

*STAFF STUDY No. 15*

An Analysis of Interregional Differences  
in Manpower Utilization and Earnings

*by* Frank T. Denton

*prepared for the  
Economic Council of Canada*

HC  
111  
.E31  
n.15

c.1  
tor mai



AN ANALYSIS OF INTERREGIONAL DIFFERENCES  
IN MANPOWER UTILIZATION AND EARNINGS

by

Frank T. Denton

Date Due

AUG 26 1975

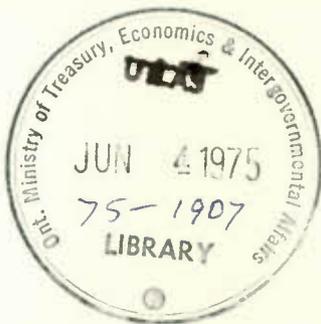
Staff Study No. 15

Economic Council of Canada

April 1966

This is one of a series of technical studies prepared as background papers for the Second Annual Review of the Economic Council of Canada, Towards Sustained and Balanced Economic Growth. Although these studies are published under the auspices of the Council, the views expressed in each case are those of the authors themselves. Other publications of the Council are listed at the end of this paper.

23-236 PRINTED IN U.S.A.



© Crown Copyrights reserved

Available by mail from the Queen's Printer, Ottawa,  
and at the following Canadian Government bookshops:

OTTAWA

*Daly Building, Corner Mackenzie and Rideau*

TORONTO

*221 Yonge Street*

MONTREAL

*Æterna-Vie Building, 1182 St. Catherine St. West*

WINNIPEG

*Mall Center Bldg., 499 Portage Avenue*

VANCOUVER

*657 Granville Street*

or through your bookseller

A deposit copy of this publication is also available  
for reference in public libraries across Canada

Price \$1.00

Catalogue No. EC22-1/15 ✓

*Price subject to change without notice*

ROGER DUHAMEL, F.R.S.C.

Queen's Printer and Controller of Stationery

Ottawa, Canada

1966



TABLE OF CONTENTS

	<u>Page</u>
I. Introduction	1
II. Utilization of Manpower	3
III. Average Earnings of Persons Employed	9
IV. Summary and Conclusions	14

Technical Appendices

Appendix A - Statistical Decomposition of Earned Income per Person	19
Appendix B - The Measurement of Seasonal Variations	21
Appendix C - Standardization Analysis: Methods and Sources of Data	23
Appendix D - Regression Analysis of the Effect of Differences in Urban-Rural Composition on Average Earnings	27
Appendix E - A Model of Regional Response to Changes in the Canadian Unemployment Rate	31
Appendix F - Relative Income Levels at High and Low Levels of Unemployment: An Experimental Simulation	43
Appendix G - Estimation of Regional Unemployment Rates Expected at Different Levels of the Canadian Unemployment Rate	47

TABLE OF CONTENTS (cont'd)

		<u>Page</u>
<u>Tables</u>		
Table 1	Earned Income per Person (1961-64 averages)	2
Table 2	Total Population and Number of Persons Employed (1961-64 averages)	3
Table 3	Age Distribution of the Population (June 1, 1961)	4
Table 4	Civilian Labour Force Participation Rates (1961-64 averages)	5
Table 5	Regional Unemployment Rates Expected at Different Levels of the Canadian Unemployment Rate (Assuming average 1961-64 relationships)	6
Table 6	Seasonal Variations in Employment: Differences between Annual and Third-Quarter Averages (1961-64 averages)	7
Table 7	Average Hours Worked per Week (Averages of February and September, 1964)	8
Table 8	Average Earned Income per Person Employed (1961-64 averages)	9
Table 9	Percentage of Male Population in Selected Educational Categories (June 1, 1961)	12
Table 10	Percentage of Population Living in Urban and Rural Areas (June 1, 1961)	13

TABLE OF CONTENTS (cont'd)Appendix Tables

	<u>Page</u>
Table A-1 Total and Earned Income per Person, 4-Year Averages, 1949-64	51
Table A-2 Factors Contributing to Differences in Earned Income per Person, 4-Year Averages, 1949-64	52
Table A-3 Factors Contributing to Differences in Earned Income per Person, Expressed as Ratios to Canada Figures, 4-Year Averages, 1949-64	53
Table A-4 Labour Force Participation Rates Cross- Standardized for Age and Sex, March 1964	54
Table A-5 Average Seasonal Levels: Differences Between Annual and Third-Quarter Averages; Labour Force, Employment, and Unemployment, 1960-64	54
Table A-6 Average Weekly Hours Cross-Standardized for Class of Worker, Sex and Agricultural- Nonagricultural Distribution, Averages of February and September, 1964.	55
Table A-7 Average Weekly Hours in Manufacturing Cross- Standardized for Industry, 1963 Annual Averages	55
Table A-8 Average Weekly Earnings in Manufacturing Cross- Standardized for Industry, 1963 Annual Averages	56
Table A-9 Average Weekly Earnings in "Industrial Composite" Group Cross-Standardized for Industry, 1963 Annual Averages	56
Table A-10 Average Hourly Earnings in Manufacturing Cross- Standardized for Industry, 1963 Annual Averages	57
Table A-11 Average Annual Earnings of Male Wage-Earners in Manufacturing Cross-Standardized for Industry, 1961	57

TABLE OF CONTENTS (cont'd)Appendix Tables (cont'd)

	<u>Page</u>
Table A-12 Average Annual Earnings of Male Wage-Earners (All Industries) Cross-Standardized for Industry, 1961	58
Table A-13 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Occupation, 1961	58
Table A-14 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Weeks Worked per Year and Hours Worked per Week, 1961	59
Table A-15 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Age, 1961	59
Table A-16 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Education, 1961	60
Table A-17 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Age and Education, 1961	60
Table A-18 Average Annual Earnings of Male Wage-Earners Cross-Standardized for Rural-Urban Distribution, 1961	61
Table A-19 Regression Estimates of Average Annual Earnings of Male Wage-Earners Adjusted to Standard Rural- Urban Distribution and Unadjusted, 1961	61
Table A-20 Hypothetical Changes in Relative Levels of Income per Person: An Experimental Simulation Based on Alternative Assumptions about the Canadian Unemployment Rate ( $u_c$ )	62

## AN ANALYSIS OF INTERREGIONAL DIFFERENCES

### IN MANPOWER UTILIZATION AND EARNINGS

#### I. Introduction

This study is concerned with interregional differences in levels of income, especially earned income, and with differences in employment levels, population characteristics, composition of industry, and other factors bearing on these income differences. The main part of the study has been written with a view to making the major findings easily available to persons not interested in statistical detail or technical description. All material of the latter kind has been relegated to appendices.

Earned income<sup>1/</sup> represents almost four fifths of total personal income in Canada and roughly the same proportion in each of the major regions.<sup>2/</sup> The interregional variation of earned income per person (earned income divided by total population) parallels closely the variation of total income per person.<sup>3/</sup> Thus, to account for the variation of the first is to go most of the distance in accounting for the variation of the second.

---

<sup>1/</sup> The term "earned income" is used here to refer to all types of personal income associated with employment: wages, salaries, and supplementary labour income, military pay and allowances, and the net income of unincorporated business proprietors, including farmers. Unincorporated business income, it may be noted, is partly a return to labour and partly a return on capital invested. No attempt has been made to separate these components in the present study.

<sup>2/</sup> The regions defined for this study are the conventional (and statistically convenient) ones: Atlantic (Newfoundland, Nova Scotia, Prince Edward Island, and New Brunswick); Quebec; Ontario; Prairies (Manitoba, Saskatchewan, and Alberta); and British Columbia. For statistical reasons, the Yukon and Northwest Territories are not examined in this study.

<sup>3/</sup> For comparison of total and earned income per person in the five regions for the post-war period, see Table A-1.

The variation among regions is considerable. Earned income per person in the Atlantic Region, as a whole, is only two thirds of the Canadian average and more than 40 per cent below the levels of Ontario and British Columbia. In Newfoundland, the average is scarcely more than half of the Ontario figure.

The differences that are observable today have existed for a long time. In the 1920's, as in the 1960's, the earned income levels in Ontario and British Columbia were substantially above the Canadian average, those of the Atlantic Provinces substantially below. The Prairies have remained consistently close to the national figure (after averaging out the year-to-year fluctuations of farm income), while Quebec has consistently fallen short of it. In the face of all that has happened in the last four decades -- depression, war, rapid technological change, doubling of the population, and so on -- the relative positions of the Canadian regions have undergone surprisingly little change. The differences among the regions are thus both marked and stubbornly persistent.

Table 1

Earned Income per Person

(1961-64 averages)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Average earned income per person (\$)	1,312	863	1,139	1,543	1,302	1,483
Regional average as % of Canadian average	100.0	65.8	86.8	117.6	99.2	113.0

Source: Based on data from Dominion Bureau of Statistics National Accounts and intercensal population estimates.

How can these differences be explained? In large measure, any attempt at explanation must focus on basic differences in rates of remuneration. However, other factors are also important, factors associated with the utilization of manpower. These factors are considered in the following section.

## II. Utilization of Manpower

The level of earned income per person obviously is related to the size of the employment base: other things being equal, the larger the number of persons at work in relation to the total population, the larger will be the amount of income available per person or per family. As Table 2 reveals, the employment base is substantially smaller in the Atlantic Region than in any of the other regions. In the period 1961-64, less than 29 per cent of the population of the Atlantic Region was employed, on average, compared with 37 per cent in Ontario. The smaller size of employment base accounts for roughly half of the difference in earned income per person between the Atlantic Region and Canada as a whole. It is also an important consideration in explaining the lower average income level in Quebec.

Table 2

Total Population and Number of Persons Employed

(1961-64 averages)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Total population (thousands)	18,696	1,940	5,414	6,403	3,259	1,680
Number of persons employed (thousands)	6,438	552	1,754	2,402	1,154	575
Persons employed as % of total population	34.4	28.5	32.4	37.5	35.4	34.2

Source: Based on data from Dominion Bureau of Statistics Labour Force Survey and intercensal population estimates.

Several factors determine the size of the employment base. The first is the composition of the population, especially the age composition. Table 3 reveals that the Atlantic Region has an appreciably lower proportion of population in the working ages than any of the other regions. Ontario has the highest proportion.

Table 3  
Age Distribution of the Population

(June 1, 1961)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Per cent under 15	33.9	37.6	35.4	32.2	34.1	31.3
Per cent 15-64	58.5	54.6	58.8	59.7	57.7	58.5
Per cent 65 and over	7.6	7.8	5.8	8.1	8.2	10.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based on 1961 Census data.

A second factor is the labour force participation rate, i.e., the percentage of the adult population that is in the labour force, whether employed or unemployed. Table 4 indicates that this factor also contributes to the low level of employment in the Atlantic Region. Only about 47 per cent of the adult civilian population was in the labour force in this region in the period 1961-64, whereas in Ontario the proportion was almost 57 per cent. In part, this difference is a consequence of the greater participation of women in Ontario. (Roughly one out of three women in the adult population was in the labour force in Ontario, a higher rate than in any other province.) To a greater extent, though, it reflects a large difference in the participation rate for men.<sup>1/</sup>

<sup>1/</sup> Differences in age and sex composition of the working-age population might lead to over-all differences in participation rates. However, in practice this was found to be of relatively minor importance. See Table A-4 for an analysis of the effects of age-sex differences, and Technical Appendix C for description of the "standardization" procedures on which the table is based.

