit refers to both economic families and unattached individuals. An economic family is defined as "a group of individuals sharing a common dwelling unit and related by blood, marriage, and adoption. Thus, all relatives living together were considered to comprise one family unit whatever the degree of family relationship; aside from sons and daughters, other relatives most commonly found living in a household were married sons and daughters and widowed parents." Statistics Canada, Income Distribution by Size in Canada (1965).

EDUCATION

Education is a powerful factor in determining the income attainment of individuals. It has positive intergenerational effects, it can provide a high-level entry into the labour market and it yields personal returns through both the ability to specialize and to be flexible in an occupational and locational sense. While "human capital" in the form of educational attainment can depreciate due to rapid change in technology through innovation, it tends to establish long-term family attitudes and economic position; children of the well-educated tend themselves to obtain higher education and to benefit, in an occupational sense, more from it than first-generation degree holders. Improved longitudinal data and/or retrospective information is required to shed more light on the process of education, occupation and advancement. It certainly appears that the connection between the field of study of degree holders and the occupations into which they gravitate is quite loose. On the other hand, higher education allows specialization and experience which contribute to relatively higher incomes within highly-skilled occupations.

HIGHER EDUCATION AND INCOME

by

Robert Lacroix and Clément Lemelin*

INTRODUCTION

In conjunction with unprecedented attempts to improve education throughout the world, a new current of thought has emerged in the field of economics over the last twenty years that of the investment in human capital.

Although we will take this new development as a starting point, we do realize, however, that we cannot give it the full treatment it deserves: our paper will deal only with one of the several investments possible, education, and will be limited to studying the impact of university education on incomes. Highly skilled labour, thus defined, represented only 7 per cent of Canada's total labour force in 1971.

The first section briefly reviews the major lines as well as the limitations of this attempt to explain the distribution of income. The second section presents the results of a brief overview of the main Canadian studies on rates of return of university education. Finally, the third section questions the respective roles of education, field of specialization, and occupation.

Throughout this text, particular attention will be given to the results of our research conducted on the basis of the survey of highly qualified manpower in Canada conducted in 1973 for the Ministry of State for Science and Technology.

1 EDUCATION, INVESTMENT IN HUMAN CAPITAL, AND INCOME DISPARITIES

Since the theory of investment in human capital placed primary emphasis on calculating rates of return as well as attempts to measure the contribution of education to economic growth, it quite naturally produced functions for determining individual income that stress labour supply characteristics, education, experience, etc., and aggregate income distribution functions.

If we are to believe recent literature on the subject, this new current constitutes one of the most stimulating contributions to these efforts to gain a better comprehension of income distribution. [1] In its original versions, this current tended to blindly follow the principle of compensation: individuals only earn income corresponding to returns on previous investments; an individual's level of income is the result of freely made personal decisions. Conversely, personal expenditures for purposes of education, health, migration, information, or professional training are essentially motivated by consideration of future income. More recently, this model has been broadened; thus, it is acknowledged that spending on education can also be influenced by family environment and the aptitudes of children, although it is quickly added that parents also make pre-school investment expenditures: the aptitudes of children are, to a large extent, the result of past investments.

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While those computing the rates of return of education were content to observe a correlation between level of education and income, advocates of the new current did not delay initially in making the neoclassical act of faith: if the correlation exists, it is because education increases marginal productivity, which is reflected in income. This income is the result of the interaction of supply and demand. The supply of better-educated workers is smaller because education carries a cost, and the demand for better-educated people is greater because they are more productive.

This formulation of the theory was accompanied especially in the early days, by several political interpretations or recommendations that gravitated around the following proposition: if people are poor, it is quite often because the process of accumulating human capital was too weak or was interrupted too early. In its less brutal form, this statement supports the tradition which makes education an instrument of social mobility and witnessed the implementation of a thousand and one policies for equalizing opportunity, compensatory education and manpower training.

This simplified view gradually gave way to moments of doubt or disenchantment, to more complex interpretations, and to a desire to broaden the framework for consideration. All the subsequent work incorporating this new trend could not, however, be viewed as a break with the theory of investment in human capital. In fact, while this theory might initially appear to constitute an outgrowth of these distribution theories that stress the existence of competitive markets and thus the principle of compensating differences, recent literature on the subject has brought about certain reconciliations with the other trend that places more stress on the existence of noncompetitive forces. [2]

Without denying the existence of a correlation between education and income, several experts have questioned the meaning of this correlation. For some, the major effect of education is not to increase technical or intellectual aptitudes but rather to implant aptitudes that will make it easier for the individual to find a place in a system characterized by the dialectics of dominator and dominated. For others, the educational system is only a vast filtering process that grants access to different job lines; it is the jobs themselves that provide the pertinent training.

All these doubts force us to raise questions and place the analysis at a more concrete and less aggregate level. In particular, they cast uncertainty over the results that ignore the diversity of individual experience in favour of only one undifferentiated variable, education.

In the following text, we have chosen to duplicate the evolution of recent economic thought on the subject and to gradually move from the simple case to the complex one. It goes without saying, however, that we have no intention of examining all the problems raised by research on the economics of education. We will limit ourselves to studying the power of some variables to explain income disparities within the highly skilled labour force.

2 THE IMPACT OF EDUCATION ON INCOME IN CANADA

"There has been surprisingly little empirical research to measure economic returns on Canadian university education, since 1960...." [3] This is the verdict passed by Mehmet in the beginning of an article on the subject; we find that his verdict is, in fact, correct.

Podoluk's work (1965) certainly was a pioneering step in this field. Afterwards, the Economic Council of Canada conducted studies on the return on investment in education and published the main results in its Eight Annual Review. In the first series of Canadian studies, university education appeared to be highly profitable. The rates of return found by Podoluk were 19.7 per cent, while the Economic Council of Canada found that although the rates of return dropped between 1961 and 1967, they still remained very satisfactory, about 11 per cent for society and 13 per cent for individuals. [4]

A second set of results is provided by the various research projects of Dodge and Stager, which culminated in publication of a joint article in 1972. Using data from the 1967 survey on highly qualified manpower and limiting calculations solely to postgraduate studies in Science, Engineering and Administration, the authors found very few investments in education that would be profitable in terms of traditional criteria. [5]

In a recent study, Mehmet (1977) calculated the rates of return for twenty-one disciplines and obtained average rates of 14.1 per cent in 1961, 22.3 per cent in 1969 and 18.2 per cent in 1972. These rates apply to undergraduate studies, but can be reconciled with those of Dodge and Stager by assuming a decrease in the rate of return at the higher levels of education. Our own research on income disparities within the highly skilled labour force in Canada also led us to the same conclusions.

In the first step, we estimated the function for determining personal income specified by Mincer (1974), using data on highly skilled labour in Canada. Mincer's function is written:

$$\ln R_i = a_0 + a_1 S_i + a_2 S_i^2 + a_3 X_i + a_4 X_i^2 + a_5 X_i S_i + a_6 \ln T_i + u_i \quad (1)$$

where R_i = annual income of individual i

S_i = number of years of education

X_i = number of years of experience

T_i = number of weeks worked.

Our sample was composed of respondents to the questionnaire of an extensive survey conducted in 1973 by Statistics Canada at the request of the Ministry of State for Science and Technology. All those in the 1971 census who claimed to hold a university degree were eligible.

For our purposes, only the 60,068 male respondents who claimed to have worked 40 weeks or more during the preceding year were retained. The income disparities of workers presumably well established in the labour market appeared to require a priority study. However, since the answers to the question on the number of weeks worked could be ambiguous as a result of summer vacations, especially among teachers, we opted for a compromise solution by retaining for analysis all respondents who claimed to have worked at least 40 weeks, while also incorporating this variable into our income determination function. [5a] This last independent variable has only a slight influence on the other coefficients, and our function could be considered as a function for determining rates of pay as well as an annual income determination function. Just as arbitrarily, we decided to sidestep the problems of income disparities associated with an individual's sex.

The income variable represents the sum of the respondent's wages and professional income. In turn, the education variable represents measure of the number of years of studies in the university system. An initial university degree is rated at four

years; all other undergraduate degrees (second or third baccalaureats, certificates or degrees not specifically in the graduate program) are worth one year. A Master's degree or other postgraduate degree are worth 1.25 years. A Ph.D. is worth 3.45 years. (The last two figures were borrowed from Dodge and Stager (1972), but we decided to tally these two degrees separately.) All other degrees granted after the Masters (for example, M. Phil.) are worth two years. The holder of an initial professional degree in medicine is credited with six years of studies but no account is taken of previous schooling. Finally, a respondent who claims to be registered in a program of study and plans to earn a degree is granted half the number of years associated with this level of studies. A second indicator of education S_2 , was also constructed; it refers only to the last degree obtained. In this case, a Baccalaureat is worth four years, a Masters 5.25, a medical degree 6 years a Ph.D. 8.70 and all other postgraduate degrees 7.25.

The experience variable is measured as the difference between the sum of 18 and the education indicator, and the respondent's age. A second experience indicator, X_2 , includes only the number of years elapsed since the last degree was earned.

The main empirical results are compiled in Table 1, specifically in columns (1), (2), (4) and (5). Columns (3) and (6) contain the results obtained under a different definition of the education and experience variables; these results will only be analysed at the very end of this section. As will rapidly become evident, these regression results appear to be very stable and change very little with alterations in the form of the income determination function used.

The coefficient of determination increases from .033 to .210, .214 and .222 as the influence of education, experience, impact differentiated by the various years of university studies and number of weeks worked are successively and cumulatively taken into account. In this way, the relative importance of years experience in the determination of income for highly skilled labour can be placed in relief.

The results of equation (5) also make it possible to infer rates of return. If we set the number of years of experience at 8 we obtain: [6]

$$r = .235 - .026 S$$

We can thus set the rate of return for a Masters program at 9.8 per cent and that of a Ph.D. program at 0.9 per cent. It should be noted here that the rates of return tend to decrease very rapidly. As already pointed out, this tends to reconcile the results of Dodge and Stager (1972) and Mehmet (1977).

The significance of experience in the determination of income becomes clear in Table 1. The coefficients designed to isolate the role of experience prove practically insensitive to a change in the formulation of the income determination function. The impact of years of experience obviously decreases as these accumulate. Thus, supplementary years of experience cease to have a positive impact after twenty-six or twenty-seven years of work, or at about fifty years of age. [6a] At first glance, this conclusion tends to confirm the impression that emerges from an analysis of income patterns observed for groups defined by various levels of education; this analysis leads us to believe that the most educated individuals attain their maximum income relatively late, when they are in their fifties.

In fact, our estimate of the optimum number of years of experience remains imprecise, particularly when we remember that rate of pay rather than annual income is the issue, since our

sample includes only those workers who had income derived from work during more than forty weeks throughout the year. An evaluation of the optimum number of years of experience would have produced a lower number had we used all individuals, since retirement, either partial or total, of the labour force increases with age. (This effect, however, probably would have a significant impact only at a fairly old age.)

On the other hand, it should be remembered that our data were obtained from a static cross-section and do not refer to a given individual. If productivity grows and quality of education improves with time, we can partially re-establish the balance and claim an optimum age beyond fifty years.

We mentioned above a second way of measuring the level of university education. The variable S_2 represents only the value, in terms of years of study, of the last degree obtained, with experience adjusted accordingly. The effect of this new definition of the education variable can be measured by comparing columns (2) and (3) in Table 1. The main, if not the only, change consists of an increase in coefficient a_1 , the estimate of the average rate of return, which rises from .075 to .098. Since the hesitation of students and some nonlinear channeling in the educational system are not taken into account, the highly skilled labour force may be credited with more efficiency in its investment process than it actually produced. Thus, training costs are under estimated and the rate of return rises accordingly. This process is unfortunate in our opinion. In retrospect, we must take into account this hesitation when measuring the rate of return. It should also be stressed that the coefficient of determination grows from .210 to .221, indicating that any studies not strictly necessary for obtaining an initial degree prove to be a hindrance for purposes of understanding income variations.

These same conclusions can be inferred from the data in column (6). In this formulation, we consider simultaneously only the minimum number of years of study necessary for obtaining the initial degree and the years of experience registered after the date of obtaining the degree. This formulation is even more radical, since it labels all other years a pure loss. Once again, this formulation allows us to better predict the level of income than does that represented by column (5); however, the former cannot be used to measure rates of return.

It is convenient here to discuss one final aspect. In Canada, the French system of education in Quebec was and remains in some respects different from the English system. Until very recently, several faculties in Quebec required the Baccalaureate from a classical college before granting of admission. Thus, to obtain a Masters degree or Ph.D., a student had to obtain two baccalaureates. In our first method of calculation, a Francophone would have studied a greater number of years than an Anglophone to earn the same end degree. This larger number would correspond to more education and measurement of the rates of return should take into account. However, for purposes of determining the level of income, this appears to be the worst of all possible situations, since Francophones are credited with more years of education for a given degree but earn less income, if we are to believe the literature [Raynauld and Marion (1972), Migué (1970), Boulet and Raynauld (1977), and Vaillancourt (1978)]. This would explain, therefore, why the predictions are better when we consider only the value of the last degree. We also find here a need to break the figures down by linguistic or ethnic variables.

3 OCCUPATIONS, FIELD OF SPECIALIZATION AND INCOME

The importance of the role of occupations in determining income is an important theme in Canadian literature. The works

of Wilkinson (1966), Sewell (1972) and Dodge (1972), among others, should be mentioned here.

Even though Wilkinson (1966) did not limit his study to the distribution of income among the highly skilled labour force -- his study deals with the income of labourers, technicians and engineers -- he raises an extremely important question: what are the respective roles of education and occupation in the determination of income?

His answer is well known, if not famous: inequalities in income between occupations are much greater than inequalities in income between levels of education. He thus concluded that education is a means of access to an occupation; within a given occupation, the acquisition of a greater quantity of education does not always pay dividends.

Wilkinson's thesis on the influence of occupations has been re-examined on several occasions in Canadian literature. For example, Sewell (1972) stressed that the "return on education" was, in his view, much more attributable to differences in income associated with various occupations than to differences in income within a given occupation associated with various levels of education. If there is often much dispersion in education within an occupation, it follows that individuals with varying levels of education may choose the same career. Moreover, these differences in income associated with differences in education within a given occupation lead to rates of return for education equal to half the usual values. From there it is only a short, quick step to conclude that education permits primarily easier access to certain better paid careers.

Consequently, according to Dodge (1972), the differences in income between occupations are often the result of licences and the high rate of return usually attributed to certain types of learning only indicates the utility of circumventing the restrictions to entry. [7]

Dodge's explanation, as important as it is, by no means explains all income disparities within the highly skilled labour force. When reference is made to licensed professionals, one thinks immediately of lawyers, doctors, engineers and architects who may only practise their profession after obtaining a degree in a very specific discipline. However, as demonstrated by both Ahamad et al. (1978) and Girard et al. (1978), these professions constitute exceptions within the highly skilled labour force, whose main characteristics are flexibility and mobility; while degrees in law and medicine lead primarily to the respective practice of the professions of lawyer and doctor and conversely, the professions of law, medicine, engineering and pharmacy require corresponding degrees, this is far from being the case for the vast majority of other occupations and fields of specialization.

Like Becker (1964, p. 86), we believe that the analytical methods of some of this work are particularly unfair to education and experience. These, in effect, are often the means that make it possible for individuals to obtain higher incomes through better jobs. In fact, the introduction of occupation as an argument in the income determination function is not, in our view, particularly fortunate. For example, in sociology of education, the occupation variable has long played a role equivalent to that of income in neoclassical economic theory, that of a dependent variable. Increased education not only makes it possible for an individual to be more efficient in his career, but also to gain access to "better" occupations. It is through these two channels that education and experience become correlated with income. To place education, experience and occupation on the same footing in an income determination function can only cause a downward bias in the coefficients that estimate the role of the first two variables.

The debate is far from over however, and must now be extended to field of specialization.

While occupation is one of the prime means through which education gives access to high levels of income, field of specialization has a direct effect on education. In the course of post-secondary studies an individual simultaneously acquires both a higher level of education and a field of specialization. In other words, the education is specialized. Thus, the addition of fields of specialization to education and experience in an income equation dealing with highly skilled labour will take into account the specific characteristics of the education acquired. [7a]

We may now ask in what way the specific characteristics of education provided by the field of specialization will add to the explanation of income disparities within the highly skilled labour force.

In the socio-economic context of most industrialized countries, it is reasonable to believe that at a given level of education, some fields of specialization will, at a given moment in time, provide more direct and rapid access to a larger number of the best paid occupations. Thus, for example, four years of university education in the field of specialization of "administration and commerce" will generally give easier and more rapid access to the best paid occupations than four years of university education in the "arts and humanities." If such is the case, the specific characteristic of education revealed by the field of specialization becomes important in explaining income disparities within the highly skilled labour force.

In a dynamic perspective, however, we should expect this characteristic of some fields of specialization to give access to a greater number of better paid occupations to disappear through market interaction, since these fields of specialization should begin to attract more students and thus produce more graduates. The excess supply would then lead to the disappearance of the income disparity over a fairly long period. However, in the framework of this factor, disparities could persist over time for either one or both of the following reasons: access to some of these favoured fields of specialization is institutionally limited, or the innate aptitudes required for apprenticeship in these fields of specialization are such that only a small proportion of the stock and flow of the population possesses them. The first reason has received the most attention in the past, both in Canada and the United States. The links between innate aptitudes, fields of specialization and income constitute a vast, relatively untouched field, particularly in Canada. The availability of reliable and complete statistical data raises a major obstacle to advanced research in this field. [8]

Moreover, the institutional organization of labour may vary between fields of specialization. By institutional organization of labour, we mean the relative proportions of "self-employed workers" and "employed workers" in the various fields of specialization. This factor will have two effects: it may alter the degree of certainty that the individuals attach to their income pattern while at the same time it may differentiate the work habits and particularly the average number of hours worked by specialization.

If the degree of certainty that individuals attach to their income pattern differs from one field of specialization to another, the higher risks should logically be compensated by larger earnings. This hypothesis is by no means recent; as early as 1945, Friedman and Kuznets (1945) advanced the idea and attempted to verify it empirically. We can, however, ask why risk would be greater in some fields of specialization. The determining factor in our view is that the majority of indivi-

duals in some disciplines rent out their services to private or public firms, while in other specialization, they themselves are the employer and must consequently assume all risks, if in fact there are any. The practice of law is certainly a good example of this. Most lawyers (60 per cent) are, individually or in groups, businessmen assuming all the risks of their business. However, it must be stressed that the institutional organization of labour, inherited from a certain tradition, would have it this way. Nothing rules out another possible organization of labour in which lawyers would mostly be employed, but with very little uncertainty over their income pattern.

As emphasized earlier, these differences in the institutional organization of labour have another effect capable of producing income disparities between fields of specialization. This is the average length of time devoted to work in a given period (week, month, etc.). In fields of specialization dominated by "self-employed worker," the institutional constraint on hours of labour in each period is nonexistent, thus individuals could generally work a greater number of hours than in disciplines where workers are employed and the number of hours of work in each period is institutionally fixed. It would thus be normal that where individuals generally work a greater number of hours we could find, *ceteris paribus*, a higher average income as well. [9]

The Income Equation and Empirical Results

We have thus specified an income equation in which net income before taxes is explained by education, experience and field of specialization. The dependent variable is continuous, while the explanatory variables are dummy variables. This discrete specification of the independent variables has two advantages. First, the qualitative characteristic of the field of specialization lends itself particularly well to this type of variable and second, the explanatory dummy variables have the advantage of implicitly linearizing the equation to be estimated, so that the least squares can be applied.

With the same sample as that used in the preceding section and the same definition of variables we formed seven dummy variables for education, eight dummy variables for experience and thirteen dummy variables for field of specialization. The nomenclature of these sets of variables is given in the table in which the empirical results are presented.

Our income equation can be written as follows:

$$y_t = \alpha + \sum_{i=1}^7 \beta_i Ed_{it} + \sum_{j=1}^8 \gamma_j Ex_{jt} + \sum_{k=1}^{13} d_k S_{kt} + U_t \quad (2)$$

y_t is net income before taxes of the t -th individual, Ed_{it} , Ex_{jt} and S_{kt} are the values respectively taken by the i -th, j -th and k -th variables for education, experience and field of specialization. U_t is a centred normal stochastic variable.

The informed reader will have noted immediately that this equation cannot be estimated by ordinary least squares without previously imposing three linear constraints. In effect, the cross products matrix of our observations is singular and thus cannot be inverted.

We chose to impose the following constraints:

$$\sum_{i=1}^7 f(i) \beta_i = 0 \quad (2.1)$$

$$\sum_{j=1}^8 g(j)\gamma_j = 0 \quad (2.2)$$

$$\sum_{k=1}^{13} h(k)\delta_k = 0 \quad (2.3)$$

$f(i)$, $g(j)$ and $h(k)$ are the number of individuals holding the i -th level of education, the j -th level of experience and a final degree in the k -th specialization, respectively.

Under these constraints, it can easily be shown that the estimator of the least squares of α will be equal to \bar{y} , the average of wages in our total population. Moreover, if we examine the value of the estimator of β_i for example, we would find that [10]

$$\hat{\beta}_i = \bar{y}_i - \bar{y} - \frac{1}{F(i)} \left[\sum_{j=1}^8 \hat{\gamma}_j \left(\frac{T}{\sum_{t=1}^T Ed_{it} Ex_{jt}} \right) + \sum_{k=1}^{13} \hat{\delta}_k \left(\frac{T}{\sum_{t=1}^T Ed_{it} S_{kt}} \right) \right] \quad (3)$$

where $\hat{\beta}_i$, $\hat{\gamma}_j$ and $\hat{\delta}_k$ are the estimators of β_i , γ_j and δ_k , \bar{y}_i is the average income of individuals holding the i -th level of education and T is the total number of observations. β_i thus represents the gap existing between the average income of the total population and that of individuals at the i -th level of education, given that the two groups are defined by a common structure of experience and field of specialization. Now that the reader is more familiar with the scope of the method used, we present the results of the regression in Table 2.

Following the explanations below, the coefficient of the "law" specialization, for example, indicates that a gap of \$4953 would exist between the average wage of individuals with this specialization and that of the whole population if members of both groups held the same levels of education and experience. [10a]

Analysis of General Results

The results obtained require some comments.

First, the coefficients of the education variable show erratic movements mainly because of the results for the 6-7 level of education. Let us suggest an interpretation capable of explaining this fact. In the English education system, individuals in the highly skilled labour force who have progressed linearly have been credited with four years of study if they hold an honours baccalaureat only, 5.25 or 6 years if they hold a masters degree or M.D. and 7.70 if they have obtained a Ph.D. without completing a masters program. In the French education system, because of the former system of classical colleges, an extra year must usually be added to these estimates, although M.D.'s constitute an exception because of our method of evaluation. Consequently, the 6-7 category of education probably includes an abnormally high number of Francophones holding a masters degree and its coefficient is more likely to reflect the existence of the income disparity between Anglophones and Francophones. [11] Thus, we can again claim a positive correlation exists between education and income.

The coefficients of the experience variable behave as expected. The results reveal that the influence of experience on incomes is parabolic: the most experienced usually earn more; however, the marginal contribution decreases with experience. Finally, it should be noted that the influence of this variable is considerable and stable.

The estimation of an income equation integrating fields of specialization in addition to the traditional variables makes it possible to measure the net impact on income of this last variable. We first find that the addition of fields of specialization causes R^2 to grow from .17 to .24. This variable thus substantially increases the percentage of the income variance explained. Moreover, as indicated by columns 1 and 2 of Table 2, the coefficients of the education variable are considerably modified by the addition of the field of specialization variable. In effect, the impact of each levels of education on income is considerably reduced. The specificity of education taken into account by the field of specialization thus affects not only the explanation of income disparities but also the measurement of the actual role itself of education in the experience of these disparities. Furthermore, fields of specialization explain 34.8 per cent of the variation in income, while levels of education explained only 12.2 per cent.

A Case Study of Two Fields of Specialization

The results of the preceding section indicate that the inclusion of fields specialization was justified. However, these same results provide no information on the respective importance of each of the factors that led us to integrate fields of specialization into our income equation.

Using two extreme cases of the impact of field of specialization on income ("education" and "medicine"), we will illustrate how it is possible to assess, albeit very roughly, the respective importance of some factors represented by field of specialization.

We will assume from the outset that in general the innate aptitudes of individuals do not differ from one field of specialization to another. Moreover, in the two cases studied, the link between field of specialization and occupations is close, and access to a larger number of occupation should not be a factor explaining the impact on income of these two fields of specialization. Of the set of factors considered, we are left with institutional organization of labour and barriers to entry into a discipline.

We will first examine the case of the "medicine" field of specialization in terms of these two factors. It should be remembered that institutional organization of labour means the relative proportions of "self-employed workers" and "employed workers" in various fields of specialization. This factor could, on the one hand, affect the degree of certainty that individuals attach to their income pattern and, on the other hand, differentiate work habits by specialization, particularly the average number of hours worked.

