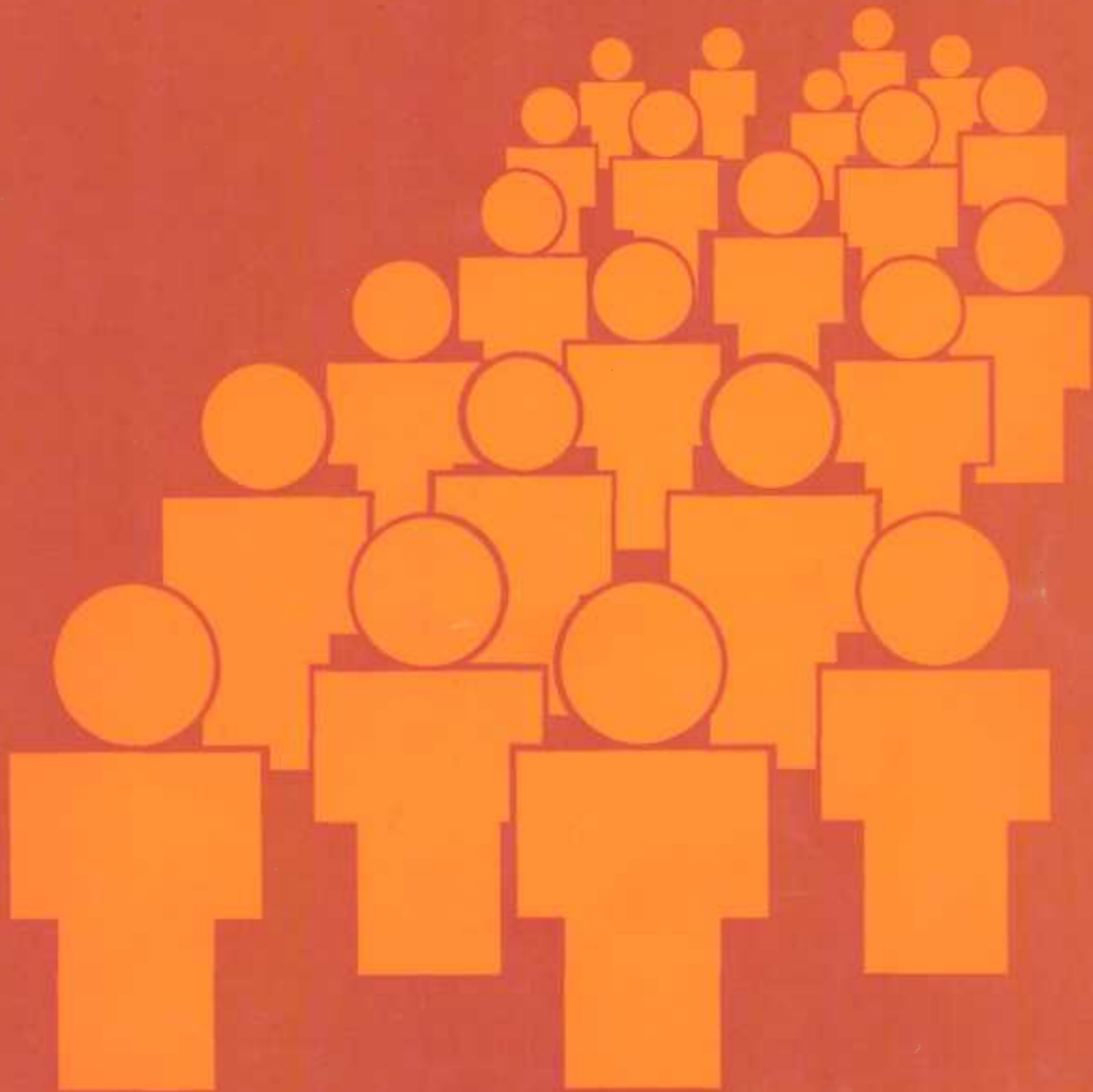


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Demographic Trends and Their Impact on the Canadian Labour Market



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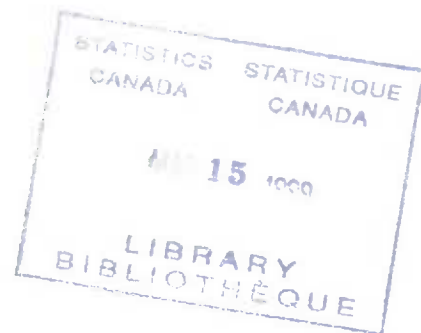
Canada

PROCEEDINGS OF A WORKSHOP ON

DEMOGRAPHIC TRENDS AND THEIR

IMPACT ON THE
CANADIAN LABOUR

MARKET



Sponsored Jointly By:

The Demography Division of Statistics Canada

and

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PREFACE

The Workshop on Demographic Trends and Their Impact on the Canadian Labour Market took place on October 23, 1980 in the Centennial Room of the Government Conference Centre. Approximately sixty persons attended the workshop representing eight federal departments or agencies: the Department of Employment and Immigration, the Employment and Immigration Commission, the Economic Council of Canada, Regional Economic Expansion, the Department of Labour, the Ministry of State for Economic Development, the Secretary of State and Statistics Canada. (A list of participants is given on page 223.)

Seven papers were presented at the workshop by members of the Demography Division of Statistics Canada and of the Employment and Immigration Analysis Directorate of the Department of Employment and Immigration. These proceedings contain revised versions of these papers in the order in which they were presented at the workshop, along with a summary of the discussion period as prepared from a tape transcript.

The workshop was a success in that it established good rapport between its participants and identified some important areas of policy-related research where Statistics Canada and the Department of Employment and Immigration could usefully join forces. The following research areas were given high priority:

- (1) the impact of demographic factors on the labour market and demographic correlates of unemployment;

- (2) the preparation of background papers as input to the formulation of immigration targets;
- (3) the improvement of statistics on immigration and emigration flows for Canada;
- (4) the development of labour force projections by occupational group.

The workshop re-emphasized the need for joint analytical research, such as that identified above, in order to shape and present statistical material into a more suitable form for input to policy decision-making processes.

Appreciation is expressed here to Dr. John Samuel (Employment and Immigration) and Dr. John Kelly (Statistics Canada) for their help in organizing the workshop, and to Mr. Malcolm Britton and Ms. Judith McSkimmings, both from Statistics Canada, for editing the proceedings.

The contents of individual papers are the views and opinions of the authors and do not necessarily represent the views, opinions or policies of Statistics Canada or the Department of Employment and Immigration.

**Employment and Immigration Analysis
Directorate
Department of Employment and
Immigration**

Demography Division
Statistics Canada
June 1981

INTRODUCTORY REMARKS

by

P. B. Fay

Acting Assistant Deputy Minister,
Strategic Policy and Planning,
Employment and Immigration Canada

Along with other departments, Employment and Immigration Canada certainly requires social data in order to formulate soundly based policies. In this respect we have had a long and very profitable association with Statistics Canada. This workshop, on the initiative of Statistics Canada, is welcomed by us as a useful opportunity to discuss the demand for and supply of information in this field. I have two points to make in relation to this workshop. Firstly, it has brought together a group of professionals working in the same field but with different perspectives; I think this is extremely valuable for the cross-fertilization of ideas. Secondly, I am sure everybody here agrees that the emphasis and resources given to the areas of demography and labour force are not what they should be. I think we should do all that is possible, particularly in the current economic climate, to ensure that the need for demographic and labour force data is recognized as important and that the associated resources required are the most cost-effective. In order to accomplish this goal, we must all ensure that the need for and the uses of these data are very clearly articulated for senior managers in both agencies.

With such a group as the one which is assembled here, I am sure that the workshop will provide us all with the opportunity of having a

highly productive and stimulating discussion and exchange of views. On behalf of my colleagues from Employment and Immigration Canada, I would like to thank Statistics Canada for inviting us to participate so actively in this workshop, and I hope that similar types of collaborative undertakings will be arranged between our two departments in the future.

INTRODUCTORY REMARKS

by

A. RomaniucDirector, Demography Division
Statistics Canada

This workshop is one of several that the Demography Division of Statistics Canada plans to hold with government departments and agencies which make use of demographic data in their work. With the appointment of Dr. I.P. Fellegi, as the Assistant Chief Statistician responsible for Social Statistics, a more determined effort is being made to enhance the relevance of social and demographic statistics to policy decision-making processes. As a statistical agency, we are clearly not in the business of formulating policies. It is, however, incumbent upon us to be aware of the policy departments' needs for data and to effectively respond to these needs. One way of achieving this is by establishing closer personal and institutional links between ourselves and the users of our data.

The purpose of this workshop is to bring together colleagues from various departments in order to, firstly, discuss technical and substantive issues concerning the relationship between demographic trends and the labour force; secondly, identify areas that require further research; and thirdly, initiate the process for establishing an on-going program of joint analytical research in the population field which will be of interest to both Departments. It is hoped that in this way we can make demographic information more relevant to policy decision-making processes.

We are very pleased that our colleagues from the Department of Employment and Immigration responded so positively to the idea of this particular workshop. I would like to take this opportunity to thank the organizers, Dr. John Samuel (Employment and Immigration) and Dr. John Kelly (Statistics Canada), for all they have done to make this workshop possible.

PAPER 1

CANADIAN FERTILITY TRENDS*

by

T.J. Samuel
Department of Employment and Immigration

Introduction

This paper intends to examine Canadian fertility trends in order to better understand the steep decline in fertility experienced by Canada during the past twenty years. The causes of the fertility decline are investigated and the probable course of this crucial demographic variable in the next few years is explored with a view to formulating suitable fertility assumptions for developing population projections.

Before the conquest of Quebec (known as New France) by England, Quebec's fertility was "a legend in its time"(1). Quebec's first census provided the comment: "Women bear a child nearly every year". The colony's first woman, who came in 1617, is reported to have had 27 children. In the decades immediately following the "conquest of Canada by England, the Canadians of French origin did achieve the growth rate forecast by Malthus, namely doubling their population once in

* I am thankful to R.F. Gordon of the Dept. of Employment and Immigration for his comments on an earlier draft of this paper.

(1) Beaujot, Roderic P., Canada's population: growth and dualism, Population Bulletin, April 1978, p.8.

25 years"(2), through natural increase(3). As observed by Henripin, "insofar as the birth rate is concerned, the Canadians of those days cannot be reproached for not having done their duty"(4).

The prolificity of those days is attributed to early marriages, monetary incentives to fathers, heavy taxes on bachelors, availability of virgin land, scarcity of labour, high infant mortality, and the absence of contraception in a pre-industrial and religious society.

Quebec's vital statistics are better documented than those of the rest of Canada. Four decades after the conquest of Quebec by the British in 1760, Quebec had a birth rate of over 60 per thousand. In 1761-70 the birth rate was 65.2(5). In Canada as a whole during the 18th Century, married women over age 45 had an average of 8.4 live births. Quebec's fertility rate continued to remain high in the 19th century.