Table 4  
Civilian Labour Force Participation Rates\*

(1961-64 averages)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Men	78.9	71.8	78.8	81.3	79.5	76.2
Women	29.5	23.6	27.3	32.6	30.3	29.2
Both sexes	54.0	47.4	52.7	56.6	55.3	52.6

\*Civilian labour force as per cent of civilian population 14 years of age and over, excluding inmates of institutions and Indians living on reserves.

Source: Based on data from Dominion Bureau of Statistics Labour Force Survey.

A third factor is the unemployment rate, the percentage of the civilian labour force out of work. Table 5 presents estimates of the average annual unemployment rate that might be expected in each region at different levels of the over-all Canadian unemployment rate, assuming the basic relationships among regions to remain unchanged.<sup>1/</sup> (The relationships among unemployment rates in the different regions have, in fact, remained surprisingly constant, at least throughout the period since World War II.) The table shows that if the national rate were to be brought down to 3 per cent, Ontario's rate would probably fall below 2 per cent and the Prairie and British Columbia rates would likely be in the range from 2 to 3 per cent. But the Atlantic Region would still have to contend with a rate in the neighbourhood of 5 per cent and Quebec with a rate of about 4½ per cent. Thus, in the absence of other developments, the achievement of a relatively low rate of unemployment for Canada as a whole would by no means assure similarly low unemployment rates in every section of the country. Moreover, there is evidence to suggest that even if a relatively low national unemployment rate

<sup>1/</sup> See Technical Appendix G for discussion of the derivation of the figures in Table 5.

were to be achieved and maintained over a long period of time, this by itself would leave the interregional disparity of income levels essentially intact.<sup>1/</sup>

Table 5  
Regional Unemployment Rates Expected at  
Different Levels of the Canadian Unemployment Rate  
(Assuming average 1961-64 relationships)

Assumed unemployment rate in Canada	Expected unemployment rate in region				
	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
	%	%	%	%	%
2.5%	4.3	3.8	1.4	2.0	2.3
3.0%	5.1	4.4	1.8	2.3	3.0
3.5%	5.9	5.0	2.3	2.6	3.6
4.0%	6.8	5.6	2.7	2.8	4.2
5.0%	8.4	6.8	3.6	3.3	5.5
6.0%	10.0	8.0	4.4	3.8	6.8
7.0%	11.7	9.1	5.3	4.3	8.0

As noted above, the labour force participation rate is lowest in the Atlantic Region, the region in which the unemployment rate is highest. Both the high unemployment rate and the low participation rate might be regarded as symptoms of a substantial underutilization of manpower resources in this part of Canada.

Seasonal influences also play a role in determining the level of employment. It is estimated that the average number of persons with jobs

<sup>1/</sup> This evidence is based on a model of regional response to changes in the national unemployment rate. The model is described in Technical Appendix E and an experimental simulation of regional behaviour over two decades under alternative assumptions of high (7 per cent) and low (3 per cent) national unemployment rates is described in Technical Appendix F. Some numerical results of the simulation are presented in Table A-20.

in the period 1961-64 would have been higher by some 280,000 or about 4½ per cent had it not been for seasonal declines. In the Atlantic Region, employment would have been about 8½ per cent higher, reflecting the impact of winter conditions on the primary industries which constitute a very important part of the total economic activity in this region. In the Prairie Region, average employment was lowered by 6 per cent, owing mainly to the seasonality of farm employment. Ontario showed much less seasonality because of its greater concentration of activity in manufacturing and other industries which are less vulnerable to the impact of weather. Thus, seasonal influences reduce employment much more in some regions than in others and thereby contribute to the differences in the average size of the employment base.<sup>1/</sup>

Table 6

Seasonal Variations in Employment:

Differences between Annual and Third-Quarter Averages

(1961-64 averages)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
<u>Seasonal Variations</u>						
In thousands	280	45	77	68	67	23
As per cent of annual employment	4.4	8.6	4.4	2.9	5.9	4.1

Another factor of possible importance in explaining income differences is the number of hours worked per week. However, among most of the

<sup>1/</sup> For description of procedures used to measure seasonal variations, see Technical Appendix B. Table A-5 presents estimates for labour force and unemployment, as well as employment.

regions, the average work week does not vary greatly. It is somewhat longer in the Prairies, but this is attributable almost entirely to the heavy weight of agriculture in the Prairie total, coupled with the longer hours typically reported by farmers. When allowance is made for this, the average work week in the Prairies is very close to the national figure. The one significant exception is British Columbia, where average weekly hours are some 8 per cent lower than the national average. The higher per capita earned income in British Columbia is thus achieved in spite of a substantially shorter work week.<sup>1/</sup>

Table 7

Average Hours Worked per Week

(Averages of February and September, 1964)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Average hours worked per week	42.2	43.3	43.0	41.4	44.0	38.7
Regional average as % of Canadian average	100.0	102.6	101.9	98.1	104.3	91.7

Source: Based on data from Dominion Bureau of Statistics Labour Force Survey.

Differences in the utilization of available manpower are thus seen to be important in explaining differences in earned income per person. Roughly half of the gap between the Atlantic Region and the national average can be explained in this way.<sup>2/</sup> But there are also substantial differences

<sup>1/</sup> For analysis of the effect of industrial composition and other factors on average hours, see Tables A-6 and A-7. The "standardization" procedures on which these tables are based are described in Technical Appendix C.

<sup>2/</sup> For a precise statistical decomposition of earned income per person, relating it to factors associated with manpower utilization and other factors, see Technical Appendix A and Tables A-2 and A-3.

in the basic rates of remuneration among the regions, and we turn now to a consideration of these.

### III. Average Earnings of Persons Employed

The average employed person in the Atlantic Region earned about 20 per cent less than the Canadian average in the period 1961-64. At the other extreme is British Columbia which, in spite of its shorter work week, was about 14 per cent above the average. Ontario was about 8 per cent above the average and Quebec about 8 per cent below. The Prairie Region was  $3\frac{1}{2}$  per cent below the national average in the four-year period, although average income in this region is subject to considerable variation from year to year because of the fluctuations in agriculture.

Table 8

#### Average Earned Income per Person Employed

(1961-64 averages)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Average earned income per person employed (\$)	3,810	3,033	3,515	4,113	3,676	4,331
Regional average as % of Canadian average	100.0	79.6	92.3	108.0	96.5	113.7

Source: Based on data from Dominion Bureau of Statistics National Accounts and Labour Force Survey.

There were several possibilities to be considered in seeking an explanation of these differences in rates of earnings. For one thing, the "mix" of industries varies considerably from one region to another. For example, Central Canada and British Columbia have higher proportions of manufacturing activity, while the Atlantic Region has a higher proportion of primary industries. An area in which there is a concentration of low-

wage industries naturally would tend to have a lower over-all average than one in which there is a concentration of high-wage industries. However, analyses based on hourly, weekly or annual earnings data from several sources suggest that this by itself is not a very important factor in explaining the variation of earnings among the major regions of Canada — that differences in industry "mix", at least for nonagricultural industries, account for surprisingly little of this variation.<sup>1/</sup>

Another possibility was that the differences in average earnings could be explained by differences in the "mix" of occupations of the labour force — that proportionately larger numbers of workers in the more highly skilled and better-paid occupations might account for the higher average earnings in some regions. Again, though, this appears not to be the case. An analysis of data from the 1961 Census for 55 occupational groups in each region indicates that the interregional disparity of earnings is not reduced in any considerable degree when allowance is made for differences in occupational "mix".

A third consideration was the average number of weeks worked per year and the varying prevalence of part-time employment, as reflected in the numbers of wage-earners normally working less than a 35-hour week. But here,

---

<sup>1/</sup> The results of these analyses, and of others on which the conclusions of this section are based, are presented in Tables A-8 to A-18. The analyses involve the "standardization" or reweighting of average earnings of wage-earners in each region according to a uniform weighting pattern. (Earnings from self-employment are excluded in the standardization analysis for statistical reasons.) Thus, for example, average earnings in each region may be recalculated on the assumption that the region has the same "mix" of industries as the country as a whole, and the results compared with the original or "unstandardized" averages. For a more specific description of the procedures, see Technical Appendix C.

too, adjustments to regional earnings data to eliminate the effect of differences in weeks and hours of work failed to bring about any appreciable alteration in the degree of interregional disparity.

A fourth possibility was that differences in the age distributions and educational levels of workers were responsible for the interregional differences in earnings. According to the 1961 Census, on which Table 9 is based, only about 40 per cent of the male population of the Atlantic Region and Quebec went beyond elementary school, compared with 60 per cent in British Columbia and approximately 50 per cent in Ontario and the Prairies. Looking at the other end of the educational spectrum, only 2.3 per cent of the male population of the Atlantic Region obtained university degrees, compared with a national average of 4 per cent. Because of the differences between the educational systems of different provinces, to say nothing of the differences between systems in Canada and those in the many other countries from which immigrants have come, comparisons of this kind should be treated with caution. However, there is no doubt that there are substantial differences among the regions with respect to the average educational levels of the population and labour force. These differences account for part of the variation in earnings, but only a small part. Most of the variation still remains to be accounted for.<sup>1/</sup>

---

<sup>1/</sup> A word of caution may be in order here. The analysis on which this conclusion is based is essentially statistical. It leaves open the possibility that the level of education, particularly among managerial and professional groups, is in some sense a "key factor" in the processes of production and income generation, with importance beyond that indicated by mere statistical distributions. The present analysis has nothing to contribute on this point.

Table 9  
Percentage of Male Population\*  
in Selected Educational Categories  
 (June 1, 1961)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
Per cent who did not go beyond elementary school	52.4	59.0	59.5	48.9	50.7	40.2
Per cent with university degrees	4.0	2.3	4.0	4.7	3.4	4.3

\*Excludes persons who were still attending school and children under five years of age.

Source: Based on 1961 Census data.

A fifth factor considered was the degree of urbanization. In the Atlantic Region, only half of the population was living in urban centres in 1961, compared with 70 per cent for the nation as a whole and 77 per cent in Ontario. Forty-two per cent of the Atlantic population was in rural nonfarm areas. The degree of urbanization was found to have an effect on inter-regional differences in earnings since earnings tend to be higher in urban areas. However, once again, the influence of this factor was not sufficient to account for more than a relatively small fraction of the total inter-regional variation.<sup>1/</sup>

<sup>1/</sup> This conclusion is supported by Table A-18, which is based on the "standardization" analysis, described in Technical Appendix C. It is further supported by a regression analysis which allows not only for the proportions of the population living in urban and rural areas, but also for the size distribution of urban centres. The regression analysis is described in Technical Appendix D and some results which flow from it are recorded in Table A-19.

Table 10

Percentage of Population Living in Urban and Rural Areas

(June 1, 1961)

	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia
	%	%	%	%	%	%
Urban	69.6	49.8	74.3	77.4	57.6	72.5
Rural farm	11.4	8.6	10.7	8.1	24.0	4.8
Rural nonfarm	19.0	41.6	15.0	14.5	18.4	22.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based on 1961 Census data.