To examine the hypothesis under which the income disparity attributable to the "medicine" specialization would be a compensation for a greater degree of uncertainty over income, we calculated for our entire sample and for the subset of individuals in the "medicine" field of specialization an income variation coefficient. The results will support the previously outlined hypothesis if the income variation coefficient is greater for "medicine" than for our entire sample of highly skilled labour. In effect, such results would simply indicate that, as expected, greater opportunity for earnings is linked with greater risk. The variation coefficient for the entire sample is .61, compared to .54 for "medicine." It would thus be difficult in the case of "medicine" to retain this first hypothesis. [13]

In the second hypothesis, the fields of specialization in which "self-employed workers" are in the majority, as in medicine, the institutional organization of labour may be such that the average number of hours worked in a given period is higher than for the population as a whole.

The method used to verify this hypothesis is quite simple. The coefficient for each of the fields of specialization in the general regression gives the net effect of the field of specialization on average income after standardization of education and experience. Using these regression results, the average income of degree holders having specialized in medicine which we wish to compare with the average income of all highly skilled labour is \$30 807. Physicians working in their own practice generally cannot obtain the fringe benefits provided by employers, which usually amount to 10 per cent of the wages received. [14] To make the income of physicians comparable to wage earnings, it was necessary therefore to reduce it by some \$1 800. Moreover, we assumed that the work week for the population as a whole was average 40 hours and that workers had four weeks of vacation. At this number of working hours, the average hourly wage for all workers in our population was \$9.33. We then computed the average hourly wage for physicians for various numbers of hours worked to determine whether we could explain the income disparity favouring this field of specialization.

For the United States, Freeman indicates that by working an average 50.8 hours a week, physicians would have a work week some 20 per cent longer than that of all professionals in general. [15] In Quebec, a survey conducted among physicians by their federation led to quite similar results. [16] However, 80 per cent of the respondents to this survey said that they took five weeks or more vacation a year which, in our opinion, is clearly above the average for the highly skilled labour force as a whole.

Table 3 gives the hourly wage rate of physicians in terms of various lengths of the work week and assuming four weeks of vacation each year.

If physicians worked only 40 hours a week, their wage rate would be some 62 per cent above that for the highly skilled labour force as a whole. To obtain a wage equivalent to that of all professionals, physicians would in fact have to work almost 65 hours a week and 48 weeks a year. However, if we accept the standard of 50 hours a week, some 30 per cent of the income disparity between physicians and highly skilled labour as a whole could not be explained by the set of factors taken into consideration, and this figure would rise to 35 per cent if we assume that physicians take an average of two more weeks of vacation a year than other professionals.

Thus, the explanation of this residual can only be attributed to the market characteristics of medical care. In effect, if education, experience, risk and the number of hours worked cannot explain the total income disparity between physicians and other professionals, we must therefore conclude that artificial barriers to entry or the influence of physicians on the demand for medical care play a role in determining their income. This role would be considerable since the disparity in question is far from negligible.

For quite some time (and right to this day), the high income of physicians has been attributed exclusively to artificial barriers to entry into the medical profession. [17] It is increasingly believed, however, that to this artificial constraint on the supply of physicians must be added (if not substituted) an "artificial" shift in the demand for medical services caused by physicians themselves. This has been suggested, among other, by Migué and Bélanger (1972).

In Chart 1, at time t_0 , the income of physicians is located at y_0' rather than at y_E because of a constraint on supply. Because of immigration and a less restrictive policy in faculties of medicine and the college of physicians, supply increases from O_0 to O_1 at t_1 . During this same period, however, the greater

accessibility of health care combines with the growth of the population to push demand for care from D_0 to D_1 . This decrease in the constraint on supply reduces the income disparity by causing the income of physicians to decrease from y_0' to y_1 . If, at the same time, physicians have been able to "artificially" shift demand for medical care from D_1 to D_1' , they will succeed in maintaining the income disparity. It will be noted that, following this approach, we could just as easily observe an increase in the disparity despite a loosening of the constraint on supply, as a smaller reduction of the gap than would normally have occurred following the shift in the supply had demand not shifted as well. [17a] Explanation of the high incomes of physicians through the characteristics of their market is thus considerably more complex than the existence of artificial barriers to entry into this profession. Consequently, the belief that the income disparity could be eliminated solely by freeing the supply of physicians could lead to the establishment of policies having more impact on the growth of health costs than on the decline of physicians' income.

Let us now examine the field of specialization of "education science." At given levels of education and experience, the income of individuals specializing in "education science" is \$3539 less than the average income of the highly skilled labour force as a whole. What is the explanation for this negative difference?

First, in contrast to the medical profession, there is no barrier of entry into this field of specialization and it does not lead to a protected labour market. Moreover, this field of specialization is not recognized as giving access to a large group of highly paid careers. Teaching and the administrative tasks related to it constitute the normal and almost sole destination of specialists in "education science." The two elements mentioned above are certainly not favourable to the establishment of a positive income differential.

Moreover, while the coefficient of income variation is .61 for the entire highly skilled labour force, it is only .37 for the "education science" subset. As we previously stressed, lower risk is generally accompanied by lower earnings. Based on this interpretation, it would thus be normal that the "education science" field of specialization would have a negative income differential. [18]

Finally, if we accept that teachers normally have eight weeks of vacation a year, they would only have to work five hours less a week (35 hours) than the 40 hours assumed for all highly skilled labour in order for their hourly wage rate to exactly equal that of the entire highly skilled labour force.

The Impact of Education and Experience Within Fields of Specialization

Dodge and Stager (1972) already discovered, using data from the 1967 survey of highly qualified manpower that not only does the rate of return on investment in education decrease with the number of years of study but also that it varies according to discipline. The more recent study by Mehmet (1977) confirms this conclusion.

The application of our income equation to each field of specialization has also revealed to what extent the impact of education and experience varies according to field of specialization. [19]

Continuing our study of the two particular fields of specialization, Table 4 gives the results of the estimation of the income equation for "education science" and "medicine." For purposes of comparison, the results for "law" have been added to the same table.

The results for "education science" are a dream come true for any economist wishing to demonstrate the pertinence of the theory of human capital and consequently the importance of education and experience in explaining these income disparities. First, using only the educational and experience variables, we obtain an R^2 of .34. Moreover, these last two variables behave as predicted by the theory of human capital.

The "medicine" field of specialization produces much less orthodox results. First, the R^2 obtained (.10) is three times lower than that obtained for "education science." The education variable gives initially surprising results. If we used only this explanatory variable, the R^2 obtained would be only .017. Moreover, if we exclude the seventh level of education, explained only by the fact that it essentially includes "resident students" who are hospital employees, we find that for all practical purposes education adds nothing to the income level after the initial degree has been obtained.

One might think that in fields of specialization where the initial degree gives access to a fairly protected market and where "self-employed" are in the majority, education and experience would explain very few of the interpersonal income disparities and, therefore, income might very well fail to increase with level of education. In effect, once a first degree has been acquired in these professional fields, experience, the ability to work, and the individual's other personal attributes (personality, ease of verbal communication, etc.) would be more likely to explain a large part of the interpersonal income disparities. The results obtained for "law" confirm those obtained for "medicine"; in fact, they reveal that after the first degree, education actually has a negative effect on income.

As previously stated, "education science" leads primarily to a career in teaching and school administration. The individuals are therefore employed by public or parapublic institutions in which working hours is fixed institutionally and wage scales are structured to reward level of education and years of experience. Under these conditions, it is not surprising that education and experience explain a major proportion of the income disparities and that the other individual characteristics are less determinant.

All these results on fields of specialization, shown in the appendix, demonstrate to what extent the impact of education and experience may vary according to field of specialization. It is only by thoroughly studying the mechanisms for determining income in each of the fields of specialization that we can begin to understand the impact of various factors on income disparities. We also realize, through these results, that studies on the impact of education and experience dealing with the entire highly skilled labour force would produce fairly useless results due to dispersion around these average results.

CONCLUSION

The concept of investment in human capital definitely constitutes a major theoretical contribution for purposes of understanding the distribution of income. In fact, this concept involves much more than just university training and experience; consequently, the preceding text does very little justice to this theory.

Our study of income disparity in the highly skilled labour force nonetheless throws some light on problems of distribution. In Canada, the three factors -- level of education, experience, and field of specialization -- allow us to explain a significant portion, approximately one fourth, of the total income disparities.

Care must be taken here to avoid an oversimplified approach: we have demonstrated, in our opinion, that use of an excessively aggregate approach hides important differences: a greater number of years of experience or education has a different impact in one field of specialization than in another. Breaking down the study by region or ethnic origin might also lead to more complex results.

Attempts to use education to change the income structure have not all been recent. The 1960s were dominated by the slogan "To learn is to earn" and by compensatory education policies; in the 1970s, this gave way to uncertainty, if not frustration as illustrated by Jencks in Inequality. We, however, have avoided these important problems, which would have raised questions over the identification of those who benefit by the educational system as it now exists. Is the role of this system to promote the creation of new elites or rather to simply reproduce the social classes from one generation to another?

These questions require increased knowledge of the concrete experience of individuals at home, in school and in the labour market. What ensures students' success in their apprenticeship? The very question raises the problem of the effectiveness of schools and the influence of the family environment. With time, this question is eclipsed by another: what role does success in school play in determining an individual's career profile?

Longitudinal data are a useful tool in attempting to answer these questions. Rather than demand other very expensive surveys, we prefer to adopt a typically microeconomic reflex and respect the budget constraint: in effect, we believe that the resources already available are often ignored or under exploited. For example, the 1973 survey of the highly qualified manpower already mentioned contains much information on the previous experience of respondents; any attempt to make these data more accessible would undoubtedly be a step in the right direction. Similarly, the cumulative school files of students of the Montreal Roman Catholic School Board, and the file of the ASOPE project by Professors Rocher and Bélanger constitute important sources of information.

In fact, the most important constraint appears to be the relatively small size of the scientific community willing to work on Canadian problems; this constraint is also exacerbated by the dispersion of work. Throughout our study we discovered an urgent need to compile a day-by-day inventory of all research conducted in Canada and Quebec on the problems of education and income distribution. The Inventory of Research into Higher Education in Canada, published by the Association of Universities and Colleges of Canada, could serve as an example and model to be copied.

Table 1
Income Determination Functions, Highly Skilled Labour Force, Canada, 1973

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	9.27	8.68	8.58	8.21	3.81	2.63
Education	.075 (108.8)	.075 (119.5)	.098 (141.8)	.238 (64.3)	.237 (64.3)	.820 (144.5)
(Education)				-.013 (-45.1)	-.013 (-45.8)	-.059 (-130.3)
Education x Experience				-.00037 (-5.9)	-.00022 (-3.5)	-.0001 (-1.5)
Experience		.064 (237.0)	.065 (237.4)	.067 (159.8)	.064 (153.9)	.059 (138.9)
(Experience) ²		-.0012 (-186.6)	-.0012 (-187.5)	-.0012 (-188.2)	-.0012 (-183.1)	-.0012 (-178.4)
Number of Weeks Worked (ln T)					1.12 (57.6)	1.05 (55.2)
R ²	.033	.210	.221	.214	.222	.264

The numbers in parentheses represent the Student Data.

Source: The regressions were estimated by the authors from data drawn from a highly qualified Manpower Survey, Statistics Canada, 1973.

Table 2

Impact of Education, Experience and Field of Specialization on Incomes of the Highly Skilled Labour Force, Canada, 1973

Constant	Regression 2a	Regression 2b
	17911	17911
<u>Education</u>		
0 < ED ≤ 4	-1754(- 92.66)	- 1418(- 70.90)
4 < ED ≤ 5	-1258(- 29.59)	- 283(- 6.69)
5 < ED ≤ 6	4564(120.26)	2818(72.05)
6 < ED ≤ 7	-1649(- 20.10)	- 709(- 8.91)
7 < ED ≤ 8	4696(45.84)	3341(33.53)
8 < ED ≤ 9	1696(17.37)	2452(15.85)
9 < ED	3377(20.75)	2486(15.85)
<u>Experience</u>		
Ex ≤ 2	-8472(- 78.14)	- 7945(- 76.16)
2 < Ex ≤ 5	-6506(-131.10)	- 6119(-127.53)
5 < Ex ≤ 9	-3785(- 92.15)	- 3408(- 86.06)
9 < Ex ≤ 14	- 478(- 11.82)	- 243(- 6.26)
14 < Ex ≤ 20	2954(67.54)	2860(68.08)
20 < Ex ≤ 27	4789(106.96)	4450(103.12)
27 < Ex ≤ 35	4232(80.15)	3705(72.74)
35 < Ex	2401(33.03)	1666(23.70)
<u>Specialization</u>		
Arts and Humanities		- 4125(- 18.84)
Education		- 3539(- 54.59)
Human Sciences		- 3474(- 70.70)
Natural and Biological Sciences		- 1256(- 18.37)
Pure Sciences		- 1180(- 21.51)
Other Health Disciplines		- 881(- 6.30)
Social Sciences		- 290(- 5.66)
General B.A.		- 65(- 1.43)
Applied Sciences and Architecture		899(22.98)
General Sciences		1538(12.11)
Administration and Commerce		1594(26.42)
Law		4953(29.92)
Medicine		12896(141.84)
R ²	.170	.236

The Student Data are in parentheses.

Source: The regressions were estimated by the authors from data drawn from a highly qualified Manpower Survey, Statistics Canada, 1973.

Table 3

Hourly Wage Rate With Respect to Number of Hours Worked -- Medicine

Hours Worked Per Week	Hourly Rate \$	Difference in Per Cent Compared to Total
40	15.11	61.9
45	13.43	43.9
50	12.09	29.6
55	11.00	17.9
64.8	9.33	0.0

Data drawn from a highly qualified Manpower Survey, Statistics Canada, 1973.

Table 4

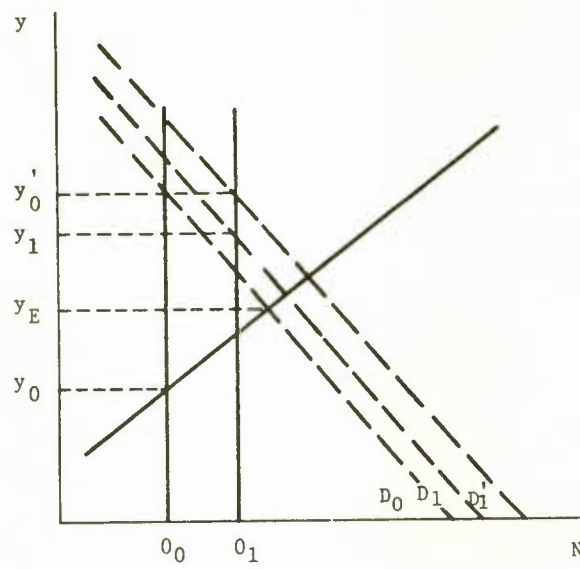
Impact of Education and Experience on Incomes of Graduates in Education, Medicine and Law, Canada, 1973

	Educational Science	Medicine	Law
Constant	13407	34952	23314
<u>Education</u>			
0 < ED ≤ 4	- 848(-35.63)		367(2.70)
4 < ED ≤ 5	- 261(- 5.02)		1475(1.53)
5 < ED ≤ 6	1593(26.37)	180(2.59)	- 2970(- 2.36)
6 < ED ≤ 7	1581(15.15)	-15963(- 11.98)	- 5309(- 2.66)
7 < ED ≤ 8	2598(11.78)	1865(4.70)	- 4033(- 1.58)
8 < ED ≤ 9	5447(28.73)	- 1815(- 1.20)	- 3710(- 2.08)
9 < ED ≤	6064(18.40)	- 3852(- 5.60)	- 6817(- 1.64)
<u>Experience</u>			
Ex ≤ 2	-5149(-34.03)	-18570(- 15.69)	-13218(- 3.65)
2 < Ex ≤ 5	-3647(-55.11)	-10062(- 16.67)	-13132(-13.10)
5 < Ex ≤ 9	-1957(-40.53)	- 7268(- 17.67)	- 2745(- 2.95)
9 < Ex ≤ 14	191(4.20)	1539(4.65)	- 1595(- 1.88)
14 < Ex ≤ 20	2368(37.94)	4953(15.54)	3800(6.07)
20 < Ex ≤ 27	3263(44.74)	5112(17.84)	5671(8.21)
27 < Ex ≤ 35	2844(29.28)	1712(5.21)	4786(8.07)
35 < Ex	3144(24.38)	- 6931(- 17.00)	- 3564(- 7.29)
R ²	.34	.10	.08

Source: The regressions were estimated by the authors from data drawn from a highly qualified Manpower Survey, Statistics Canada, 1973.

Chart 1

Impact of an Increase in the Number of Doctors on Their Income



Footnotes

- 1 Consult the bibliographic article by Sahota (1978) on this subject.
- 2 Consult the bibliographic article by Blaug (1976) on this subject.
- 3 Mehmet (1977), p. 322.
- 4 In a more recent study, Holmes (1974) obtained a social rate of return of slightly less than 8 per cent for the same year, 1967.
- 5 At a discount rate of 10 per cent, only graduates of Science who undertook Masters studies in Administration achieved a pattern which, from the private point of view, was accompanied by a positive present value.
- 5a This variable has a continuous range from 40 to 52 weeks.
- 6 Based on the conclusions of Mincer (1974), at eight years of experience, income comparisons produce the best estimates of rates of return.
- 6a Taking the partial derivative of regression (3), for example, in comparison with the experience variable, and making it equal 0, we obtain a value of 27.0 for the latter variable. Thus, we can speak of an optimum number of years of experience.
- 7 The work of Canadian economists fits in with the current of western literature on the subject. Eckaus (1964), Berg (1971) and Thurow (1975) all claim that education is merely a means of entering the best paid occupations, which it should also be noted do not always require a very high level of education. Klevmarken (1972) states that occupation plays a more important role than experience or education in determining income.
- 7a Obviously, this specific characteristic of education that we find so important at the university level is certainly much less significant at the primary and secondary levels. For this reason, field of specialization has won little favour as an explanatory variable in studies of income disparities dealing with the entire population.
- 8 For an interesting synthesis on this subject, see Psacharopoulos, G. (1975), Chapter III, pp. 13-40.
- 9 This possibility is increasingly stressed in the case of doctors and dentists. See, for example, Lindsay, C.M. (1973); United Kingdom, Royal Commission (1973); Menemeyer, S. (1978).
- 10 On this subject, see Boulet, Jac-André (1975).
- 10a It bears repeating that in this approach, such a result assumes that the impact of the levels of education and experience are the same regardless of the field of specialization. We will return to this hypothesis in the last section.
- 11 For an exhaustive study of these types of disparities, see Boulet Jac-André and André Raynauld (1977).
- 12 In Regression 2a, 19.0 per cent of the explanation is accounted for by education and 71.0 per cent by experience. In Regression 2b, 12.2 per cent is explained by education, 53.0 per cent by experience and, finally, 34.8 per cent can be attributed to the field of specialization.
- 13 In fact, for the various fields of specialization mentioned in Table 2, only the variation coefficients of graduates in pure sciences and educational science are below those for graduates in medicine.

- 14 In view of the type of calculations performed afterwards, we retained only fringe benefits other than paid holidays and vacation. For more details on the importance of fringe benefits, see Economic Council of Canada, The Inflation Dilemma, Thirteenth Annual Review, Ottawa, 1976, Chapter 3.
- 15 Freeman, Richard B. (1976), Chapter 5, page 120.
- 16 The results of this January 1976 survey were: the total number of hours worked each week (including the administrative, professional and provision of care aspects) averaged 53.1 for all doctors, 51.8 hours for general practitioners, 61.2 hours for residents and 50 hours for specialists.
- 17 Freeman, M. and S. Kuznets (1945); Freeman, Richard B. (1976)
- 17a A recent study of Boulet and Grenier (1978) implies that in recent years doctors have failed to take full advantage of this particular situation.
- 18 To carry this further and claim that the \$3539 provides full compensation requires more daring than we possess.
- 19 The empirical results for each of the fields of specialization will be found in the appendix.

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Appendix Table
Impact of Education and Experience on Incomes by Field of Specialization, Highly Skilled Labour Force, Canada, 1973

	Arts and Humanities 13384	Human Sciences 14067	Natural and Biological Sciences 17402	Health (Others) 17090	Social Sciences 15942	Applied Sciences and Architecture 19008	Pure Sciences 16082	Adminis- tration 18502	General Sciences 20007
Constant									
Education									
0 < ED ≤ 4	- 954(- 8.0)	-1270(-27.4)	-2845(-44.1)	- 220(- 4.2)	-1292(-23.4)	- 352(-15.3)	-1227(-32.3)	- 665(-19.1)	-4610(-27.6)
4 < ED ≤ 5	- 507(- 1.4)	350(5.6)	-1993(-11.3)	- 848(- 1.8)	942(8.9)	- 659(- 4.4)	- 961(-10.6)	1227(6.1)	-3264(-11.5)
5 < ED ≤ 6	1463(5.1)	810(10.0)	3923(41.5)	3576(7.5)	1135(8.8)	1269(13.5)	1596(18.4)	2955(15.7)	7862(36.2)
6 < ED ≤ 7	3499(5.6)	460(3.8)	-1494(- 4.8)	-5922(- 3.3)	407(1.8)	546(1.9)	- 372(- 2.3)	2144(4.5)	-2777(- 5.1)
7 < ED ≤ 8	393(0.3)	886(3.9)	4615(19.2)	511(0.5)	3389(8.3)	2520(7.5)	2917(21.2)	1865(1.8)	8815(12.6)
8 < ED ≤ 9	4684(6.5)	3393(19.3)	1033(5.7)	1826(2.2)	3927(14.2)	2346(11.2)	2912(24.5)	7732(10.2)	518(0.6)
9 < ED	-2727(- 1.2)	3073(11.3)	5234(13.8)	2275(1.0)	3758(6.0)	2113(3.2)	3325(12.0)	7468(4.1)	3104(3.2)
Experience									
Ex ≤ 2	-4445(- 4.3)	-5791(-31.0)	-7553(-23.2)	-5665(- 6.9)	-7278(-31.9)	-9079(-27.6)	-6449(-37.6)	-8610(-24.0)	-10897(-14.1)
2 < Ex ≤ 5	-3978(-12.0)	-4108(-44.5)	-5894(-39.9)	-4414(-10.5)	-5199(-48.0)	-7374(-60.9)	-4926(-60.6)	-7187(-47.8)	-7211(-21.6)
5 < Ex ≤ 9	-2204(- 7.9)	-1783(-23.2)	-3992(-30.9)	-1586(- 4.9)	-1812(-18.2)	-4723(-52.3)	-2828(-40.2)	-3739(-17.4)	-4630(-15.0)
9 < Ex ≤ 14	583(1.9)	712(9.8)	- 289(- 2.1)	- 608(- 2.3)	1009(8.4)	-1611(-20.5)	- 453(- 5.6)	248(1.8)	2756(- 8.5)
14 < Ex ≤ 20	1956(6.2)	1985(22.1)	1030(14.8)	1504(5.8)	4268(29.6)	1060(12.9)	2722(30.2)	3732(26.6)	5009(14.4)
20 < Ex ≤ 27	1867(5.7)	3018(31.5)	4164(34.1)	3166(12.7)	5813(33.6)	3889(48.6)	5040(52.1)	5179(33.3)	6472(25.6)
27 < Ex ≤ 35	3683(8.9)	2846(24.0)	4023(29.0)	451(1.6)	6036(28.2)	4127(44.9)	6706(57.1)	3568(20.4)	3227(8.7)
35 < Ex	1048(1.6)	676(4.9)	1043(4.5)	-1799(- 4.9)	6945(24.8)	4609(31.4)	4492(25.5)	3610(13.0)	575(1.0)
R ²	.17	.13	.26	.07	.15	.15	.30	.16	.35

Student Data are in parentheses.

Source: The regressions were estimated by the authors from data drawn from a highly qualified Manpower Survey, Statistics Canada, 1973.

AN INCOME ATTAINMENT MODEL FOR
NATIVE-BORN CANADIAN MALE
WAGE EARNERS

by

Hugh A. McRoberts*

In 1967 Blau and Duncan published The American Occupational Structure, in which they presented their now famous status attainment model. This model was useful primarily because, in addition to demonstrating with very good data the already well documented relationship between the socio-economic status of a man's family of origin and his current socio-economic status, the model showed how this transmission of status occurred. The major finding, not wholly a surprising one, was that, while there were small direct effects of origin on socio-economic status, most of the effects of origins on current status were indirect effects operating through the effects of origins on other variables in the model, most notably education. In short, the major advantage which the privileged derived from their origins was a better education than those from less advantaged families. Since that time status attainment models have been estimated for virtually every industrial nation including Canada (McRoberts, 1975; Boyd, McRoberts, and Porter, 1976). The result of these studies was confirmation of the soundness of the basic formulation of the model.