Regarding Quebec's birth rate, in 1959 it was higher than the Canadian birth rate, 28.3 compared to 27.4. Nine years later, in 1968,

(2) In 1882 Thomas Robert Malthus formulated his theory of population which brought the population problem to the attention of the scholarly world. The theory said that human population when unchecked increases in geometrical progression (so as to double every twenty-five years) while the food supply increases only in arithmetical progression. This results in food supply eventually falling short of the needs of the population. Therefore, if population growth is unchecked by reduced birth rates, mortality rates will have to increase.

(3) Henripin, Jacques, Trends and Factors of Fertility in Canada, Statistics Canada, Ottawa, 1972, p. 3.

(4) Ibid., p. 1.

(5) Henripin, Jacques, loc.cit.

it was the lowest of the Canadian provinces. Such drastic fertility declines have not been common in the annals of demography. Perhaps the only parallel is that of Japan where the birth rate during the post-war period plummeted by half during a single decade mainly because of legalized abortions. By 1972 Quebec's birth rate stood at 13.8 compared to 15.3 in 1976, but it is still below the Canadian average.

This decline is often explained in terms of the Demographic Transition Theory(6) according to which the fertility reduction during the modernization process is experienced last by the most disadvantaged group in society. Also it needs to be noted that the baby boom experienced by North America during the post-war period was not shared by the Quebec population(7). Industrial expansion in Quebec, improved facilities for education, increased urbanization and the weakened hold of religion are some of the contributory factors.

Before discussing the convergence of fertility interprovincially, it should be mentioned that the birth rate, as a measure of human reproduction, does not often give a true picture of these events since births occur only to women in a certain age group, mostly within the framework of marriage. Therefore, variations in birth rates will be significantly influenced by the proportion of married women in the

(6) The demographic transition was conceived as taking place in three broad stages: (a) pre-industrial societies, with high fertility and mortality and a consequent low natural increase; (b) societies in transition, with continuing high fertility but declining mortality and rapid natural increase; and (c) modern societies, with both fertility and mortality established at a low level with more or less static population.

(7) Beaujot, Roderic P., loc.cit., p. 10.

childbearing age group. For example, as pointed out by Henripin, "the considerable rise in the crude birth rate up to 1959 and its no less considerable decline from 1959 to 1967 is almost totally due to changes in age-specific fertility rates; and the rise would have been even more important were it not for the negative influences of the age distribution"(8).

For a better measure of human fertility, therefore, the concept known as total fertility is often used. "The total fertility rate refers to the average number of children born to a hypothetical cohort of women if they experienced no mortality and were subjected to the same schedule of age-specific fertility rates as observed during a calendar year"(9). This rate could be expressed as per 1,000 women or per woman. The proportions of women married, their age at, and duration of, marriage affect total fertility rates.

Table 1 and Chart 1 show that the total fertility rate has been on the decline for some time. In 1917 there was a total fertility rate of 4.3 which declined to 2.6 in 1937, rose to 3.9 by 1959 and fell to 1.8 in 1978. Along with this drastic decline in fertility, a convergence in fertility between the provinces has been taking place. Quebec, which used to have the highest birth rate in the country, now has the lowest. Quebec's birth rate dropped from 35.5 in 1921-25 to 28.3 in 1959 while Ontario's rose from 23.7 to 26.4. Since that time, however, both

(8) Henripin, Jacques, Recent Trends in Canadian Fertility, Canadian Review of Sociology and Anthropology, Vol. 8, No. 2, 1971, p. 117.

(9) George, M.V. and A. Romaniuc, Patterns and Factors of Fertility Decline in Canada in 1960's (Mimeo), Statistics Canada, 1971, p. 3.

TABLE 1. Total Fertility Rate (TFR) per Woman*, Canada, 1917-1978

Year	TFR	Year	TFR	Year	TFR	Year	TFR
1917	4.3	1937	2.6	1951	3.5	1965	3.1
1922	3.4	1938	2.7	1952	3.6	1966	2.8
		1939	2.7	1953	3.7	1967	2.6
1926	3.4	1940	2.8	1954	3.8	1968	2.5
1927	3.3	1941	2.8	1955	3.8	1969	2.4
1928	3.3	1942	3.0	1956	3.9	1970	2.3
1929	3.2	1943	3.0	1957	3.9	1971	2.2
1930	3.3	1944	3.0	1958	3.9	1972	2.0
1931	3.2	1945	3.0	1959	3.9	1973	1.9
1932	3.1	1946	3.4	1960	3.9	1974	1.9
1933	2.9	1947	3.6	1961	3.8	1975	1.9
1934	2.8	1948	3.4	1962	3.8	1976	1.8
1935	2.8	1949	3.5	1963	3.7	1977	1.8
1936	2.7	1950	3.5	1964	3.5	1978	1.8

* See text for definition

Source: Statistics Canada, *Vital Statistics*, Volume 1, Births, Catalogue 84-204, Annual.

Chart — 1
Female Participation Rates and Total Fertility Rates,
Canada, 1951-1978



Source: Statistics Canada, *Vital Statistics*, Volume 1, Catalogue 84-204, Annual.
 Labour Force Survey Group, Statistics Canada.

provinces have experienced a decline in fertility. The 1975 total fertility rate in all provinces, with the exception of British Columbia, Quebec and Ontario, slightly exceeded that for the country as a whole. Most other provinces seem to be rapidly moving to the 1.7 total fertility rate attained by the three provinces above, while Newfoundland, Northwest Territories and Yukon still lag behind.

The drastic reduction in Canadian fertility came as a result of progressive industrialization and urbanization and all the social attitudes, aspirations and behaviour patterns that accompany such changes, as often described in the social theories of fertility(10). Despite the earlier attitudes of governments, contraception has become common, religious restrictions on the use of contraceptive techniques are honoured more in breach than in observance, legalized abortions are easier to be arranged; the end result being that, in most cases nowadays, children are born by deliberate choice not by random chance.

The steep decline in fertility experienced by Canada since 1959, as seen in Table 1, may now be looked at. Such an examination is necessary to understand the complex phenomenon of fertility and its probable course in the future. The causes of this decline could be attributed to a number of factors which may be grouped under the broad headings of economic, social-psychological, demographic, governmental and environmental.

(10) The social theories of fertility attribute decisions on fertility to a number of social factors. The Nobel-laureate economist Paul Samuelson admits that it is to sociology, rather than economics that one must look for an understanding of the basic demographic trends. In other words, he felt that tastes and preferences dominate the impact of income and relative prices (and also wealth) on fertility.

1. Economic.

From the days of Malthus it has been recognized that economic factors play a crucial role in fertility decisions and the resulting fertility behaviour. While Malthus believed that improved standards of living will lead to increased fertility, the Theory of Demographic Transition suggested the opposite. Nevertheless as Ryder observed, "... to judge from the reports of informants, emphasis of analysts, and everyday conversation, economy is the paramount determinant of fertility decisions"(11).

The economic model of fertility would suggest that fertility decisions are arrived at through a consideration of relative preferences for children and the level of living of the couples. Some of these may be looked at in the Canadian context.

(a) Female Participation Rate.

A study that investigated the relationship between the economic structure of populations and their level of fertility, using data from censuses conducted in some 50 nations, shows that "high rates of female labour force participation outside the home depresses a society's fertility level..."(12). Several Canadian studies have

(11) Ryder, N.B., Fertility, in Hauser, Philip M. and Otis Dudley Duncan (eds.), The Study of Population: An Inventory and Appraisal, University of Chicago, 1959, p. 426.

(12) Karda, John D., Economic structure and fertility: A comparative analysis, Demography, August 1971, p. 307.

suggested that the presence or absence of a young child is the most important single factor influencing the wife's participation in the labour force(13). An ever-increasing number of women during the last 20 years or so have questioned their traditional roles in the home and have taken employment outside the home with a view to self-fulfillment, to supplement the family income, to avoid boredom and to acquire modern household gadgets and other amenities of life such as vacations. Since the bearing and rearing of children constitute major barriers to labour force participation, many women have opted for the labour market in preference to repeated motherhood.

As observed in a U.S. study, while "there are no child care arrangements which render the mother and worker roles 'compatible' ..., the stability of child care arrangements may be an important factor affecting women's employment and fertility"(14). Several empirical investigations have come to the conclusion that lower fertility rates and availability of child care arrangements go hand in hand. Since there are no Canadian studies on this issue one has to turn to U.S. studies.

(13) Allingham, John D. and Byron G. Spencer, Women Who Work: Part 2 Married Women in Labour Force, Special Labour Force Studies, Series B, No. 2, Ottawa, 1968; Ostry, S., The Female Worker, DBS, Ottawa, 1968; Skowlas, N., Determinants of the Participation Rate of Married Women in the Canadian Labour Force, Statistics Canada, 1974.

(14) Flogue, Liliane, P., Types of child care and fertility: A longitudinal study of working and nonworking mothers, Population Index, July 1978, p. 421.

A study of non-employed mothers showed that "entry into the labour force facilitated by child care might reduce subsequent fertility"(15). Another study said: "The use of child care is associated with lower fertility and lower fertility expectations..."(16).

Child care facilities available in society either institutionally or privately will influence fertility levels through the participation rate of women in the labour force. In Eastern Europe, in particular, such facilities are widely available and perhaps have contributed to declining fertility. In Canada, however, this has not been the case so far, though such facilities are becoming increasingly available in response to the greater demand for them. This greater availability may stimulate the labour force participation rate, and it is anticipated that it will depress fertility further in the future.

In modern society, where work is performed in a location away from home, there is a great amount of incompatibility between the roles of mother and worker. The less the cost in transferring the childbearing tasks to others, or in

(15) Presser, Harriet B., Child care, non-familial activities and fertility among non-employed mothers, Population Index, July 1978, p. 240.

(16) Baldwin, Wendy, Child care arrangements and fertility of working mothers, changes from 1973 to 1976, Population Index, July 1978, p. 421.

incorporating them within the job, the greater the compatibility"(17). "The major ways in which family status is related to employment status are: the older the youngest child, the lower the probability that a mother will regard her employment as an inappropriate activity; the younger the youngest child and the more children there are, the more homework that needs to be performed; the younger the youngest child, the greater the difficulty of arranging satisfactory child care, and the greater the probability that child care will cost money, and thus reduce the net wage received"(18).

The rate of decline of fertility was substantial during the period 1961 to 1971, precisely during the period when participation rates increased for the prime childbearing age groups of women as seen in Chart 1. When fertility declined by about 50 percent during the period, the female participation rate of the 20-24 age group increased from 50.4 to 61.6 percent; for the 25-34 age group it increased from 28.9 to 40.6 percent(19).

It might be useful to speculate what the future holds for fertility as a result of greater involvement of women in work

(17) Shycos, J.M. and R.H. Weller, Female working roles and fertility, Demography, May 1970, p. 207.

(18) Sweet, James A., Family composition and labour force activity, Demography, May 1970, p. 207.