It appears, then, that one cannot go far in accounting for basic differences in levels of earnings in terms of mere statistical differences in industrial and occupational distributions, age composition, hours and weeks of work, average levels of education, and rural-urban population distributions. It must be stressed that the contributions of the various factors taken one at a time cannot be added together without considerable double-counting because they are not independent of each other. The occupational distribution of the work force is closely related to the industrial distribution and both are related to the rural-urban and education distributions. It must be stressed also that even if one were to account for earnings differences in terms of one or more of the factors examined, this might represent merely a superficial "explanation". For example, if industrial or rural-urban composition had been found to be more strongly related to differences in earnings, one would then have to inquire into the reasons for the industrial or rural-urban differences themselves. The significant conclusion is a negative one: even at the level of mere statistical distributions, the factors examined do not account for much of the observable variation in earnings; something more basic must be sought.

Limitations of time, information, or methodology precluded the possibility of examining a number of other factors of possible relevance. Among the more obvious ones are the amounts of capital and natural resources per worker in the different regions, variations in managerial skills and the state of applied technology, and in such intangibles as attitudes and effort.

#### IV. Summary and Conclusions

Some of the main conclusions may be summarized as follows. First, the Atlantic Region has a particularly unfavourable set of characteristics. The effect of relatively low basic rates of earnings is reinforced by very high unemployment rates, an unfavourable age structure, and low labour force participation rates. Seasonal fluctuations are severe, the general educational level of the population is lower than in other regions, and a large proportion of the population live in rural nonfarm areas which tend to have low income levels.

Ontario, on the other hand, has a particularly favourable set of characteristics. Basic rates of earnings are relatively high. Unemployment rates are low and participation rates high. A larger proportion of the population is in the working ages and the province is very highly urbanized.

✓ The effect of seasonal factors is at a minimum in Ontario.

British Columbia has the highest basic earnings rate in Canada, as well as the shortest average work week, but, because of its much lower participation rates and somewhat higher unemployment rates, it lags behind Ontario in earned income per person.

Quebec suffers from many of the unfavourable factors that are operative in the Atlantic Region, but in lesser degree. Unemployment rates are

high and, as in the Atlantic Region, would probably remain relatively high even at low levels of the Canadian rate. Seasonality is also an important factor in Quebec. Basic rates of remuneration are appreciably lower than in Ontario and British Columbia, partly a reflection of differences in the average educational level of the labour force and partly of other factors that have yet to be determined.

The Prairie Region has a level of income per person close to the national average, after allowing for the short-run fluctuations of agriculture. Unemployment rates are low in the Prairies and labour force participation rates are relatively high. Seasonal fluctuations are pronounced, mainly because of the seasonality of agriculture. Basic earnings rates are, in general, neither very high nor very low in relation to other regions of Canada.

In the light of past experience, a relatively low level of unemployment for Canada as a whole would not of itself ensure correspondingly low unemployment levels in all parts of Canada, in particular the Atlantic Region and Quebec. The over-all disparity of income levels among the regions, and especially the gap between the Atlantic Region and the rest of Canada, have proved to be surprisingly stable over several decades in the face of marked changes in the fortunes of the national economy.

TECHNICAL APPENDICES

APPENDIX AStatistical Decomposition of Earned Income per Person

Earned income per person (i.e., per population member) may be expressed as the product of four quantities: earned income per person employed; the employment rate; the labour force participation rate; and the ratio of labour force source population to total population. Alternatively, and more simply, it may be expressed as the product of earned income per person employed and the ratio of employed persons to total population:

$$(1) \quad \frac{Y^e}{N} = \left(\frac{N'}{N}\right) \left(\frac{L}{N'}\right) \left(\frac{E}{L}\right) \left(\frac{Y^e}{E}\right)$$

$$(2) \quad \frac{Y^e}{N} = \left(\frac{E}{N}\right) \left(\frac{Y^e}{E}\right)$$

where  $Y^e$  is earned income

$N$  is total population

$N'$  is labour force source population (population 14 years of age and over, excluding inmates of institutions and Indians living on reserves)

$L$  is labour force

$E$  is employment

Furthermore, if we attach subscripts  $i$  and  $c$  to represent the  $i^{\text{th}}$  region and Canada, respectively, we may write

$$(3) \quad \frac{\left(\frac{Y^e}{N}\right)_i}{\left(\frac{Y^e}{N}\right)_c} = \frac{\left(\frac{N'}{N}\right)_i}{\left(\frac{N'}{N}\right)_c} \cdot \frac{\left(\frac{L}{N'}\right)_i}{\left(\frac{L}{N'}\right)_c} \cdot \frac{\left(\frac{E}{L}\right)_i}{\left(\frac{E}{L}\right)_c} \cdot \frac{\left(\frac{Y^e}{E}\right)_i}{\left(\frac{Y^e}{E}\right)_c}$$

$$(4) \quad \frac{\left(\frac{Y^e}{N}\right)_i}{\left(\frac{Y^e}{N}\right)_c} = \frac{\left(\frac{E}{N}\right)_i}{\left(\frac{E}{N}\right)_c} \cdot \frac{\left(\frac{y^e}{E}\right)_i}{\left(\frac{y^e}{E}\right)_c}$$

Thus, the relationships hold equally well when all quantities are expressed as ratios to Canada averages. This provides a convenient framework for analyzing interregional differences in earned income per person.

Table A-2 presents, for Canada and each of the regions, the quantities required for equations (1) and (2). Table A-3 presents the same quantities in relative form, as required for equations (3) and (4). Columns 2-5 of these tables correspond to the factors on the right side of equations (1) and (3); columns 5 and 6 correspond to the factors on the right side of equations (2) and (4). Column 6, it may be noted, can be obtained as the product of columns 2, 3, and 4.

APPENDIX BThe Measurement of Seasonal Variations

The seasonal deviation was calculated for each quarter by subtracting the seasonally adjusted employment or unemployment series from the unadjusted series. (The method of seasonal adjustment is the well-known Census Method II developed at the United States Bureau of the Census.) The seasonal level for the quarter was then calculated as the difference between the actual seasonal deviation in that quarter and the minimum (in the case of unemployment) or maximum (in the case of employment) deviation for the year. The observed minimum (i.e., largest negative) or maximum (i.e., largest positive) deviation varies from one year to the next and values to be associated with intervening months were obtained by interpolation. Seasonal levels for labour force were calculated as the difference between the seasonal levels for employment and unemployment. Averages for Canada in all three cases were obtained by summing over regions. Finally, the seasonal levels for the four quarters of each year were averaged to yield the average annual seasonal level. In the case of unemployment, the result may be interpreted as the amount by which average annual unemployment would be lower if the third-quarter level were maintained throughout the year; in the case of employment or labour force, it may be regarded as the amount by which the average annual figure would be higher if the third-quarter level were maintained.<sup>1/</sup>

Estimates of average seasonal levels for the period 1961-64 for labour force, employment, and unemployment are presented in Table A-5.

---

<sup>1/</sup> For detailed analysis of seasonal variations in Canada, see Canadian Department of Labour, "Seasonal Unemployment in Canada", Labour Gazette, 1960, in three parts: pages 444-456 (May); pages 584-592 (June); and pages 694-701 (July). See also the testimony by Gil Schonning and F. J. Doucet, representing the Economics and Research Branch of the Department of Labour, before the Special Committee of the Senate on Manpower and Employment, Proceedings, No. 16, Ottawa, 1961.

## APPENDIX C

Standardization Analysis: Methods and Sources of Data

The term "standardization" is used here to refer to the application of a uniform set of weights to average earnings, hours of work, etc., in different regions in order to remove that part of interregional variation which results merely from differences in population characteristics. The standardized and unstandardized averages can then be compared. For example, in the first column of Table A-4 the average labour force participation rates have been recalculated for each region by applying the age-sex population distribution for Canada. In the second column, the same sort of calculation has been carried out using the Atlantic Region distribution, and so on. Each of the first six columns can be compared with the final column, in which the unstandardized averages appear. The process of applying the weights for each region (including Canada) to the rates for each region is termed here "cross-standardization".<sup>1/</sup>

The calculations can be represented very simply in matrix form. Let  $P = [p_{ij}]$  and  $W = [w_{ij}]$  be  $m \times n$  matrices of rates and weights, respectively, in which  $i$  stands for some characteristic (e.g., age) and  $j$  stands for region. The  $n \times n$  matrix  $\bar{P} = [\bar{p}_{kj}]$  of cross-standardized average rates is then given by  $\bar{P} = P'W$ . Reading down a column of the  $\bar{P}$  matrix (i.e., of a table such as Table A-4) shows the effect of holding the weights constant and allowing only the rates to vary; reading along a row shows the effect of

---

<sup>1/</sup> The technique has been applied by R. J. Wonnacott in "Wage Levels and Employment Structure in United States Regions: A Free Trade Precedent", Journal of Political Economy, August 1964, and by R. J. Wonnacott and Paul Wonnacott in a forthcoming study of the economics of North American free trade.

holding the rates constant and allowing only the weights to vary. The elements on the principal diagonal, it may be noted, are the unadjusted average rates for the regions. (In some cases the diagonal elements may differ from actual published figures because of rounding or minor differences in the treatment of the data.)

The following are notes on the various standardizations performed for this study, indicating sources of data and levels of detail at which the calculations were carried out:

Table A-4: Labour force participation rates cross-standardized for age and sex (10 age categories, making 20 groups altogether). Based on data from Dominion Bureau of Statistics monthly Labour Force Survey for March, 1964.

Table A-6: Average weekly hours cross-standardized for class of worker (2 categories: paid workers and other than paid workers), sex, and agricultural-nonagricultural distribution (8 groups altogether). Based on data from Dominion Bureau of Statistics monthly Labour Force Survey, averaged for February and September, 1964.

Table A-7: Average weekly hours in manufacturing cross-standardized for industry (17 industries). Based on 1963 annual average data from Dominion Bureau of Statistics monthly Survey of Man-hours and Hourly Earnings.

Table A-8: Average weekly earnings in manufacturing cross-standardized for industry (17 industries). Based on 1963 annual average data from Dominion Bureau of Statistics monthly Survey of Employment and Payrolls.

Table A-9: Average weekly earnings in "industrial composite" group cross-standardized for industry (37 industries). Based on 1963 annual average data from Dominion Bureau of Statistics monthly Survey of Employment and Payrolls. The "industrial composite" group includes all industrial divisions except agriculture, fishing, trapping, government service, domestic service, and community service.

Table A-10: Average hourly earnings in manufacturing cross-standardized for industry (17 industries). Based on 1963 annual average data from Dominion Bureau of Statistics monthly Survey of Man-hours and Hourly Earnings.

Table A-11: Average annual earnings of male wage-earners in manufacturing cross-standardized for industry (20 industries). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-12: Average annual earnings of male wage-earners (all industries) cross-standardized for industry (45 industries). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-13: Average annual earnings of male wage-earners cross-standardized for occupation (55 occupations). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-14: Average annual earnings of male wage-earners cross-standardized for weeks worked per year (4 categories) and hours worked per week (2 categories: 35 hours or more, and less than 35 hours;

making 8 groups altogether). Based on 1961 Census data. Average earnings estimated from frequency distributions by assuming class averages equal to mid-points of class intervals; for this reason unstandardized over-all averages differ from published figures and figures in other tables of this study. Earnings refer to 12-month period preceding June 1 census date.

Table A-15: Average annual earnings of male wage-earners cross-standardized for age (7 age categories). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-16: Average annual earnings of male wage-earners cross-standardized for education (3 categories). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-17: Average annual earnings of male wage-earners cross-standardized for age and education (7 age categories, 3 education categories, making 21 groups altogether). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

Table A-18: Average annual earnings of male wage-earners cross-standardized for rural-urban distribution (3 categories: rural farm, rural nonfarm, and urban). Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date.