In 1972, a number of studies appeared which attempted to extend the model to an income attainment model (see Duncan, Featherman, and Duncan, 1972; Jencks et al., 1972; and Bowles, 1972). The findings of these studies are, if one looks only at the tables, remarkably similar. They suggest that, as with occupational attainment, the major effect of family of origin on income is through its effect on educational attainment. These models were all linear in form. Further work has shown that, while a linear form continues to be appropriate for the equations dealing with the occupational attainment model, and for the occupational attainment stages of an income attainment model, the final equation in the extension to the income attainment model is nonlinear (Featherman and Hauser, 1976; Hauser and Featherman, 1977; Blinder, 1973; Mincer, 1974; Stolzenberg, 1975). While this extension of the status attainment model to income attainment has generated a considerable amount of research in the United States, no similar attempt for Canada has been published.

My purpose in this paper is to build and estimate an income attainment model for Canadian males. In doing so, I will be particularly concerned with two questions. To what extent do the advantages or disadvantages accruing to an individual from his family background affect his current earnings? What is the process whereby the advantages and disadvantages of origin are translated into differences in income?

To answer these questions, I will first present a general discussion of the form of an income attainment model. I will then describe the data and the measurement of the variables to be employed. Following this I will discuss the detailed specification of the model and the analysis of the results.

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AN INCOME ATTAINMENT MODEL

The basic status attainment model and its extension to income is presented in Figure 1. The model traces the relationship between an individual's background as measured by his father's occupational status and educational attainment, and the individual's attainments at a series of key points in the life cycle. In particular, the model examines the effect of family background on educational attainment, on the way in which this attainment is translated into a labour force entry status (first job), and on the way in which all of these factors then affect the status of the respondent's present job. More compactly, the model may be represented as a recursive sequence of three equations:

$$\begin{aligned} (1) \text{ Education:} & \quad E = f(F, Fe) \\ (2) \text{ First Job:} & \quad J1 = f(F, E) \\ (3) \text{ Present Job:} & \quad J = f(F, E, J1) \end{aligned}$$

The extension of the model to include income adds a fourth equation:

$$(4) \text{ Income:} \quad I = f(F, E, J1, J)$$

The specification of the functional form for the last equation in particular has been the topic of some debate amongst both economists and to a lesser extent sociologists (Rosenzweig and Morgan, 1976; Blinder, 1976; Rosenzweig, 1976; Mincer, 1974; Featherman and Hauser 1976; Stolzenberg 1975). It is clear from these discussions that at least one further variable must be added to the equation; namely, some measure of length of experience in the labour force. This implies both the revision of the fourth equation, and the addition of a fifth one to yield the following revised model; where A and L denote age in years, and years worked (full-time) since beginning the first full-time job, respectively.

$$\begin{aligned} (5) \text{ Education:} & \quad E = f(F, Fe, A) \\ (6) \text{ First Job:} & \quad J1 = f(F, E, A) \\ (7) \text{ Work Experience:} & \quad L = f(E, A) \\ (8) \text{ Present Job:} & \quad J = f(F, E, J1, L) \\ (9) \text{ Income:} & \quad I = f(F, E, J1, L, J) \end{aligned}$$

THE DATA

The data employed in this analysis were drawn from the Canadian Mobility Study. This study was carried out by a team of sociologists including the author, Monica Boyd, and John Porter of Carleton University, Frank E. Jones and Peter C. Pineo of McMaster University, and John Goyder of Waterloo University. The data were gathered in co-operation with Statistics Canada through a self-enumerated questionnaire which was dropped off and picked up in conjunction with the July 1973 Monthly Labour Force Survey. This procedure yielded roughly 44,000 usable responses for a response rate of 78 per cent. This sample represents the civilian noninstitutionalized population of Canada (excluding the Yukon and Northwest Territories) who were over 18 years of age and not attending school full-time. (Boyd and McRoberts 1974)

In this paper the analysis is restricted to a subset of this sample, representing the population of native-born Canadian males between the ages of 25 and 65 who worked for wages or salary, and who in 1972 worked for 40 or more weeks and for 35 or more hours per week. The decision to exclude females and the foreign born was the most clear cut, as previous work has shown that with respect to the status attainment process, both of these groups differ in important ways from the native born male population. The decision to exclude those over 65 is clear, and the exclusion

of those under 25 was done to reduce as much as possible the bias due to the incomplete enumeration of those who for educational reasons had not yet begun to earn an income.

The exclusion of those who were self-employed from our analysis arises from the way in which we posed our question on income. We asked for, "... your income (before taxes) from employment during 1972?. (Include wages, salaries, tips, commissions, etc., or if you have your own farm, business or professional practice give your net income after deducting business expenses but before taxes.)" The result was, of course, a mixture of two quite different things. For the wage earner we had the total income which he derived from his work and which in turn he had available to him to spend. For the self-employed worker, on the other hand, we had a fiction which was the result of the taxation structure and creative accounting, and which need not bear any relationship to the actual amount of real return (in the sense of money which the earner had available to him to spend) which that worker received. For this reason, it was decided to estimate the model for employed workers only.

THE VARIABLES

The variables employed in the model along with their means and standard deviations are presented in Table 1. The occupational status variables (F, J1, and J) are measured using the Blishen-McRoberts (1976) socio-economic index for occupations which was based on the 1971 Census. The scale which combines the average prestige, income, and education for each occupation measures the typical socio-economic status enjoyed by an incumbent of that occupation. Father's level of education is measured by scaling a categorical report of the highest level of schooling received by the respondent's father into the number of years of schooling typically required in order to complete that level. Age is measured in years. Respondent's education is also measured in years, based on the respondent's report of the number of completed years of schooling which he had attained. Years of working experience is based on the response to the question: "From the beginning of your first full time job until now, in how many years have you worked full time for pay or profit? (Count as a full year any in which you worked for a period of seven months or more.)" It should be noted that this measure of experience is substantially superior to the usual proxy: $Exp = -5 + A - E$ which tends to over estimate experience for older and less well educated workers.

I have already given the wording of the income question above. Regrettably, the responses for this question had to be categorical in nature as Statistics Canada was concerned with both respondent resistance to a question on income which asked for exact figures and with the confidentiality problems. In order to scale this variable, we decided to use the information from the 1971 Census individual file. The equivalent question on that file was recoded into the groups corresponding to our response categories for income. It was then possible to use the continuous income information on the Census file to estimate the category mid-points for our data. The results of this procedure are presented in Table 2. As can be seen from the table, the mean and median are very close, except for the open ended category (\$20,000 plus). Here the median falls well below the mean. We decided to use the median as the mid-point estimate on the grounds that this would result in less mis-estimation of incomes than would be the case with the mean. The consequence of having to use a categorical variable of this type is that the range and variance are truncated, with the likelihood that the gains enjoyed by the most successful members of the sample will be under estimated. In short, it is likely that this will bias the results toward an under-estimation of the effects of background for the most privileged.

THE SPECIFICATION OF THE MODEL

Based on earlier work (McRoberts, 1975; McRoberts *et al.*, 1976) it is expected that the first four equations in the model will be linear and additive, with the exception of the need for interaction terms involving age and experience. The equations employed are:

$$(10) \text{ Education: } E = a + b_1 F + b_2 A + b_3 A F e + e_E$$

$$(11) \text{ First Job: } J_1 = a' + b'_1 F + b'_2 A + b'_3 E + b'_4 E A + e_{J_1}$$

$$(12) \text{ Work Experience: } L = a'' + b''_1 A + b''_2 E + e_L$$

$$(13) \text{ Present Job: } J = a''' + b'''_1 F + b'''_2 E + b'''_3 J_1 + b'''_4 L + b'''_5 E L + b'''_6 J_1 L + e_J$$

where undefined symbols $\{a, b\}$ represent unknown coefficients and $\{e\}$ are random errors. The interaction terms control for systematic variation in the coefficients which I observed in an earlier (1975) cohort analysis of the status attainment model for Canadian males.

In considering the form of the equation for the determination of income three candidates have been proposed. Mincer (1974), working from the assumptions of human capital theory, proposes an equation

$$(14) \ln I = a + b_1 E + b_2 L + b_3 L^2 + e_I,$$

to predict the proportional return to schooling and experience. Stolzenberg (1975), based on Thurow's (1967) argument for an interaction between education and experience, proposed the alternative equation

$$(15) \ln I = (a + b_1 E + b_2 E^2) (b_3 + b_4 L + b_5 L^2) + e_I.$$

Additionally, Featherman and Hauser propose, based partly on Mincer's work (1974), the equation

$$(16) I = a + b_1 E + b_2 L + b_3 L^2 + e_I.$$

The only difference between equations (14) and (16) lies in the form of the dependent variable. Mincer uses a logarithmic transformation of I whereas Featherman and Hauser leave the variable untransformed. Apart from the fact that the two equations pose slightly different questions (a change in $\ln I$ is a proportional change in I), the decision to use untransformed income is desirable as the occupational variables J and J_1 both show good linear fits with income and rather bad fits with logarithm of income.

Theoretically and empirically Stolzenberg's equation (15) is superior to either (14) or (16) in that it allows for different rates of return to different levels of education, and for an interactive effect between education and experience. It is worthy of note that Mincer includes an equation which is an incomplete form of (15) in his analysis [eq. (P 2) Mincer 1974:92], and that there is an improvement of fit. Further, both the squared term for education and the interaction term are significant at any conventional level.

These and other considerations suggest yet another functional form for the income equation

$$(17) I = (a + b_1 E + b_2 E^2) (a_2 + b_3 L + b_4 L^2) + b_5 B + e_I$$

where B represents the set of other variables in the equation (F, J1, J). However, attempts to estimate this equation encountered severe multicollinearity problems with the terms involving E and E² (the single correlation between them is .97). As the relationship between I and E is concave upwards, it was decided to drop the linear term in E and consider

$$(18) \quad I = (a+b_1E^2)(a_2+b_3L+b_4L^2)+b_5B+e_I.$$

One further alteration is necessary. While occupational status will have a direct and linear effect on income, it is also expected that for any given occupation those who are better educated will enjoy a higher level of income than those who are less well educated. Hence the final form of the equation becomes

$$(19) \quad I = (a+b_1E^2)(a_2+b_3J+b_4L+b_5L^2)+b_6J1+b_7F+e_I$$

$$(20) \quad I = a+b_1J+b_2JE^2+b_3L+b_4L^2 \\ +b_5LE^2+b_6E^2L^2 \\ +b_7J1+b_8F+b_9E^2+e_I$$

which can be estimated using ordinary least squares.

The model consists then of equations (10 - 13) and (20). If the five error terms of these equations are mutually uncorrelated, we may view these equations as forming a recursive model.

FINDINGS

The Effect of Background

Table 3 presents empirical results. All of the reported coefficients are significant if the errors are normally distributed. Careful examination of the residuals suggests that there are no serious departures from linearity in the data, and that there is neither marked autocorrelation nor severe heteroscedasticity.

With these results in hand, we can now turn to the first of the two questions posed earlier. How much difference does background make in the determination of income? To answer this question, let us consider three sons all of whom are forty years of age at the time of our study (roughly the average age of our sample). The first, whom I will call SA, comes from average origins. His father has eight years of schooling and a semi-skilled blue collar occupation (Blisshen-McRoberts score 40). The second son, SB is a child of the middle class. His father completed high school (12 years of schooling) and works at a middle level white collar job (Blisshen-McRoberts score, 55). The third son, SC, had a father who was a professional engineer (Blisshen-McRoberts score, 70; education 16 years). By substituting these values of our exogenous variables into the estimated equations for the model, we can see what the predicted values of the endogenous variables would be in each case. The results of this are presented in Table 4.

The first thing to be noted in the table is that the advantages of origin are maintained throughout the attainment process. SC will receive more education than SA and SB, indeed, he is the only one likely to complete university. Further, he will get a better entry occupation when he completes school. If we assume, in the absence of any experience of unemployment, that $A-(E+L+5) = 0$, then SB and SC are unlikely to have experienced any unemployment, whereas in the case of SA two full years remain unaccounted for and most likely represent years of unemployment. SA's current occupation will be better than his father's by eight points. Most likely, he will be a skilled-blue collar worker or a semi-skilled white collar worker (say, a clerk, or bookkeeper). SB will end up in about the same position as his father, and SC will be slightly less well off than his father was with a score of 61 (say, a school teacher or a manager). Finally, of course, their incomes will be different as well. The difference between SA's income and SB's will be \$1951, giving SB an 18 per cent advantage relative to SA. SC will enjoy a 17.5 per cent advantage over SB in income (difference = \$2241), and a 32 per cent advantage over SA (difference = \$4192). If SC's advantage over SA were to continue at this amount over the 25 remaining years of their working lives, and if we assume that money is worth 10 per cent compounded annually over that time, SC's accumulated advantage would amount to just under one-half million dollars.

In sum, there can be little doubt that origins, in particular those factors associated with socio-economic status, do make a rather substantial difference in the incomes which sons will receive. I will now turn to a further examination of the model in order to look at how these advantages or disadvantages of origin are converted into income, and at how the model differs for sons of differing origins.

The Process of Income Attainment

If the equations for the model were simple linear additive equations, the examination of the process would be straightforward. One would calculate the total, direct, and indirect effects of each of the variables following the procedure outlined by Alwin and Hauser (1975), and from these calculations, one could simply read off the structure of the model. In this instance, however, it is necessary to bring some elementary calculus into play.

In essence, what we are interested in are the partial differentials of the dependent variable with respect to each of the independent variables in the model. In a linear model, these are equivalent to the partial regression coefficients, so we usually do not even think about this step. This procedure breaks down with nonlinear systems. Using the chain rule where we have a set of recursive (or chained equations), we can calculate the total effect of a variable on $Y(dY/dX)$ only as a sum of products involving the partial differentials in the model. (See Stolzenberg, 1978 for a detailed discussion of this application; a brief account is given in the Appendix.)

A further difficulty here is that the effects are in some instances functions of the independent variables. As a consequence if we wish to compare effects, it becomes necessary to evaluate these functions for specific values of these variables. I have done this for three fictional sons.

The standardized total, direct and indirect effects for each of the independent variables on income are given in Table 5. Comparing the effects for the three sons, one thing is clear throughout the table: not only do the better off enjoy greater attainments, but they consistently enjoy greater rates of return in terms of income from their advantages. When we look at the direct effects of the variables on income, only the effects for

father's occupation and first job do not vary with origin. In every other instance the effects grow stronger the greater the advantages due to background.

The effect of father's education on income is the weakest in the entire model and is wholly mediated through its effect on the respondent's educational attainment.

The next strongest effect on income is due to father's occupational status. Here there is a small direct effect which is invariant with respect to background. The total effect, however, does vary with background, and most of this variation may be traced to the way in which the indirect effect of father's status on income is mediated through its effect on the son's educational attainment, and in turn, the sharply graded difference in the rates of return to education (see the direct effects of education in the table). In the case of SA the indirect effect of father's occupation on income through education is only marginally greater than the direct effect, whereas for SC the indirect effect through education is more than double the direct effect of father's occupation on income. In all three cases, however, the indirect effect through education is the single most important component of the total effect of father's occupation on income.

In terms of total effect, educational attainment is the single most important determinant of income in the model. [1] The values are sharply graded by background reflecting not only the different rates of return to education by background observed in the direct effects, but the differences in the indirect effects as mediated through the effects of education on experience and current occupational status as well. In sum, not only will sons from privileged backgrounds be more likely to get a good education, they will also enjoy a higher rate of return in terms of income for their education.

First job status has a weak direct effect on income which does not vary by background. The total effect does show some variation by background, but this is entirely due to the way in which first job affects current job. Finally, experience and current occupational status both have strong direct effects on income, and both show, again, higher rates of return to those from more advantaged backgrounds.

Clearly, however, education is the central factor, both in the determination of income and in the effect of socio-economic background on income. Education has the strongest total effect on income, and vies with experience for the strongest direct effect on income; in addition, it has nontrivial indirect effects through its influence on experience, and occupation. Secondly, all of the effects of father's education on income and most of the effects of father's occupation on income are due to their influence on the son's educational attainment.

If this assessment of the central role of education in the effect of background on income is correct (and given the American findings cited earlier it would not be surprising) then we should find, if we hold education constant and vary background using only the equations for J1, L, J, and I from Table 3, that the differences in income due to differences in the background variables will drop very sharply from those observed in Table 4.

Table 6 presents the incomes predicted by the model when we hold education constant and vary the background characteristics as was done in Table 4. The values of E employed were 8, 10, 12, 14, and 16 years respectively representing, the completion of grade school, some high school, then completion of high school, some post-secondary education, and the completion of an undergraduate degree. The first panel of the Table 6 gives the predicted incomes for the different background levels, of SA, SB,

and SC when it is assumed that they had achieved the particular levels of education given in the column labels for the table. The second panel examines the within column differences in income between SA, SB, and SC. An examination of the data will allow us to answer the question, "Assuming that SA, SB, and SC all achieved the same level of education, by how much would their incomes differ?" The third panel presents the within row differences in estimated income, and allows us to look at the degree to which background affects the returns derived from moving from one level of education to the next.

Looking at the second panel of Table 6, we can see very clearly that the differences between SA, SB, and SC, as expected decline very sharply once the level of education attained has been controlled for. If all three had managed no more than a grade school education, the advantage of SB with respect to SA, and of SC with respect to SB would have amounted to \$462 per year. As the level of education increases the advantage in income due to background increases slightly in absolute value, to a difference between SA and SB and SC of \$562 per year, by the time all three are assumed to have a university degree. At the same time however, it should be noted that, as the base income increases with educational attainment as well, the proportional effect of background measured by the percentage difference between the incomes at each level of education declines very slightly. These differences while by no means trivial are nonetheless small when compared with the differences of the order of \$2,000 per year in income which were observed earlier when the effect of background on education was not controlled. This lends strong support to the earlier conclusion that by far the greatest way in which a person's socio-economic background affects his income is through the effect which his background has on his educational attainment.

Further, evidence of this can be seen in panel three of Table 6. Here we can examine the effects on income of increases in education (in 2 year steps) controlling for class background. Looking across the rows it can be seen that in each case the gains from the next two years of schooling will be greater than for the last. When we compare down the columns to see how the gains to additional education differ with origins, we can see that those who are better off will make larger gains at each step. However, the magnitude of this latter difference is trivial, varying from \$40 to \$50.

Finally, we can partition the effects of background into direct and indirect effects measured in dollars. The results of this are given in Table 7. The way in which this is done is as follows:

1) From Table 4 we can see that the total difference in income between SA and SB due to the differences in their backgrounds is $\$12,746 - \$10,795 = \$1951$.

2) By estimating the income with F set to 40, Fe set to 8, and E set to 14.19, we will get the income of someone with SA's background and SB's education. The difference $\$12,216 - \$10,795 = \$1421$ is the effect due to the difference in their education holding background constant.

3) The direct effect of background on income can be estimated from the income equation in Table 3. Father's socio-economic status is the only variable background variable which has a direct effect on income. Hence, if the status score of SB's father is 55 and A's father is 40, the difference in income due to the direct effect of background on income will be:

$$19.24 \times 15 = \$289$$

4) Finally the difference,

$$\$1951 - (1421 + 289) = \$241$$

represents the remaining indirect effects of family background on income as mediated by first and present job.

The results in Table 7 show that the \$1951 difference in incomes between SA and SB due to the difference in their origins, can be decomposed as follows: \$1421 (72.8 per cent) of the difference is attributable to the different levels of education which they received as a result of the differences in their background; \$241 (12.4 per cent) of the difference is due to the influence of their differing origins on their occupational attainments; and \$289 is a consequence of the direct effect of the difference in background on their income, net of all other influences. The income difference between SB and SC is \$2241, somewhat larger than the difference between SA and SB as I noted earlier. In this instance \$1678 of the difference is due to the effects of different origins on education, or about threequarters of the total effect of background on differences in income. The direct effect of background is constant at \$289 although as the other components have increased from the comparison of SA with SB, its proportional contribution to the difference has declined slightly (1.9 percentage points). There is a small increase in the component of the difference between SB and SC's incomes due to the effect of their differing backgrounds on their occupational achievements, by comparison with the magnitude of this component in the SA vs. SB comparison (\$274 vs. \$241 respectively). However, the change in this component of the differences is so small that it could be treated as being nearly constant.

The overall effect of background is, as I noted earlier, nonlinear. That is to say, that the benefits from origins increase with the origin variables. This is particularly interesting as an examination of the equations in Table 3 shows that all of the direct effects of the background variables are linear. The source of this nonlinearity is easy to trace when we look at Table 7. The direct effect of origins and the indirect effect of origins through occupation are both virtually invariant with respect to origins. It is the effect of origins on income mediated through their effect on education which results in the increasing return to origins with respect to income.

CONCLUSIONS

The data show very clearly that an individual's origins, as measured by the socio-economic status of his father, make a substantial difference in his current income. Indeed, the difference between the son of a blue collar worker and a professional will on the average be in excess of \$4,000 per year at age 40. This is, of course, an average difference and is subject to considerable variability.

Secondly, the data show that the major way in which background affects income is through educational attainment. A difference of 15 status points, and 4 years of education between fathers will result in an average difference of two years in education between their sons. A difference in two years of education between two sons of the same origins can result in income differences of between \$1000 and \$1650, depending on the level of education involved and the origins of the two sons. The higher the level of education involved in the difference, the greater the difference in income will be. Holding the level of education constant, the higher the socio-economic status of origin of the two sons the greater the difference in their incomes will be. The differences in educational attainment due to differences in origin, in fact, account for between 70 and 75 per cent of the total difference in income due to origins.

These results are not in themselves surprising. They show a very similar picture of the relationship between socio-economic background and income to that which has been found in various studies carried out in the United States (Bowles, 1972; Bowles and Gintis, 1977; Featherman and Hauser, 1975; Blinder, 1973). It should, however, be noted that Jencks et al., using a model which was not unlike that employed by the other American researchers, come to different conclusions.

In addition to these findings, the model does reveal another way in which background affects earnings. This is through the effect which background has on the rates of return to the other variables in the model. It will be recalled, in the examination of the total and partial effects of the variables in the model on income, that the rates of return to these variables were either constant (the direct effects of F and J1) or varied systematically with background in a way which give an increased rate of return to the variables to those from higher socioeconomic origins, by comparison with those from lower socioeconomic origins. The result of all of this is that those from families with low socio-economic status are in a sense doubly disadvantaged. On the average, their attainments will be lower in absolute terms than those from more privileged backgrounds. They will also get a lower rate of return on what they have managed to achieve.

This last conclusion clearly differentiates our results from those reported for the United States. Two questions arise from this: Do these results make any sense? What are the implications of them for discussions of inequality? The answer to the first question is clearly in the affirmative. The advantages of socio-economic background do not just extend to better schooling or even to better jobs per se. They also include a whole series of advantages which are rather more difficult to measure, varying from self-confidence to a better sense of the way in which society operates. In other words, one can conjecture that the children of the better off get more out of the same attainments than those of the less well off because their background has also equipped them to use their attainments more efficiently and effectively.

The implications for equality of opportunity are also clear. We tend to think of equality of opportunity as being something which is independent of equality of condition. The whole meritocratic argument indeed assumes that this is so. What these data, and much of the more recent data in stratification and mobility, show is that this independence, if it exists, is bounded. That is to say, that even if one could control for the obvious advantages of family backgrounds, or in other words if one could equalize opportunity, there would still be advantages, albeit of a lesser magnitude, for those who were born with them.

Table 1
Means and Standard Deviations of Variables

	Means	Standard Deviations
Father's Occupation -- Blishen-		
McRoberts Index (F)	35.79	12.64
Father's Education (Fe)	7.44	3.70
Age (A)	39.91	10.81
Education (E)	11.69	3.53
First Job -- Blishen-		
McRoberts Index (J1)	40.34	13.88
Years of Work (L)	20.20	11.31
Present Job -- Blishen-		
McRoberts Index (J)	47.00	14.03
Income (I)	9937.83	4507.09
Number of observations: 4706		

Table 2
Medians and Means for Income Categories Based on the 1971 Census Public Use Sample Tape*

Category	Median**	Means**
	(Dollars)	
Less than \$2,000	1199	1119
2,000 - 2,999	2500	2474
3,000 - 3,999	3510	3488
4,000 - 4,999	4500	4462
5,000 - 5,999	5421	5424
6,000 - 6,999	6400	6417
7,000 - 7,999	7380	7389
8,000 - 8,999	8370	8378
9,000 - 9,999	9381	9384
10,000 - 10,999	10201	10295
11,000 - 11,999	11303	11346
12,000 - 12,999	12126	12270
13,000 - 13,999	13298	13327
14,000 - 14,999	14218	14304
15,000 - 15,999	15098	15266
16,000 - 16,999	16203	16298
17,000 - 19,999	18002	18089
20,000 and over	25001	29143

* I would like to thank my colleague Monica Boyd who provided these figures.

** Based on native-born males, between the ages of 25 and 64 who worked full time for more than forty weeks in 1970, for wages or salary.

Table 4
 Estimates of the Outcome Variables in the Income Attainment Model for Various Values of the
 Exogenous Variables, F, Fe, and A.