(19) Stone, Leroy and Andrew J. Siggner, The Population of Canada: A Review of the Recent Patterns and Trends, Statistics Canada, 1974, p. 92.

outside the home. According to the C.D. Howe Research Institute, female participation rates are likely to increase further due to higher levels of education of women, increased urbanization, greater career commitment of women and lower fertility itself(20). Also the expansion of employment opportunities in the service sector of industry, a traditional source of employment for women, is likely to encourage a higher female participation rate. However, it is possible that society will be working out certain arrangements that will bring greater compatibility between the roles of motherhood and labour force participation. For "mothers of young children the financial and emotional costs of children and the husband's attitudes are important determinants of labour force participation"(21). Subsidized child care facilities could reduce the financial costs and improve the quality of such care; greater participation of husbands in child care (even to the extent that some remain at home) could lower the emotional costs involved.

The overall female participation rate in Canada increased from 28.3 percent in 1960 to 48.9 percent in 1979. However, Japan had a female labour force participation rate of 54.5 in 1960 and Sweden of 53.5 in 1975. This indicates that the

(20) C.D. Howe Research Institute, Policy Review and Outlook, 1979, Anticipating the Unexpected, Montreal, 1979, p. 145.

(21) Crimmins-Gardner, Eileen, The prediction of young mother's labour force participation and future participation expectations through use of a household decision-making model, Population Index, July 1978, p. 401.

potential exists in Canada for an even higher female participation rate. Projections indicate that adult females (25 and over) who had a participation rate of 45 percent in 1979 are likely to have a rate of 54 to 55 percent by 1990(22).

It may, therefore, be concluded that the increasing participation rate of females is likely to reduce fertility rates further.

(b) Costs of Children and The Level of Living.

Preferences for childbearing are also related to the costs of children and the level of living. It is less difficult to discuss the economic costs of bringing up children than the emotional costs. The fertility decisions of couples would also be based on the benefits - both emotional and economic if any - derived from the children. "It cannot be denied that the attitude towards the material comforts of modern existence and the growing expensiveness of children and adolescents contributed their share to the acceleration in the fall of the family size"(23).

(22) Employment and Immigration Canada, An Analysis of Labour Force Participation: Underlying Factors and Future Trends, December 1979, p. 24.

(23) Banks, Joseph A., Prosperity and Parenthood, Routledge and Kegan Paul Ltd., London, 1954, p. 206.

Several studies have shown that the cost of bringing up a child, both in terms of monetary expenditures and imputed costs as a result of lost opportunities, is several times the annual family income. Since in a modern society the decision to have a child is often weighed in the context of the ability of the parents to provide a comfortable standard of living for the family, an economy in which prices rise faster than income is unlikely to be conducive to higher fertility. Even more important, the direct costs related to childbearing such as health services, recreation and education are probably increasing at a higher rate than family income.

The couples' level of living is inextricably related to their level of income. In a modern society, unlike an agrarian one, children are often perceived more as a liability than as an asset. As suggested by Gary S. Becker, "the decision to have an additional child is, among other things, a major economic decision and is subjected to the same principles of economic analysis that influence other economic activities of persons and groups"(24).

Considering income, a study relating income to fertility in Canada found a positive relationship during the years 1926-57 and a negative one during the 1958-64 period(25). Other

(24) As quoted by Bogue, D.J., Principles of Demography, John Wiley, New York, p. 679.

(25) Rao, Bhaskara N., Fertility and Income in Canada, Population Research Laboratory, Edmonton, 1973.

studies have shown that the higher the husband's income the lesser the possibility of the wife working and hence the higher the fertility rate, especially in an urban environment. Henripin concluded on the basis of the 1961 Census that, controlling both the age of the wife and the education of the couple, the couple have 2.8 children on average when the husbands income is \$10,000 or over, 2.6 children when the income is \$5,000 - \$7,000 and only 2.2 when the income is \$1,000 to \$3,000 in large cities(26). On the other hand, an empirical investigation in Edmonton in 1973-74 concluded that "higher incomes appear to be associated with lower preferences for childbearing and thus with lower fertility"(27).

Unemployment among the younger population especially is likely to have an unfavourable effect on fertility. As is well known, their unemployment rate has escalated in recent years. Needless to say that an economic climate with a high unemployment rate does not generally encourage couples to marry or to have a family. The unemployment rate among the 14-24 year age group doubled between 1953 and 1957 when the fertility decline set in; it remained in the 9 to 13 percent range in the 1957-63 and 1970-75 periods, though during 1964-69 the range was between 6 to 10 percent.

(26) Henripin, Jacques, loc.cit., p. 122.

(27) Beaujot, Roderic P., Karol J. Krotki and P. Krishnan, Socio-cultural variations in the applicability of the economic model of fertility, Population Studies, July 1978, p. 323.

Perhaps the most well known economic theory relating income to fertility is the Easterlin-Wachter model(28). The model does offer an adequate explanation for the baby boom of the fifties. However, the empirical testing of the above model in Western Canada showed mixed results as applied to different socio-cultural groups(29).

The Easterlin theory has been challenged on the ground that "changes in women's economic roles will help perpetuate low fertility and probably prevent baby booms of the magnitude experienced..."(30). The high rate of female labour force participation has reduced the extent of fertility fluctuations based on the Easterlin hypothesis.

Despite the general appeal of the theory, it is not clear that it would be correct in suggesting a reversal in fertility at the time when the younger population currently experiencing an economic squeeze, reaches a period of

(28) In 1968 R.A. Easterlin made an attempt (later known as the Easterlin - Wachter Model) to reconcile the post-war baby boom with the earlier history of fertility in the United States. Fertility, he says, is a positive function of relative income - the relation between the current income of young people, especially those in their early twenties, and that of their parents some ten to fifteen years earlier. When young people think about marrying and having children, they compare their current income with the consumption level they were accustomed to, as adolescents. They marry sooner and have more children if the comparison is favourable. This model was found to be applicable to the post-war baby boom.

(29) Rao, Bhaskara, loc.cit.

(30) Oppenheimer, Valerie K., The Easterlin hypothesis: another aspect of the echo effect to consider, Population and Development, Sept.-Oct., 1976, p. 433.

relative economic prosperity. Even if the economic squeeze is eased, because of the high female participation rate and other social and psychological factors to be discussed soon, this group is unlikely to experience a baby boom. One is tempted to agree with a recent British study which points to "a combination of low fertility and the possibility of a secular decline with fertility approaching some lower asymptote"(31).

2. Social-psychological.

Apart from economic factors, some social and psychological factors are significant both in decisions related to having children and in the use of techniques to control births. Though a complete enumeration and investigation of these factors are difficult some of them may be mentioned.

(a) Religion:

As observed by Henripin, "of all the factors that may affect fertility, religion is probably the one which most explicitly affects the behaviour of couples"(32). In addition to official prohibitions against the use of abortion and certain techniques of contraception by the Roman Catholic Church, the Church doctrine teaches couples not to impede births without serious reasons.

(31) Ermisch, J., The relevance of the 'Easterlin Hypothesis' and the 'New Home Economics' to fertility movements in Great Britain, Population Studies, March, 1979, p. 39.

(32) Henripin, Jacques, loc.cit., p. 194.

In the 40-44 age group the number of children born per Catholic woman in Canada was 4.0 in 1961 compared to 2.7 per Protestant woman and 2.1 per Jewish woman(33). For the 25-29 age group, however, these numbers were 2.2, 2.1 and 1.7 respectively, indicating a reduction in the differences between these religious groups for the younger generation. It is assumed that no catch up in fertility was intended by any of these groups later in their reproductive life.

The influence of religion on fertility has weakened lately. Even in the Roman Catholic Church, to which more than two-fifths of the Canadian population belong and where opposition to contraception is found, "the individual couples appear to be increasingly ignoring their church's teaching on this issue"(34). This trend, already widespread, is likely to become even more so in the years to come. A survey in Toronto covering the period 1958 to 1968 concluded that most women, regardless of religious affiliation, use contraception although the prevalence of its use was greater among Protestants than Catholics(35). On the basis of the above evidence it could be assumed that religion is not likely to be a major factor determining the course of fertility in the future.

(33) Henripin, Jacques, loc.cit., p. 198.

(34) Hudson Institute, Canada has a Future, McClelland and Stewart, 1978, p. 71.

(35) Kantner, J.F., J.D. Allingham and T.R. Balakrishnan, Oral Contraception and the Fertility Decline in Canada, (Mimeo).

(b) Urbanization.

Studies have shown that fertility is related to the degree of urbanization attained by the population. According to studies based on Canadian censuses, big urban centres have the effect of reducing fertility by 10 to 15 percent(36). Small towns with 1,000 to 5,000 residents have an excess fertility of 10 percent and the rural non-farm environment induces an excess fertility of nearly 20 percent(37).

The data also indicate that after an urban population has reached a given size, a further increase in population has no effect on fertility rates. As in most industrial countries, Canada's urban population has progressively increased from 13.1 percent in 1851 to 62.9 percent in 1951 and to 76.6 percent in 1971(38).

The effect of urbanization on fertility is felt through the life style adopted by the urban population. The urban life style and the status accorded to urban women and their labour force participation rate, the cost of housing, rate of mobility, level and pattern of consumption, multiplicity of recreational opportunities and "discrimination" against children all add up to reduce fertility levels.

(36) Henripin, Jacques, loc.cit., p. 122.

(37) Ibid.

(38) Johnson, Thomas H., Urbanization and economic growth in Canada, 1851-1971, Research Report No. 7321, The University of Western Ontario, London, p. 8.

However, it is not certain whether the urban proportion of Canada's population will continue to increase. Nor it is certain that the positive correlation between urban size and lower fertility will be maintained in the future.

(c) The Status of Women.

As observed in an American study, "the status of women is no simple topic to be neatly dissected and disposed of... It touches on virtually all aspects of the social order whose priorities and projects it helps shape. And it is woven into the fabric of our private lives in a multiplicity of ways"(39). One of the areas it has deeply affected is procreation since for "the first time in historic memory, the reproductive imperative is being challenged and motherhood itself is under fire"(40).

The women's liberation movement has added a new dimension to the status of women in North America. Singles and divorcees are no longer social outcasts; they "have not only become acceptable, they have acquired an aura of glamour and adventure"(41). Higher divorce rates and the existence of more female-headed families are also "consistent with a

(39) Keller, Suzanne, The future status of women in America, in Westoff, Charles F. and, Park Robert J. (Eds.), Demographic and Social Aspects of Population Growth, Washington, 1972, p. 269.

(40) Ibid., p. 270.

(41) Santos, Frederick P., The economics of marital status, in Lloyd, Cynthia B. (ed), Sex Discrimination and the Division of Labour, Columbia, 1975.

strong women's liberation effect"(42), and the likelihood of divorce is often positively correlated with higher labour force participation.

The effect of sexual integration on the basis of equality, attempted by the women's liberation movement, is expected to cause a decline in fertility. The demand for children may fall and their cost (including opportunity costs) will rise as the marginal value of the woman's time rises.

(d) Education.

Higher levels of education have had a depressing effect on fertility through higher labour force participation rates and probably greater efficiency in the practice of contraception. Differential fertility rates by education suggest that the improving educational levels of women are likely to have a dampening effect on fertility.