APPENDIX DRegression Analysis of the Effect of Differences in Urban-Rural Composition  
on Average Earnings

Use was made in this analysis of 1961 Census data for counties or census divisions. Average earnings of male wage-earners was taken as the dependent variable in regression equations which included as independent variables the proportions of population living in various urban-rural categories and dummy variables to represent regions. The variables are defined as follows:

- $\bar{W}$  - average annual earnings of male wage-earners (12-month period preceding June 1 census date)
- RF - proportion of population living in rural farm areas
- RNF - proportion of population living in rural nonfarm areas
- $U_1$  - proportion of population living in urban areas of 100,000 and over
- $U_2$  - proportion of population living in urban areas of 30,000 - 99,999
- $U_3$  - proportion of population living in urban areas of 10,000 - 29,999
- $U_4$  - proportion of population living in urban areas of 5,000 - 9,999
- $U_5$  - proportion of population living in urban areas of 2,500 - 4,999
- $U_6$  - proportion of population living in urban areas of less than 2,500
- A - dummy variable for Atlantic Region (A = 1 if area is in Atlantic Region; A = 0, otherwise)
- Q - dummy variable for Quebec (Q = 1 if area is in Quebec; Q = 0, otherwise)
- O - dummy variable for Ontario (O = 1 if area is in Ontario; O = 0, otherwise)

P - dummy variable for Prairie Region (P = 1 if area is in Prairie Region; P = 0, otherwise)

BC - dummy variable for British Columbia (BC = 1 if area is in British Columbia; BC = 0, otherwise)

In specifying the regression equations it was necessary to drop one of the dummy variables and one of the population proportion variables. For every area, the relationships

$$(5) \quad A + Q + O + P + BC = 1$$

$$(6) \quad RF + RNF + U_1 + U_2 + U_3 + U_4 + U_5 + U_6 = 1$$

hold exactly, and in this situation (a limiting case of the more general problem of "multicollinearity") it is not possible to estimate the equation when all variables are included. It was decided to omit the variables O and U<sub>6</sub>.

Two equations were estimated from data for 238 areas by ordinary least squares, one equation with only urban-rural variables and the other with both urban-rural and regional variables. The equations are as follows:

$$(7) \quad \bar{W} = 3,125.8 - 1,088.3 RF - 944.9 RNF + 1,132.1 U_1 \\ \quad \quad \quad (2.4) \quad \quad \quad (2.2) \quad \quad \quad (2.9) \\ \quad \quad \quad + 972.6 U_2 + 953.7 U_3 + 1,173.8 U_4 \\ \quad \quad \quad (2.5) \quad \quad \quad (2.3) \quad \quad \quad (2.5) \\ \quad \quad \quad + 1,161.4 U_5; \quad R^2 = .5981; \quad \bar{S} = 450.8 \\ \quad \quad \quad (2.3)$$

$$(8) \quad \bar{W} = 3,733.9 - 2,003.3 RF - 872.4 RNF + 738.1 U_1 \\ \quad \quad \quad (5.6) \quad \quad \quad (2.5) \quad \quad \quad (2.5) \\ \quad \quad \quad + 555.4 U_2 + 532.4 U_3 + 583.7 U_4 \\ \quad \quad \quad (1.9) \quad \quad \quad (1.7) \quad \quad \quad (1.6) \\ \quad \quad \quad + 827.9 U_5 - 693.4 A - 516.1 Q \\ \quad \quad \quad (2.2) \quad \quad \quad (8.7) \quad \quad \quad (8.2) \\ \quad \quad \quad + 33.0 P + 272.4 BC; \quad R^2 = .7760; \quad \bar{S} = 339.5 \\ \quad \quad \quad (0.4) \quad \quad \quad (2.2)$$

where  $R^2$  is the coefficient of determination,  $\bar{S}$  is the standard error of estimate, and the figures in brackets are t-values (ratios of estimated coefficients to their standard errors).

Rural-urban distribution clearly is a factor in accounting for differences in the level of earnings. However, the substantially better explanatory power of the second equation (higher  $R^2$ , lower  $\bar{S}$ ) and the high t-values for the coefficients of A, Q, and (to a lesser extent) BC indicate that there are important factors other than urban-rural distribution.

This is demonstrated further in Table A-19, which compares an estimate of census earnings in each region based on the actual urban-rural distribution in the region with an estimate based on the all-Canada distribution, both estimates being calculated using equation (8). Thus, for example, it is calculated that average earnings in British Columbia would be \$4,063 if British Columbia had the all-Canada rural-urban distribution, compared with \$4,198 when the actual BC rural-urban distribution is assumed. These estimates are obtained by setting BC equal to one; A, Q, and P equal to zero; and the urban-rural variables equal to their Canada values or to the actual British Columbia values, as the case may be. The Canada earnings figures are weighted averages of the regional figures based on the actual regional distribution of wage-earners.

A comparison of the second and fourth columns of Table A-19 suggests some narrowing of the differences when rural-urban distribution is allowed for in this way. However, the Atlantic Provinces and Quebec still remain substantially below the national average. Moreover, it must be stressed that to "explain" differences in earnings in terms of differences

in urban-rural distributions invites the question: Why are the urban-rural distributions different? Differences in urban-rural distribution may be more in the nature of a symptom of lower income levels in some areas than a cause.

APPENDIX EA Model of Regional Response to Changes in the Canadian Unemployment Rate

This appendix presents a description of an econometric model which was developed principally for the purpose of studying the effect of changes in the over-all Canadian unemployment rate on the relative income levels in the regions. (The results of applying it for this purpose are presented in Appendix F.) The model contains 41 structural equations estimated from annual data for the period 1947-64, plus some definitions or identities. The variables used in the model are as follows:

Definitions of Variables

- $u$  : unemployment rate (total unemployment as per cent of civilian labour force)
- $U$  : total unemployment (in thousands)
- $\sum u_{-1}$  : cumulative sum of unemployment rates from 1946 up to and including one period preceding the current period
- $\bar{u}$  : average of current unemployment rate and rate for previous period
- $\sum \frac{1}{\bar{u}}$  : cumulative sum of reciprocals of  $\bar{u}$  from 1946-47 up to and including the current period
- $E$  : employment (civilian plus armed forces, in thousands)
- $A$  : armed forces (in thousands)
- $L$  : labour force (in thousands)
- $p$  : labour force participation rate (labour force as per cent of labour force source population)
- $N$  : total population (in thousands)

- $N'$  : labour force source population (population 14 years of age and over, excluding inmates of institutions and Indians living on reserves, in thousands)
- $\Pi$  : consumer price index (1949 = 100)
- $\Pi_f$  : implicit price deflator for imports in the national accounts (1949 = 100)
- $Y^e$  : earned income of persons (wages, salaries, and supplementary labour income plus military pay and allowances plus net income received by farm operators from farm production plus net income of nonfarm unincorporated business, in millions of dollars)
- $R$  : interest, dividends, and net rental income of persons (in millions of dollars)
- $Tr(U)$ : unemployment insurance component of transfer payments (in millions of dollars)
- $Tr(N)$ : all other components of transfer payments (in millions of dollars)
- $F$  : short-run component of farm income (deviation from 3rd-degree polynomial trend fitted to 1946-64 series of net income received by farm operators from farm production, in millions of dollars)
- $Y$  : total personal income (in millions of dollars)
- $Y^d$  : personal disposable income (in millions of dollars)
- $t$  : index of time, with value 0 in 1955 and annual increments of 1 ( $t = -1$  in 1954,  $t = +1$  in 1956, etc.)
- $-1$  : subscript indicating lag of one period
- $a, q, o, p, b$  and  $c$  as subscripts represent Atlantic Region, Quebec, Ontario, Prairie Region, British Columbia, and Canada, in that order.

The actual equations are presented in the accompanying table. There are eight structural equations for each of the five regions, plus a national price determination equation. All equations were estimated by ordinary least squares. A discussion of the equations follows.

#### Earned Income Equations

Aggregate earned income was regarded initially as a function of employment, the general price level, the current unemployment rate, the cumulative sum of unemployment rates in previous years, a linear trend variable, and a variable to represent short-run fluctuations in farm income. The current unemployment rate was included in order to allow for short-run variations in average hours of work and other factors associated with year-to-year variations in the unemployment level. The cumulative unemployment rate variable, on the other hand, was included on the grounds that the rate of growth of income may vary with the level of unemployment because of associated variations in the rate of growth of capital stock and the rate of technical progress. (That the cumulative variable does allow for this possibility can be seen by taking first differences on both sides of the equation; the change in income from year  $t$  to year  $t + 1$  is then seen to be a function of the unemployment rate in year  $t$ , as well as other variables.)

Not all variables were retained in the final equation for each region, although all were included initially. There was considerable experimentation with different combinations. In general, a variable was retained unless this actually led to an increase in the standard error of estimate, whether or not the coefficient of the variable in question was statistically significant at conventional significance test levels. The application of this criterion resulted in a number of variables being

discarded in different cases. In particular, it led to the exclusion of the cumulative unemployment rate variable from all but the British Columbia equation. A lagged price variable, which was also included in the initial specification, was dropped from all of the equations.

#### Unemployment Equations

The unemployment rate for each region was treated as a function of the national rate, thus taking advantage of the surprisingly strong tendency for the rates in all regions to move together. A trend variable was also included. However, attempts to improve the equations further by incorporating lead or lag relationships were not successful.

#### Price Level Equations

The national price level was related to the level of import prices, both current and lagged, the cumulative reciprocal of the national unemployment rate, and a trend variable.<sup>1/</sup> The cumulative variable was included in order to provide for a possible relationship between the rate of increase of prices and the level of unemployment. (Again, this can be seen by taking first differences on both sides of the equation.) Initially, a dummy variable with value zero in 1947 and decreasing annual increments of 1/2, 1/4, 1/8, etc., was included in order to allow for any special upward pressures on prices that might have existed in the early post-war years and which were not sufficiently reflected in the low unemployment rates of that period. However, this variable caused no improvement whatsoever in the equation and it was dropped.

---

<sup>1/</sup> The specification of the national price level equation was inspired in part by some work of G. L. Reuber. See "The Objectives of Canadian Monetary Policy, 1949-61; Empirical 'Trade-Offs' and the Reaction Function of the Authorities", Journal of Political Economy, April 1964, and The Objectives of Monetary Policy, working paper prepared for the Royal Commission on Banking and Finance, Queen's Printer, Ottawa, 1962.

The price level for each region was then related to the national price level, with provision for autonomous trend in cases in which this improved the equations. Experiments with lead-lag relationships failed to effect any significant improvements.

#### Labour Force Equations

The labour force participation rate was expressed as a function of the unemployment rate in order to allow for net labour force additions or withdrawals at different unemployment levels. Both current and lagged rates were included to provide for the possible effect of unemployment duration as well as level. Provision was also made for autonomous trend, it being necessary to include a quadratic as well as a linear trend term for all but one region in order to represent adequately the changes in participation rates over the period 1947-64.

#### Labour Force Source Population Equations

The labour force source population was treated as a simple linear function of the total population.

#### Unemployment Insurance Equations

The unemployment insurance component of transfer payments was related to the current number of persons unemployed, the lagged number unemployed, and a linear trend. The lagged variable was included to allow for exhaustion of insurance benefits as a consequence of prolonged unemployment. As one would expect, the coefficient of the lagged variable turned out to be negative in every case. (For any given volume of unemployment in the current year, aggregate payments will be lower the greater the volume of unemployment in the previous year.)