<u>A</u>	<u>Exogenous Variables</u>			<u>Estimated Outcomes</u>			
	<u>F</u>	<u>Fe</u>	<u>E</u>	<u>J1</u>	<u>L</u>	<u>J</u>	<u>I</u>
40	40	8	12.14	39.8	20.1	47.9	10,794
40	55	12	14.19	46.8	19.1	54.6	12,746
40	70	16	16.23	53.8	18.1	61.3	14,987

Table 5
Standardized Effects on Income Attainment Evaluated for Age = 40, And(F=40, Fe=8), B(F=55, Fe=12), C(F=70, Fe=16)

Variables	Total Effect	Direct Effect	Indirect Effects					
			Via E	Via J1	Via L	Via J	Via J	Via J
F (A)	.159	.054	.073	.007	-	-	.025	
(B)	.183	.054	.094	.007	-	-	.028	
(C)	.208	.054	.115	.007	-	-	.032	
Fe (A)	.084	-	.084	-	-	-	-	
(B)	.106	-	.106	-	-	-	-	
(C)	.131	-	.131	-	-	-	-	
A (A)	.164	-	.069	.002	.231	-	.314	
(B)	.258	-	.057	.001	.314	-	.421	
(C)	.388	-	.032	-	.421	-	-	
E (A)	.511	.306	-	.040	.041	-	.124	
(B)	.626	.390	-	.040	.056	-	.140	
(C)	.753	.481	-	.040	.075	-	.157	
J1 (A)	.185	.062	-	-	-	-	.123	
(B)	.206	.062	-	-	-	-	.144	
(C)	.229	.062	-	-	-	-	.167	
L (A)	.309	.267	-	-	-	-	.042	
(B)	.415	.364	-	-	-	-	.051	
(C)	.549	.488	-	-	-	-	.061	
J (A)	.321	.321	-	-	-	-	-	
(B)	.368	.368	-	-	-	-	-	
(C)	.421	.421	-	-	-	-	-	

Table 6

Income Estimates from Income Attainment Model for Three Hypothetical Sons for Various Amounts of Education

Panel One	Years of Education				
	8	10	12	14	16
A	8555	9535	10703	12073	13662
B	9017	10016	11207	12606	14224
C	9479	10497	11710	13136	14786

Panel Two: Differences		8-10	10-12	12-14	14-16
SB-SA	\$	462	481	504	533
SB-SA	%	5.4	5.0	4.7	4.4
C-B	\$	462	481	503	530
C-B	%	5.1	4.8	4.5	4.2

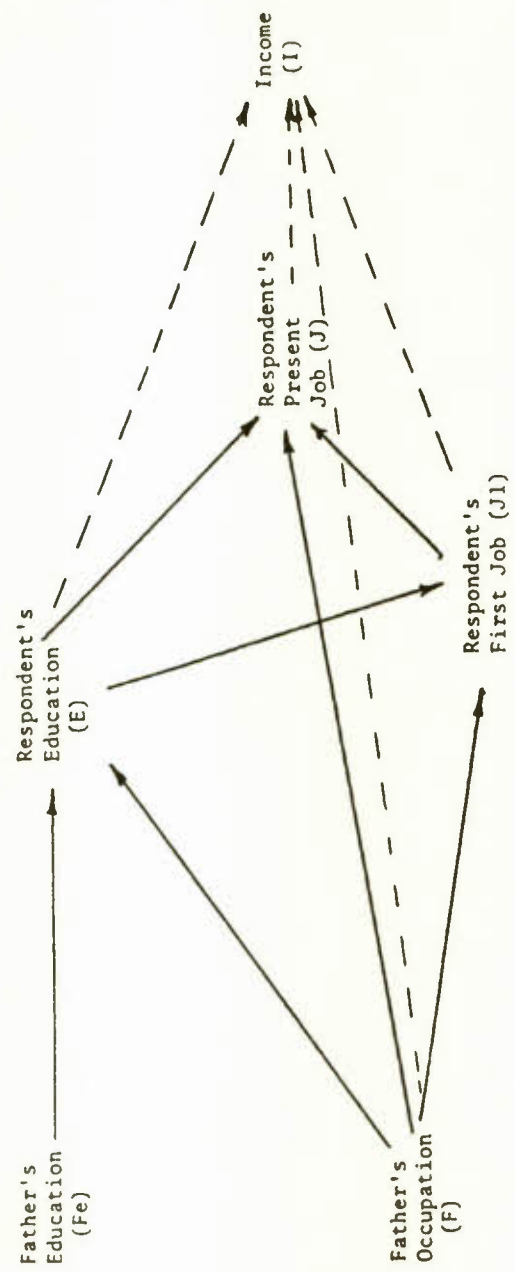
Panel Three: Changes in Income for Each Change in Educational Level		8-10	10-12	12-14	14-16
A		980	1168	1370	1589
B		999	1191	1399	1618
C		1018	1213	1426	1650

Table 7

Decomposition of the Effects of Background on Differences in Income

<u>Difference Between</u>		<u>Total Difference Due to Background</u>	=	<u>Direct Effect of Background</u>	+	<u>Effect Through Education</u>	+	<u>Other Indirect Effects</u>
SB and SA	\$	1951		289		1421		241
	%	100%		14.8		72.8		12.4
SC and SB	\$	2241		289		1678		274
	%	100%		12.9		74.9		12.2

Figure 1



Note: The solid lines represent the effects usually found in a status attainment model. The broken lines represent the effects which we would expect to find in the extension of the model to an income attainment model.

Footnote

- 1 While age has a total effect on income, it has no direct effect, and most of its total effect is an indirect effect due to its high correlation with experience. As a consequence, with age held constant in the model, no particularly useful substantive interpretation can be placed on the effect terms.

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APPENDIX: CALCULATION OF EFFECTS IN NONLINEAR EQUATIONS

We consider a simple two equation model that illustrates the procedure for establishing total and partial effects. Suppose:

$$y = a + b_1V + b_2W^2 \text{ and } z = a' + b_1'Y + b_2'V^2.$$

Then $\partial Y/\partial V = b_1$ and $\partial Y/\partial W = 2b_2W$ are partial effects of V and W on Y while $\partial z/\partial Y = b_1'$ and $\partial z/\partial V = 2b_2'$ are partial effects of Y and V on z .

To apply the chain rule: let $X_1 = V$, $X_2 = W$, $X_3 = Y$ and calculate $\partial X_1/\partial V = 1$, $\partial X_2/\partial V = 0$, $\partial X_3/\partial V = b_1$, $\partial X_1/\partial W = 0$, $\partial X_2/\partial W = 1$, $\partial X_3/\partial W = 2b_2W$, $\partial X_1/\partial Y = 0$, $\partial X_2/\partial Y = 0$, $\partial X_3/\partial Y = 1$, $\partial z/\partial X_1 = 2b_2'V$, $\partial z/\partial X_2 = 0$, $\partial z/\partial X_3 = b_1'$.

Following the chain rule:

$$\begin{aligned} \frac{dz}{dV} &= \frac{\partial z}{\partial X_1} \cdot \frac{\partial X_1}{\partial V} + \frac{\partial z}{\partial X_2} \cdot \frac{\partial X_2}{\partial V} + \frac{\partial z}{\partial X_3} \cdot \frac{\partial X_3}{\partial V} \\ &= (2b_2'V)(1) + (0)(0) + (b_1')(b_1) \end{aligned}$$

where the terms:

$\frac{dz}{dV}$ is the total effect of V on z ,

$2b_2'V$ is the direct effect of V on z , and

$b_1'b_1$ is the indirect effect of V on z as mediated through Y .

Carrying out a similar operation for W we would find that the total effect of W on z is $(b_1')(2b_2W)$. That is to say, that W has no direct effect on z , and that the total effect is an indirect effect mediated through Y .

THE EARNINGS OF DEGREE-HOLDERS IN CANADA

by

B. Ahamad*

In 1973, Statistics Canada carried out a post-census sample survey of persons reporting a university degree in the 1971 Census. The data collected in the survey record field of study, level of degree, occupation and earnings of the selected degree-holders in 1973. Data on other socio-economic characteristics of the selected respondents, such as marital status and language spoken at home, are already available from their 1971 census returns, so collectively these data provide a rich base for research on degree-holders in Canada. A general review of the survey data has recently been published by the Department of the Secretary of State. This paper is based on the analysis in this report, Degree-Holders in Canada, 1979. Its purpose is to present some results concerning the earnings of degree-holders. In particular, the effects of education, occupation and sex on the earnings of degree-holders are discussed.

EDUCATION AND OCCUPATION

There are many reasons to expect that the earnings of individuals will be closely related to their educational qualifications and occupations. These are sufficiently well-known so they need not be repeated here. Most empirical models of earnings blur the distinction between education and occupation. Thus their separate effects on the earnings are sometimes confused. Data on educational attainment and occupation are not often available at a detailed level of classification, so that it is often possible to examine the relationship between the two only for highly aggregated groups. For example, while highly aggregated data show that most persons working in professional and technical occupations are university degree-holders, data for detailed occupations reveal that the proportion of degree-holders varies considerably from one occupation to the other.

Education was measured for the Highly Qualified Manpower Survey in terms of ninety-eight major fields of study as well as in terms of level of degree. Occupation was defined using the three-digit code of the Canadian Classification and Dictionary of Occupations.

The analysis in the report Degree-Holders in Canada suggests that there is only a loose link between the occupations and fields of study of degree-holders. Some occupations, such as medicine and engineering, are obviously highly education-specific but even graduates in these particular fields did not always work in the corresponding occupations. While most graduates in medicine worked as doctors, graduates in electrical engineering worked in a variety of occupations. The difference between the two occupations suggests that the effects of a number of factors (including the availability of different types of degree-holders and the wages in the occupations in which their skills may be useful) are important in determining the actual mix between occupations and educational backgrounds.

This loose linkage appears to be even more significant for occupations such as government administrators which are not highly education-specific. Here data suggest that functions can

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be performed by graduates in a variety of fields, so that factors other than the skills learned in the educational system must be important in determining employment and earnings.

Table 1 shows the major field of study of degree-holders employed in a number of occupations. Nearly 200,000 individuals, 35 per cent of all degree-holders, reported that they were employed in these particular occupations. Most occupations appear to be education-specific to some extent, but the level varies considerably between occupations. For example, nearly 80 per cent of accountants, auditors and other financial officers had taken their highest degree in the social sciences. For government administrators, the most important field was also the social sciences, but the figure here was only 44 per cent.

The data in Table 1 which are summarized into nine groups, are highly aggregated for fields of study. If the full classification of ninety-eight fields had been used instead, many of these occupations would appear less education-specific. For example, Table 1 shows that 73 per cent of degree-holders employed as social workers had specialized in the social sciences; but in the full classification of fields of study, only 50 per cent had in fact specialized in social work in their highest degree.

These conclusions are supported and extended by other results in the report. For example, the occupations of respondents in 1971 and 1973 were compared to determine the extent to which degree-holders had changed occupation in the period. It was found that using the three-digit occupational classification, 45 per cent had changed occupation. Using an aggregated occupation classification with 20 categories, 32 per cent had changed occupation group. These figures are surprisingly high and could have been due partially to errors in coding or response or to other technical factors. However, further detailed analysis of the movements suggested that the revealed patterns of occupational mobility are sensible so that the result appears to be reasonable and represent a genuine phenomenon. Most of the mobility occurred for six occupation groups: managerial and administrative, architecture and engineering, elementary and secondary school teaching, clerical, sales, and other (residual) occupations. These are among the largest occupation groups. They tend to be generally associated with career progression and with promotion or demotion to different jobs.

If degree holders are highly flexible in terms of the functions they perform in the production process, their earnings will depend more on the occupations they hold than on the major field of study of their degrees. Graduation in a particular field is essential for membership in some occupations but, in occupations which are not education-specific, earnings differentials by field of study may be fairly small.

Table 2 shows the mean earnings of male degree-holders (who worked 40 or more weeks on a full-time basis in the twelve months prior to the survey) for selected occupations and fields of study. Average earnings vary substantially by occupation. For the age-group 25-29, average earnings varied from \$9,100 for elementary and kindergarten school teachers to \$36,100 for general managers, and for the age-group 45-54, earnings varied from \$13,900 for elementary and kindergarten school teachers to \$42,500 for physicians. By contrast, the average earnings differences among fields of study within given occupations are fairly small. For example, the maximum differential over all age-groups between graduates in social sciences and those in architecture and engineering who worked as general managers was \$5,000; for university teachers, the range in average earnings over the fields shown varied from \$1,700 to \$4,000.

SEX AND OCCUPATION

Recent literature on the participation of women in the Canadian labour force has demonstrated the wide differences in the proportion of men and women in various occupations. The sex composition of occupation groups recorded in Table 3 shows that this is also true in the case of degree-holders. Men were generally dominant, with particular dominance -- more than 90 per cent -- of six occupation groups: architecture and engineering, law, religion, health diagnosing, physical science, and managerial and administrative occupations. Women outnumbered men in only four occupation groups: clerical, other health, social work and other social science occupations.

There are many explanations for these differences. As noted earlier in the paper, some occupations are highly education-specific so that the same differences may be due to the educational choices of men and women. Very few women have taken degrees in engineering so that the number of women working as engineers will necessarily be small. Nearly half of female graduates specialized in education or in the humanities, which fields are closely associated with teaching occupations, so that the high proportion of women in teaching occupations is not surprising. Explanations are not as apparent for occupations which are not highly education-specific. One possibility is that women may choose occupations in which part-time employment is readily available or in which continuous working experience is not considered essential. Another possibility is that women face discrimination in the labour market and cannot easily find employment in some occupations.

Entries in Table 4 show that the earnings of males and females (who worked on a full-time basis for 40 or more weeks in the twelve months prior to the survey in 1973) also varied substantially within occupation groups. For example, women in managerial and administrative occupations earned on average only 62 per cent as much as men. The lowest differential was for occupations in social work and related fields where women earned on average 90 per cent as much as men. Tables 3 and 4 also reveal that the proportion of women tends to be low in occupations which are highly paid and to be high in those which are not highly paid. Women formed only 10 per cent of persons employed in managerial and administrative occupations and 58 per cent of those in clerical occupations.

There is also a tendency for the male-female earnings differential to be more marked in occupations where the proportion of females is low. In managerial and administrative occupations, female average earnings were only 62 per cent of male average earnings, and only 10 per cent of those in these occupations were females. By contrast, women formed 54 per cent of those employed as social workers, and female average earnings represented 91 per cent of male average earnings in this occupation.

ESTIMATED EARNINGS DIFFERENTIALS

One of the chapters in the report Degree-Holders in Canada presents a regression model for earnings. Estimates of the coefficients were obtained from a random sample of 12,000 responses selected from the weighted population file. This number was further reduced to 7,985 by eliminating the responses for those persons who reported earnings for a period other than the twelve months prior to response, or who did not respond by December 1973, or were either under 25 or over 65 years of age.

The model used is the familiar one in which an individual's earnings is related linearly to a number of specific variables and to a random disturbance term. The variables included in the model were arranged in five groups: geographic, demographic, education, employment and occupation. Values recorded in Table 5

show the estimated coefficients associated with various occupation groups and two of the demographic factors included in the model. Each explanatory variable is a dummy variable for a polytomous coding so the estimation procedure omitted one cell from each polytomy in order to deal with multicollinearity. Thus estimates represent the effect of particular variables relative to that of an excluded variable. For example, the estimated coefficient for "females" measures the earnings differential of females compared to males. Coefficients which are significantly different from zero at the 5 per cent level (based on the familiar F test and the assumptions of the classical linear model) are indicated with asterisks.

As expected the coefficients for each age-group show considerable variation over the various occupation groups. For example, for the age-group 35-44, average earnings in clerical occupations were \$8,500 less than in managerial and administrative occupations while those in health diagnosing and treating occupations were \$19,400 greater than these. By implication, individuals in health diagnosing occupation earned on average \$27,900 more than those in clerical occupations. Similarly, in the same age-group, graduates in law earned on average \$16,000 more than those in architecture and engineering.

The estimated coefficients can also be used to derive estimated age-earnings profiles for the various occupation groups when the constant term is interpreted as the effect of the variables omitted in the estimation procedure. For example, the constant term of 16,597 for the age-group 25-34, may be interpreted as the average earnings of persons in managerial and administrative occupations, who were male heads of households and had all the characteristics specified by the omitted variables in the equation. As noted earlier, these characteristics reflect geographic (residence), employment (working full/part time), education (level of degree) and demographic (home language) factors.

Estimates of average earnings for male heads of household with similar characteristics (specified by the omitted variables in the analysis), are shown for the different age-groups and selected occupations in Table 6. The variation by age follows the familiar pattern for many occupation groups. For example, average earnings in managerial and administrative occupation increase with age to a peak in the 45-54 age-group, and then decline slightly. For some occupation groups (for example, architecture and engineers), earnings increase rapidly up to age 44 and then moderately to age 64. Social science occupations show a peak in the earnings profile for the 35-44 age group and a decline thereafter.

Many factors could affect the diverse shapes of the estimated age-earnings profiles. One explanation is that the cost of educational investment for persons in some occupations is much higher than that for persons in other occupations so that the former could expect to receive higher earnings if the market worked efficiently. However, direct educational costs are only higher in the case of some fields of study (such as medicine) so that the explanation is not of wide validity. There appears to be a fixed educational requirement only for some occupations, including law, health diagnosing and treating occupations, and architecture and engineering. Individuals in most fields of study were employed in a wide variety of occupations, and their earnings might be roughly the same if they were merely receiving market returns for their educational investment. The high variation in the effects of occupational employment on earnings suggests that this is not the case.

Variations in average earnings by occupation are smaller if the highly education-specific occupations are excluded from Table 6. This is particularly so for the age-group 25-34, which covers

individuals in early stages of careers. Variation in average earnings among these occupations also increases with age thus suggesting that working experience or learning-by-doing may be an important determinant of the earnings differences between degree-holders.

Returning now to the estimates contained in Table 5, it should be noted that the variables "sex" and "status in the home" are highly correlated since many female degree-holders were spouses rather than heads of household. This means that the estimated coefficient of each variable may be biased downwards. It seems preferable to add the coefficients to obtain an estimate of the earnings of female spouses compared to male heads of household. These estimates are: -2011 (25-34), -4792 (35-44), -7050 (45-54) and -5085 (55-64).

These values support the view that the length of working experience is an important determinant of differences in earnings. The estimated differential is fairly small for those aged 25-34 when both men and women have had limited experience in the labour force. Women tend to leave the labour force for varying periods to raise their families, so that the average length of their continuous work experience will frequently be less than that for men. In addition, older women probably also have some difficulty in obtaining highly paid jobs after being out of the labour force for an extended period of time, so that their average earnings will tend to be less than those of men in the same age-group.

CONCLUSIONS

For many degree-holders, there is a loose relationship between the field of study in which they had specialized and the occupations in which they find employment. This suggests that many degree-holders are flexible in terms of functions they perform, and that their earnings are determined by the occupations they hold rather than by the field of study in which they choose to specialize. Of course, some occupations, such as medicine, are highly education-specific so that the earnings of individuals in such occupations will be more affected by their field of study.

These results have important implications for planning investment in education. Individuals in many fields of study cannot predict their future earnings since these depend on the occupations in which they will find employment. This uncertainty may be acceptable for private planning if the high risks are compensated for by high returns. However, it clearly limits the usefulness of the expected net returns of different types of education as a basis for state planning of the level of investment in university education.

Table 1
Distribution of Degree-Holders in Selected Occupations by Major Field of Study of Highest Degree

Major Field of Study (Aggregated)	Occupations										All Social Workers Occupations	
	Government Administrators	General Managers and Other Senior Officials	Accountants, Auditors, and Other Financial Officers	University Teachers	Elementary and Kindergarten Teachers	Secondary School Teachers	Industrial Engineers	Economists	Social Workers	All Occupations		
	(per cent)											
General Arts	3.9	5.6	6.2	0.4	6.6	5.4	4.6	3.3	4.0	5.2	4.0	5.2
Education	6.3	1.5	1.6	9.1	55.6	54.4	0.5	0.8	5.7	18.4	5.7	18.4
Fine Arts and Music	0.0	0.1	0.1	2.0	1.4	1.0	0.0	0.0	0.8	1.3	0.8	1.3
Humanities and Related	8.1	3.9	5.2	22.4	18.9	18.9	1.4	1.5	13.6	14.2	13.6	14.2
Social Sciences and Related	44.1	40.8	78.7	22.7	14.2	7.2	16.3	81.2	73.3	23.7	73.3	23.7
Agriculture and Biological Sciences (except Health)	10.4	4.6	1.6	9.6	2.1	5.0	3.6	4.2	0.8	6.6	0.8	6.6
Architecture and Engineering	16.0	33.5	2.2	7.4	0.0	1.4	64.2	3.8	0.0	13.1	0.0	13.1
Medicine, Dentistry and Health	3.2	2.0	0.1	8.9	0.0	0.1	0.2	0.0	0.3	10.0	0.3	10.0
Mathematics and Physical Sciences	8.0	8.0	4.3	17.5	1.0	6.5	9.1	5.2	1.2	7.4	1.2	7.4
Total Per Cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Number (000)	5.3	13.5	20.0	27.1	28.0	79.1	8.2	4.6	7.1	554.0	4.6	554.0

Table 2

Mean Earnings for Male Degree-Holders By Age for Selected Occupations and Fields of Study¹

Occupation	Field of Study	Age-Groups					
		-24	25-29	30-34	35-44	45-54	55-64
(thousands of dollars in 1973)							
1. General Managers and Other Senior Officials	a. Social Sciences	-	36.1	36.4	36.5	41.5	39.2
	b. Architecture and Engineering	-	-	31.4	35.0	37.7	43.2
2. Accountants, Auditors and Other Financial Officers	a. Commerce (General)	9.2	11.7	15.3	20.7	18.6	20.4
	b. Commerce (Accounting)	11.0	11.7	16.0	19.6	19.3	21.5
3. Industrial Engineers	a. Social Sciences	-	19.8	17.5	21.2	21.5	-
	b. Architecture and Engineering	-	12.1	15.6	17.8	20.2	19.0
4. Agriculturists and Related Scientists	a. Agriculture	-	10.3	13.2	15.3	16.6	17.0
	b. Forestry	-	11.7	13.3	16.2	17.6	-
5. Elementary and Kindergarten School Teachers	a. Humanities	-	9.1	11.7	14.0	13.9	-
	b. Education	8.9	9.5	12.2	13.5	15.3	11.6
6. Secondary School Teachers	a. Humanities	8.1	10.2	12.9	14.7	15.1	15.9
	b. Education	8.1	9.8	12.0	14.1	14.6	15.0
7. University Teachers	a. Humanities	-	11.2	13.5	15.8	20.0	21.5
	b. Social Sciences	-	13.3	15.8	19.7	23.2	23.9
	c. Architecture and Engineering	-	-	16.1	19.8	22.6	23.2
8. Government Administrators	Social Sciences	-	12.4	17.6	22.4	25.7	22.9
9. Lawyers	Law	-	12.5	21.7	31.6	35.4	33.0
10. Dentists	Dentistry	-	23.6	29.4	33.6	28.4	24.6
11. Physicians	Medicine	-	17.5	28.7	43.3	42.5	38.0

¹ Persons who worked full-time for 40 or more weeks. Averages based on less than 100 weighted responses are omitted.