According to Canadian censuses, "fertility is lower as schooling is higher"(43). The differences were most pronounced between women with elementary and secondary levels of education and less pronounced in the urban environment.

(42) Johnson, Shirley B., The impact of women's liberation on marriage, divorce and family life-style, in Lloyd, Cynthia B. (ed.), loc.cit., p. 416.

(43) Henripin, Jacques, loc.cit., p. 239.

(e) Psychological Factors.

A number of psychological factors influence the motivation for children. Some of them may be briefly mentioned.

The love for children could act as a favourable influence on fertility. The desire to have children, universal in mankind, could be satisfied by having one or two children. Children have a "symbolic and psychological value for their parents - as extensions of themselves, as sources of intrinsic pleasure"(44). However, these values may be offset by considerations of costs in terms of money, time and, even probably, heartache.

The rebellion of youth could act as a disincentive to couples making fertility decisions. The values of the parents do not often coincide with those of the children and the "vision of ungrateful children turning against their parents' values and standards must give some persons pause in considering having more children"(45).

The desire to be with the "in group" in social fashions may, or may not stimulate fertility depending upon the family size of role models in society such as well known personalities.

(44) Keller, Suzanne, The future status of women in America in Westoff, Charles F. and, Park Robert J. (Eds.), loc.cit., p. 270.

(45) Hudson Institute, loc.cit., p. 71.

This influence is not likely to be the result of conscious thinking.

The seeking of pleasurable activities and shying away from greater parental responsibilities could have an adverse effect on fertility. As a result of the increasing awareness of the responsibilities of parenthood, some European countries have offered televised courses leading to a "parent certificate". Though children provide a certain type of pleasure, there are many who feel the absence of children would be even more pleasurable. In other words, "none is fun".

According to a Time Essay, "of the 50,000 parents who responded to a query by Advice Columnist Ann Landers a while ago, a depressing 70 percent said that given the choice again, they would not have children; it wasn't worth it"(46). In 1960, 20 percent of married couples in the U.S. were childless; by 1975 that figure increased to 32 percent(47).

3. Demographic.

Among the demographic forces influencing fertility are age at marriage, marriage rates, duration of marriage, mortality, and immigration.

(46) Time, March 5, 1979, p. 60.

(47) The Globe and Mail, October 17, 1980, p. 17

(a) Age at Marriage.

The 1961 Census found that after 30 years of married life women married at less than 20 years of age had between 4 and 5 children; those married between 20 and 24 years of age had 3 to 4 children; and those married in the 25-29 age bracket had less than three children(48). The fact of marrying at 25 rather than at 20 reduces the fertility by up to 30 percent.

"All other things being equal, where early marriage is the norm, larger proportions of the population will be married and the potential fertility levels will tend to be higher because of the longer exposure to the risk of pregnancy"(49). The average age at marriage of persons never previously married declined from 24.4 years for brides in 1941 to 22.4 years in 1973, and for bridegrooms from 27.6 years to 24.9 years. A sudden drop in the age at marriage is believed to be a factor that raised the fertility rates in the fifties. The tendency to spend more years in acquiring an education is likely to raise further the age at marriage in future.

(b) Marriage Rates.

It appears that 70 percent of the rise in fertility during the 1941-56 period was due to higher proportions in the

(48) Henripin, Jacques, loc.cit., p. 127.

(49) Kalbach, Warren E. and Wayne W. McVey, The Demographic Bases of Canadian Society, McGraw Hill, 1971, p. 271.

childbearing ages being married(50). Between 1941 and 1961, the percentage of married women increased from 56.9 to 66.8(51). Though the marriage rate increased from 7.0 per thousand population in 1961 to 9.0 in 1973, fertility has declined during the period. Therefore, no positive correlation between the marriage rate and fertility levels can be assumed.

(c) Duration of Marriage.

The duration of marriage depends on mortality levels, termination of marriage and the incidence of remarriage. The longer lasting the marriage, the higher fertility is likely to be. In other words, for each additional year's duration of marriage the number of children is likely to be higher. Also, it is quite likely that troublesome marriages may decrease fertility.

A number of social and economic forces have contributed to a rapid increase in termination of marriages in modern times. Recently a Swedish study reported that "the greater participation of women in economic life seems to increase both the feasibility and desirability of divorce"(52).

(50) Keyfitz, Nathan, New Patterns in the Birth Rate in Bladen, V.M., Canadian Population and Northern Colonization, University of Toronto, 1962, p. 37.

(51) Kalbach, Warren E., loc.cit., p. 277.

(52) Schoen, Robert, Economic and social correlates of cohort marriage and divorce in twentieth-century Sweden, Population Studies, July 1978, p. 415.

Partly due to the comparative ease with which divorces can be obtained now, the number of divorces has increased significantly. And it may not be long before the number of divorces will exceed the number of marriages in a given year. Meanwhile, the duration of marriage before the divorce has been decreasing. In 1970 the average duration of marriage before divorce was 13.5 years and it had declined to 11.8 years by 1973. Though remarriages have also been rising with the divorce rates, it appears that on the whole changes to the institution of marriage in recent years will depress the fertility rates.

(d) Mortality.

Low and declining mortality, especially of infants, will have an effect of reducing fertility; this has been noted from the experience of many developing countries. It is explained by the desire of parents to have a given number of surviving children; and, if the infant mortality is high, more than that number will have to be born.

In some of Canada's regions the infant mortality rate (per 1,000 infants under one year) is higher than in others; judged from international comparisons, Canada's infant mortality rates could decline further. The rate declined from 38.5 in 1951 to 15.5 in 1973(53). Further declines are

(53) Statistics Canada, Canada Year Book, 1975, Ottawa, p. 182.

possible, particularly in the Northwest Territories with a rate of 37.4 and in British Columbia, Yukon, Saskatchewan, Manitoba, New Brunswick, and Newfoundland where the rate ranges between 16.4 and 19.3.

(e) Immigration.

Historically, foreign-born women in Canada have had lower levels of fertility than the Canadian-born women. The fertility rates for Canadian-born and foreign-born women 45 years of age and over in 1971 were 3.4 and 2.9 children respectively(54). This differential is documented in earlier censuses as well(55). Thus a higher level of immigration will not boost fertility rates.

4. Governmental.

Government policies and programs could influence the fertility rate as seen in many developing nations now. Governmental influence on fertility is exerted indirectly in a number of ways such as through family allowances, tax laws, social security, allowing the advertisement and sale of contraceptives, legalized abortion, etc. Each of these may be briefly examined.

(a) Family allowance.

Canada is one of the few countries where an allowance is paid

(54) Statistics Canada, Profile Studies, Catalogue No. 99-711, 1978, p. 43.

(55) Kalbach, Warren E., The Impact of Immigration on Canada's Population, Statistics Canada, p. 104.

on behalf of children, in effect through the taxation system and restricted to families below a certain level of income. Such payments, even in Quebec where the allowance is higher for children of higher birth order, have always been small and can have very little, if any, effect on fertility. Some Eastern European countries have attempted, in recent years, to provide financial incentives to parents to have larger families. The impact of such policies on fertility has been very limited.

(b) Tax Laws.

Though married couples and those with children get some financial advantage in the process of being taxed, this could hardly be a factor stimulating fertility. If the Canadian fertility rates continue to slide further, it is conceivable that more favourable tax laws for those with children will be contemplated seriously.

(c) Social Security.

In the days when universal social security measures were absent, children were desired as a source of support in old age; this is still the case in many developing nations. An analysis based on empirical data from 67 countries shows that "Social security programs have a measureable negative effect on subsequent levels of fertility"(56).

(56) Hohm, Charles F., Social security and fertility: an international perspective, Demography, November 1975, p. 629.

Currently the social security system in Canada, through governmental and private pension plans, is adequate, if not plentiful, to look after the basic necessities of aging parents. Therefore, the rationale to have children for support and succour in old age does not exist any more. Most of the fertility decline that may be expected as a result of this has probably been achieved.

(d) Advertisement and Sale of Contraceptives.

There was a time when the advertisement and sale of contraceptives were banned. The removal of such restrictions has contributed immensely to the fall of the birth rate. The availability of improved techniques of contraception has increased the acceptability and effectiveness of birth control.

All sectors of Canadian society, with the exception of the Eskimos and the Indians on Reserves, practice contraception widely and effectively.

Further improvement in techniques of contraception is on the way. The World Health Organization is experimenting with a "once a year pill" and some research to induce temporary infertility in males is also making progress.

All these developments indicate that fertility could, marginally, decline further in the future.

(e) Abortion.

The legalization of abortion, under certain conditions, has it easier to abort unwanted pregnancies.

Though Canadian studies on the issue are not readily available, the results of American research may be applicable to Canada as well. In a study during the 1971-75 period, attitudes towards abortion showed a "high level of approval for 'hard' reasons (health, 85 percent); rape, (76 percent;...) but less than half the sample approved of abortion for 'soft' reasons (low income, 40 percent; unmarried mothers, 34 percent; child not wanted, 28 percent)"(57).

5. Environmental.

Environmental concerns such as pollution and depletion of non-renewable resources have focussed public attention on population growth and could lower future fertility levels. The following observation made on U.S. population growth would be applicable to Canada. "A share of the recent decline in birth expectations of young American wives may be due to the historically unique stimulus of intense public attention to population growth and family size..."(58).

(57) Monteiro, Lois A., Attitudes towards women's role and abortion 1971-75, Population Studies, July 1978, p. 445.

(58) Blake, Judith, Can we believe recent data on birth expectations in the United States, Demography, February 1974, p. 25.

(a) Pollution.

Pollution and population growth, rightly or wrongly, have been perceived to go hand in hand. Therefore, those who are conscious of the damage that population growth could cause to the environment through pollution of air and water have argued for a lower, or zero, rate of population growth.

It is conceivable that this group would become even more vocal in future especially with increasing awareness of the dangers of pollution, and with further improved communication facilities. This could act as a deterrent to fertility.

(b) Resources.

There has also been a serious concern expressed on the possibility of the depletion of non-renewable resources such as energy. A zero population growth has therefore been advocated as a necessity, not sometime in the future, but immediately.

The concern for the depletion of non-renewable resources could be a factor that will help to reduce family size.

Conclusion

At this juncture one might ask: "Quo vadis fertility?" At least three scenarios are possible.

First, if one follows the economic theory fertility model, it could be argued that when relative incomes of couples (compared to their parents income while the couples themselves were adolescents) rise, sometime in the future, another baby boom may occur.

Second, fertility levels will show no tendency for a secular change but will tend to fluctuate around the replacement level (currently 2.1). This view is supported by the following observations: "if a population is highly urbanized, has low mortality, and uses contraception effectively, there remains little basis for projecting a secular change in fertility; the trend-producing aspects of historical change have been largely 'used-up'"(59).

Third, a high and increasing female participation rate, changing social attitudes towards women and children, improved education, urbanization, higher levels of absolute income, and the governmental and environmental factors mentioned earlier could cause a further decline in fertility.

(59) Lee, Ronald D., Demographic forecasting and the Easterlin hypothesis, Population and Development Review, September-December 1976, p. 459.