### Interest, Dividends, and Net Rental Income Equations

The interest, dividends, and net rental income component of personal income appears to be too heterogeneous to be explained adequately in simple aggregate form. Satisfactory explanation might be attained with some degree of disaggregation of published totals but the time available for the present study did not permit exploration of this possibility. However, rather than treat the variable as entirely exogenous it seemed preferable to relate it to the general level of earned income. It represents only a small fraction of total personal income in each region.

### Personal and Personal Disposable Income Equations

Total personal income was expressed as the sum of (1) earned income, (2) interest, dividends, and net rental income, (3) the unemployment insurance component of transfer payments, and (4) the remainder of transfer payments, the latter being treated as an exogenous variable. Personal disposable income was then treated as a simple linear function of personal income. The slope coefficients in the disposable income equations thus represent 1 minus the over-all average marginal tax rates on personal income.

### Further Note on the Characteristics of the Model

It may facilitate understanding of the model to observe that it contains five sub-models, one for each region, connected via the equations relating regional unemployment rates and price levels to the national unemployment rate and price level. Each sub-model is entirely recursive, as is the over-all model.

From the point of view of the over-all model, the essential exogenous variables in the system are  $u$  and  $\Pi_f$  at the national level and  $A$ ,  $N$ ,  $Tr(N)$ , and  $F$  at the regional level, plus the time variable  $t$ .

#### Sources of Data Used in the Model

All income data are from national accounts sources, as is the price series for imports. Employment, labour force, unemployment, labour force source population, and armed forces series are from DBS Labour Force Survey sources. Total population is from annual DBS intercensal estimates for June 1.

In the absence of series with more comprehensive geographic coverage, consumer price indexes for selected cities were chosen to represent regional price movements. The selection was as follows:

Atlantic Region -- average of Halifax, Saint John, and St. John's indexes (for the period before 1952, the St. John's index was not available and the series was carried back to 1947 on the basis of the average of the other two cities)

Quebec -- Montreal index

Ontario -- Toronto index

Prairies -- average of Winnipeg, Saskatoon-Regina, and Edmonton-Calgary indexes

British Columbia -- Vancouver index

All income, employment, and other aggregates were adjusted to include estimates for Newfoundland in the early post-war years in which this province was not represented in the statistical series.

Equations for Regional Response Model Fitted to 1947-64 Data

	% $\bar{S}$	$\bar{R}^2$	d
<u>Earned Income</u>			
$Y_a^e = 293.27 + 1.8116E + 57.8107t - 4.9314u_a + 1.9568F_a$ <p align="center">(6.9) <sup>a</sup>      (39.1)      (2.2)      (2.8) <sup>a</sup></p>	1.31	.9978	1.58
$Y_q^e = -3,650.06 + 5.1584E_q + 123.2127t - 22.5600u_q$ <p align="center">(5.2)      (3.6)      (1.2)</p>	1.16	.9988	2.57
$Y_o^e = -3,297.48 + 4.0900E_o + 16.5411\pi_o + 206.5713t - 98.5780u_o$ <p align="center">(3.4) <sup>o</sup>      (2.5) <sup>o</sup>      (3.1)      (2.9) <sup>o</sup></p> $+ 1.6910F_o$ <p align="center">(2.0)</p>	1.56	.9977	1.38
$Y_p^e = -822.84 + 2.4319E_p + 16.2666\pi_p + 108.7583t - 172.3228u_p$ <p align="center">(2.7) <sup>p</sup>      (2.2)      (3.8)      (4.7) <sup>p</sup></p> $+ .7741F_p$ <p align="center">(6.6)</p>	2.49	.9921	2.22
$Y_b^e = -1,366.23 + 4.3023E_b + 9.8274\pi_b + 50.7163t - 8.9111u_b$ <p align="center">(6.2)      (4.2)      (2.6)      (1.5)</p> $- 2.7105 \sum u_{b-1}$ <p align="center">(1.4)</p>	1.50	.9980	2.53
<u>Unemployment</u>			
$u_a = .5512 + 1.6596u_c - .0918t$ <p align="center">(7.3) <sup>c</sup>      (1.4)</p>	11.41	.8594	1.18
$u_q = .4125 + 1.1762u_c + .0775t$ <p align="center">(17.2) <sup>c</sup>      (3.8)</p>	4.77	.9848	.84
$u_o = -.5624 + .8614u_c - .0219t$ <p align="center">(21.7) <sup>c</sup>      (1.8)</p>	4.81	.9848	1.74
$u_p = .5032 + .5109u_c + .0273t$ <p align="center">(9.4) <sup>c</sup>      (1.7)</p>	7.76	.9475	1.82
$u_b = -.4663 + 1.2654u_c - .0476t$ <p align="center">(9.0) <sup>c</sup>      (1.1)</p>	10.83	.9114	1.13
$U = \frac{u(L-A)}{100} \text{ for all regions}$			

## Equations...(cont'd)

	% $\bar{S}$	$\bar{R}^2$	d
<u>Price Level</u>			
$\pi_c = 24.0366 + .2919\pi_f + .3444\pi_{f-1} + 7.9158\frac{1}{u_c} - .9506t$ (2.7) (3.6) (3.6) (1.9)	1.28	.9880	1.63
$\pi_a = 7.2064 + .9379\pi_c + .1740t$ (29.4) (2.1)	.48	.9983	1.25
$\pi_q = -13.8784 + 1.1227\pi_c - .3263t$ (47.4) (5.4)	.36	.9991	1.89
$\pi_o = -3.3723 + 1.0436\pi_c$ (74.9)	.66	.9970	.64
$\pi_p = -3.3409 + 1.0121\pi_c - .2992t$ (31.4) (3.6)	.49	.9978	1.24
$\pi_b = -18.4523 + 1.1608\pi_c - .4273t$ (20.4) (2.9)	.85	.9947	.76
<u>Labour Force</u>			
$p_a = 45.9130 + .2280u_a + .0418u_{a-1} - .2302t + .0296t^2$ (2.4) (0.4) (6.1) (4.6)	1.18	.7786	2.05
$p_q = 54.0994 + .1157u_q - .1526u_{q-1} - .0249t - .0100t^2$ (1.9) (2.5) (0.9) (3.6)	.47	.7421	1.71
$p_o = 56.5777 + .0986u_o - .1320u_{o-1} + .1072t$ (0.7) (0.9) (2.9)	.80	.5598	1.16
$p_p = 49.4750 + .6642u_p + .7109u_{p-1} - .2046t + .0438t^2$ (1.9) (1.8) (2.8) (5.3)	1.37	.7573	1.34
$p_b = 52.1259 - .0105u_b - .1289u_{b-1} + .0170t + .0357t^2$ (0.1) (1.1) (0.4) (6.4)	1.02	.7012	1.00
$L = \frac{pN'}{100}$ for all regions; $L = E+U$ for all regions			

Equations...(cont'd)

	% $\bar{S}$	$\bar{R}^2$	d
<u>Labour Force Source Population</u>			
$N'_a = 262.86 + .5030 N_a$ (21.7)	1.19	.9650	.19
$N'_q = 227.37 + .6168 N_q$ (58.7)	.86	.9951	.24
$N'_o = 797.77 + .5604 N_o$ (136.8)	.36	.9990	.49
$N'_p = 486.54 + .5079 N_p$ (69.5)	.48	.9965	.23
$N'_b = 173.42 + .5848 N_b$ (102.4)	.56	.9984	.65
<u>Unemployment Insurance</u>			
$Tr(U)_a = 8.48 + .8398U_a - .2361U_{a-1} + 3.1338t$ (6.8) (1.9) (10.9)	11.62	.9702	1.16
$Tr(U)_q = -8.17 + 1.1011U_q - .1837U_{q-1} + 1.4899t$ (9.5) (1.5) (1.3)	10.66	.9700	1.35
$Tr(U)_o = -10.61 + 1.3293U_o - .1339U_{o-1} + 2.2376t$ (14.8) (1.4) (3.6)	8.36	.9849	.93
$Tr(U)_p = 1.49 + 1.1202U_p - .1631U_{p-1} + 1.5522t$ (8.2) (1.2) (4.6)	10.46	.9738	1.12
$Tr(U)_b = 1.31 + 1.2120U_b - .2346U_{b-1} + .8399t$ (8.4) (1.6) (2.3)	14.12	.9454	1.05

## Equations...(cont'd)

	$\% \bar{S}$	$\bar{R}^2$	d
<u>Interest, Dividends, and Net Rental Income</u>			
$R_a = -37.39 + .1248Y_a^e$ (22.4)	6.78	.9671	1.08
$R_q = -113.52 + .1450Y_q^e$ (22.3) <sup>q</sup>	7.42	.9670	.78
$R_o = -373.96 + .1870Y_o^e$ (20.7) <sup>o</sup>	9.04	.9618	.53
$R_p = -138.32 + .1493Y_p^e$ (13.9) <sup>p</sup>	11.86	.9185	1.08
$R_b = -66.94 + .1630Y_b^e$ (16.6) <sup>b</sup>	10.70	.9420	.54
<u>Personal and Personal Disposable Income</u>			
$Y_a^d = 27.22 + .9288Y_a$ (238.0) <sup>a</sup>	.53	.9997	1.29
$Y_q^d = 119.58 + .9021Y_q$ (196.7)	.73	.9996	.97
$Y_o^d = 234.05 + .8789Y_o$ (178.1)	.80	.9995	1.06
$Y_p^d = 116.20 + .9023Y_p$ (163.9)	.76	.9994	1.96
$Y_b^d = 29.07 + .9027Y_b$ (163.7)	.88	.9994	1.09
$Y = Y^e + R + Tr(U) + Tr(N)$ for all regions			

Note:  $\% \bar{S}$  - standard error of estimate (corrected for degrees of freedom) as per cent of mean value of variable being "explained".

$\bar{R}^2$  - coefficient of determination (corrected for degrees of freedom).

d - Durbin-Watson statistic for autocorrelation of residuals.

Figures in brackets under coefficients are t-values (estimates of coefficients divided by their standard errors).

APPENDIX FRelative Income Levels at High and Low Levels  
of Unemployment: An Experimental Simulation

The model described in Appendix E was used to simulate the behaviour of relative income levels over a period of twenty years on the assumption of a continuous 3 per cent national unemployment rate and again on the assumption of a 7 per cent national rate. This required the specification of values of the exogenous variables in the system throughout the period and the selection of a set of initial values for all of the predetermined variables (exogenous and lagged endogenous). For year 0, the initial year, all predetermined variables except three were set equal to their actual 1947 values, the three exceptions being  $F_a$ ,  $F_o$ , and  $F_p$ , which were set equal to zero. Population, import prices, and transfer payments other than unemployment insurance were assumed to grow at constant geometric rates equal to their actual average 1947-64 growth rates, while the armed forces variables were held constant at their 1947 levels. The national unemployment rate was set equal to 3 per cent in the first simulation and 7 per cent in the second, commencing with year 1. (For year 0 it was set at its actual 1947 level.) The model was then used to generate values of the current endogenous variables in year 0 and the current and lagged endogenous variables in years 1 and 20. The relevant final results of this exercise are displayed in Table A-20, in which earned income, total personal income, and personal disposable income per person in the regions are expressed as percentages of the corresponding national figures. (The national aggregates required for these calculations were obtained by summing regional figures.)