Table 3

Sex Composition of Occupations, Degree-Holders

Occupation	Proportion of Females	
	in Total (per cent)	Total Coverage (thousands)
Managerial, Administrative and Related Occupations	9.9	109.2
Occupations in Physical Sciences	9.2	12.5
Occupations in Life Sciences	17.8	7.6
Occupations in Architecture and Engineering	1.5	45.0
Occupations in Mathematics, Statistics, Systems Analysis and Related Fields	14.5	9.3
Occupations in Social Sciences and Related Fields	28.8	10.8
Occupations in Social Work and Related Fields	54.0	10.6
Occupations in Law and Jurisprudence	5.2	21.2
Other Occupations in Social Sciences and Related Fields, n.e.c.	53.9	11.8
Occupations in Religion	7.0	12.9
University Teaching and Related Occupations	18.8	29.2
Elementary and Secondary School Teaching and Related Occupations	45.0	111.0
Other Teaching and Related Occupations	48.2	21.9
Health Diagnosing and Treating Occupations	9.1	36.6
Other Occupations in Medicine and Health	56.4	19.9
Artistic, Literary, Recreational and Related Occupations	39.9	9.9
Clerical and Related Occupations	57.5	23.2
Sales Occupations	13.1	22.6
Service Occupations	17.2	8.9
Other Occupations	15.1	20.9

Table 4

Mean Earnings of Degree-Holders By Occupation and Sex

Occupation	Mean Income		Female Income
	Male	Female	Male Income
	(thousands of dollars in 1973)		(per cent)
Managerial, Administrative and Related Occupations	21.1	13.2	62.2
Occupations in Physical Sciences	15.1	9.5	61.3
Occupations in Life Sciences	14.9	9.6	64.5
Occupations in Architecture and Engineering	16.7	10.7	63.9
Occupations in Mathematics, Statistics, Systems Analysis and Related Fields	14.3	11.5	80.4
Occupations in Social Sciences and Related Fields	15.8	11.6	73.7
Occupations in Social Work and Related Fields	11.2	10.2	91.2
Occupations in Law and Jurisprudence	26.2	14.7	56.2
Other Occupations in Social Sciences and Related Fields, n.e.c.	13.6	12.0	88.8
Occupations in Religion	6.5	5.6	85.5
University Teaching and Related Occupations	19.0	14.2	74.8
Elementary and Secondary School Teaching and Related Occupations	12.3	10.9	88.4
Other Teaching and Related Occupations	13.2	11.0	83.2
Health Diagnosing and Treating Occupations	34.5	20.1	58.3
Other Occupations in Medicine and Health	16.8	9.6	56.9
Artistic, Literary, Recreational and Related Occupations	13.0	10.0	76.9
Clerical and Related Occupations	10.3	7.2	70.6
Sales Occupations	14.3	11.0	76.9
Service Occupations	15.4	9.2	59.4
Other Occupations	13.0	7.4	57.2

Table 5

Estimated Average Earnings Differentials Among Degree-Holders By Occupation
(Compared to Persons in Managerial and Administrative Occupations) and By Some
Demographic Variables (Compared to Variables in Parentheses)

Occupation	Age-Group			
	25-34	35-44	45-54	55-64
Physical Science	-3011*	-4617*	-7714*	-5140
Life Science	-2292*	-6071*	-6352*	-4110
Architects and Engineers	-1168*	-3361*	-4489*	-3840*
Mathematics and Related	-1066	-5334*	-7944*	-12799
Social Science	-1602*	-2175	-6228*	-6260
Social Work and Related	-3984*	-5931*	-7942*	-8050
Law and Jurisprudence	2561*	12711*	3692*	12666*
Other Social Science	-3181*	-5077*	-6376*	-6916*
Religion	-9482*	-13374*	-16257*	-14975*
University Teaching	-2955*	-1674	-3625*	452
Elementary and Secondary School Teaching	-3195*	-5175*	-6707*	-5803*
Other Teaching	-3135*	-5260*	-6910*	-5869*
Health Diagnosing	7770*	19427*	11718*	13490*
Other Health	-2213*	-4926*	-8970*	-7284*
Artistic, Literary, etc.	-3889*	-3228	-9952*	-10253*
Clerical	-4495*	-8477*	-11036*	-10238*
Sales	-1960*	-5594*	-7604*	-8592*
Service	-1871*	-4848	-7593*	-2076
Other	-3840*	-5166*	-10628	-8719
<u>Sex - female (male)</u>	-371	-1856*	-3248*	-3766*
<u>Status in the home - spouse (head)</u>	-1641*	-2936*	-3802*	-1319
<u>Constant</u>	16597	22543	25025	24799
Number of observations	3587	2126	1554	718
R ²	0.37	0.45	0.37	0.39

* Indicates that using a statistical F test this coefficient is significantly different from zero.

Table 6

Estimated Average Earnings of Degree-Holders By Occupation for Male Heads of Households with Specified Characteristics

Occupation	Age-Group			
	25-34	35-44	45-54	55-64
	(dollars in 1973)			
Managerial and Administrative	16,597	22,543	25,025	24,799
Physical Science	13,586	17,926	17,311	19,659
Architects and Engineers	15,429	19,182	20,536	20,959
Social Science	14,995	20,368	18,797	18,539
Social Work and Related	12,613	16,612	17,083	16,749
University Teaching	13,642	20,869	21,400	25,251
Elementary and Secondary School Teaching	13,402	17,368	18,318	18,996
Health Diagnosing and Treating	24,367	41,970	36,743	38,289
Clerical	12,102	14,066	13,989	14,561

A VIEW FROM THE UNITED KINGDOM

Canadian researchers in the field can benefit from the experience gained through investigations into the distribution of income and wealth elsewhere. The following paper was designed to provide an overview of the concern about this issue in the United Kingdom and the findings of the Royal Commission addressed to examine it. Commentators noted, however, that British concern with inequality, particularly the concentration of wealth and income at the top of the pyramid, is a much more peripheral issue in Canada. Here, the adequacy of income at the base is of overriding concern.

The second important purpose of the paper was to show that research, even when it is not explicitly designed to deal with policy questions, can have notable policy relevance. This paper addresses the matter of "bridging-the-gap" between research and policy-program design. As such, it served as prologue to a panel discussion on policy issues; points raised in that discussion are covered in the Introduction to this volume.

POLICY ISSUES IN THE DISTRIBUTION OF INCOME AND WEALTH;
SOME LESSONS FROM THE DIAMOND COMMISSION

by

Dorothy Wedderburn*

INTRODUCTION

The background to the establishment of the Royal Commission on the Distribution of Income and Wealth in August 1974 was political, and was directly related to tensions surrounding the attempts of successive governments to implement an incomes policy. After the 1970 defeat of the Labour Government, discontent grew among the trade unions with the Conservative Government's legislation to control industrial relations and with its particular versions of incomes policy. During this period in opposition, the Labour Party began to work with the T.U.C. on the formulation of the 'social contract', which directed attention to, among other things, inequalities in the distribution of income and wealth. The February 1974 election manifesto of the Labour Party spoke of the need for a Commission that would advise on income distribution (earned and unearned) with particular reference to differentials and job evaluation -- that is, still with a flavour of incomes policy about it. In the event, the Commission was established after the Labour Party had been returned to power

"to inquire into, and report on, such matters concerning the distribution of personal incomes, both earned and unearned and wealth, as may be referred to it by the government".

It was given a standing reference (the full terms of which are reproduced in Appendix A) which invited an analysis of the current position and past trends in the distribution of income and wealth.

The preamble to the standing reference speaks of the need for a comprehensive inquiry "to help to secure a fairer distribution of income and wealth in the community". Certainly the Commission was viewed generally, at that time, as a policy-making body, and its activities appeared to be linked to such declared Labour Party electoral intentions as "to use taxation to achieve a major redistribution of both wealth and income" and "to introduce an annual tax on wealth above £100,000" and to introduce a Capital Transfer Tax in place of Estate Duty. [1] The popular press described the Commission as "a sort of time-bomb ticking away beneath the feet of the rich" and the Confederation of British Industry, when presenting evidence to the Commission in 1975, stated that the terms of reference clearly prejudiced the outcome of any inquiries. Four and a half years, and six reports later, it is doubtful whether many ordinary people are aware of the Commission's continued existence. Discussion of income and wealth redistribution has largely disappeared from the political agenda; nothing has been heard recently about a wealth tax; and the work of the Commission has received as much, if not more, criticism from the left as from the right.

Yet this background may help to explain the choice of a Royal Commission as the vehicle for the investigation of a subject which might be thought to be highly technical and yet is politically charged. For Royal Commissions are supposed to be chosen to represent the views of the "man on the Clapham omnibus"

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and this is usually seen to be achieved by a suitable balance in the representation of different interest groups. In the case of the Diamond Commission there is a Chairman (originally full-time, now part-time), who was a former Labour Cabinet Minister, three members representing financial and employing interests, two representing trade unions, and two or three academics with varying amounts of professional interest and expertise in the area.

The Commission has its own staff, including economists and statisticians, mainly on secondment from the government departments. It co-operates with other government departments, who have provided a lot of additional data to the extent that their staffing position would allow. It has used consultants to prepare special reports, and has drawn heavily on academic research publications. The following is a personal account of my experiences as a member of the Commission until August 1978.

The Chairman made it clear that in his view the task of the Commission was to establish 'facts' and that all policy recommendations were to be eschewed. On receipt of a reference, staff would prepare a paper summarising sources and issues in relation to the reference. At this point the Commissioners became involved in the crucial process of deciding what was a relevant 'fact' or question which we should attempt to answer and what particular areas should be selected for a programme of work. We would engage in a process of bargaining, which explains why the reports show varying degrees of willingness to engage in estimation on sensitive issues, and to pursue different topics in depth. For example, Report No. 5 contains the results of a model which was constructed in an attempt to investigate the relationship between inherited and accumulated wealth. [2] Such a model clearly involves strong assumptions about relationships between variables, as well as estimates of values. But in another case, the Commission decided that it would not attempt to estimate the value of fringe benefits for higher incomes from employment, because, it argued, insufficient data was available, even though it was clear that such benefits were of considerable and increasing value at the top income levels.

The work proceeded with the staff returning to the Commission periodically with draft reports which would be discussed and amended in full meeting. At the same time the views of interested parties among the public would be solicited by advertisement, and the Commission would be involved in taking both oral and written evidence, from individuals and institutions. This evidence could range from expressions of strongly held opinions from employers, trade unions, or pressure groups through to evidence from economists on the use, say, of equivalence scales.

Three reports have been published so far on the standing reference, and three reports on specific references. The first of these was on income from dividends and its distribution; the second was on higher incomes from employment and the third was on lower incomes. Six background papers have also been published. The titles of these together with the terms of all the references are listed in Appendix A.

The reports which have emerged are a mine of information and they are invaluable as references. To the policy-maker, however, they may appear baffling. Those issues which have been selected for discussion are not always obviously the most urgent, whilst others which are, by general agreement, both important and urgent, tend to become obscured beneath a mountain of statistical material. Since the Diamond Commission itself has shunned policy recommendations I will select a limited number of areas where, in my view, the reports do significantly add to our understanding of the processes which influence the distribution of resources in the U.K.

SOME CHARACTERISTICS OF THE DATA PRODUCED

First a word about the nature of the data contained in the reports. It is impossible to describe fully the material contained in so many reports and background papers. I will select certain items for comment which will provide a general picture of the range of material to be found in the published reports on the standing reference.

Beginning with income, the reports bring together material published by a number of government departments, and provide time series of varying length: successive reports up-date this material. For example, data on the dispersion of earnings are drawn from the Department of Employment's now annual New Earnings Survey and from the Department of Health and Social Security's Statistics of Earnings. Distribution of household income is drawn from the annual Family Expenditure Survey of the Department of Employment. This survey also forms the basis of the Central Statistical Office's study of the incidence of taxes and benefits on the distribution of household income, which has been utilized by the Commission.

The core data on the distribution of income relate to tax units, and are obtained from Inland Revenue data, supplemented by estimates supplied by the C.S.O. to cover those units falling below the tax threshold. Over the four years the Commission, with the co-operation of Inland Revenue and other government departments, has tackled certain deficiencies in these basic statistics, for example excluding part-year income units, adding in an imputed rent for owner-occupiers, and taking employees' superannuation contributions into account. The tables provide some data on source of income, by income range, and a separate distribution for tax units where the main earner is economically active and where he or she is economically inactive. But whilst the basic income distribution, both before and after tax, is now available for 1949, 1954, 1959 and thereafter annually to 1974-5 (the latest published figures) the adjustments described above are available, at most, for the years during which the Commission has been working. Since some of these items, such as owner occupation and superannuation are likely to have been increasing in importance over time, it is still not possible to assess their effect upon long-term trends.

The Commission has been relatively conventional in its presentation of the statistics of income distribution, relying heavily upon tables showing percentile shares. A special study of international comparisons of personal income distribution was commissioned. [3] It proved extremely difficult to obtain comparable data, although that of the best available quality was from consumer units in the U.K., U.S.A. and Canada for the 1970's. This suggested that the distribution of incomes was more equal in the U.K. than in the U.S.A., with Canada being somewhat less unequal than the U.S.A. [4] Some studies of the income of particular groups under the standing reference, e.g., of the self-employed and possibly of women, are promised for the future.

When we turn to estimates of the distribution of wealth, the basic data are less complete because wealth is not at present taxed in the U.K., although there are, of course, taxes on those incomes derived from wealth and taxes on the transfer or exchange of wealth (for example estate duty and capital gains tax). The estate multiplier method as used by the Inland Revenue in its own estimates of wealth distribution was the starting point for the Commission's work. A number of academics had experimented with methods for improving these official estimates and the Commission benefitted from their experience. [5] Thus, by first estimating personal sector balance sheets to provide control totals, the Commission's estimates adjust for (i) individuals excluded and (ii) wealth excluded or undervalued by the estate duty method.

These adjustments as made by the Commission are only available for the years 1972-75. Most of the wealth data relate to individuals, although some estimates have been provided of the effect of marriage on the distribution, based on certain assumptions about the way in which couples are paired in relation to their position in the wealth distribution. [6]

Another innovation was to extend the conventional Inland Revenue definition of wealth to include the capitalised value of occupational pension rights and the value of accrued rights to State pensions. Again, however, these estimates are available for only a limited number of years. In the fifth report, separate distributions and some average values are given for different forms of wealth classified according to the degree of liquidity. This also involves valuing marketable assets in terms of their "realisation" or current sale values in contrast to the other estimates which are based on "going concern" values.

Some interesting explorations of the impact of changes in relative asset prices upon the degree of inequality in the distribution of wealth have been reported. Finally a major exercise was undertaken, following earlier work by Harbury [7], to analyse a sample of wills, which it was hoped would contribute to an understanding of the role of inheritance, in the distribution of wealth. Then on the basis of these findings and using a perpetual inventory method and certain simple demographic assumptions, a model was constructed to study the relationship between transmitted and accumulated wealth. [8]

Work is continuing to refine this model, and to include a model of lifetime savings. A number of other studies, including an international comparison of wealth distribution and detailed analysis of the ownership of two major assets, namely land and company shares, are under way.

THE DISTRIBUTION OF INCOME IN THE U.K. IN THE POST WAR PERIOD

The starting point for our discussion is the availability of a consistent time series of income distribution for tax units (i.e., a single person or a married couple with dependent children), over a 25 year period (both before and after direct tax). The first notable feature is the small amount of change that has occurred whatever measure is chosen. The share of the lowest 50 per cent of tax units in the total of personal income before tax was 23.7 per cent in 1949 and 24.2 per cent in 1974-75. After tax, it was 26.5 per cent in 1949 and 27.0 per cent in 1974-75. Most change was registered by the top decile group and within that the top one per cent. In 1949 the top ten per cent of tax units received 33.2 per cent of total personal income before tax and 26.6 per cent in 1974-75, a fall of approximately 20 per cent. But almost half of this decline occurred in the six years at the beginning of the period, between 1949 and 1954. The after tax picture is similar although the fall in the share of the top decile group was less marked, from 27.1 per cent in 1949 to 23.2 per cent in 1974-75. [9] The Gini coefficient of the before tax distribution fluctuated. It fell from 41.1 per cent in 1949 to 38.8 in 1961. It rose again, and then fell from 1972-73 back to 37.1 in 1974-75.

As early as 1962, Richard Titmuss had drawn attention to the importance of taking account of social and demographic changes when interpreting aggregate income distribution statistics, although he himself made no attempt to estimate orders of magnitude. [10] This task was undertaken by the Commission's staff with interesting results. [11] Using a technique of shift-share analysis, the possible effects of four social and demographic

changes upon the personal income distribution (before direct taxes) between 1951 and 1971, were explored. These were:

- the pattern and extent of marriage
- the proportion of the population which is elderly
- the extent of female employment
- the proportion of the population in full-time education

As conducted, the exercise is subject to important qualifications, among which only two will be mentioned here. The first is the assumption of a causal link running from the characteristics of a population group to the income of that group. A good example is the implied assumption about the levels of income of the elderly, namely that because they are old they have low incomes. The second is the assumed absence of any link running from changes in the relative numbers of a population group to changes in the income pattern of its members. For example, the method implies that the reduction in the number of young entrants to the labour force, resulting from an increase in young people receiving full-time education, has no impact upon the wages of those young who are in work.

A tentative conclusion from the analysis would be, that, over the 20 year period in question, the four factors together would have made the income distribution more unequal. As we have seen, however, there was actually a movement towards greater equality (as measured by the Gini coefficient) and on further analysis it appears that the fall in the share of the top decile group, which owed little to the social and demographic changes being analysed, was more than enough to outweigh any other trends. Within the bottom 90 per cent of the distribution, however, the shift share analysis gives a forecast remarkably close to what actually happened. Using once again the Gini coefficient as a summarising measure, inequality actually increased within the bottom 90 per cent of tax units. The analysis suggests that changes in the extent of marriages (allowing for changes in the population structure), in the proportion of the population in full-time education, have all tended to make the distribution of income more unequal; and although changes in the extent of female employment have tended to make it less unequal, the former tendencies have outweighed the latter.

Such an approach to disaggregation of the income distribution can be only a beginning. Not only is more sophisticated analysis required but more factors need to be isolated for study, particularly for policy purposes. For example, the policy implications of an increase in the number of low income receivers arising because more young people are receiving university education will be viewed differently from that which results from an increase in the number of single parent families. But the usefulness of such analysis in directing attention to the interaction of public policies in different spheres upon income distribution, e.g., income maintenance for the elderly with educational policy, as well as the importance of disaggregation for forecasting future trends, is considerable. It certainly calls in question any notion of unitary causation.

Returning now to examine the top of the income distribution, two factors have to be encompassed. First, social and demographic changes appear to have had relatively little influence upon trends at this level, and yet it is at the top that the most marked change in shares, in a downward direction, can be observed, over the post war period. We noted above that the fall in income share for the top decile was, in fact, largely concentrated at the very top. The share of the top 1 per cent of tax units in total personal income before tax fell from 11.2 per cent in 1949 to 6.2 per cent in 1974-75. In the light of these special characteristics a closer examination of the position of

these income groups and its implications for policy might well have been expected, but this has so far not been undertaken by the Commission. Nonetheless, some issues are worthy of discussion.

In many respects the top percentiles of the income distribution appear to be unique. First, incomes at this level appear to be derived from the combination of a number of different sources. Income from self employment is important, although until the promised special study of this category it is not possible to be precise. But so, too, is investment income. In the seventies it supplied a quarter of all income before tax for the top 1 per cent of tax units and about 10 per cent for the next highest 2-5 per cent. Together, the top 5 per cent received more than a half of all investment income accruing to persons. Around this level there appears to be a qualitative change, for the next highest 5 per cent of tax units received only 8 per cent of all investment income which in turn contributed only 4 per cent of their total income.

It follows then, that any special factors relating to movements in investment income would be likely to have a differential impact upon top income receivers. To begin with it should be noted that the estimates of the share of total personal income derived from investment is difficult to reconcile with the global national income estimates. It is also clear that personal ownership of company securities has been declining over this period (in favour of institutions), and possibly even the share of personal wealth in total national wealth. More particularly, income from dividends in real terms has not increased in line with other sources of income. The significance of such changes for the total economic position of top income receivers relative to the rest of the population is far from clear, however.

Tax avoidance has also probably increased over the post-war period and, with British tax laws, this is known to be most readily possible for those with self-employment income, either as a main or a subsidiary source, and investment income. This same period has also seen the growth in another form of tax avoidance for those with employment incomes, namely the cluster of benefits such as occupational pensions, company cars, and low interest company loans, private medical insurance, etc. It is not suggested that these are confined to the top end of the income distribution, but they are undoubtedly of far greater importance in value terms and degree of concentration there. The Commission's Report on Higher Incomes from Employment showed that at the higher levels of employment incomes the cost to the employer (as distinct from value to the employee, which is very different) could be as much as 25 to 30 per cent of average salary. [12] There is evidence to suggest that one effect of more recent incomes policies has been to increase this trend. Thus we have a situation where the income distribution, as conventionally measured, may be misleading because the form in which remuneration is received, and command over resources is obtained, has changed over time.

A number of stages of incomes policy pursued by successive governments in the post war period could have been expected to have a particular effect at the top end of the income distribution. From April 1973 to July 1974 there were limits on the total amount of increase that could be paid to an individual. From July 1975 to 1976 no increases at all were allowable for those earning £8,500 or more a year, and from July 1976-77 there was again an upper limit upon individual increases. The statistics available from the Commission cover only the first of these limitations, but there does not appear to be any discontinuity in the trend at the top of the distribution. This suggests that other factors, either the ability to circumvent incomes policy by changes in the form of remuneration or by other means, (e.g., change of job title) or the relatively greater

importance of other sources of income at these levels, are at play to offset any effect which might otherwise be felt.

From the viewpoint of the policy-maker, the top end of the income distribution is a politically sensitive one. It is unfortunate therefore that the global statistics of distribution provide so little guidance to the underlying economic and social trends.

It is not only at the top end of the distribution, however, that incomes policies have apparently had little effect. The general stability in the overall income distribution, suggests that this is a more general phenomenon, yet one which must cause concern to some government policy-makers. There is no doubt that certain phases of incomes policy have been looked to, not only to improve, relatively, the position of the low paid, but also to reduce the dispersion at the top. (For example, in the period July 1975-76 increases of £6 a week were permitted for all except those earning £8,500 a year, for whom no increase at all was allowed). But even if we concentrate upon the data on the distribution of individual earnings, the evidence for a narrowing of relativities here is by no means obvious. The Department of Employment's New Earnings Survey provides a series over the period 1970-76. Admittedly, there was some narrowing of the distribution, slightly more for men than women, but it was by no means concentrated in periods of incomes policy, and the trend was actually reversed in the period 1975-76, when it might have been expected to be most marked. [13]

Expressed as a percentage of the median, gross weekly earnings of full-time adult male employees in the lowest decile increased from 65.4 in 1970 to 68.1 in 1977 and in the highest decile fell from 160.6 to 157.7, but within the period a narrowing and a subsequent widening of relativities were both observable. The most marked and consistent contraction was the reduction in the highest percentile earnings of nonmanual men which fell from 349.6 of the median in 1970 to 291.9 in 1976 irrespective of the form of incomes policy. [14] This is not to say that differentials within companies, for example, have not been disturbed by the operation of these policies, but in the aggregate there is little evidence "that there has been a strong compression of pay brought about directly by incomes policies." [15]

When considering the likely influence of such changes upon the aggregate income distribution for tax units, allowance has to be made for other factors, such as the presence of second earners, and these, we know, have increased. The activity ratio of married women in the age group 25-59 more than doubled between 1951 and 1971 (from 23.7 per cent to 49.3 per cent), and the percentage of tax units with earning wives increased over all the decile groups of the distribution. This also encompasses the period when women's pay has been strongly influenced by the movement towards equal pay, and generally allowed as an exception to statutory pay limits. Another factor is the possibility of an increasing number of people (men and women) with second jobs, an area about which all too little is known. Thus what is happening to the content of men's pay packets is by no means the only important factor influencing the position of tax units in the middle of the income distribution.

Indeed, one of the most noticeable developments of the last twenty years is the weakening of the links between individual gross earnings and the real standard of living which is available to any particular family grouping. If we ignore the fact that the standard of living of particular families will vary according to family composition, not only is the earning power of a wife an important economic fact, but there has also been an increased direct tax burden felt by most decile groups over the period. The average rate of income tax more than doubled in the period

1959 to 1974-75 for the bottom 90 per cent of the distribution, whereas that of the top decile group increased by less than a quarter. In 1959 the top 1 per cent of tax units paid 34.5 per cent of all personal income tax, whereas in 1974-75 they paid only 15.8 per cent. [16]

There have also been other influences upon the real standard of living, not immediately encompassed by data either on individual earnings or by the aggregate income distribution. The report on Lower Incomes discussed briefly the possibility of differential effects of inflation upon families at different income levels, of particular importance in a five year period when the Retail Price Index doubled. [17] Moreover, as we noted above, fringe benefits are by no means confined to top income receivers, and yet their incidence at other levels is extremely uneven as between manual and nonmanual occupations, men and women, between industries and between sectors. Thus it can be concluded that the link between any single individual's pay or salary and the real command over resources that he or she enjoys is becoming increasingly opaque.

THE PROBLEM OF POVERTY - THE LOWER INCOMES REFERENCE

If policy implications were to be spelled out by the Commission anywhere, they might have been expected in the reference on lower incomes (interpreted as about the bottom 25 per cent of the distribution). [18] Yet once again the emphasis in this report was upon factual analysis, even though the Commission did allow itself to address the question of whether personal characteristics associated with earning capacity are determined genetically. [19] Perhaps not surprisingly it found the evidence inconclusive, although an addendum signed by three Commissioners, asserted that "the genetic argument contributes nothing to an understanding of the causes of lower incomes in contemporary society." [20]

The Lower Incomes report is the only one which has so far tried to make allowance for differences in the size and composition of tax units and families. A considerable amount of evidence was received about equivalence scales which explored both the debatable nature of some of the assumptions underlying their construction as well as the practical difficulties involved. In the end, the Commission adopted the scales laid down as the supplementary benefit scale rates, which are used to calculate entitlement to income support from the Supplementary Benefits Commission. The argument used was that these particular scales embodied a view taken by Parliament as to the relative need of different groups and, moreover, the results did not differ radically from those yielded by more sophisticated methods. The Lower Incomes Reference and its accompanying background paper [21] made primary use of the income data from the Family Expenditure Survey which has certain deficiencies. [22]

The Lower Incomes report found, perhaps not surprisingly, that about 60 per cent of the families in the lower part of the equivalent income distribution relied almost exclusively upon state benefits, and they comprised the usual disadvantaged groups; the elderly, the disabled and long-term sick, one parent families and the unemployed (an increasingly important category since the mid-sixties when the employment situation worsened and both the numbers, and the length of period unemployed, have increased). The relative position of the lower income group in aggregate, and the separate distributions within groups of families of different size and composition, remained remarkably stable. Over a ten-year period the income share of the lowest quarter was only about 12 per cent of the total compared with 44 per cent going to the top quarter. The real value of lower incomes (measured by their purchasing power in constant prices)

after taxes grew by about 40 per cent, in line with G.N.P., until 1974 followed by a fall in 1975 and 1976, when G.N.P. also fell. This is not surprising given the basic structure of the social security system where, in recent years, a statutory link has been established between certain national insurance benefits and movements both in earnings and prices. At the same time the system has become much more complex in operation and more varied in its impact. The elderly have done relatively better than other groups, and the short-term unemployed are protected by earnings related supplements. On the other hand the long-term unemployed, or any other dependent families where there are children, are badly off and the evidence suggests that here incomes are barely adequate.