Some European countries have already recorded lower fertility levels than those currently experienced by Canada. Sweden, for example, had a total fertility rate of 1.6 in 1978 as compared to 2.1 in 1966-70(60). Another country worth mentioning is the Federal Republic of Germany where the total fertility rate declined from 2.2 in 1969 to 1.4 in 1978(61). Some futurists, who have commented on Canadian fertility, feel that the fertility level will fall to 1.0 before the end of the century.

In the context of the steady decline in the Canadian fertility rate since 1959, taking into consideration the influence of social, economic, psychological and other factors on fertility, and in view of the fertility experience of some European countries cited above, it is felt that the Canadian fertility rate is likely to decline further, however slightly, in the next few years.

(60) Grendell, Murray, Sweden Faces Zero Population Growth, Population Bulletin, June 1980, p. 10.

(61) Calot, Gérard, Données sur l'évolution de la fécondité le rang de naissance en Allemagne fédéral et en France (1950-1977), Population, décembre 1979, p. 1292.

PAPER 2

THE UNITED NATIONS' RECOMMENDATIONS FOR
IMMIGRATION AND EMIGRATION STATISTICS, AND
THEIR APPLICATION TO CANADA

by

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Statistics Canada

Introduction

International migration is a very important component of population change in Canada. The Department of Employment and Immigration publishes official statistics annually on the number and characteristics of persons who are admitted entry to Canada as immigrants. Statistics Canada publishes estimates of the number of persons who emigrate from Canada each year. This paper examines the quality and coverage of Canada's data on international migration flows. It compares the data that are available for Canada with the type of data which the United Nations has recommended that countries collect, tabulate and publish on international migration flows, and suggests possible ways in which Canada could produce improved statistics on immigration and emigration flows which not only would correspond more closely with the international recommendations, but also would be more useful to the Government and other users.

The United Nations' Recommendations on International Immigration and Emigration Statistics

Most statistically advanced countries attempt to collect information regularly on the number and characteristics of migrants entering and leaving the country(1). Since immigration statistics are generally easier to collect than emigration statistics, more countries collect the former than the latter. However, as can be seen from Table 1, there are wide variations in the manner in which different countries define and classify persons who cross their borders, and therefore at the present time there is a lack of comparability throughout the world among the available national statistics on international migration flows.

In an attempt to overcome this problem, the United Nations recently published an extensive set of recommendations for statistics of international migration(2). This report provides a classification for the different categories of persons who enter or leave a country, identifies the categories of arrivals and departures which are considered to be international migrants, and recommends the type of information which countries should collect, tabulate and publish for each of the recommended categories of international migrants.

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- (1) Countries require data on immigration and emigration flows because the flows can have a pronounced effect on the size of the population, on the demographic composition of the population, on the occupational composition of the population, etc. With such information, countries can take action to help to ensure that they acquire and/or retain the human resources and skills for which they have a need.
- (2) Recommendations on Statistics of International Migration, United Nations, 1980 (Report ST/ESA/STAT/SER.M/58)

TABLE 1. SOME WIDE VARIATIONS IN NATIONAL DEFINITIONS OF IMMIGRANTS

COUNTRY	NATIONAL DEFINITION OF IMMIGRANT
AFRICA	
Seychelles	Residents returning after an absence of over 12 months and other arrivals intending to stay over 12 months.
United Republic of Cameroon	Persons entering the country with visas and staying at least 1 month.
NORTH AMERICA	
Barbados	Non-residents intending to remain for 6 months or more.
Trinidad	Persons (except students) intending to reside in the country for 3 or more years (permanent immigrants), and persons permitted to reside in the country for 1 year but less than 3 years (temporary immigrants).
SOUTH AMERICA	
Ecuador	Persons entering the country through the Office of the Chief of the Migration Authority.
Uruguay	Aliens entering the country with the intention of establishing residence and who have taken the appropriate legal steps.
ASIA	
Saudi Arabia	Aliens entering the country regardless of the purpose or intended duration of their stay.
Burma	Persons entering intending to find employment.
EUROPE	
Denmark	Persons starting to work after arriving from a foreign country or those having stayed for at least 3 months.
United Kingdom	Persons (nationals and aliens) intending to reside in the country for a year or more after having resided outside the country for a year or more.
OCEANIA	
Australia	Persons arriving with the stated intention of settling permanently in the country (settlers) and visitors arriving with the stated intention of staying for 12 months or more, and residents returning after spending 12 months abroad.
Papua New Guinea	Persons arriving for long-term (over 12 months) or for short-term (less than 12 months).

Source: Extracted from National Practices in the Definition, Collection and Compilation of Statistics of International Migration (United Nations, ST/ESA/STAT/80/REV. 1).

Note: This document also reviews national variations in the definitions of emigrants.

The United Nations recognized in formulating its recommendations that not all countries would be able to comply with the recommendations in the short-term future; it intends therefore, that its recommendations be viewed as long-term goals for countries to aim at. Nevertheless, in order to ensure that some progress towards the long-term goal might be made, the United Nations has encouraged all countries to develop a phased or step-by-step program tailored to their own circumstances which would enable them to gradually comply more fully with the international recommendations.

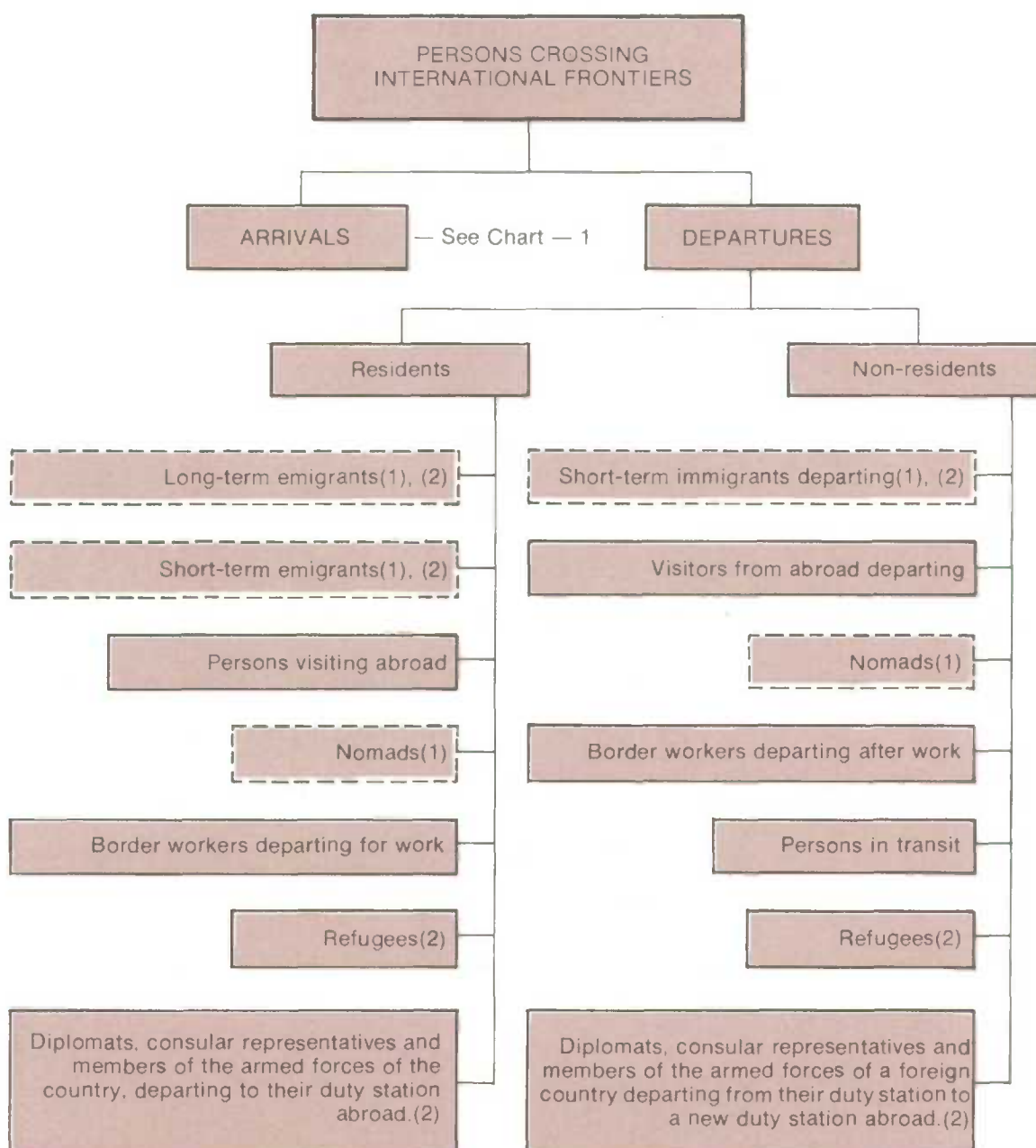
ARRIVALS

A diagrammatic summary of the various categories which have been delineated by the United Nations for persons entering a country ("Arrivals") is shown in Chart 1. As can be seen, not all persons who enter a country are considered to be international migrants. Of the thirteen categories of arrivals(3) which have been delineated only four are considered to be international migrants - namely, long-term immigrants, short-term immigrants, short-term emigrants returning and nomads; these are the four categories of arrivals for which the United Nations has recommended that countries collect, tabulate and publish statistics. Since Canada can be considered as being among those countries which are not affected by nomadic population movements, there are only three categories of arriving international migrants which are applicable to Canada. These categories are described in full in the report of the United Nations.

(3) These include eight categories of "non-residents" and five categories of "residents".

Chart — 2

Summary of the United Nations' Classifications of the Major Categories of Persons Who Depart a Country (i.e., Departures)



(1) The categories for which data are recommended to be collected and published are shown in broken line boxes (i.e., long-term emigrants, short-term emigrants, short-term immigrants departing and, if applicable, nomads). Refer to the accompanying text for summaries of the definitions of these categories of migrants.

(2) Including dependants and domestic employees accompanying or departing to join the migrant (or traveller).

Source: *Recommendations on Statistics of International Migration*, United Nations, 1980. (Document ST/ESA/STAT/SER.M/58).

In the interest of brevity, the definitions are summarized below:

(i) Long-term immigrants

These are persons (nationals and aliens) who enter the country intending to remain for more than one year and who, if they have ever previously been in the country continuously for more than one year, must have been away continuously for more than one year since their last stay of more than one year.

(ii) Short-term immigrants

These are persons (nationals and aliens) who enter the country intending to remain for one year or less for the purpose of working at an occupation remunerated from within the country and who, if they have ever previously been in the country continuously for more than one year, must have been away continuously for more than one year since their last stay of more than one year. It should be noted, however, that border workers who regularly cross the border to work daily or slightly less frequently are NOT considered to be short-term immigrants, and thus are not included in this category.

(iii) Short-term emigrants returning

These are persons (nationals and aliens, but excluding border workers) entering the country who previously were in the country continuously for more than one year and who have not been away continuously for more than one year since their last stay of more than one year, and whose departure was to work at an occupation remunerated from a foreign country.