Among the important points which emerge from Table A-20 are the following. First, the regional-national comparisons are affected very little by the choice of income measure; all three measures present about the same picture. Second, the income gap between the Atlantic Region and the rest of Canada is not closed by operating the model with a high employment level for the country as a whole, and in general the over-all picture of regional income disparities remains essentially the same at high and low national employment levels. Third, the experiment suggests that British Columbia is the region in which the income growth rate is most responsive to changes in the employment level, being more rapid at high employment levels than at low ones.

The over-all stability of regional income differences under different assumptions about national unemployment is consistent with the actual experience of the past four decades. The basic differences have shown themselves to be surprisingly durable. However, it must be stressed that the simulation described here is experimental and any conclusions based on it must be regarded as tentative. Certainly the model should not be relied on to measure with accuracy relatively small differences in regional behaviour.

For convenience in applying the model, the condition that the unemployment rates and labour force figures for the regions must yield the specified national unemployment rate was ignored initially. However, subsequent checks were made for consistency and this condition was found to have been satisfied virtually exactly for both sets of calculations. The difference between the specified national unemployment rate (3 per cent or 7 per cent) and the national rate calculated from the sums of the

regional unemployment and labour force figures was in no case greater than .03 (e.g., 7.03 compared with 7.00), a difference which could arise easily from rounding alone.

A similar condition applies to the price indexes: the all-Canada consumer price index should be equal to an appropriate weighted combination of the regional indexes. Although in this case no check was made, the movements of the regional and national indexes conform so closely that any inconsistency would necessarily be quite negligible.

## APPENDIX G

Estimation of Regional Unemployment Rates Expected at  
Different Levels of the Canadian Unemployment Rate

The estimated regional unemployment rates associated with hypothetical national rates, as given in Table 5, are based on equations similar to those incorporated in the model described in Appendix E but fitted to 1950-64 data rather than data for the full period 1947-64. The equations used for Table 5 are as follows:

$$u_a = .3767 + \frac{1.6404u_c}{(7.3)} - \frac{.0231t}{(0.3)} \quad \bar{S} = .90; \bar{R}^2 = .8780$$

$$u_q = .4879 + \frac{1.1829u_c}{(19.9)} + \frac{.0501t}{(2.5)} \quad \bar{S} = .24; \bar{R}^2 = .9858$$

$$u_o = -.5491 + \frac{.8634u_c}{(19.9)} - \frac{.0277t}{(1.9)} \quad \bar{S} = .17; \bar{R}^2 = .9805$$

$$u_p = .4866 + \frac{.5040u_c}{(8.9)} + \frac{.0403t}{(2.1)} \quad \bar{S} = .23; \bar{R}^2 = .9411$$

$$u_b = -.5028 + \frac{1.2711u_c}{(8.2)} - \frac{.0463t}{(0.9)} \quad \bar{S} = .62; \bar{R}^2 = .8920$$

where the figures in brackets are ratios of coefficient estimates to their standard errors, and  $\bar{S}$  and  $\bar{R}^2$  are the standard error of estimate and the coefficient of determination, respectively (both corrected for degrees of freedom).

Table 5 assumes the conditions of the period 1961-64, so that  $t$  is set equal to 7.5, its average value in this period. The given hypothetical values of the national unemployment rate  $u_c$  are then inserted into the equations and the corresponding values of the regional rates calculated.

TABULAR APPENDIX

Table A-1  
Total and Earned Income per Person,  
4-Year Averages, 1949-64

	Dollars				Per Cent of Canada Figure			
	1949-52	1953-56	1957-60	1961-64	1949-52	1953-56	1957-60	1961-64
<u>Total Income per Person</u>								
Canada	1,066	1,266	1,468	1,699	100.0	100.0	100.0	100.0
Atlantic Region	685	822	980	1,153	64.3	64.9	66.8	67.9
Quebec	889	1,083	1,255	1,488	83.4	85.5	85.5	87.6
Ontario	1,263	1,502	1,740	1,982	118.5	118.6	118.5	116.7
Prairie Region	1,131	1,254	1,431	1,674	106.1	99.1	97.5	98.5
British Columbia	1,284	1,543	1,735	1,942	120.5	121.9	118.2	114.3
<u>Earned Income per Person</u>								
Canada	895	1,044	1,169	1,312	100.0	100.0	100.0	100.0
Atlantic Region	560	659	751	863	62.6	63.1	64.2	65.8
Quebec	736	884	998	1,139	82.2	84.7	85.4	86.8
Ontario	1,073	1,251	1,399	1,543	119.9	119.8	119.7	117.6
Prairie Region	964	1,048	1,142	1,302	107.7	100.4	97.7	99.2
British Columbia	1,049	1,247	1,356	1,483	117.2	119.4	116.0	113.0

Note: Based on income data from Dominion Bureau of Statistics National Accounts and population data from Dominion Bureau of Statistics census and intercensal estimates for June 1 of each year. For present purposes, "total income" is defined as all income received by persons and "earned income" as those components of the total which are associated with employment, namely labour income, military pay and allowances, and the net income of unincorporated business proprietors (including farmers).

Table A-2  
Factors Contributing to Differences in Earned Income per Person,  
4-Year Averages, 1949-64

	Labour Force Source				Employment Rate (4)	Earned Income per Person Employed (5)	Employed Persons as Proportion of Total Population (6)
	Earned Income per Person (1)	Population as Proportion of Total Population (2)	Labour Force Participation Rate (3)				
	\$					\$	
<u>Canada</u>							
1949-52	895	.703	.539	.969	2,437	.367	
1953-56	1,044	.686	.536	.962	2,950	.354	
1957-60	1,169	.674	.544	.940	3,392	.345	
1961-64	1,312	.671	.544	.943	3,810	.344	
<u>Atlantic Region</u>							
1949-52	560	.665	.493	.938	1,821	.307	
1953-56	659	.650	.476	.941	2,265	.291	
1957-60	751	.641	.484	.899	2,694	.279	
1961-64	863	.645	.487	.907	3,033	.285	
<u>Quebec</u>							
1949-52	736	.674	.540	.962	2,104	.350	
1953-56	884	.664	.538	.948	2,607	.339	
1957-60	998	.658	.539	.921	3,055	.327	
1961-64	1,139	.663	.529	.925	3,515	.324	
<u>Ontario</u>							
1949-52	1,073	.736	.558	.978	2,673	.402	
1953-56	1,251	.713	.565	.972	3,199	.391	
1957-60	1,399	.695	.572	.954	3,695	.379	
1961-64	1,543	.686	.570	.959	4,113	.375	
<u>Prairie Region</u>							
1949-52	964	.700	.540	.980	2,600	.371	
1953-56	1,048	.682	.523	.976	3,010	.348	
1957-60	1,142	.666	.544	.966	3,262	.350	
1961-64	1,302	.660	.558	.962	3,676	.354	
<u>British Columbia</u>							
1949-52	1,049	.735	.519	.960	2,864	.366	
1953-56	1,247	.713	.515	.962	3,529	.353	
1957-60	1,356	.696	.522	.930	4,011	.338	
1961-64	1,483	.689	.531	.935	4,331	.342	

Note: See Table A-1 note with respect to earned income and total population. Labour force, labour force source population, and employment series required for these calculations are based on data from Dominion Bureau of Statistics monthly Labour Force Survey sources, with adjustments to include Newfoundland in 1949 and 1950 and other minor adjustments.

Table A-3  
Factors Contributing to Differences in Earned Income per Person,  
Expressed as Ratios to Canada Figures,  
4-Year Averages, 1949-64

	Earned Income per Person (1)	Labour Force Source Population as Proportion of Total Population (2)	Labour Force Participation Rate (3)	Employment Rate (4)	Earned Income per Person Employed (5)	Employed Persons as Proportion of Total Population (6)
<u>Atlantic Region</u>						
1949-52	.626	.946	.914	.968	.747	.837
1953-56	.631	.947	.887	.978	.768	.822
1957-60	.643	.952	.888	.957	.794	.809
1961-64	.658	.961	.894	.961	.796	.826
<u>Quebec</u>						
1949-52	.822	.958	1.001	.993	.863	.952
1953-56	.847	.968	1.004	.986	.884	.958
1957-60	.854	.977	.990	.980	.901	.948
1961-64	.868	.988	.971	.980	.923	.941
<u>Ontario</u>						
1949-52	1.200	1.047	1.035	1.010	1.097	1.094
1953-56	1.198	1.039	1.053	1.010	1.085	1.105
1957-60	1.197	1.031	1.050	1.015	1.089	1.099
1961-64	1.176	1.023	1.048	1.017	1.080	1.090
<u>Prairie Region</u>						
1949-52	1.077	.996	1.002	1.011	1.067	1.010
1953-56	1.004	.993	.976	1.014	1.020	.984
1957-60	.977	.989	1.000	1.028	.962	1.016
1961-64	.993	.983	1.025	1.021	.965	1.029
<u>British Columbia</u>						
1949-52	1.173	1.045	.963	.991	1.175	.998
1953-56	1.194	1.039	.960	1.000	1.196	.998
1957-60	1.161	1.034	.959	.990	1.182	.982
1961-64	1.130	1.027	.976	.991	1.137	.994

Note: Based on figures in Table A-2.

Table A-4  
Labour Force Participation Rates  
Cross-Standardized for Age and Sex, March 1964

	Standardized According to Distribution in:						Unstandardized
	Atlantic		Quebec	Prairie		British	
	Canada	Region		Region	Columbia		
	%	%	%	%	%	%	
<u>Participation Rates in:</u>							
Canada	53.0	51.4	53.8	53.1	53.0	52.3	53.0
Atlantic Region	47.8	46.3	48.5	47.9	47.8	47.2	46.3
Quebec	51.4	49.9	52.2	51.4	51.4	50.6	52.2
Ontario	55.4	53.5	56.0	55.5	55.3	54.7	55.5
Prairie Region	53.4	51.8	54.1	53.5	53.4	52.8	53.4
British Columbia	53.4	51.6	54.1	53.5	53.3	52.6	52.6
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	90.2	90.1	90.1	90.2	90.2	90.2	87.4
Quebec	97.0	97.1	97.0	96.8	97.0	96.7	98.5
Ontario	104.5	104.1	104.1	104.5	104.3	104.6	104.7
Prairie Region	100.8	100.8	100.6	100.8	100.8	101.0	100.8
British Columbia	100.8	100.4	100.6	100.8	100.6	100.6	99.2

Note: Based on data from Dominion Bureau of Statistics Labour Force Survey for March, 1964.  
 See Technical Appendix C for additional detail.

Table A-5  
Average Seasonal Levels:  
Differences between Annual and Third-Quarter Averages;  
Labour Force, Employment, and Unemployment, 1960-64

	Labour Force		Employment		Unemployment	
	% of Annual		% of Annual		% of Annual	
	Thousands	Average	Thousands	Average	Thousands	Average
Canada	171.2	2.6	280.5	4.4	109.3	28.2
Atlantic Region	23.4	4.0	44.8	8.6	21.4	37.5
Quebec	38.8	2.1	77.1	4.4	38.3	26.8
Ontario	46.3	1.9	68.2	2.9	21.9	21.1
Prairie Region	48.1	4.1	67.0	5.9	18.9	42.0
British Columbia	14.6	2.4	23.4	4.1	8.8	22.0

Note: Based on data from Dominion Bureau of Statistics monthly Labour Force Survey.  
 For description of procedures, see Technical Appendix B.