The intensive discussion over this period of the position of the poor and the frequent revision of levels of benefit have served to ensure that those excluded from the labour market should at least share the increase in the real standard of living of the rest of the community. But a number of other influences are at work to prevent them improving their relative position. First, there is the interaction between levels of pay and benefit, which derives from what some people see as the possible disincentive effects of benefit levels creeping close to or above earnings levels. Second, benefit levels have improved in relation to net earnings after tax (as the tax burden has risen: see above). But the need for a large tax yield has itself been influenced by such factors as the increasing proportion of the elderly in the population and the increasing number of unemployed. It is also possible that families at the bottom of the distribution have not improved their position relative to families around the median because the contribution of working wives has increased the average after tax income. Certainly the policy-maker needs a clearer understanding of the multiplicity of factors which have been at work here. Some policy comments were made forcibly by the authors of the background paper, The Causes of Poverty. They argued that if the existing complex system of income support which exists for the working poor (consisting of child benefit, family income supplement, etc.) could be made automatic; "The living standards of the working poor and also of the nonworking poor could within limits be set at whatever level society chose". [23] Their interesting analysis also suggests, somewhat controversially, that poverty does not stem from low pay. The reason is that most of those on the lowest pay (in terms of hourly earnings) are married women whose earnings ensure that their families are not among the poorest, whilst the poorest workers are men with large families, whose earnings may be good but still inadequate in relation to their need. Among families with earnings, whether a wife works is a crucial determinant of whether a family is, financially-speaking, poor.

THE DISTRIBUTION OF WEALTH IN THE U.K. IN THE POST WAR PERIOD

The Commission has not yet produced a combined distribution of income and wealth, although it is investigating the links between the two. Nevertheless we can deduce from the existing data that there is a heavy concentration of wealth ownership among those at the top end of the income distribution. Among the many difficulties in analysing the relationship further is the fact that the presently available statistics on the distribution of wealth take the individual as the unit of analysis, whereas the income distribution relates to tax units. Moreover the quality of the wealth statistics is much poorer and greater caution in interpreting them is therefore needed. Nonetheless it is reasonable to say that wealth is far more unevenly distributed than income in the U.K. On the best available evidence, so far, in 1975 the top 1 per cent of wealth holders owned a quarter of all personal wealth and the top 20 per cent owned 78 per cent. [24] The average value of the wealth held by the top 1 per cent was £135,000. [25] The evidence generally supports the view

that there has been a trend towards greater equality of wealth holding over the very long run, as well as in the last 15 years. But the precise significance of this trend, as well as its causes remains somewhat obscure. Commenting on the long run series, from just before the first world war up to 1960, Tony Atkinson noted that although the share of the top 1 per cent of wealth holders declined, the share of the next 4 per cent actually increased, and he suggested that this might reflect

"in part the rearrangement of wealth within families rather than the redistribution between rich and poor families." [26]

One factor inducing such a rearrangement would be the incidence of estate duty tax.

In the longest consistent series available in the Commission's own report, from 1960 to 1975 (which is based on the assumption that individuals excluded from the Inland Revenue statistics have no wealth), the share of the top 1 per cent of individuals is shown as falling from 38.2 per cent in 1960 to 27.6 per cent in 1974 and 23.2 per cent in 1975. The share of the next 4 per cent in this period shows some small year to year fluctuations but is basically stable around a quarter. The bottom 80 per cent of the distribution shows the most marked change, but only at the very end of the period. In 1960 and 1972 the bottom 80 per cent are shown as owning 10 per cent of personal wealth and this has only risen to 13.6 per cent in 1973, although by 1975 it is 18.2 per cent. [27] An alternative series provided by the Commission for four years (1972-75) is based on an alternative assumption that individuals excluded from the Inland Revenue's own estimates have positive wealth holdings. This has the effect of increasing the share of wealth attributed to the bottom 80 per cent of the distribution, but the trends over time remain similar. Methods of improving the estimates of wealth distribution, particularly at this lower end, are badly needed, and the Commission has considered the possibility of conducting a survey of wealth by means of personal interviews with a random sample of the population in order to supplement Inland Revenue tax data. So long as such heavy reliance has to be based upon somewhat arbitrary assumptions it is difficult, for example, to provide any finer estimates of ownership by decile shares at the lower end of the distribution or to begin to analyse the composition of wealth at such levels. It has been widely assumed, for example, that the extension of owner occupation of housing (from 25.9 per cent of wealth owners in 1960 to 43.8 per cent in 1975) has been an important influence making for more equality in the distribution. [28] But the trend to increased home ownership has been fairly steady over the whole period and can scarcely have affected the fairly sharp increase in the share of the bottom 80 per cent which was shown between 1974 and 1975. It seems likely that the influence of home ownership has been most marked in the middle ranges of the distribution and that there remain substantial numbers of individuals with no or very little wealth at all.

Not only is there heavy concentration in the ownership of wealth but the characteristics of the largest estates are very different from the smaller ones. Estates whose total value was £200,000 or more in 1975 consisted predominantly of listed shares and other company securities (over one third), of land (17 per cent) and of dwellings (12 per cent). Individuals with estates worth more than £100,000 owned nearly half of all shares in private hands and 46 per cent of all land. In the lower ranges of wealth the predominant form was dwellings (over a half) and life policies (about a fifth). [29] These marked differences in the type of asset held at different levels of wealth makes the year to year estimates of the degree of concentration by total value particularly susceptible to fluctuations in the relative price of different assets. The value of company shares has been

volatile but has increased less than the retail price index, while the price of land and dwellings has shown a more rapid rate of increase than other prices. Indeed, even allowing for the increased incidence of owner occupation, it is notable that the share of physical assets in total personal wealth increased from 30 per cent in 1960 to 54 per cent in 1975 while that of shares and securities declined from 23 per cent to 9.6 per cent.

Independent evidence shows that this decline in the importance of shares and securities in the total of personal wealth holding may represent more than a relative fall in price; it suggests a fall in quantity, as given by the estimates which show that the proportion of listed U.K. ordinary company shares held by persons has fallen from 56 per cent in 1963 to 40 per cent in 1975. [30] Correspondingly the proportions held by financial companies and institutions has risen from 30 per cent to 48 per cent.

This kind of change emphasizes the necessity for setting the total of personal wealth holding in the wider context of national wealth and this the C.S.O. has begun to do (with encouragement from the Royal Commission). The first estimates suggest that not only has personal wealth declined as a percentage of total national wealth, but also as a multiple of personal income.

"In 1966 the net wealth of 'households' was about 3.5 times total personal income and accounted for three quarters of the total national wealth: in 1976 it is estimated to have been 2.9 times total personal income, and whereas an accurate estimate of national wealth is not yet available, it seems possible that the corresponding proportion of total national wealth may turn out to be about a half." [31]

There is much interest in unravelling further the interconnections between the volume and nature of wealth holding of persons, financial institutions, companies and government so that it is possible to understand better the new forms of relationship which appear to be developing between ownership and control, and the new role, in the functioning of the economy, of personal wealth holdings.

The Commission produced estimates of wealth extended to include the value of accrued rights in the state pension scheme. The use of this wider definition reduces dramatically the degree of inequality in the wealth distribution. Not only is the total of personal wealth increased substantially (from £238 billion to £392 billion) but the sum is distributed among all adults varying only with age and sex. The Commission discussed at length the need for using alternative definitions of both income and wealth, but the usefulness of this particular exercise is very doubtful. [32] In the U.K. the state pension scheme is unfunded; an individual's entitlement cannot be realised in any way until the conditions for receiving the pension have been fulfilled, and, moreover, the nature of entitlement is subject to change by political fiat. If wealth is held to be economically and socially important because:

"apart from providing a source of income which is compatible with a life of leisure, wealth gives opportunity, security, social power, influence and independence" [33]

then £6,000 of capital attributed to a woman aged 50-54, as the value of her rights in the state scheme, is qualitatively different from £6,000 which she may have invested in a building society. Rights in occupational pension funds are clearly in an intermediate category between more conventional forms of wealth and state pensions. But here we encounter wide variations in the incidence and characteristics of such pensions, between occupations, industries and between men and women. From the viewpoint of the policy-maker, therefore, the need for more

disaggregation of the wealth estimates by personal characteristics as well as according to the degree of marketability of the assets owned emerges as an important consideration.

The idea that inherited wealth may be considered a fit object for taxation since it is in the nature of a windfall compared with that wealth which has been accumulated out of lifetime income as a result of effort and thrift, has long influenced taxation policy in the U.K., and led the Commission, as we noted above, to devote some of its resources to make some estimates of the order of magnitude of inherited and accumulated wealth. These were based on extremely restricted assumptions and were published with a view to encouraging research workers to become interested in some of the problems associated with the construction of the model. [34] But the study of the pattern of inheritance based on an analysis of a random sample of wills receiving probate in 1973, and which formed part of the model, produced some interesting results. It found that, irrespective of size, the great bulk of property is bequeathed to relatives (from 90 per cent in the smaller estates to 75 per cent in larger ones). But there is a significant fragmentation of wealth on death, the average number of bequests increasing from five in the smaller estates to 24 in the larger ones, while larger estates also tend to be more equally distributed. We cannot deduce from this anything about the effect upon inequality in the ownership of wealth because we know nothing, for example, about gifts inter-vivos, about the extent to which the inheritors may receive bequests from a number of sources or about the effects of inheritance upon the ability to accumulate. For those who are interested in the analysis of the effect of wealth ownership upon life-chances, this material is disappointing because even the expectation of inheritance may suffice to enhance opportunities and extend the range of temporal choices. However, it is a small beginning in an area which calls for further study.

CONCLUSION

In discussing some of the policy implications of the Diamond Commission, I have not attempted to specify what policies or which policy-makers. What is not in the reports, as much as what they contain, underlines the complexity of the interaction of demographic, social and economic factors which generate the distribution and control of resources in an economy like the U.K. It might, however, be thought surprising that I have omitted any specific discussion of the fiscal implications or indeed the consequences of fiscal policy for the distribution of resources. This is done deliberately not only because I am not equipped for such a discussion, or because such a discussion would require another paper; it is also because a major debate about the chaotic nature of the present U.K. tax structure has been initiated by the publication of the Meade report. [35] This contains proposals for a 'new Beveridge scheme' for dealing with the so-called poverty trap and other deficiencies in the existing social security system, which occupied much of the discussion of the Commission in its sixth report. It also advocates a progressive expenditure tax system combined with "a system of progressive taxation on wealth with some discrimination against inherited wealth." [36]

But for a successful outcome to that discussion as well as for providing answers to the major questions still left unanswered by Diamond, priority should be given to unravelling the generation of original income, and here to the interplay of economic and political factors such as ownership and control, with social factors such as the importance of custom and convention in determining levels of remuneration. [37] The distribution of access to resources in modern society is ultimately the consequence of almost the totality of social

arrangements, as well as being in turn one of the major determinants of those social arrangements.

Note: Since this paper was presented the Royal Commission was wound up and its work disbanded in July 1979.

Footnotes

- 1 Labour Party Manifesto, October 1974.
- 2 Report No. 5. Third Report on Standing Reference, London, H.M.S.O. Cmd. 6999, Chpt. 9.
- 3 T. Stark, The Distribution of Income in Eight Countries. A background paper to Report No. 5, London, H.M.S.O. 1977.
- 4 Report No. 5, London, H.M.S.O. Cmd. 6999 p. 141. In the background paper by Stark, Chpt. 3 compares available data for Canada and the U.K.
- 5 See for example, A.B. Atkinson, Unequal Shares: Wealth in Britain; Allen Lane, 1972, A.B. Atkinson and A.J. Harrison, "Wealth Distribution and Investment Income," Review of Income & Wealth, Series 20, No. 2, 1974; J. Revell, The Wealth of the Nations, CUP, 1967.
- 6 Report No. 1, London, H.M.S.O., Cmd. 6171, Table 40.
- 7 For example C. Harbury, "Inheritance and the Distribution of Personal Wealth in Britain", Economic Journal, Vol. 72, No. 288, 1962.
- 8 Report No. 5, op. cit., Chpt., 8 & 9.
- 9 Report No. 5, op. cit., Tables D1 and D3.
- 10 R. Titmuss, Income Distribution and Social Change, George Allen and Unwin, 1976.
- 11 A summary is available in Report No. 5, op. cit., Chapt. 5, and a full account in Background Paper No. 3.
- 12 Report No. 3, London, H.M.S.O. Cmd. 6383, Chpt. 3 and Appendix H.
- 13 A.J.H. Dean, "Income Policies and Differentials", National Institute Economic Review, No. 85, August 1978.
- 14 Report No. 5, op. cit., Table 18. These would be incomes of £11,000 a year upwards in 1976.
- 15 A.J.H. Dean, op. cit., p. 48.
- 16 Report No. 5, op. cit., Table 26.
- 17 Report No. 6, Lower Incomes, London, H.M.S.O., Cmd. 7175, p. 6 and Appendix F.
- 18 For full terms of reference see Appendix A.
- 19 Report No. 6, op. cit., p. 149.
- 20 Report No. 6, op. cit., p. 157.
- 21 R. Layard, D. Piachaud, et al, The Causes of Poverty, Background Paper to Report No. 6, Lower Incomes, London, H.M.S.O.
- 22 It is obtained from a continuous sample survey where it is known that there is response bias, in particular that self-employment and investment income are under-reported.
- 23 Background Paper to Report No. 6, op. cit., p. 134.
- 24 1 per cent here is approximately 400,000 individuals.
- 25 These estimates are on the basis of market valuation, Report No. 5, op. cit., Table 55.

- 26 Estimates are from J. Revell quoted in Report No. 1, Table 41. For earlier discussion of these estimates see A.B. Atkinson, 1972, op. cit., p. 24.
- 27 Report No. 5, op. cit., Table 33, and for the alternative series referred to below, Table 39.
- 28 Report No. 5, op. cit., Table 72.
- 29 Report No. 5, op. cit., Tables 29 and 30.
- 30 M.J. Erritt and J.C.D. Alexander, "Ownership of Company Shares." Economic Trends, September 1977. The personal sector have included a small amount of shares in the possession of nonprofit making bodies.
- 31 "Personal Sector Balance Sheets", Economic Trends, January 1978.
- 32 Report No. 5, op. cit., Chpt. 2.
- 33 J.E. Meade (Chairman of the Committee), The Structures and Reform of Direct Taxation, George Allen and Unwin, 1978.
- 34 Report No. 5, op. cit., Chpt. 9.
- 35 J.E. Meade, 1978, op. cit.
- 36 J.E. Meade, 1978, op. cit., p. 518.
- 37 For some evidence of the role of custom and convention see Report No. 3, op. cit., Chpt. 8.

APPENDIX A

THE TERMS OF REFERENCE AND PUBLICATIONS OF THE ROYAL
COMMISSION ON THE DISTRIBUTION OF INCOME AND WEALTH

Standing Reference

"To help to secure a fairer distribution of income and wealth in the community there is a need for a thorough and comprehensive enquiry into the existing distribution of income and wealth. There is also a need for a study of past trends in that distribution and for regular assessments of the subsequent changes.

The Government therefore asks the Commission to undertake an analysis of the current distribution of personal income and wealth and of available information on past trends in that distribution and would welcome an initial report on this as early as possible during the first year of the Commission's operation, and subsequent reports from time to time.

These reports should cover personal incomes at all levels; earned income of all kinds (including fringe and nonmonetary benefits); unearned income of all kinds; capital gains; and all forms of personal wealth. They should take into account the incidence of taxation and any other factor which the Commission may consider relevant."

Report No. 1, London, H.M.S.O. Cmnd. 6171

Report No. 4, London, H.M.S.O. Cmnd. 6626

Report No. 5, London, H.M.S.O. Cmnd. 6999

Income from Companies and its Distribution

The Government therefore asks the Commission to prepare a report, based on the most reliable information available to them and drawing on material assembled under their standing reference, on:

- i The pattern of distribution of ownership of equity capital and of income arising from it between United Kingdom pension funds, life insurance funds, other institutions, companies, individuals resident in the United Kingdom and overseas recipients. The Commission is asked to show as far as possible the final distribution of the income to individuals of different income levels in the United Kingdom and the trends in distribution over a recent period of years;
- ii the pattern of financing of United Kingdom companies, including financing by equity and nonequity capital; and in particular the role of dividends in the raising of capital which does not have to be remunerated by a fixed return for the financing of long term investment. The Commission is asked to distinguish as far as possible the significance of equity capital and dividends for companies of different sizes, sectors and rates of growth;
- iii changes over a recent period of years in the total of dividends paid by companies in the United Kingdom covered by dividend control, and in the capital in relation to which those dividends were paid; and the relationship in a similar illustrative period between the growth of different forms of personal income, including dividends, other investment income and income from employment and self-employment. The Commission is asked to take into account capital gains and losses where practicable and appropriate;

- iv such further information as would in the Commission's view be directly relevant to the Government's review.

Report No. 2, London, H.M.S.O. Cmnd. 6172

Higher Incomes from Employment

The Government therefore asks the Commission:

- i to analyse the present position and past trends in the levels and distribution of such incomes, including all forms of monetary and nonmonetary benefit, and showing separately the incidence of taxation and of changes in the value of money;
- ii to include in their analysis directors' fees; remuneration for part-time employment at comparable rates; and returns on personal investment insofar as these can be regarded as a form of remuneration arising from the employment or self-employment;
- iii to examine the economic and social reasons given for the levels and distribution of such incomes in relation to others, including for example the degrees of personal responsibility and risk; the qualifications, experience, ability and individual effort required; the international as well as domestic market for certain occupations; and such other factors as the Commission may consider relevant.

Report No. 3, London H.M.S.O. Cmnd. 6383

Lower Incomes

There is a need for a comprehensive and objective analysis of incomes at the lower levels (say about the lowest 25 per cent of income recipients).

The Government therefore asks the Commission:

- i to analyse the present position in the levels and distribution of such incomes from all sources before and after tax, in relation not only to individuals but also to households and families;
- ii to analyse past trends in such incomes and in particular trends over the past five years;
- iii to examine the economic, social and other factors which give rise to low incomes, both inclusive and exclusive of incomes derived from social security benefits.

The Government would welcome a progress report within one year.

Report No. 6, London, H.M.S.O. Cmnd. 7175

BACKGROUND PAPERS

- No. 1 The financing of quoted companies in the United Kingdom: by Geoffrey Meeks and Geoffrey Whittington - a background paper to Report No. 2, London, H.M.S.O., 1976.
- No. 2 Analysis of managerial remuneration in the United Kingdom and overseas; a report by HAY-MSL - a background paper to Report No. 3, London, H.M.S.O., 1976.
- No. 3 The effects of certain social and demographic changes on income distribution: by Robert Dinwiddy and Derek Reed - a background paper to Report No. 5, London, H.M.S.O., 1977.

- No. 4 The distribution of income in eight countries: by Thomas Stark - a background paper to Report No. 5, London, H.M.S.O., 1977.
- No. 5 The causes of poverty: by R. Layard, D. Piachaud and M. Stewart - in collaboration with N. Barr, A. Cornford and B. Hayes - a background paper to Report No. 6, London, H.M.S.O., 1978.
- No. 6 Low incomes in Sweden: by John Greve - a background paper to Report No. 6, London, H.M.S.O., 1978.

MEASUREMENT

Agreement among researchers and policy-program planners that income distribution should be studied even more intensively is an automatic outcome of these sorts of deliberations. While such moral support will be welcomed by future researchers and planners, it was felt that the inclusion of the two following technical papers would provide more tangible support. These papers provide important advice on certain technical approaches relevant to incomes research. They illustrate the danger of recognizing only one characteristic of a population such as age when other characteristics are perhaps more significant (Gillespie) and they indicate how to make comparisons of income distribution that are not solely based on averages (Dagum). For future research, the papers point, first, to the general need for a referent or standard as the basis for assessing the degree of equality and, second, to the potential shift of emphasis toward looking at complete distribution of incomes rather than a more restricted focus.

MEASURING THE ECONOMIC DISTANCE
BETWEEN INCOME DISTRIBUTIONS

by

Camilo Dagum*

ABSTRACT

The purpose of this study is to introduce a measure of inter-income inequality that complements the traditional ones proposed by Gini, Theil and others. The latter are measures that account for the degree of income inequality within a given population of economic units (called here intra-income inequality ratios) while the former is intended to measure the degree of inequality between income distributions, which is called here economic distance ratio. The generalized mathematical form of this ratio is provided and two particular forms of economic distance ratios are identified. They are presented under both the discrete form, which is distribution-free, for a direct application to observed income distributions and, the parametric form corresponding to a given model of income distribution. Application is made to the five economic regions of Canada.

1 INTRODUCTION

Since Pareto (1895, 1897) started the formal quantitative research on personal income distribution, studies in this field have been mainly concentrated in the following two areas:

1) Model specifications purported to offer an accurate and elementary description of the income distribution by size of relevant economic units (households, families, unattached individuals, etc.).

2) Measurements of the degree of income inequality within an observed population of economic units, henceforth called intra-income inequality ratios. Further research on this subject dealt with the disaggregation and economic interpretation of the intra-income inequality ratios proposed by Gini (1912) and Theil (1967). The main contributions dealing with the disaggregation of the Gini ratio are due to the studies of Bhattacharya and Mahalanobis (1967), Pyatt (1976) and Henderson and Rowley (1977).

The main purpose of this study is the introduction of a new statistic that measures the degree of inequality between income distributions. In order to do so, the population of economic units must be partitioned according to a given socio-economic characteristic, e.g., ethnic groups, regions, social classes, sex. This new statistic measures the degree of "affluence" of a given income distribution with respect to another. It will be called here economic distance or inter-income inequality ratio.

Depending on the assumptions made concerning the treatment of the income difference for each binary combination of economic units between the two populations, a class of ratios (D_r) is defined. The economic distance ratio d_r , for any r , measures the proportion by which the more affluent population is better off than the other. The simplest member in this class is the economic distance ratio D_0 . It considers only the proportion of

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economic units in the less affluent population with income smaller than each member of the more affluent one, without incorporating in its measurement the amount by which the income of each binary combination differs. Another economic distance ratio being discussed is D_1 , which does take into account the amount of the income difference.

The economic distance ratios can be directly applied to the observed income distributions (distribution-free) which are presented under a discrete form, or they can be calculated from the parametric specification of models fitted to the data (the parametric form). D_0 and D_1 have been applied in this study to Canadian economic regions.

2 THE ECONOMIC DISTANCES d_0 AND d_1

Let X and Y be two income variables with cumulative distribution functions (cdf), $F_1(x) = P(X \leq x)$ and $F_2(y) = P(Y \leq y)$ respectively. Their corresponding probability density functions (pdf) are $f_1(x)$ and $f_2(y)$. Let M_1 and M_2 be their corresponding means, $E(X)$ and $E(Y)$. For any pair of observed income distributions, the subscript 2 is attached to the distribution with the larger mean income. Hence, without loss of generality and for the sake of notational simplification, we have $M_2 > M_1$.

Let Q_1 be the population of economic units with cdf $F_1(x)$ and Q_2 that with cdf $F_2(y)$. It follows from the relation $M_2 > M_1$ that Q_2 is more affluent than Q_1 . In order to assess the relative degree of economic affluence of one population with respect to another, we propose a class of economic distance, d_r , r real, and its corresponding normalized form, the economic distance ratio D_r . A special feature of this ratio is that it is a function of the two income distributions considered. It is a full information measure, since it takes into account both income distributions and, a fortiori, it is a function of their most relevant characteristics: the means, the variances and the asymmetries of the two distributions involved. Thus we can have two pairs of income distributions (Q_1, Q_2) and (Q_3, Q_4) , such that their means satisfy the following relations: $M_1 = M_3$ and $M_2 = M_4$ or the less restrictive relations: $M_2/M_1 = M_4/M_3$, but if their corresponding variances and asymmetries differ, then the measurements of the economic distance will also be different.

The definition and a brief discussion of the economic distance d_0 developed by Dagum (1978a, b) and of its natural extension, the economic distance d_1 follows.

Definition 1: The economic distance d_0 between the income distributions $F_1(x)$ and $F_2(y)$ is defined as the probability that income Y be greater than income X given that the mean M_2 is greater than the mean M_1 . Hence:

$$(2.1) \quad d_0 = P(Y > X | M_2 > M_1) = \int_0^{\infty} \int_0^y dF_2(y) dF_1(x) = E_2(F_1(Y)),$$

where E_2 symbolize the mathematical expectation with respect to the pdf $f_2(y)$. Therefore, d_0 is equal to the mathematical expectation of the cdf $F_1(y)$ taken with respect to the pdf $f_2(y)$.