It should be noted that the United Nations' recommendations indicate that both citizens and non-citizens, with all dependants and domestic employees who accompany or come to join them, are to be included in the tabulations that countries prepare for each of the three categories of arriving migrants described above.

DEPARTURES

In addition to identifying thirteen separate categories of persons who enter a country, the United Nations' recommendations also delineate fourteen separate categories(4) of persons who depart from a country ("Departures"), and these are shown in Chart 2. As was the case for arrivals, not all persons who depart from a country are considered to be international migrants. Of the fourteen departure categories that have been delineated, only four are considered to be international migrants - namely, long-term emigrants, short-term emigrants, short-term immigrants departing and nomads. In effect, there are only three categories of departing international migrants which are applicable to Canada. The definitions of these three categories are described in full in the United Nations' report, but summaries are provided below:

(1) Long-term emigrants

These are persons (nationals and aliens) leaving the country who intend to remain abroad for more than one year and who, if they have ever been away from the country continuously for more than one year, must have been in the country continuously for more than one year since their last absence of more than one year.

(4) These include seven categories of "residents" and seven categories of "non-residents".

(ii) Short-term emigrants

These are persons (nationals and aliens) leaving the country who intend to remain abroad for one year or less for the purpose of working at an occupation remunerated from within a foreign country and who, if they have ever been away from the country continuously for more than one year, must have been in the country continuously for more than one year since their last absence of more than one year. It should be noted, however, that border workers who regularly cross the border to work daily or slightly less frequently are NOT considered to be short-term emigrants, and thus are not included in this category.

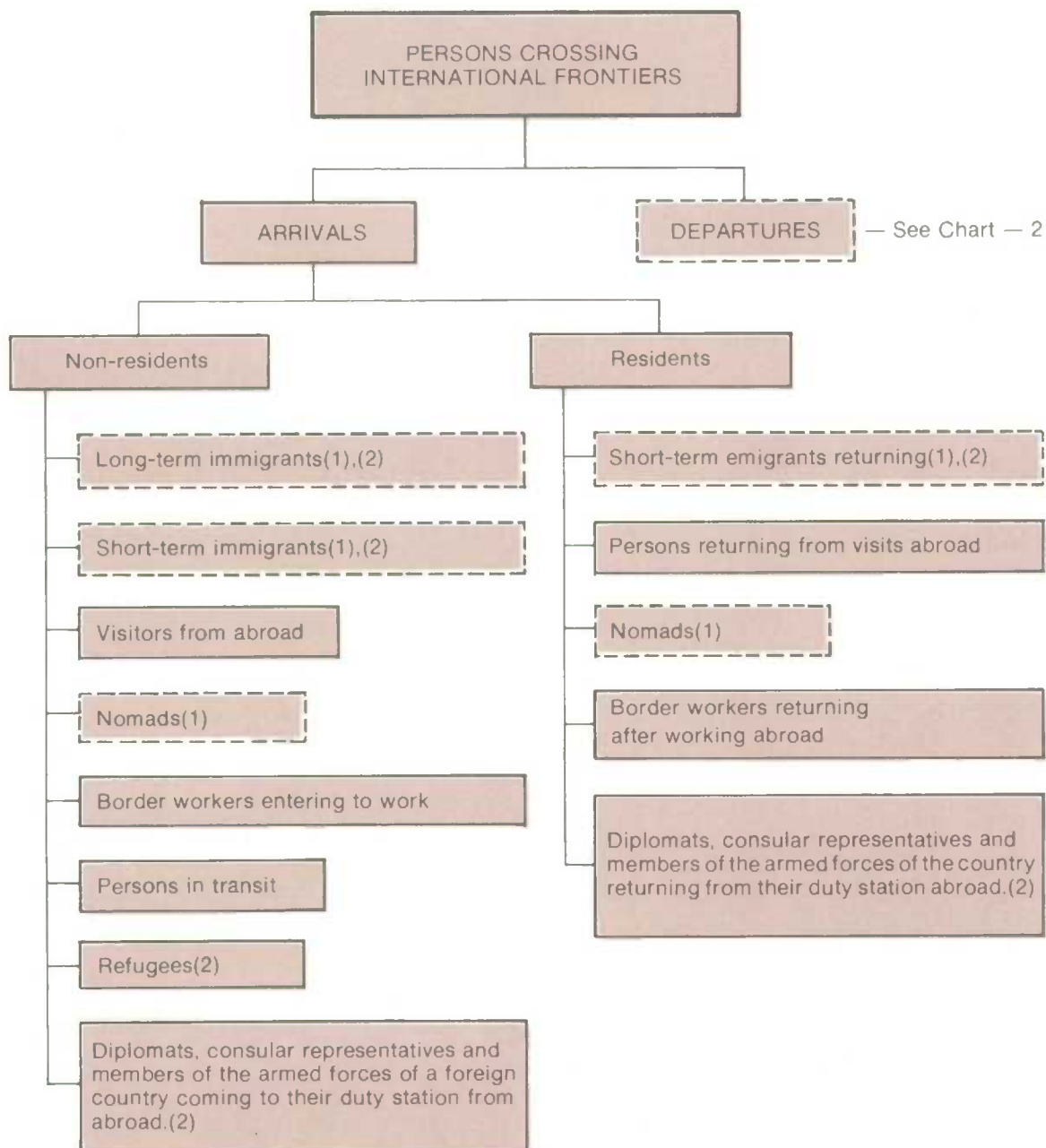
(iii) Short-term immigrants departing

These are persons (nationals and aliens) leaving the country (excluding border workers) who were previously away from the country at least once continuously for more than one year and not in the country continuously for more than one year since their last absence of more than one year, and whose last arrival was to work at an occupation remunerated from within the country.

It should be noted that, as specified in the United Nations' recommendations, the data to be collected and published for each of the above three categories of departures are to include both citizens and non-citizens of the country and any dependants and domestic employees who accompany or who leave the country to join the migrants.

Chart — 1

Summary of the United Nations' Classifications of the Major Categories of Persons Who Enter a Country (i.e., Arrivals)



(1) The categories for which data are recommended to be collected and published are shown in broken line boxes (i.e., long-term immigrants, short-term immigrants, short-term emigrants returning and, if applicable, nomads). Refer to the accompanying text for summaries of the definitions of these categories of migrants.

(2) Including dependants and domestic employees accompanying or coming to join the migrant (or traveller).

Source: *Recommendations on Statistics of International Migration*, United Nations, 1980. (Document ST/ESA/STAT/SER.M/58).

As can be seen from the material presented above, the United Nations' recommendations for statistics on international migration flows provide a framework for classifying all persons who enter or leave a country; they identify the categories of arrivals and departures which are considered to be international migrants, and outline the type of data(5) which countries are recommended to collect, tabulate and publish for each of those categories. Having provided this background information, attention will now be focused on the type of data that Canada currently tabulates and publishes on migration flows to and from Canada.

Canada's Data on Immigration

Incorrect

The statistics that Canada publishes on immigration(6) are compiled by the Employment and Immigration Commission, and they are based on the definition of an immigrant which is contained in the Immigration Act (1976). In general, Canada's administrative definition of an immigrant may be considered as being a person other than a Canadian citizen who has been legally granted admission to the country and who is legally authorized to establish permanent residence in the country. These persons are usually referred to as "landed immigrants", and they form part of the category of "long-term immigrants" which has been identified in the United Nations' recommendations. However, Canada's definition of

(5) The report cited in footnote 2 contains a complete description of the type of data which the United Nations has recommended that countries collect, tabulate and publish for each category of migrant.

(6) These statistics are published by the Employment and Immigration Commission in an annual publication entitled Immigration Statistics; selected statistics on immigration are published by Statistics Canada in an annual publication entitled International and Interprovincial Migration in Canada (Catalogue 91-208).

an immigrant excludes the following persons who would be considered to be immigrants if the United Nations' recommendations were followed:

- (1) Canadian citizens returning to Canada to reside after having been absent from Canada for more than one year.
- (2) Persons who previously acquired and still possess "landed immigrant status" and who return to Canada to reside after having been absent from Canada for more than one year.
- (3) Non-citizens of Canada who have been granted temporary admission to Canada on employment visas and who through visa renewals have been permitted to remain in Canada continuously for more than one year.
- (4) Non-citizens of Canada who have been granted temporary admission to Canada on student visas and who through visa renewals have been permitted to remain in Canada continuously for more than one year.
- (5) Non-citizens of Canada who have been granted temporary admission to Canada on other types of non-landed immigrant visas (for example, long-term "visitors") and who through visa renewals have been permitted to remain in Canada continuously for more than one year.
- (6) Illegal immigrants.

Of the four recommended categories of arriving migrants which have been proposed by the United Nations, Canada's immigration statistics are considered to most closely approximate the category for "long-term immigrants"; but there are several important groups of migrants who are excluded from Canada's immigration statistics which according to United Nations' criteria would be classified as long-term immigrants. Consequently, it must be concluded that Canada's immigration statistics do not closely approximate the internationally recommended category of long-term immigrants. Moreover, at the present time, Canada does not publish any statistics which could be considered as approximating the categories of arriving migrants which in the United Nations' recommendations have been designated as being either "short-term immigrants" or "short-term emigrants returning". Nevertheless, there are several possible ways in which Canada could obtain improved data on immigration flows, and these are outlined below.

Possible Ways of Improving Canada's Data on Immigration Flows

Although Canada's statistics on immigration flows do not correspond very closely to the classification and definitions of arriving migrants which have been recommended by the United Nations, several means by which Canada could improve the quality, coverage and international comparability of its statistics on immigration are suggested below. It should be noted that in making these suggestions a deliberate attempt has been made to propose ways of improving the data which could be implemented without incurring high financial or manpower costs in the government departments which would be responsible for making such

improvements. It should also be noted that in addition to the suggestions which are outlined below, other possible methods of improving the statistics on migration flows (some of which may prove to be more promising than the ones outlined herein) could also be considered by Canadian government officials. In an attempt to consider the needs of users both in Canada and in other countries, many of the suggestions identify ways in which the existing official government publications(7) could be improved by providing users with more meaningful information and more useful data on persons migrating to Canada from other countries.

SUGGESTION 1

The existing publications for immigration statistics should be amended by providing TEXTUAL material in which:

- (i) the data source is described;
- (ii) the method of data collection is described;
- (iii) Canada's definition of an immigrant is explained;
- (iv) explanations are provided on the categories of persons which are INCLUDED in and EXCLUDED from the official immigration statistics;
- (v) explanations are provided outlining the points of CONVERGENCE and the points of DIVERGENCE between the official statistics and the international recommendations; and
- (vi) some commentary is provided on the perceived quality of the official statistics on immigration.

(7) Refer to footnote 6.

The above suggestion is to rectify the problem that the publications containing statistics on immigration to Canada contain no information, at the present time, on the data source, the method of data collection, the coverage of the data, the definition of an immigrant or on the quality of the data. It should also be noted that by amending the existing statistical publications in the ways that are suggested above, users in other countries (who rely on Canadian government publications to obtain information on emigration from their countries to Canada) will be better able to interpret and analyze the data, not forgetting users within Canada.