Table A-6  
Average Weekly Hours Cross-Standardized for Class of Worker,  
Sex, and Agricultural-Nonagricultural Distribution,  
Averages of February and September, 1964

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
<u>Average Hours in:</u>							
Canada	42.2	42.3	41.9	41.7	44.1	41.5	42.2
Atlantic Region	43.2	43.3	43.0	42.8	44.4	42.6	43.3
Quebec	43.2	43.2	43.0	42.7	45.1	42.4	43.0
Ontario	42.0	42.0	41.7	41.4	44.2	41.2	41.4
Prairie Region	42.2	42.4	42.0	41.7	44.0	41.6	44.0
British Columbia	39.3	39.4	39.1	38.9	40.8	38.7	38.7
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	102.4	102.4	102.6	102.6	100.7	102.7	102.6
Quebec	102.4	102.1	102.6	102.4	102.3	102.2	101.9
Ontario	99.5	99.3	99.5	99.3	100.2	99.3	98.1
Prairie Region	100.0	100.2	100.2	100.0	99.8	100.2	104.3
British Columbia	93.1	93.1	93.3	93.3	92.5	93.3	91.7

Note: Based on data from Dominion Bureau of Statistics monthly Labour Force Survey.  
 See Technical Appendix C for additional detail.

Table A-7  
Average Weekly Hours in Manufacturing Cross-Standardized for Industry,  
1963 Annual Averages

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
<u>Average Hours in:</u>							
Canada	40.8	40.9	40.5	40.9	40.6	41.0	40.8
Atlantic Region	40.7	40.6	40.5	40.7	40.8	42.1	40.6
Quebec	42.0	42.2	41.5	42.0	41.8	43.3	41.5
Ontario	40.9	41.2	40.6	40.9	41.0	41.6	40.9
Prairie Region	40.1	39.8	39.9	40.2	39.7	40.1	39.7
British Columbia	38.0	37.6	37.8	38.2	37.7	37.8	37.8
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	99.8	99.3	100.0	99.5	100.5	102.7	99.5
Quebec	102.9	103.2	102.5	102.7	103.0	105.6	101.7
Ontario	100.2	100.7	100.2	100.0	101.0	101.5	100.2
Prairie Region	98.3	97.3	98.5	98.3	97.8	97.8	97.3
British Columbia	93.1	91.9	93.3	93.4	92.9	92.2	92.6

Note: Based on data from Dominion Bureau of Statistics monthly Survey of Man-hours and Hourly Earnings. See Technical Appendix C for additional detail.

Table A-8

Average Weekly Earnings in Manufacturing Cross-Standardized for Industry,  
1963 Annual Averages

	Standardized According to Distribution in:						Unstandardized
	Atlantic			Prairie British			
	Canada	Region	Quebec	Ontario	Region	Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	86.24	87.35	82.01	89.07	86.09	85.28	86.24
Atlantic Region	68.04	69.89	64.52	70.51	66.92	66.72	69.89
Quebec	84.16	85.33	80.55	86.91	84.23	80.84	80.55
Ontario	88.07	89.90	83.59	91.16	88.91	85.07	91.16
Prairie Region	79.67	81.25	76.30	81.94	80.57	77.36	80.57
British Columbia	91.02	92.75	86.13	93.50	91.13	94.43	94.43
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	78.9	80.0	78.7	79.2	77.7	78.2	81.0
Quebec	97.6	97.7	98.2	97.6	97.8	94.8	93.4
Ontario	102.1	102.9	101.9	102.3	103.3	99.8	105.7
Prairie Region	92.4	93.0	93.0	92.0	93.6	90.7	93.4
British Columbia	105.5	106.2	105.0	105.0	105.9	110.7	109.5

Note: Based on data from Dominion Bureau of Statistics monthly Survey of Employment and Payrolls. See Technical Appendix C for additional detail.

Table A-9

Average Weekly Earnings in "Industrial Composite" Group  
Cross-Standardized for Industry,  
1963 Annual Averages

	Standardized According to Distribution in:						Unstandardized
	Atlantic			Prairie British			
	Canada	Region	Quebec	Ontario	Region	Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	83.43	84.30	82.04	84.32	83.83	82.47	83.43
Atlantic Region	67.75	69.76	66.32	68.32	68.68	66.75	69.76
Quebec	82.17	83.11	81.01	82.84	83.31	80.34	81.01
Ontario	85.51	86.84	84.15	86.59	85.39	83.95	86.59
Prairie Region	79.29	81.53	77.96	79.58	80.82	78.28	80.82
British Columbia	89.28	90.91	87.64	89.70	89.82	90.52	90.52
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	81.2	82.8	80.8	81.0	81.9	80.9	83.6
Quebec	98.5	98.6	98.7	98.2	99.4	97.4	97.1
Ontario	102.5	103.0	102.6	102.7	101.9	101.8	103.8
Prairie Region	95.0	96.7	95.0	94.4	96.4	94.9	96.9
British Columbia	107.0	107.8	106.8	106.4	107.1	109.8	108.5

Note: Based on data from Dominion Bureau of Statistics monthly Survey of Employment and Payrolls. The "industrial composite" group includes all industrial divisions except agriculture, fishing, trapping, government service, domestic service, and community service. See Technical Appendix C for additional detail.

Table A-10

Average Hourly Earnings in Manufacturing Cross-Standardized for Industry,  
1963 Annual Averages

	Standardized According to Distribution in:						Unstandardized
	Atlantic			Prairie British			
	Canada	Region	Quebec	Ontario	Region	Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	1.94	2.00	1.84	2.00	1.96	1.94	1.94
Atlantic Region	1.58	1.66	1.49	1.64	1.56	1.52	1.66
Quebec	1.82	1.88	1.75	1.88	1.85	1.72	1.75
Ontario	1.97	2.03	1.86	2.05	1.99	1.88	2.05
Prairie Region	1.86	1.95	1.76	1.91	1.92	1.82	1.92
British Columbia	2.24	2.34	2.11	2.30	2.27	2.36	2.36
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	81.4	83.0	81.0	82.0	79.6	78.4	85.6
Quebec	93.8	94.0	95.1	94.0	94.4	88.7	90.2
Ontario	101.5	101.5	101.1	102.5	101.5	96.9	105.7
Prairie Region	95.9	97.5	95.7	95.5	98.0	93.8	99.0
British Columbia	115.5	117.0	114.7	115.0	115.8	121.6	121.6

Note: Based on data from Dominion Bureau of Statistics monthly Survey of Man-hours and Hourly Earnings. See Technical Appendix C for additional detail.

Table A-11

Average Annual Earnings of Male Wage-Earners in Manufacturing  
Cross-Standardized for Industry  
1961

	Standardized According to Distribution in:						Unstandardized
	Atlantic			Prairie British			
	Canada	Region	Quebec	Ontario	Region	Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,998	3,873	3,977	4,100	3,954	3,657	3,998
Atlantic Region	3,100	2,954	3,105	3,211	2,950	2,722	2,954
Quebec	3,814	3,656	3,805	3,946	3,791	3,284	3,805
Ontario	4,176	4,058	4,164	4,281	4,177	3,746	4,281
Prairie Region	3,792	3,736	3,825	3,843	3,799	3,438	3,799
British Columbia	4,248	4,185	4,258	4,298	4,159	4,069	4,069
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	77.5	76.3	78.1	78.3	74.6	74.4	73.9
Quebec	95.4	94.4	95.7	96.2	95.9	89.8	95.2
Ontario	104.5	104.8	104.7	104.4	105.6	102.4	107.1
Prairie Region	94.8	96.5	96.2	93.7	96.1	94.0	95.0
British Columbia	106.3	108.1	107.1	104.8	105.2	111.3	101.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-12  
Average Annual Earnings of Male Wage-Earners (All Industries)  
Cross-Standardized for Industry,

1961

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,680	3,546	3,661	3,774	3,621	3,577	3,680
Atlantic Region	2,959	2,885	2,929	3,050	2,899	2,838	2,885
Quebec	3,480	3,326	3,472	3,592	3,404	3,321	3,472
Ontario	3,895	3,794	3,882	3,984	3,824	3,782	3,984
Prairie Region	3,597	3,496	3,586	3,664	3,579	3,480	3,579
British Columbia	4,028	3,979	4,036	4,072	3,947	4,004	4,004
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	80.4	81.4	80.0	80.8	80.1	79.3	78.4
Quebec	94.6	93.8	94.8	95.2	94.0	92.8	94.3
Ontario	105.8	107.0	106.0	105.6	105.6	105.7	108.3
Prairie Region	97.7	98.6	98.0	97.1	98.8	97.3	97.3
British Columbia	109.5	112.2	110.2	107.9	109.0	111.9	108.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-13  
Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Occupation,

1961

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,680	3,494	3,626	3,775	3,665	3,663	3,680
Atlantic Region	3,032	2,878	2,981	3,116	3,022	3,009	2,878
Quebec	3,528	3,306	3,470	3,631	3,522	3,505	3,470
Ontario	3,895	3,735	3,841	3,983	3,876	3,889	3,983
Prairie Region	3,588	3,429	3,540	3,672	3,577	3,558	3,577
British Columbia	3,988	3,874	3,957	4,051	3,945	4,004	4,004
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	82.4	82.4	82.2	82.5	82.5	82.1	78.2
Quebec	95.9	94.6	95.7	96.2	96.1	95.7	94.3
Ontario	105.8	106.9	105.9	105.5	105.8	106.2	108.2
Prairie Region	97.5	98.1	97.6	97.3	97.6	97.1	97.2
British Columbia	108.4	110.9	109.1	107.3	107.6	109.3	108.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-14

Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Weeks Worked per Year  
and Hours Worked per Week,

1961

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,895	3,608	3,853	4,015	3,872	3,859	3,895
Atlantic Region	3,282	3,038	3,245	3,384	3,262	3,252	3,038
Quebec	3,717	3,445	3,674	3,831	3,698	3,692	3,674
Ontario	4,095	3,792	4,052	4,222	4,069	4,054	4,222
Prairie Region	3,807	3,528	3,768	3,924	3,783	3,769	3,783
British Columbia	4,274	3,987	4,235	4,394	4,246	4,230	4,230
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	84.3	84.2	84.2	84.3	84.2	84.3	78.0
Quebec	95.4	95.5	95.4	95.4	95.5	95.7	94.3
Ontario	105.1	105.1	105.2	105.2	105.1	105.1	108.4
Prairie Region	97.7	97.8	97.8	97.7	97.7	97.7	97.1
British Columbia	109.7	110.5	109.9	109.4	109.7	109.6	108.6

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-15

Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Age,

1961

	Standardized According to Distribution in:						Unstandardized
	Canada	Atlantic Region	Quebec	Ontario	Prairie Region	British Columbia	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,683	3,628	3,659	3,722	3,635	3,724	3,683
Atlantic Region	2,928	2,885	2,912	2,957	2,895	2,957	2,885
Quebec	3,499	3,449	3,475	3,536	3,454	3,539	3,475
Ontario	3,944	3,886	3,918	3,986	3,892	3,990	3,986
Prairie Region	3,627	3,572	3,609	3,664	3,581	3,664	3,581
British Columbia	3,964	3,905	3,940	4,005	3,912	4,008	4,008
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	79.5	79.5	79.6	79.4	79.6	79.4	78.3
Quebec	95.0	95.1	95.0	95.0	95.0	95.0	94.4
Ontario	107.1	107.1	107.1	107.1	107.1	107.1	108.2
Prairie Region	98.5	98.5	98.6	98.4	98.5	98.4	97.2
British Columbia	107.6	107.6	107.7	107.6	107.6	107.6	108.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-16  
Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Education,