If the income distributions functions are discrete, we have no-nil joint pdf $f_1(x_i)f_2(y_i) = f_1(y_i)f_2(y_i)$ corresponding to each common interval of income $i (i=1, \dots, n)$. In such cases of tie, it will be assumed that 50 per cent has income Y greater than X and 50 per cent has income Y smaller than X . Then, for discrete income distributions, (2.1) becomes (Dagum, 1978b):

$$(2.2) \quad d_0 = \sum_{i=1}^n [F_1(y_i) - \frac{1}{2} f_1(y_i)] f_2(y_i),$$

where $f_1(y_i)$ and $f_2(y_i)$ stand for the pdfs of the interval of income to which $y_i = x_i$ belongs. In general, $y_i, i=1, \dots, n$, is equal to the midpoint of its corresponding interval, and $F_1(y_i)$, is the summation of the pdf $f_1(x)$ for all x less than and equal to the upper limit of the interval that contains the income y_i .

Definition 1 suggests that d_0 , as an inequality measure between two income distributions, is a head-count measure. Its final result deduced in (2.1) states that d_0 is an average of the cdf $F_1(y)$ of the population of economic units Q_1 , weighted by the pdf $f_2(y)$ of Q_2 . It is a measure of the degree of relative affluence of the population Q_2 with respect to Q_1 . It is equal to the addition of the joint pdf $f_1(x)f_2(y)$ for all $y > x$, and when $x = y$, the criterion for ties mentioned above applies.

The economic distance d_0 considers only the frequency of economic units from the more affluent population with income greater than the members of the other. It does not take into account the amount of income by which these economic units differ. For this, a new economic distance must be introduced.

Definition 2: The economic distance d_1 between the income distributions $F_1(x)$ and $F_2(y)$ is defined as the weighted sum of the income difference $Y-X$ for all $Y > X$, given that $M_2 > M_1$. The weighting factor is the joint pdf $f_1(x)f_2(y)$. Hence, d_1 is the mathematical expectation of $Y-X$ subject to the conditions that $Y > X$ and $M_2 > M_1$. In symbols:

$$(2.3) \quad d_1 = E(Y-X | Y > X, M_2 > M_1) = E_2(YF_1(Y)) + E_1(YF_2(Y)) - E(X)$$

We can deduce from (2.3), under the assumption of discrete income distributions:

$$(2.4) \quad d_1 = \sum_{j=1}^n y_j F_1(y_j) f_2(y_j) - \sum_{j=1}^n f_2(y_j) \sum_{x_i \leq y_j} x_i f_1(x_i) \\ = \sum_{j=1}^n (y_j F_1(y_j) - M_1 L_1(y_j)) f_2(y_j)$$

where $L_1(y_j)$ is the Lorenz curve corresponding to the cdf $F_1(x)$.

3 THE CLASS OF ECONOMIC DISTANCES d_r, r REAL

The definition of d_1 can be generalized to introduce the class of economic distances $\{d_r | r \text{ real}\}$. That is:

$$(3.1) \quad d_r = [E((Y-X)^r | Y > X, M_2 > M_1)]^{1/r}, \quad r \neq 0,$$

$$(3.2) \quad d_0 = P(Y > X | M_2 > M_1)$$

We can add one further member to the class (3.1) - (3.2) of economic distances. It is:

$$(3.3) \quad d_g = \exp[E(\log(Y-X) | Y > X, M_2 > M_1)]$$

If Y and X are measured in dollars, then d_r and d_g have the same dimension. They are weighted economic distances. When $r=1$, we weight the difference of income $Y-X$ by its joint pdf and then take its average. That is, to each pair of economic units, one belonging to the population Q_2 and the other to the population Q_1 , with incomes Y and X respectively, given that $Y > X$ and $M_2 > M_1$ we form the product $(Y-X)f_1(X)f_2(Y)$ and add it for all $Y > X$. Hence, d_1 is a conditional arithmetic mean. When $r=2$, the function associated to each pair of economic units is the square of the difference of their corresponding incomes and then we take the square root of the conditional expectation so obtained. Hence, d_2 has the same dimension as the income variables. It is indeed a conditional quadratic mean and, for all $r > 0$, d_r is a conditional generalized quadratic mean.

On the other hand, when $r=-1$, to each pair of economic units as above, we weight the function $1/(Y-X)$ by its joint probability density function. The corresponding average is raised to the power of negative one. Hence, d_{-1} is a conditional harmonic mean and, for all $r<0$, the economic distance d_r is a conditional generalized harmonic mean.

It can be seen that d_g in (3.3) is a conditional geometric mean and it has the same dimension of the income unit. Finally, d_0 in (3.2) is a dimensionless economic distance and, from (2.1), it is an average of the cdf $F_1(y)$ weighted by the pdf $f_2(y)$.

It can be proven (Dagum, 1979a) that d_r , $r \neq 0$, is a monotonic increasing function of r . Moreover:

$$(3.4) \quad d_{-r} \leq d_g \leq d_r, \quad r > 0$$

In the limit, when r tends to plus infinity, the measurement of d_r will be dominated by the largest income differential and, when r tends to minus infinity, the measurement of d_r will be dominated by the smallest income differential. In the former case, the value of the economic distance will be overemphasized, converging to $\max(Y-X | Y > X, M_2 > M_1)$. In the latter, it will be de-emphasized since $\lim d_r = \min(Y-X | Y > X, M_2 > M_1)$ as $r \rightarrow -\infty$ and it will be equal to zero unless the two pdfs do not overlap. If they do not overlap, then $\lim d_r = \min Y - \max X > 0$ as $r \rightarrow -\infty$.

Two desirable properties of any inequality measure are: to be dimensionless and to take values in the unit interval; d_r , for all $r \neq 0$, and d_g do not fulfill these properties. On the other hand, d_0 fulfills the first but not the second since it takes values, as we shall see below, in the interval $[\frac{1}{2}, 1]$.

The next section deals with the normalization of this class of economic distances to satisfy the two properties above mentioned.

4 THE CLASS OF ECONOMIC DISTANCE RATIOS D_r , r REAL

The class of economic distance ratios D_r is a transformation of the class of economic distances d_r such that D_r is dimensionless and takes values only in the unit interval. They are defined as:

$$(4.1) \quad D_r = (d_r - \min d_r) / (\max d_r - \min d_r)$$

and for d_g in (3.3):

$$(4.2) \quad D_g = (d_g - \min d_g) / (\max d_g - \min d_g).$$

The minima and the maxima of d_r and d_g are deduced from the observation that d_r and d_g are increasing functions of the income differentiation between the two populations of economic units. Hence, the larger the income differential of the members of the most affluent population (Q_2) with respect to the others (Q_1), the larger the values of d_r , $r \neq 0$, and d_g . This statement is a straightforward consequence of the mathematical definitions of d_r and d_g given in (3.1) and (3.3). For d_0 , in (3.2), we consider only the frequency of the income differentials. Therefore, we have:

i) The maximum of the economic distance (d_g and d_r , r real) is obtained when we consider the absolute value of all possible income differentials between the two populations of economic units. Hence:

$$(4.3) \quad \max d_0 = 1$$

$$(4.4) \quad \max d_r = \Delta_r = [E(|Y-X|^r)]^{1/r}, \quad r \neq 0$$

and

$$(4.5) \quad \max d_g = \Delta_0 = \exp (E \log (|Y-X|)),$$

where Δ_r is the Gini mean difference of order r between two income variables. It can be seen that Δ_r has, for all r , the dimension of income, while d_0 and $\max d_0$ are dimensionless economic distances. These maximum values are attained by d_0 , d_r and d_g when the two income distributions do not overlap.

In particular, for $r=1$ and $r=2$ we have:

$$(4.6) \quad \Delta_1 = 2E_2(YF_1(Y)) + 2E_1(YF_2(Y)) - E(Y) - E(X)$$

$$(4.7) \quad \Delta_2 = [\text{var } Y + \text{var } X + (E(Y) - E(X))^2]^{1/2}.$$

ii) The minimum of d_g and d_r , r real, is obtained under the assumption that X and Y are identical and independently distributed income variables. That is, when there is no income differential between the two populations of economic units. Whence, $F_1(y) = F_2(y)$ for all y , and

$$(4.8) \quad \min d_0 = E_1(F_1(Y)) = E_2(F_2(Y)) = E(F(Y)) = \frac{1}{2}$$

$$(4.9) \quad \Delta_1 \leq 2d_1 \rightarrow d_1 \geq \Delta_1/2 = \min d_1$$

$$(4.10) \quad D_0 = 2d_0 - 1 = 2E_2(F_1(Y)) - 1$$

and

$$(4.11) \quad D_1 = 2d_1/\Delta_1 - 1.$$

It follows from (2.3) and (4.6) that $\Delta_1 = 2d_1 + E(X) - E(Y)$,

and

$$(4.12) \quad D_1 = (E(Y) - E(X))/(2d_1 - E(Y) + E(X)).$$

The class of economic distance ratios D_r , r real, and D_g can be applied without any assumption regarding the mathematical form of the observed income distributions (a distribution-free approach), or with a given parametric assumption concerning the mathematical form of the income distribution (a model specification approach).

5 THE DISCRETE FORM OF D_0 and D_1

Observed income distributions always belong to the discrete type of distribution functions. This means that the income range is partitioned into a finite number of intervals and the population (or sample) of economic units are distributed among them. We assume without loss of generality, that the observed distributions are partitioned in n identical intervals of income, including the two open-ended intervals.

The discrete versions of d_0 and d_1 are given in (2.2) and (2.4) respectively. Replacing these formulas in (4.10) and (4.12) we deduce their corresponding economic distance ratios D_0 and D_1 . These formulas are mathematically appropriate to estimate the distribution-free values of parameters D_0 and D_1 from the observed income distributions.

6 A PARAMETRIC FORM OF D_0 and D_1

The economic distance ratios D_0 and D_1 are now deduced under the assumption that the observed income distributions are described by the following model developed by Dagum (1977):

$$(6.1) \quad F(z) = \alpha + (1-\alpha)(1+\lambda z^{-\delta})^{-\beta},$$

$$z > 0, \quad 0 < \alpha < 1, \quad (\beta, \lambda, \delta) > 0,$$

where z is income and $F(z) = P(Z \leq z)$ is the predicted cdf of income. Its corresponding pdf is:

$$(6.2) \quad f(z) = \begin{cases} \alpha, & \text{when } z=0 \\ (1-\alpha)\beta\lambda\delta z^{-\delta-1}(1+\lambda z^{-\delta})^{-\beta-1}, & z>0, \\ 0, & z<0. \end{cases}$$

The probability properties of (6.1) and (6.2) are preserved by application of the Jordan decomposition theorem which states that every probability distribution is a convex combination of a discrete and a continuous distribution, i.e.,

$$(6.3) \quad F(z) = \alpha F_d(z) + (1-\alpha) F_c(z), \quad 0 \leq \alpha \leq 1$$

It follows from (6.1)-(6.3):

$$(6.4) \quad f_d(0) = 1, \quad F_d(z) = 0, \quad z < 0,$$

$$(6.5) \quad F_c(0) = 0, \quad \text{and } F_c(z) = (1 + \lambda z^{-\delta})^{-\beta}, \quad z > 0.$$

Given the cdf (6.1), it can be proven (Dagum, 1979b) that the moment of order r around the origin is

$$(6.6) \quad E(Z^r) = (1-\alpha)\beta\lambda^{r/\delta} B(1-r/\delta, \beta+r/\delta), \quad r < \delta,$$

where $B(\cdot)$ is the complete Beta function; the p -th percentile is:

$$(6.7) \quad z_p = \begin{cases} \lambda^{1/\delta} [((1-\alpha)/(p-\alpha))^{1/\beta-1}]^{-1/\delta}, & p > \alpha \\ 0, & p \leq \alpha \end{cases}$$

and for $p=0.5$ we have the median of the income distribution; the Lorenz curve is:

$$(6.8) \quad L(F) = B(((F-\alpha)/(1-\alpha))^{1/\beta}, \beta + \frac{1}{\delta}, 1 - \frac{1}{\delta}), \quad \delta > 1,$$

hence, it is a Beta cdf; the Gini ratio is:

$$(6.9) \quad G = (2\alpha-1) + (1-\alpha)B(\beta, \beta)/B(\beta, \beta + \frac{1}{\delta}).$$

It follows from (3.1), (4.1), (4.4) and (6.6), that for the model of income distribution (6.1) there exists the economic distance ratio D_r for all $r < \delta$. It can be shown that:

i) For $r=0$:

$$(6.10) \quad d_0 = \alpha_1(1-\alpha_2/2) + (1-\alpha_1)(1-\alpha_2)\beta_2 \int_0^1 (1-t)^\theta [(1-t)^\delta + at^\delta]^{-\beta} dt,$$

where:

$$(6.11) \quad \theta = \beta_1\delta + \beta_2 - 1, \quad \delta = \delta_1/\delta_2, \quad a = \lambda_1\lambda_2^{-\delta}.$$

ii) For $r=1$:

$$(6.12) \quad d_1 = E_2(YF_1(Y)) + E_1(YF_2(Y)) - E(X),$$

where:

$$(6.13) \quad E_2(YF_1(Y)) = \int_0^\infty yF_1(y)dF_2(y) = \alpha_1 E_2(Y) \\ + (1-\alpha_1)(1-\alpha_2)\beta_2\lambda_2^{1/\delta} \int_0^1 t^{-1/\delta} 2(1-t)^b [(1-t)^\delta + at^\delta]^{-\beta} dt,$$

$$(6.14) \quad b = \beta_1\delta + \beta_2 + 1/\delta_2 - 1, \quad \delta = \delta_1/\delta_2, \quad a = \lambda_1\lambda_2^{-\delta}$$

and $E_1(YF_2(Y))$ is obtained after permuting the subscripts 1 and 2 in (6.13) and (6.14). The cdf $F_1(x)$ is obtained from (6.6), making $r=1$ and $(\alpha, \beta, \lambda, \delta) = (\alpha_1, \beta_1, \lambda_1, \delta_1)$.

Replacing in (4.10) the value obtained for d_0 in (6.10), we have the economic distance ratio D_0 and, replacing in (4.12) the value obtained in (6.12), we have the economic distance ratio D_1 .

7 A CASE STUDY: THE CANADIAN REGIONS

The economic distance ratios D_0 and D_1 are estimated following the two approaches studied in sections 5 and 6.

The Canadian family income distribution is analyzed by regions for 1971 (Statistics Canada, 1973). The Canadian population of family units is disaggregated in five regions: Atlantic Provinces (Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick), Quebec, Ontario, Prairie Provinces (Manitoba, Saskatchewan and Alberta) and British Columbia (B.C.).

Tables 1 and 2 provide the information needed to estimate the economic distance ratios D_0 and D_1 , for each binary combination of regions in Canada (1971), as well as the total with respect to the regions.

Table 1 reports the nonlinear least square parameter estimates resulting from the fit of model (6.1) to the observed income distributions. It also includes the Gini ratios estimated from the fitted income distributions, using formula (6.9) and the sum of square deviations of the observed from their corresponding predicted probability density functions.

Table 2 (columns 1 and 3) shows the observed mean and median incomes as reported by Statistics Canada (1973). Columns 2 and 4 report the mean and median incomes estimated from the fitted model, using formulas (6.6) and (6.7) for $r=1$ and $p=0.5$ respectively.

Tables 3 and 4 present the estimates of D_0 and D_1 for the Canadian regions. The first row, for each combination of regions, shows the estimates of D_0 (Table 3) and D_1 (Table 4) obtained from the fitted models of income distribution. For the estimates of D_0 we replace the estimated parameters from Table 1 in (6.10)-(6.11) and (4.10). The same estimates from Table 1 and the estimated mean income from Table 2 are used in (6.12)-(6.14) and (4.12) for the estimates of D_1 .

The second row, for each combination of regions in Canada provides the estimates of D_0 (Table 3) and D_1 (Table 4) directly obtained from the observed income distributions (the distribution-free approach). It makes use of formulas (2.2) and (4.10) for the estimates of D_0 and, for the estimates of D_1 , it works with the observed mean income in Table 2 and formulas (2.4) and (4.12). Formula (2.4) contains a term in y_j , $j=1, \dots, n$, where y_j is the midpoint of each interval. y_n is the midpoint of the openended interval $[y^*, \infty)$. Its estimator makes use of the convergence property of model (6.1) to the Pareto model of income distribution. It can be proven (Dagum, 1977, pp. 425-7) that, for large incomes, $1-F(y)$ converges to:

$$(7.1) \quad P(y) = (1-\alpha)\beta\lambda y^{-\delta}, \quad \delta > 1.$$

Hence, the mean income of the openended interval $[y^*, \infty)$ is:

$$(7.2) \quad E(Y|Y \geq y^*) = \delta y^*/(\delta - 1).$$

It follows from the estimates of the economic distance ratios (D_0 and D_1) presented in the Tables 3 and 4, the Gini ratio (Table 1) and the mean income (Table 2), that:

i) There is a high disparity among the Canadian regions. The most striking results correspond to the Atlantic Provinces.

They have a significant income differential with respect to all the other Canadian regions, as can be judged by both economic distance ratios D_0 and D_1 . In particular, the very high economic distance from the poorest (Atlantic Provinces) and the richest (Ontario and British Columbia) regions of Canada is compounded by a significant higher intra-income inequality (the Gini ratio) in the Atlantic Provinces ($G=0.351$) with respect to those of Ontario ($G=0.30$) and British Columbia ($G=0.297$).

ii) According to the Gini ratio as a measure of the intra-income inequality and the economic distance ratios (D_0 and D_1) as measures of the interincome inequality we can perform the following grouping of regions in Canada: 1) Ontario and British Columbia; 2) Quebec and the Prairie Provinces and 3) the Atlantic Provinces. In effect: the economic distance between regions of the same group is small and between regions belonging to different groups is large. It can also be observed that the regions included in the first group (Ontario and British Columbia) have almost the same intra-income inequality, as measured by the Gini ratio, and they are smaller than the Gini ratio estimates for the regions in the other two groups (Quebec, Prairies and Atlantic Provinces).

iii) The economic distance ratio of Canada with each of its regions places Ontario and British Columbia as more affluent than the average of the country and, the remaining regions, as less affluent. A similar situation is observed with respect to the Gini ratio, since its estimate for Canada is greater than those of Ontario and British Columbia and smaller than the estimates of the remaining regions.

iv) The two estimation procedures of the economic distance D_0 give almost identical results.

v) The parametric and distribution-free formulas of the economic distance ratio D_1 (Table 4) show consistent results following similar trends for the fifteen cases studied. Their levels, however, are not as close as those obtained for D_0 . The difference of level is particularly high for the estimates of the economic distance ratio between the Atlantic Provinces and Ontario. The reason for this large discrepancy is mainly due to the fact that whereas the estimated mean income of the Atlantic Provinces is 2.1 per cent greater than its observed mean income, that of Ontario is 2.9 per cent smaller, reducing the difference $M_2 - M_1$ from \$3,547 to \$3,043. This difference enters in the estimate of D_1 , as can be seen in (4.12).

vi) The economic distance ratios D_0 and D_1 are mutually consistent. They move in the same direction and show similar evaluation of the income differential between regions in Canada. D_1 , however, is systematically larger than D_0 because it includes the difference of incomes $Y-X$.

8 CONCLUSION

This study introduces a class of economic distance ratios that purports to assess the income differential between two populations of economic units. It is particularly adequate to analyze the income differential due to a given socio-economic characteristic such as sex, race, language, region, profession and age.

Two members of this class of economic distance ratios, called here D_1 and D_0 , are identified and applied to the income differential between regions in Canada. These two ratios are normalized forms of their corresponding economic distances d_1 and d_0 , being dimensionless and take values between 0 and 1 only.

The economic distance ratios D_0 and D_1 measure the degree of relative affluence of one population with respect to the other.

D_1 is different from D_0 in that D_1 takes into consideration the size of income whereas D_0 does not.

Mathematically, D_1 is the normalization of the weighted average of the income differences $Y-X$, for all $Y>X$, given that the mean income M_2 of Y is greater than the mean income M_1 of X . On the other hand, D_0 is the normalization of the average of the cumulative distribution function of the less affluent population Q_1 weighted by the probability function of the most affluent population, Q_2 .

From the mathematical definitions of D_0 and D_1 their corresponding formulas for discrete distributions are deduced. These formulas are directly applied to the observed income distributions (distribution-free estimates).

The formulas for D_0 and D_1 under the parametric assumption of the income distribution model specified in (6.1) are also deduced and applied. Table 3 provides the parametric (first row) and distribution-free (second row) estimates of D_0 for the Canadian regions. Table 4 gives the corresponding values of D_1 . The results from Tables 3 and 4 show that:

i) Both the distribution-free and the parametric estimates of D_0 are almost identical for the 15 cases considered.

ii) The distribution-free and parametric estimates of D_1 provide the same overall assessment of regional disparities although their estimated levels are not so close as those of D_0 .

iii) The difference of levels between the distribution-free and the parametric estimates of D_1 is mainly due to the discrepancy between the observed and the estimated mean income difference M_2-M_1 (Table 2). This source of discrepancy can be eliminated using the same mean income difference M_2-M_1 for both estimation procedures.

iv) The Gini ratio, the mean and median income of Canada and its regions place Ontario and British Columbia above the country average. The estimates for these two regions show smaller intra-income inequality and more affluence than the rest.

v) The poorest region in Canada, as measured by the mean and median income of family units in 1971, is the Atlantic Provinces. This economic reality is aggravated by the fact that this region has the greatest intra-income inequality as measured by the Gini ratio, 0.351. The richest region is Ontario and it has a Gini ratio, 0.30. The parametric and distribution-free estimates of the economic distance ratio D_0 between these two regions (Table 3) is equal to 0.343 and 0.344 respectively. The parametric and distribution-free estimates of the economic distance ratio D_1 between the same regions are (Table 4) $D_1 = 0.448$ and $D_1 = 0.561$ respectively.

vi) The results obtained with the economic distance ratio D_1 provides useful information that complements the information given by the Gini coefficient. The parametric version should be preferred since it will give more stable results whenever a good income model is identified. The lack of a good model, however, should not be a deterrent for the use of the economic distance ratio since the distribution-free procedure, directly applied to the observed income distributions, gives results consistent with those of the parametric version.

vii) If measured over consecutive years, the economic distance ratio becomes a basic time series for the analysis of the trend and the impact of the business cycle upon the income differential.

Table 1

Estimated Parameters and Gini Ratios (*) (Model (6.1))

Family income units	Estimated parameter				Gini ratio	Σu^2
	α	β	$\lambda(**)$	δ		
Canada (1971)						
Total	0.0043	0.3231	5.515	4.7785	0.323	0.00047
Atlantic Prov.	0.0	0.4667	0.953	3.5953	0.351	0.00126
Quebec	0.0093	0.4283	2.363	4.0620	0.332	0.00032
Ontario	0.0197	0.3754	7.502	5.0375	0.300	0.00068
Prairie Prov.	0.0	0.2808	4.643	4.7068	0.346	0.00066
B.C.	0.0069	0.2860	11.977	5.7336	0.297	0.00225

(*) The observed income distribution is grouped in 14 intervals of income.

(**) The scale parameter λ corresponds to income measured in 10^{-4} Canadian dollars.

Table 2

Observed and Estimated Means and Medians* (in current values)

Family income units	Mean Income		Median Income	
	Observed	Estimated	Observed	Estimated
Canada (1971)				
Total	10,368	10,074	9,947	9,340
Atlantic Prov.	7,936	8,103	7,094	7,010
Quebec	9,919	9,679	8,706	8,700
Ontario	11,483	11,146	10,546	10,560
Prairie Prov.	9,309	9,147	8,388	8,360
B.C.	11,212	10,643	10,269	10,220

(*) Sources: Columns 1 and 3 are obtained from Statistics Canada (1973); column 2 is estimated applying (6.6) for $r = 1$ and column 4 is obtained from (6.7) for $p = 0.50$.

Table 3

Regional Economic Distance Ratio D_0 , Canada 1971*

Family Income Units	Atlantic Provinces		Prairies	Quebec	Canada	British Columbia (B.C.)	Ontario
Atlantic Provinces	0.0 0.0	0.124 0.125	0.182 0.181	0.229 0.229	0.309 0.306	0.343 0.344	
Prairies		0.0 0.0	0.049 0.048	0.099 0.097	0.175 0.173	0.212 0.210	
Quebec			0.0 0.0	0.053 0.052	0.132 0.131	0.171 0.170	
Canada				0.0 0.0	0.075 0.077	0.116 0.115	
B.C.					0.0 0.0	0.042 0.039	
Ontario						0.0 0.0	

* The first row of each binary combination of regions presents the parametric estimates obtained from the model (6.1). The second row presents the estimates obtained directly from the observed income distributions (distribution-free).