SUGGESTION 2

The scope of the existing publications on immigration statistics should be extended to include information which is now being collected but not published. The suggested new tables for publication are:

- (i) a separate table on the number of persons admitted to Canada on student visas in 19__ and who through visa renewals were authorized to remain in the country for longer than one year(8), by country of last permanent residence (include dependants also);

- (ii) a separate table on the number of persons admitted to Canada on employment visas in 19__ and who through visa renewals were authorized to remain in the country for longer than one year(8), by country of last permanent residence (include dependants also, but exclude border workers);

(iii) a separate table on the number of persons admitted to Canada on other types of non-landed immigrant visas in 19__ and who through visa renewals were authorized to remain in the country for longer than one year(8), by country of last permanent residence (include dependants also);

(iv) a separate table on the number of persons admitted to Canada on employment visas in 19__ and who through visa renewals were authorized to remain in the country for one year or less(8), by country of last permanent residence (include dependants also, but exclude border workers).

The new tables (i), (ii) and (iii) are suggested because, according to the United Nations' recommendations, such persons should be classified as "long-term immigrants". By adding these separate tables to the publications, Canada would not need to alter the definition of immigrant which is currently being used, and yet it would succeed in more closely approximating the United Nations' recommendations. Interested users (and particularly those in other countries) would be able to combine the data in the different tables to obtain a total which corresponds more closely to the definition of "long-term immigrants". The new table at (iv) is suggested because, according to the United Nations' recommendations, such persons should be classified as

(8) In order to obtain an approximate measure of the length of the duration of stay in Canada of these temporary residents, the measure necessarily must be ex post facto in nature, and thus will result in statistics for a given year (e.g., 1980) only being able to be included in the immigration bulletin for a later year (e.g., 1982). Although this would not be an ideal situation, other possible alternatives seem even less promising.

"short-term immigrants." It should be re-emphasized that the Department of Employment and Immigration is already collecting the data that are required to produce the four new tables referred to above, and thus that the costs associated with making these data available to users by placing them in the Department's annual bulletin for immigration statistics would be quite minimal.

SUGGESTION 3

After determining that persons entering Canada are in designated "special" categories of migrants, Canadian border officials should collect a minimum amount of information from the entrants which would permit new types of data to become available for these special categories of migrants.

There are several types of migrants who enter Canada each year for whom no information is currently being collected, and thus little knowledge is available on them. These special types of migrants are:

- (a) Canadian citizens returning to Canada to reside after having lived abroad for more than one year (Note: These persons are "long-term immigrants" according to the United Nations' recommendations.);
- (b) landed immigrants returning to Canada to reside after having lived abroad for more than one year (Note: These persons are "long-term immigrants" according to the United Nations' recommendations.);

- (c) Canadian citizens and landed immigrants returning to Canada to reside after having lived abroad for one year or less, and whose departure was to work at an occupation remunerated from a foreign country. (Note: These groups are "short-term emigrants returning" according to the United Nations' recommendations.)

In order to keep costs to a minimum, and in order to avoid any unnecessary delays in the flow of migrants and travellers, it is suggested that Canadian border officials restrict themselves to obtaining the name and mailing addresses in Canada of persons who are identified as fitting into any of the three categories referred to above; a questionnaire could then be mailed to them within the first few weeks of their return to Canada in which they could be requested to respond to a limited number of questions (such as, age, sex, previous country of residence, etc.)(9). Once the questionnaire had been completed, the respondents could return it to Canadian statistical authorities by mail for statistical processing. Moreover, if deemed desirable, such a procedure could be implemented in a phased approach, beginning with border entry points which offer the most advantage. Another possibility would be to collect such information through the use of sampling at the designated border points (for example, by having only selected border officials obtain the names and mailing addresses of persons identified as belonging to any of these "special types" of migrants).

(9) An alternative possibility would be for the border officials to hand the questionnaires to persons in these categories, and request them to complete it within the next few days and then return it to Canadian statistical authorities by mail.

By proceeding in one of the ways outlined above, Canadian authorities would be able to collect information on these special types of migrants entering the country for whom no information is currently available, make further advances towards complying more closely with the international recommendations, and in the process obtain statistics which would be useful for policy formulation and other purposes.

Canada's Estimates of Emigration

Canada does not collect statistics on emigration, and therefore little concrete information is available on the number and characteristics of persons who emigrate from Canada. However, Statistics Canada, Canada's national statistical agency, does produce annual ESTIMATES of emigration by combining statistics that are compiled by the United States and the United Kingdom on the number of persons immigrating to these countries from Canada with an assumed volume of the number of persons who emigrate from Canada to all other countries each year(10). In general, these annual estimates of emigration can be considered conceptually as providing the same type of coverage of persons emigrating from Canada as do Canada's published immigration statistics of persons immigrating to Canada, and therefore it must be concluded that Canada's estimates of emigration do not closely correspond to the

(10) This assumed volume for the number of persons who emigrate from Canada each year to countries other than the U.S.A. and the U.K. is currently set at 48,000 persons per year; the assumption was derived by the residual method of emigration estimation, after having adjusted the 1971 and 1976 census data for undercoverage. For additional details on this estimation procedure, refer to International and Interprovincial Migration in Canada, 1978-79 (Statistics Canada, Catalogue 91-208), or to Kelly, J.J., Alternative Estimates of the Volume of Emigration from Canada, 1961-71, by Canadian Review of Sociology and Anthropology, Volume 14, 1977, pp. 57-67.

United Nations' definitions of the different recommended categories of emigrants. Moreover, because of the way in which the two types of data on international migration flows for Canada are obtained, it must also be concluded that Canada's immigration statistics are superior in quality to its estimates of emigration.

The comparatively poor quality of the available data on emigration is an unfortunate situation, because among other reasons, emigration data are required by Canada for measuring population change, for determining the types of human skills and resources that the country is losing through emigration, for providing information which is required for establishing short-term employment strategies and for formulating appropriate annual immigration targets that are geared to the economic and social needs of the nation. In attempting to obtain data which are required for such purposes, Canadian officials should make a concerted effort to comply with the United Nations' international recommendations. Moreover, in devising their data collection strategy, Canadian officials should endeavor to develop one which is not too costly, will not impede the flow of traffic across the border, and yet will yield sufficiently reliable emigration data. There are many different ways of developing such a strategy, some of which are outlined in the following section.

Possible Ways of Improving Canada's Data on Emigration Flows

Since Canada does not collect emigration statistics at the present time, the first thing it should do in attempting to improve this situation is to begin collecting data on at least some of the recommended,

and more easily collected, categories of departing migrants. These data could be collected either on the basis of complete counts of persons in designated categories of emigrants or, if deemed advisable, on the basis of some sort of sampling procedures(11). Indeed, the sampling of designated categories of emigrants is consistent with the step-by-step or phased approach which the United Nations has encouraged countries to follow in complying with the international recommendations. Some of the possibilities which Canadian officials could consider in this connection are listed below:

SUGGESTION 1

Establish a reciprocal agreement between Canada and the U.S.A. (and eventually, between Canada and other countries) whereby persons identified by border officials in the country of destination as belonging to a given category of migrant (for example, short-term immigrants to the U.S.A. from Canada), would be given a questionnaire by border officials in the country of destination and be requested to return it by mail to their country of origin. These questionnaires could be used by statistical authorities in the country of origin as a means of collecting data on emigration of designated categories of departing migrants (for example, residents of Canada moving to the U.S. on student or employment visas, landed immigrants moving to the U.S., etc.). In return for this service, which is provided to Canada by U.S. border officials, Canadian border officials would hand out similar types of

(11) The term sampling is used in the broad sense here to refer, for example, to collecting data at selected border points, to collecting data for persons in selected categories of migrants, etc.

questionnaires to persons entering Canada from the U.S. (and eventually from other countries) in designated categories of migrants, and request them to return them by mail to statistical officials in the U.S. (and other countries).

SUGGESTION 2

Questionnaires could be distributed to persons in departure lounges for vessels with destinations in other countries, and collected from the respondents prior to the time at which the passengers board their vessel(12).

SUGGESTION 3

Questionnaires could be sent to a sample of persons with foreign addresses drawn from Post Office change of address notifications.

SUGGESTION 4

Questionnaires could be sent to a sample of persons with foreign addresses drawn from a variety of different administrative records (for example, income tax files, mailing lists for Old Age Security benefits, mailing lists for Canada Pension Plan benefits, etc.).

SUGGESTION 5

In order to collect information from "short-term immigrants departing" (for example, from persons on employment visas who stay

(12) This suggestion could be used alone or in conjunction with the first suggestion. If used in conjunction with the first suggestion, efforts could then be concentrated on departure lounges for vessels which have a destination other than countries for which the previously described types of reciprocal agreements have been established.

in Canada for 1 year or less), a questionnaire could be sent to them at their mailing address in Canada a few weeks prior to the expiry date of their visa, with instructions to return it to Canadian statistical authorities by mail a few days prior to their departure from Canada. If this procedure were to be followed, it would be necessary to obtain a mailing address in Canada from these migrants at the time of their arrival in Canada in order that a questionnaire could later be sent to them(13).

SUGGESTION 6

If it should prove to be too difficult to collect data by other means on short-term emigrants leaving Canada, it would be possible to collect data from them at the time of their return to Canada by having Canadian border officials hand them a questionnaire to complete and mail to Canadian statistical authorities within the first week or two of their return to Canada(14). Such a questionnaire could contain questions pertaining to their socio-economic characteristics both immediately prior to their departure from Canada (that is, when they would be classified as "short-term emigrants departing") and prior to their return to Canada (that is, when they would be classified as "short-term emigrants returning").

(13) If the migrants do not have a residential or business mailing address in Canada at the time of arrival at the border, an alternative possibility would be to give them a special card for notifying statistical authorities of their address after they have obtained one.

(14) It should be noted the possibility of collecting data on short-term emigrants at the time of their return to a country (i.e., when they are "short-term emigrants returning") is specifically mentioned in the United Nations' recommendations.

As can be seen from the suggestions listed above, there are many different ways in which Canadian statistical authorities could begin collecting data on annual emigration flows. The suggestions enumerated above do not exhaust all the possibilities, and other possible methods may prove to be more effective than those which are mentioned above. Since emigration statistics are more difficult to collect than immigration statistics, government officials will have to be imaginative in attempting to develop data collection strategies which are both cost-effective and capable of generating reliable and useful data. Unless government officials in Canada begin giving serious consideration to possible ways in which reliable data on emigration can be obtained, Canada will fail to make any progress towards complying more closely with the international recommendations and it will continue to fail to possess actual statistics on this extremely important demographic phenomenon. Consequently, as in the case of immigration statistics, Canadian officials are encouraged to develop a concrete plan of action which will permit them to gradually comply more fully with the United Nations' recommendations for international migration statistics.