1961

	<u>Standardized According to Distribution in:</u>						<u>Unstandardized</u>
	<u>Atlantic</u>			<u>Prairie British</u>			
	<u>Canada</u>	<u>Region</u>	<u>Quebec</u>	<u>Ontario</u>	<u>Region</u>	<u>Columbia</u>	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,680	3,584	3,591	3,695	3,775	3,829	3,680
Atlantic Region	2,978	2,887	2,887	2,993	3,071	3,125	2,887
Quebec	3,571	3,467	3,476	3,586	3,673	3,730	3,476
Ontario	3,970	3,872	3,885	3,983	4,063	4,115	3,983
Prairie Region	3,489	3,401	3,404	3,503	3,578	3,629	3,578
British Columbia	3,910	3,847	3,854	3,918	3,969	4,003	4,003
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	80.9	80.6	80.4	81.0	81.4	81.6	78.5
Quebec	97.0	96.7	96.8	97.1	97.3	97.4	94.5
Ontario	107.9	108.0	108.2	107.8	107.6	107.5	108.2
Prairie Region	94.8	94.9	94.8	94.8	94.8	94.8	97.2
British Columbia	106.2	107.3	107.3	106.0	105.1	104.5	108.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-17  
Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Age and Education,

1961

	<u>Standardized According to Distribution in:</u>						<u>Unstandardized</u>
	<u>Atlantic</u>			<u>Prairie British</u>			
	<u>Canada</u>	<u>Region</u>	<u>Quebec</u>	<u>Ontario</u>	<u>Region</u>	<u>Columbia</u>	
	\$	\$	\$	\$	\$	\$	\$
<u>Average Earnings in:</u>							
Canada	3,684	3,518	3,569	3,745	3,721	3,888	3,684
Atlantic Region	3,045	2,890	2,930	3,098	3,098	3,243	2,890
Quebec	3,599	3,432	3,481	3,658	3,641	3,809	3,481
Ontario	3,924	3,754	3,812	3,986	3,953	4,126	3,986
Prairie Region	3,540	3,378	3,433	3,595	3,578	3,733	3,578
British Columbia	3,857	3,723	3,775	3,910	3,864	4,007	4,007
<u>Percentage Ratio to Canada Figure</u>							
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic Region	82.7	82.1	82.1	82.7	83.3	83.4	78.4
Quebec	97.7	97.6	97.5	97.7	97.9	98.0	94.5
Ontario	106.5	106.7	106.8	106.4	106.2	106.1	108.2
Prairie Region	96.1	96.0	96.2	96.0	96.2	96.0	97.1
British Columbia	104.7	105.8	105.8	104.4	103.8	103.1	108.8

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-18  
Average Annual Earnings of Male Wage-Earners  
Cross-Standardized for Rural-Urban Distribution,

1961

	<u>Standardized According to Distribution in:</u>						<u>Unstandardized</u>	
	<u>Atlantic</u>		<u>Quebec</u>	<u>Ontario</u>	<u>Prairie</u>			<u>British</u>
	<u>Canada</u>	<u>Region</u>			<u>Region</u>	<u>Columbia</u>		
	\$	\$	\$	\$	\$	\$	\$	
<u>Average Earnings in:</u>								
Canada	3,678	3,452	3,724	3,732	3,615	3,655	3,678	
Atlantic Region	3,116	2,881	3,164	3,171	3,060	3,087	2,881	
Quebec	3,411	3,137	3,467	3,475	3,345	3,377	3,467	
Ontario	3,937	3,749	3,976	3,983	3,879	3,920	3,983	
Prairie Region	3,644	3,435	3,687	3,696	3,575	3,627	3,575	
British Columbia	4,010	3,890	4,036	4,042	3,965	4,004	4,004	
<u>Percentage Ratio to Canada Figure</u>								
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Atlantic Region	84.7	83.5	85.0	85.0	84.6	84.5	78.3	
Quebec	92.7	90.9	93.1	93.1	92.5	92.4	94.3	
Ontario	107.0	108.6	106.8	106.7	107.3	107.3	108.3	
Prairie Region	99.1	99.5	99.0	99.0	98.9	99.2	97.2	
British Columbia	109.0	112.7	108.4	108.3	109.7	109.5	108.9	

Note: Based on 1961 Census data. Earnings refer to 12-month period preceding June 1 census date. See Technical Appendix C for additional detail.

Table A-19

Regression Estimates of Average Annual Earnings of Male Wage-Earners  
Adjusted to Standard Rural-Urban Distribution and Unadjusted,

1961

	<u>Based on Actual Rural-Urban</u>		<u>Based on Canada Rural-Urban</u>	
	<u>Distribution in Region</u>		<u>Distribution</u>	
	<u>Dollars</u>	<u>Per Cent of</u>	<u>Dollars</u>	<u>Per Cent of</u>
		<u>Canada Figure</u>		<u>Canada Figure</u>
Canada	3,632	100.0	3,611	100.0
Atlantic Region	2,784	76.7	3,097	85.8
Quebec	3,361	92.5	3,275	90.7
Ontario	3,954	108.9	3,791	105.0
Prairie Region	3,495	96.2	3,824	105.9
British Columbia	4,198	115.6	4,063	112.5

Note: Based on 1961 Census data. For description of procedure, see Technical Appendix D.

Table A-20  
Hypothetical Changes in Relative Levels of Income per Person:  
An Experimental Simulation Based on  
Alternative Assumptions about the Canadian Unemployment Rate ( $u_c$ )

	Year 0	Year 1		Year 20	
		$u_c = 3\%$	$u_c = 7\%$	$u_c = 3\%$	$u_c = 7\%$
(Percentage ratio to Canada figure)					
<u>Earned Income per Person</u>					
Canada	100	100	100	100	100
Atlantic Region	70	67	73	64	70
Quebec	82	83	83	83	86
Ontario	119	120	121	116	118
Prairie Region	109	106	102	103	100
British Columbia	112	114	113	126	109
<u>Total Income per Person</u>					
Canada	100	100	100	100	100
Atlantic Region	72	70	76	67	72
Quebec	83	84	85	85	88
Ontario	116	118	118	115	116
Prairie Region	109	105	100	101	99
British Columbia	114	117	116	125	110
<u>Disposable Income per Person</u>					
Canada	100	100	100	100	100
Atlantic Region	73	71	77	69	75
Quebec	84	84	85	86	88
Ontario	116	116	116	113	114
Prairie Region	110	107	102	102	100
British Columbia	112	115	114	125	110

Note: For descriptions of the model and procedures used to derive the figures in this table, see Technical Appendices E and F.

PUBLICATIONS OF  
THE ECONOMIC COUNCIL OF CANADA

(Copies of the following publications may be obtained in English and French from the Queen's Printer, Ottawa. Payment should accompany orders to avoid possible delay in shipment.)

<u>Catalogue Number</u>	<u>Title</u>	<u>Price</u>
EC1-1964	Annual Report (1964).....	\$ .50
Fo 1/1965	Annual Report (1965).....	.50
EC21-1/1964	First Annual Review: Economic Goals for Canada to 1970.....	3.50
EC21-1/1965	Second Annual Review: Towards Sustained and Balanced Economic Growth.....	2.75

Staff Studies

EC22-1/1	1. Population and Labour Force Projections to 1970, by F. T. Denton, Y. Kasahara and S. Ostry.....	.75
EC22-1/2	2. Potential Output, 1946 to 1970, by B. J. Drabble...	1.00
EC22-1/3	3. An Analysis of Post-War Unemployment, by F. T. Denton and S. Ostry.....	.75
EC22-1/4	4. Housing Demand to 1970, by W. M. Illing.....	.75
EC22-1/5	5. Business Investment to 1970, by D. A. White.....	1.00
EC22-1/6	6. Special Survey of Longer Range Investment Outlook and Planning in Business, by B. A. Keys.....	.25
EC22-1/7	7. Canada and World Trade, by M. G. Clark.....	.50
EC22-1/8	8. Export Projections to 1970, by J. R. Downs.....	.75
EC22-1/9	9. Federal Tax Revenues at Potential Output, 1960 and 1970, by D. J. Daly.....	.50
EC22-1/10	10. National Saving at Potential Output to 1970, by F. Wildgen.....	.50
EC22-1/11	11. Changes in Agriculture to 1970, by J. Dawson.....	.50

<u>Catalogue Number</u>		<u>Title</u>	<u>Price</u>
EC22-1/12	*12.	The Contribution of Education to Economic Growth, by Gordon W. Bertram.....	
EC22-1/13	*13.	Internal Migration in Canada, 1921-61, by Isabel B. Anderson.....	
EC22-1/14	*14.	Interregional Disparities in Income, by S. E. Chernick.....	
EC22-1/15	15.	An Analysis of Interregional Differences in Manpower Utilization and Earnings, by F. T. Denton.....	
EC22-1/16	*16.	Interregional Disparities in Public Services, by T. K. Shoyama.....	
EC22-1/17	*17.	Business Cycles in Canada, by D. A. White.....	

Special Studies

EC22-2/1	1.	Immigration and Emigration of Professional and Skilled Manpower During the Post-War Period, by L. Parai.....	1.50
EC22-2/2	2.	A Survey of Labour Market Conditions, Windsor, Ontario, 1964: A Case Study, by G. R. Horne, W. J. Gillen and R. A. Helling.....	.50
EC22-2/3	3.	Perspective on Canada's International Payments, by David W. Slater.....	1.60

Conference Papers and Reports

EC22-364		National Conference on Labour-Management Relations (1964).....	2.00
EC22-665		*Conference on Stabilization Policies, Report of the Conference at University of Western Ontario, August 1965.....	3.00
EC22-766		Conference on International Trade and Canadian Agriculture, Banff, 1966.....	3.00

<u>Catalogue Number</u>	<u>Title</u>	<u>Price</u>
Papers presented at "Conference on Productivity through New Technology", Toronto, May 1965:		
EC22-4/1	Modern Management, by G. G. Fisch.....	.50
EC22-4/2	Practical Application of Data Processing in Small and Medium Manufacturing Companies, by H. S. Gellman and R. C. Carroll.....	.75
EC22-4/3	A Practical Approach to Automatic Production, by D. J. Clough, J. W. Abrams, and R. W. P. Anderson.....	.50
EC22-4/4	Advances in Metal Working, by J. Vande Vegte.....	.75
EC22-4/5	Improving Material Movement Through the Manufacturing Cycle, by J. A. Brown and B. D. Beamish.....	.50
EC22-4/6	The Economic Justification of New Equipment, by C. G. Edge.....	.75

Other Studies and Reports

EC22-565	A General Incentive Programme to Encourage Research and Development in Canadian Industry, A Report to the Economic Council of Canada by Advisory Committee on Industrial Research and Technology.....	.60
----------	---	-----

\*Forthcoming

DAY  
8/22  
1/25

HC/111/.E31/n.15  
Denton, Frank T., 1930-  
An analysis of  
interregional dhyx  
c.1 tor mai

## Date Due

MAR 29 1976  
OCT - 3 1980

An Analysis of Interregional Differences  
in Manpower Utilization and Earnings  
by Frank T. Denton

---

*Economic Council of Canada*