Table 4

Regional Economic Distance Ratio D_1 , Canada 1971*

Family Income Units	Atlantic Provinces		Prairies	Quebec	Canada	British Columbia (B.C.)	Ontario
Atlantic Provinces	0.0 0.0	0.171 0.219	0.254 0.315	0.310 0.365	0.392 0.477	0.448 0.561	
Prairies		0.0 0.0	0.083 0.092	0.143 0.154	0.231 0.274	0.297 0.300	
Quebec			0.0 0.0	0.061 0.064	0.149 0.182	0.219 0.211	
Canada				0.0 0.0	0.088 0.121	0.161 0.153	
B.C.					0.0 0.0	0.077 0.037	
Ontario						0.0 0.0	

* The first row of each binary combination presents the estimates obtained from the model (6.1) fitted to the observed income distributions. The second row presents the estimates obtained directly from the observed income distributions (distribution-free.)

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THE LORENZ-GINI, THE PAGLIN-GINI
AND
THE MEASUREMENT OF INCOME INEQUALITY

by

W. Irwin Gillespie*

It is well known that the measurement of inequality in the distribution of income is fraught with theoretical and technical problems (Atkinson, 1970; Garvy, 1952; HWC, 1977; Love, 1976). It is also well known that, aside from obtaining knowledge to satisfy curiosity, the major reason for attempting to measure income inequality is normative. If the distribution of income is measured as having "x amount of inequality" and x turns out to be a greater degree of inequality than we believe "ought to exist" within the community, then some will turn their attention to those instruments that may be capable of reducing x. The measure of inequality, when compared with some well-defined "standard of equality", generates implications for policy.

Thus the normative model or standard of equality which is chosen as the ethical basis against which the measure of x is compared is a crucial factor in the use of the measure. If the standard of equality is built into the measure -- as it is with the Lorenz-Gini (Lorenz, 1905) -- then the normative model becomes the crucial theoretical problem in the derivation of the measure.

Morton Paglin has recently drawn attention to the normative role played by the 45 degree line in the derivation of the Lorenz-Gini -- a popular and widely-used measure of inequality in the distribution of income (Paglin, 1975; Paglin, 1977). He suggested replacing the 45 degree line of Lorenze curve methodology with a P-reference line of the Paglin methodology as the standard or goal of equality. In addition, he used this new standard of equality to calculate the extent to which the actual distribution of income had become more or less unequal during the post war period in the United States. The Paglin approach has already been used to calculate changes in the actual distribution of income in Canada during the post war period (Armstrong, 1977).

There has been considerable controversy over whether the Paglin-Gini measured what Paglin said it measured (Danziger *et. al.*, 1977; HWC, 1977; Johnson, 1977; Kurien, 1977; Minarik, 1977; Nelson, 1977), but with the exception of Danziger *et. al.*, and Kurien there has been little discussion of and no detailed analysis of the normative model underlying the Paglin approach. Since the Paglin methodology results in the rejection of an inequality measure which, for all its technical difficulties, is widely used in many countries, it is important to be as clear as possible about the normative model as well as the measurement problems.

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This paper is devoted to an analysis of the normative models underlying the Paglin methodology and the Lorenz-Gini methodology. I will argue that a normative model is required in order to discuss the replacement of the 45 degree line by (any kind of) P-reference line as a standard of equality and that the Paglin methodology does not have a normative model with substantive ethical content.

The argument is developed in four stages. Section 1 develops a positive model of the determination of the distribution of income. Section 2 describes the Paglin model of the determination of the distribution of income. Section 3 and 4 establish the normative models underlying the P-reference line and the 45 degree line respectively, as standards of equality. Section 5 draws several conclusions.

1 A POSITIVE MODEL OF THE DETERMINATION OF THE DISTRIBUTION OF INCOME

It has long been recognized that the marginal productivity theory of the distribution of income, regardless of its property as an efficient allocator of the factors of production, given factor endowments, entails normative difficulties. According to this theory, those workers with a zero marginal product (for example, young adults who can no longer call upon intrafamily transfer and who are too unskilled to have any value to an enterprise, or the elderly whose lifetime savings are lost through risky investment, changed market conditions, or unexpected increased lifetime expectancy) receive a zero income and cease to survive. Those workers with very low marginal productivities fare little better.

In such a model many factors contribute to determining marginal productivities and hence, income: inherited skills, capabilities, intelligence and capital, acquired human capital, etc. As a result, the productive contributions of different workers are not solely a function of the aging process. The atomistic market throws out considerable income differences among members of the same age group as well as mean income differences among different age groups. And there will be some individuals with current incomes below a level that assures survival.

The problems of current sub-survival and low incomes persist in a life-cycle context as well. Given a stationary state, perfect markets everywhere and perfect certainty, it is possible for individuals to vary the pattern of consumption over their lifetimes independent of the pattern of lifetime income. The young can borrow against future higher incomes and the middle-aged can save for later retirement. Even in such an extreme polar example, and with the added condition that each member of an age cohort can expect an equal lifetime income, the income generating process, debt aversion of some of the young, and low savings propensities of some of the middle-aged can result in some young adults and elderly adults having sub-survival current income (and hence, current consumption capabilities).

It might be argued that in a stationary state-perfect markets-perfect certainty model no rational youth would be debt averse and no rational middle-aged adult would have a lower savings propensity than would assure him a future consumption flow until precisely the day he dies. Consequently, no individuals would have sub-survival or low current incomes, so long as all had equal lifetime incomes. [1] Since this argument rules out, by definition, mistakes and preferences that diverge from a rational individual's, it devolves into a tautology: individuals with equal lifetime incomes cannot have low or subsurvival current incomes. Such a tautology is not very helpful in accounting for the world around us.

Relaxation of the assumptions of perfect markets and perfect certainty results in some young adults without debt aversion and some elderly adults who had high savings propensities during middle-age having sub-survival incomes (and consumption capabilities) during their youth and retirement respectively. Even a risk-averse middle-age high saver can find his retirement nestegg depleted by failed investment, increased life-expectancy and extraordinary medical expenses. Finally, in a dynamic, growing economy, the mean lifetime income of the post second world war generation will exceed the mean lifetime income of the pre first world war generation, in large part because the latter hands on to the former a more productive capital stock. Thus many of the elderly of the older generation will have low or sub-survival current incomes (consumption capabilities) simultaneous with increasing current incomes of all those younger than themselves.

In a life-cycle context then, young adults and elderly adults may, and in a dynamic, imperfect, uncertain economy will, end up with low or sub-survival current consumption capabilities. In a community comprised of humane members we would expect an ongoing concern about and some kind of non-private response to cope with such current low consumption capabilities -- or incomes -- any time such low consumption capabilities arise. I will assume in what follows that it is the government, duly elected by the individual members of a community, which engages in nonprivate redistributive activity.

There are many ways in which the government could act (its positive response) given the ethical view of the members of a community as to how income ought to be distributed (its normative framework). I will assume that there are three communities, each one of which instructs its government to respond to income differences in a different manner. Community One instructs its government to provide transfers to those young adults and elderly adults who would have had both zero and low incomes. The source of the transfers is a proportional tax on the incomes of all members of the community.

Community Two instructs its government to redistribute income among members of the same age group until they all have the mean income for the age group; there will be different mean incomes for different age groups. In a static economy, all members of the community now have equal lifetime incomes even though the age-income profile is peaked. Young adults and elderly adults will have very low incomes. For Community Two, I assume the resulting mean incomes of young adults and elderly adults are at least above the survival level. This outcome is not guaranteed by the directive to the government which is limited to redistributing within but not between age groups.

Community Three instructs its government to provide transfers to all those with incomes below the mean from all those with incomes above the mean until all members of the community have equal incomes. All members of the community now have equal lifetime incomes and equal current incomes. The source of the transfers is any member of the community with an above-average annual income. Age has become irrelevant: young adults and elderly adults have incomes equal to middle-aged adults.

2 THE PAGLIN POSITIVE MODEL OF THE DETERMINATION OF THE DISTRIBUTION OF INCOME

Community One is presented by Paglin as the positive model of income determination in the economy. The marginal productivity theory generates the distribution of private market incomes with a peaked age-income profile. As a worker ages his marginal productivity increases -- as do his earnings -- until, somewhere beyond middle-age, the aging process itself reduces his productivity -- and his earnings fall as well. The role of market-determined income is continually stressed by Paglin. The

peaked age-income profile reflects the "realities of income production," "basic facts relating to productivity," "functional nature of the lifecycle differences," and "such powerful forces" that they ought not to be violated (Paglin, 1975, pages 598, 602, 603; and Paglin, 1977, pages 523, 524, 525, 529). [2] "Political decisions" that affect the distribution of income are restricted to money transfers (those currently provided in the U.S. economy) and in-kind transfers which Paglin would include in the measurement of income (Paglin, 1975, p. 606 and Paglin, 1977, p. 529). Since the taxes to finance these transfers do not, in Paglin's scheme, alter the distribution of private market income, he implicitly assumes them to be proportional to income. [3]

Community Two is suggested by Paglin as the standard of equality against which current efforts aimed at redistributing income should be judged: an equal lifetime income for all members, with the peaked age-income profile associated with the mean income of each age group. [4] It is a community that has embraced the P-reference line.

Community Three has been suggested by some as the standard of equality against which current efforts aimed at income redistribution should be judged. It is a community that has embraced the 45 degree line of perfect equality.

The P-reference line and the 45 degree line are two alternative standard-of-equality answers to the question, "what ought to be the distribution of income within a community?" Each is the outcome of a set of ethical views of the members of the community about the sharing of the total resources of the community. What are the ethical views driving the normative engines of the P-reference line and the 45 degree line?

3 THE P-REFERENCE LINE AS A STANDARD OF EQUALITY

The P-reference line is the mean age-income profile. In the Paglin analysis its ethical content rests in two dimensions: (1) private market income, by age, ought to be maintained; and (2) the young and elderly, because they have fewer needs than the middle-aged, ought to share less equally in the community's resources.

The market income dimension rests on the ethical premise that a member of the community ought to receive the mean market income of his age group. This implies that a 34-year old worker who has acquired greater skills than other 34-year old workers ought not to receive any more income than they do. However, given the existing peaked age-income profile, a 35-year old worker who has accumulated more skills than a 34-year old worker ought to receive more income. Given that the source of income differences in the two examples is identical, it would be ethically inconsistent to ascribe different prescriptive rules for distributing income.

The only variable that differs in the example is age. For Paglin age is ethically beautiful until approximately 45-54, after which age becomes ethically ugly. Even here the ethical content of any particular age grouping is not dealt with adequately by Paglin. For the empirical results to have any meaning, it is necessary to know whether members of the community would prefer a one-year age grouping (as in the example above), a five-year age grouping or a mixture of ten-year, eleven-year and open-ended age groupings (as in Paglin's empirical work) to achieve their equity goals. At the point where members of the community prefer one age group that includes all members of the community, then Community Two becomes identical to Community Three and the Paglin-Gini becomes identical to the Lorenz-Gini. [5]

The ethical foundations of the market dimension turn out to be, upon closer examination, non-existent. Basing the ethical decision as to how the age-income profile ought to be distributed on how, in fact, the age-income profile is distributed is tantamount to confusing a normative model with a positive model. It is also circular reasoning. Incomes that are paid according to marginal products are a function of product demands and hence of the given distribution of income. Thus incomes that ought to be distributed according to marginal products are being distributed according to the existing distribution of income: what is, ought to be. Such a position is not an ethical position about the sharing of the community's resources; rather it is a declaration of the status quo.

That the existing distribution of income is suggested as the normative standard of equality in the Paglin analysis is clear (Paglin, 1975, pp. 599-602 and Paglin, 1977, pp. 523-4). Paglin stresses that the peaked age-income profile is the outcome of "such powerful forces" that it ought not to be violated (Paglin, 1977, p. 529). The bottom line is clear when he admits that, "I believe that average income differences between cohorts are normal and functional, and their elimination unnecessary as a long-run equality condition" (Paglin, 1977, pp. 525-6).

That the normative model so adopted is lacking in ethical content may have been obscured for a number of reasons. First, the "needs" dimension, referred to earlier, provides a patina of ethical gloss to what is basically a rationalization of the existing distribution of income. It is conceivable that members of the community might adopt the ethical premise that the young and elderly have fewer "needs" than the middle-aged and therefore they ought to have less income. However, such a premise would require a careful, precise definition of those "needs" and their distribution across the members of the community. In Paglin's normative model there is no such detailed discussion. Rather, we are left to infer that "families during the period of child rearing, when they have maximum income needs" ought to have higher incomes than "families in the retirement stage of the life cycle when they have minimum economic responsibilities" (Paglin, 1975, p. 598). A flat age-income profile is rejected because it "flies in the face of both consumption needs and the realities of income production" (Paglin, 1975, p. 599). The P-reference line even comes to embody "society's needs for varying income over the life cycle" (Paglin 1975, p. 602, emphasis added). That Paglin's differential needs by age groups is not an explicitly developed ethical position but a rationalization of the status quo is made clear in his response to the suggestion to replace the P-curve standard with a standard based on a "collective judgement on age-related need". [6] Paglin rejects this because "the collective judgement is better revealed by the average age-income statistics which recognize all market expressed preferences, productivity considerations and political decisions, than by the judgement of a team of experts" (Paglin, 1977, p. 529). [7]

Second, Paglin describes his P-reference line as an "explicit definition of perfect equality," as a "reasonable and sufficient" indication of equality and as a "more realistic definition of perfect equality" (Paglin, 1975, pages 598, 599, 605, emphasis added), using a language of persuasion that lulls the reader into uncritical acceptance of such a definition, but which is, for normative purposes, irrelevant. It is not the reasonableness of the P-reference line that is of interest; rather it is the normative model -- and the ethical content therein -- that would give rise to adopting the P-reference line that is crucial. Such a normative model does not exist: in Paglin's community what is, ought to be.

Third, Paglin suggests that the "reasonable and sufficient" income measure for purposes of discussing equality is lifetime income, without making any effort to develop the normative

foundations of a lifetime income concept (Paglin, 1975, pp. 599-600). [8] It was noted in section I that even within a static economy (assumed by Paglin in his theoretical model) with expected equal lifetime incomes there would still be some kind of redistribution of current incomes by a humane community.

Finally, the normative content of the P-reference line in a growing economy (captured by Paglin's measurements but not by his theoretical model) is even more strongly in favor of the status quo (HWC, 1977, pp. 39-40). Paglin's sole source of redistributive transfers for elderly adults with current incomes below the mean is elderly adults with current incomes above the mean; the higher mean incomes of the non-elderly -- in part a result of prior economic actions of the elderly -- are to remain intact. According to the P-reference line, income differences between generations ought to be maintained.

4 THE 45 DEGREE LINE AS A STANDARD OF EQUALITY

The 45 degree line results in each member of the community having an equal income for a given year and an equal lifetime income. In Paglin's terminology there is a flat age-income profile. The ethical content rests on one crucial dimension: existence. Because a member of the community exists he or she ought to share equally with every other member of the community in the current resources of the community. The ethical views of the members of a community which adopted such a standard of equality would be straightforward and consistent. They would place great emphasis of a life, per se. As a consequence, from the ethical premise that existence alone counts, the members of such a community would adopt as a standard of equality an equal sharing of the total resources of the community.

It is important to be clear about the major ethical implications underlying this normative model. Income is not redirected to the elderly because they are old and have made an economic contribution in the past. Income is not redirected to the young to permit them to acquire working skills which will command a price in a future market (when they will be making a future contribution). Income is not redirected to the middle-aged because they face expenses in raising and educating their children. Income is not redistributed to any group of members because that group is in some sense "more deserving" than other members. Rather income is distributed equally to all regardless of age, expenses, deservingness, skin colour or sex because of the inherent value of each person. It is a consistent set of ethical beliefs about how income ought to be distributed, and it implies a precise definition of a standard of equality -- the 45 degree line.

The 45 degree line is rejected by Paglin primarily because it interferes with the peaked age-income profile thrown out by the market: a normative standard is rejected because of a particular positive model. He argues that the standard of a flat age-income profile would fly

"in the face of both consumption needs and the realities of income production, for we know that investment in human resources through education and training produces a more peaked age-income profile (Paglin, 1975, p. 599)." [9]

Thus, the ethical views of those members of Community Three which are embodied in the 45 degree line as a standard of equality are rejected -- not because a more preferred or convincing set of ethical views are advanced by Paglin -- but because they are at variance with the status quo. This is a fallacious argument. So long as there exist humane members in each of the three communities referred to earlier, they will choose to interfere with the process of market income generation

which assigns some persons a zero or low current income. The basis and extent of their interference will depend upon the gains to be achieved for the members of the community in terms of their ethically desired distribution of the community's resources and the costs to be borne by the members of the community in terms of possible lost output due to disincentive effects. But an ethically desired distribution of income cannot be rejected because it is at variance with the peaked age-income profile.

Paglin also rejects the normative model underpinning the 45 degree line because, "Lorenzian equality does not allow family income to be increased by additional members entering the labor force" (Paglin, 1977, p. 599). It all depends on whether the unit of reference for normative purposes is a member of the community (in which case the observation is irrelevant) or a family unit (in which case the observation is a descriptive outcome of the notion of equality across all units). It is interesting to note that Paglin's P-reference line is subject to the same observation: the peaked age-income profile is for the age of the head of the family unit, and thus it "does not allow family income to be increased by additional memers entering the labor force."

Therefore, Paglin's case for rejecting the normative model underlying the 45 degree line is unconvincing. The members of a community with a strong belief in the value of the individual qua individual would adopt an equality standard of the 45 degree line sort (with whatever appropriate adjustments that are necessary to allow for family or household units) as an equity goal. Adoption of such a goal would not blind the members of the community to possible costs of moving too rapidly to achieve the goal. The "income realities" observed by Paglin do exist and the possible losses from interfering with these income realities would have to be continually weighed against the gains of achieving equal treatment of all. There would be circumstances when the benefitcost evaluation would augur for rapid progress towards the goal; there would also be circumstances calling for modest, if any, progress towards the goal.

5 CONCLUSIONS

Morton Paglin's suggestion that the 45 degree line as a standard of equality be replaced by a P-reference line should be rejected because it is without foundation. The ethical foundations of the normative model embodied in the 45 degree line of equality cannot be dismissed as cavalierly as Paglin suggests, because they do reflect a belief in the value of the individual qua individual. Such an ethical position with its emphasis on equality and equal sharing does give normative meaning to the 45 degree line as an equality standard, and therefore the Lorenz-Gini is a meaningful calculation.

The P-reference line, on the other hand, is a normatively empty box, devoid of any ethical content. The P-reference line confuses the peaked age-income profile thrown out by the market with the normative question of how income ought to be distributed. There is no ethical content to the prescription that the young and elderly ought to have low incomes because, on average, they do have low incomes. A meaningless age-Gini subtracted from the Lorenz-Gini results in a meaningless Paglin-Gini.

There are many ethical views other than those embodied in the equal sharing dimension of the 45 degree line as an equality goal to which the members of a community might aspire. My purpose here has been to demonstrate that the 45 degree line does have a normative content whereas the P-reference line does not. Others may wish to develop in explicit detail the logical "standards of equality" that follow from alternative sets of ethical beliefs.

Footnotes

- 1 I am grateful to Keith Horner for drawing this point to my attention.
- 2 Strictly speaking, all that is required is a distribution of income that is partly determined by some set of market forces. Thurow's job-competition model (Thurow, 1975) would serve equally well as the basic engine of the positive model.
- 3 Paglin accepts political decisions which "see fit to modify [the market system's generation of 'private incomes and private goods'] through income transfers" as a part of the system determining the distribution of income (Paglin, 1977, p. 529). Since only transfers are allowed to alter the distribution of private incomes, all taxes and the benefits of collective consumption goods must, necessarily, be proportional to market incomes. In Paglin's empirical work in-kind transfers as well are implicitly assumed to be proportional to market incomes. These proportionality assumptions are not supported by existing evidence (Reynolds and Smolensky).
- 4 While Communities One and Two are separate in Paglin (1975) they blend in Paglin (1977) where he argues at one point that the standard of equality would be a combination of the directives to Communities One and Two (Paglin, 1977 p. 529). This ambiguity does not affect the conclusions of this paper since it is clear that for Paglin the redistribution directive of Community Two is the operative equality standard.
- 5 I am grateful to Richard Brecher for drawing this point to my attention. In general, the broader the age grouping, the closer will the Paglin-Gini approach the Lorenz-Gini in magnitude.
- 6 Danziger, Haveman and Smolensky (pp. 508-9), question the normative content of Paglin's model and come close to acknowledging -- in their call for a collectively established "social judgement on the constitution of life cycle needs" -- that what is required is rough agreement of the ethical views of the members of the community as to how the total resources of the community ought to be distributed over the lifetime of its members. This implies some ethical decision for current incomes -- at which stage one is very close to the normative framework within which the 45 degree line is cast.
- 7 If Paglin truly believes that the collective judgement is better revealed by such a set of forces, including political decisions, and that such a collective judgement is the appropriate standard of equality, then it is necessary to argue that the community is always at its standard of equality. It must be so because political decisions are part of the revealed collective judgement; therefore what is revealed must be desired as a standard of equality. In such a world there is no reason to calculate age-Ginis, Paglin-Ginis or Lorenz-Ginis.
- 8 Again, Paglin substitutes his irrelevant criterion of "reasonableness" in place of a normative criterion of the ethical views that would lead the members of the community to choose a lifetime income standard of equality. To reject Paglin's "more realistic definition of perfect equality" we are told, one must be "prepared to argue that equality of lifetime income is not a reasonable norm" (Paglin, 1975, p. 605, emphasis added).
- 9 Paglin does not take his own argument concerning training and education seriously: not only does the age-Gini ignore the income effect of training and education, but further, Paglin rejects the suggestion in Minarik for an age-education-Gini.

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CONFERENCE PROGRAM

Thursday, May 10 Conference Chairman's Opening Remarks
A.M. (Mac) Runciman

Session #1 Social Security

Chairman: David Slater

Papers

Considered:	Eden Cloutier	"Some Regional Aspects of the Distribution of Benefits and Costs of Social Security in Canada, 1971-1975"
	Derek Hum	"Negative Income Tax Experiments: A Descriptive Survey with Special Reference to Work Incentives"

Discussants: Irwin Garfinkel
Monique Frappier-DesRochers
Greg Traversy

Session #2 Language

Chairman: Raymond Breton

Papers

Considered:	François Vaillancourt	"The Role of Language in the Determination of Labour Earnings of Quebec Males in 1970"
	Jac-André Boulet	"The Origin of Linguistic Disparities in Labour Income Between Francophones and Anglophones in the Montreal Metropolitan Zone in 1971"

Discussants: Jean Renaud
Tim Smeeding

Session #3 Special Concerns

Chairman: Robin Rowley

Papers

Considered:	Murray Brown Robert Foster	"Regional Income Effects of Migration in Atlantic Canada"
	Jenny Podoluk	"Poverty and Income Adequacy"
	Pierre Fortin	"The Price, Employment and Redistributive Effects of the Minimum Wage: Lessons from the Quebec Experience"

Discussants: James Morgan
John Vanderkamp
Lars Osberg

Friday, May 11

Session #4 Wealth

Chairman: Fergus Chambers

Papers

Considered: James Davies "The 1970 Survey of Consumer Finances, Non-sampling Error, and the Personal Distribution of Wealth in Canada"

Gail Oja "Inequality of the Wealth Distribution in Canada, 1970 and 1977"

Discussants: Alan Harrison
James Smith

Session #5 Female Incomes

Chairman: Pierre Bourdon

Papers

Considered: Rachel Rosenfeld "Sex Differences in Socio-economic Achievement: An Overview of Findings and Explanations"

Monica Boyd
Elizabeth Humphreys "Sex Differences in Canada: Incomes and Labour Markets"

Ruth Rose-Lizée
Ginette Dussault* "Discrimination against Women and Labour Market Segregation: The Case of Office Workers in Montreal"

Discussants: Mollie Orshansky
Maureen O'Neil

Session #6 Education

Chairman: John Porter

Papers

Considered: Robert Lacroix
Clément Lemelin "Higher Education and Incomes"

Hugh McRoberts "An Income Attainment Model for Native-Born Canadian Male Wage Earners"

Discussants: Jeff Greenberg
Robin Rowley
Bill Ahamad

* not present

Saturday, May 12

Session #7 Policy Implications

Chairman: Sylvia Ostry

Paper

Considered: Dorothy Wedderburn "Policy Issues in the
Distribution of Income
and Wealth: Some Lessons
from the Diamond
Commission"

PANEL: John Vanderkamp
James Morgan
John Porter

Session #8 Imputations

Chairman: Jay Kaufman

Papers

Considered: Neil MacLeod "Analyzing Postwar
Keith Horner Changes in Canadian
Income Distribution"

Irwin Gillespie "Taxes, Expenditures
and the Redistribution
of Income in Canada,
1951-1977"

Michael Wolfson "The Lifetime Impact of
the Retirement Income
System, A Quantitative
Analysis"

Discussants: Nanak Kakwani
Sheldon Danziger

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