Conclusion

As is the case in many other countries, in Canada international migration is a very important component of population change. Although Canada collects some statistics on immigration flows and produces annual estimates of emigration flows, these data are of limited utility for national and international purposes because of the comparatively narrow coverage of immigrants and emigrants as defined by Canada. This paper has attempted to describe several different ways in which Canada could

improve the quality, coverage and usefulness of statistics on immigration to and emigration from Canada; specific suggestions are made outlining how Canada could proceed in a step-by-step approach towards complying more fully with the United Nations' recommendations for statistics on international migration flows. Although the paper deals with Canadian statistics, the approach which is described herein should be viewed by government officials in other countries as an illustration of how they too could use a phased approach in their countries to make similar gradual progress towards complying more fully with the international recommendations. Unless national officials in Canada and other countries begin considering possible ways in which their countries' international migration statistics can be improved, international migration statistics will continue to remain the least developed and standardized area in the field of demography.

PAPER 3

**THE FUTURE GROWTH AND STRUCTURE OF CANADA'S POPULATION:
RESULTS AND IMPLICATIONS OF SOME DEMOGRAPHIC SIMULATIONS**

by

K.G. Basavarajappa and M.V. George
Statistics CanadaIntroduction

Significant changes occurred in the demographic profile of Canada during the 1960s and 1970s; these and the evolving prospective changes have a profound impact on current and future socio-economic policies and programmes. An attempt is made in this paper to analyse the major population trends of Canada in the recent past and as they are expected to evolve by the end of the century. A special projections series with selected demographic simulations has been used to examine the dynamics of future population trends (and structure) and to highlight the major implications associated with them. It should be noted that although forecasting is always hazardous, there are certain future population parameters at the national level that can be anticipated with some degree of confidence. For example, unlike future international relations or technological and economic progress, one can forecast with considerable reliability the number of women of childbearing ages for the next fifteen years and the size of the working age population for an even longer period.

Past Trends in Growth Rates

Although Canada's population has grown during each intercensal period this century, the trend in the growth rate has been downward since 1956. From 1951 to 1956, the nation's population increased by 2.1 million people, or 14.8 percent (Table 1). Between 1971 and 1976, it increased by only 1.4 million people (6.6 percent) which amounts to an average annual growth rate of 1.3 percent. The downward trend has continued; an estimated low of 0.8 percent was reached in 1978-79 with a total population of 23.68 million at June 1st, 1979. During 1978-1979 the net international migration reached a record low of 7,000; this was a major contributory factor to the very low growth rate. The population on June 1, 1980 was estimated at 23.94 million.

Births, deaths, immigration and emigration are the basic components of population change. These components, presented as natural increase (births minus deaths) and net migration (immigration minus emigration), have affected the national population changes to varying degrees (Table 2). Natural increase has been the dominant factor of population growth in Canada. During 1951-1976 natural increase accounted for 65 to 85 percent of the intercensal population growth. The ratio of natural increase to total growth was highest in 1961-1966 (85 percent) and lowest in 1971-1976 (66 percent). During 1976-1979, the contribution of natural increase to total growth had gone up to 84 percent.

TABLE 1. Growth of Canada's Population, 1951-2001

Year	Census	Population		
		Projection A	Projection B	Projection C
<u>(i) Numbers (000's)</u>				
1951	14,009.4			
1956	16,080.8			
1961	18,238.2			
1966	20,014.9			
1971	21,568.3			
1976	22,992.6			

1981		24,244.0	24,167.6	24,091.2
1986		25,855.9	25,456.8	25,062.3
1991		27,545.2	26,639.7	25,758.1
1996		29,065.0	27,591.2	26,151.4
2001		30,342.0	28,312.5	26,334.3

(ii) Percentage Change in Population

1951-1956	14.8		
1956-1961	13.4		
1961-1966	9.7		
1966-1971	7.8		
1971-1976	6.6		
1951-1976	64.1		
1976-1981		5.4	5.1
1981-1986		6.6	5.3
1986-1991		6.5	4.6
1991-1996		5.5	3.6
1996-2001		4.4	2.6
1976-2001		32.0	23.1
			14.5

Source: Data for 1951 - 1976 are obtained from various census publications; the projected figures are from special population projections prepared for the Department of Employment and Immigration by the Demography Division, Statistics Canada. See text for assumptions for each projection.

TABLE 2. Components of Population Growth, Canada, 1951-1978

Period	Total Population Increase (000's)	Births (000's)	Deaths (000's)	Natural Increase (000's)	Ratio of Natural Increase to Total Growth (percent)
1951-1956	2,071.4	2,106.3	633.1	1,473.2	71.1
1956-1961	2,157.4	2,362.0	687.1	1,674.9	77.7
1961-1966	1,776.7	2,248.8	730.9	1,517.9	85.4
1966-1971	1,553.4	1,855.8	766.4	1,089.4	70.2
1971-1976	1,424.3	1,758.0	823.1	934.9	65.6
1976-1977	265.0	358.5	166.0	192.5	72.6
1977-1978	218.0	358.5	168.5	190.0	87.2
1978-1979	205.7	364.6	165.9	198.7	96.6
1979-1980(c)	255.0	362.4	170.8	191.6	75.1

TABLE 2. (Cont'd) Components of Population Growth, Canada, 1951-1978

Period	Immigration (000's)	Emigration (000's)	Net Migration (000's)	Ratio of Net Migration to Total Growth (percent)	Population at the End of the Period (000's)
		(b)	(a)		
1951-1956	783.2	185.0	598.2	28.9	16,080.8
1956-1961	759.7	277.2	482.5	22.3	18,238.2
1961-1966	538.6	279.8	258.8	14.6	20,014.9
1966-1971	890.3	426.3	464.0	29.8	21,568.3
1971-1976	841.0	351.6	489.4	34.4	22,992.6
1976-1977	142.2	69.7	72.5	27.4	23,257.6
1977-1978	106.5	78.5	28.0	12.8	23,475.6
1978-1979	82.2	75.2	7.0	3.4	23,681.3
1979-1980(c)	134.0	70.6	63.4	24.9	23,936.3

(a) Residual estimates : total population change minus natural increase.

(b) Net migration minus immigration.

(c) Preliminary figures.

Source : Total population figures for 1951-1976 are obtained from various census publications; the component figures are unpublished data from Population Estimates Section, Demography Division, Statistics Canada.

Fertility Rates

The number of births is the consequence of not only the rate of childbearing, but also the number of women of childbearing age. Nevertheless, fertility, as a measure of the frequency of birth in population, has been the most important single factor of Canadian population growth.

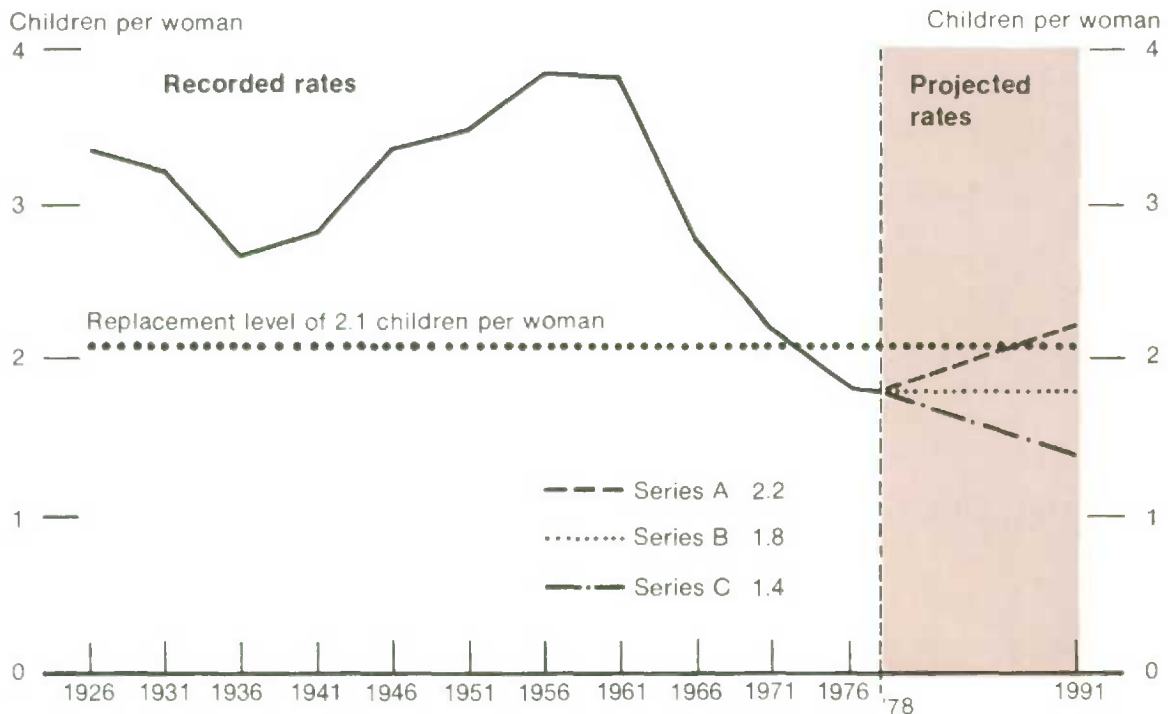
Since 1951, the total fertility rate reached its highest point in 1959 when the figure was 3.94 children per woman (Chart 1). Since that time, however, it has decreased very sharply; the 1976 total fertility rate stood at 1.83, and was below the "replacement level" of 2.1 children per woman for the total population under current mortality conditions. The fertility decline has been so precipitous in recent years that by 1978 the rate had declined to slightly below 1.8; this was 16 percent below replacement level. As may be seen from Chart 1, the fertility rate has been below the replacement level since 1971. The steady decline in fertility since 1959 has resulted in the reduction in the level of natural increase by 44 percent during the fifteen year span between the periods 1956-1961 and 1971-1976. During the same period the number of births declined by nearly 26 percent. There has been a slight upward trend in total births since 1976 which is a consequence of the changing age structure of the population. By 1985 there will be about 2.29 million women in the prime childbearing ages of 20-29, some 228,000 more than in 1976. Childbearing among the women in this group and other age groups will cause the actual number of births to increase up to 1985 even if the fertility level remains constant at 1.8 children per woman and there is no international migration during this period.

This increase in births could be attributed largely to the "echo effect" of the baby boom.

Mortality

After a period of fairly slow improvement in mortality there are indications that longevity for the total population is again increasing at a relatively faster pace in Canada. Between 1971 and 1976, the expectation of life at birth in Canada for males and females increased from 69.3 years and 76.4 years to 70.2 years and 77.5 years respectively, a gain of 0.9 years for males and 1.1 years for females, (Table 3).

Chart — 1
Recorded and Projected Total Fertility Rate, Canada, 1926-1991



Source: 1926-78, Statistics Canada, Vital Statistics, Volume I, Catalogue 84-204, 1978.

For males, the relative gain in life expectancy had been greater than that of females during 1971-1976. Another significant aspect of the historical trend has been the widening gap between the average length of life for the two sexes. Between 1966 and 1976, the sex differential in expectation of life at birth has gone up from 6.4 to 7.3 years. A faster reduction in mortality will result in a greater increase in the elderly population.

International Migration

International migration has been characterized by wide fluctuations in the number of immigrants arriving each year. During 1961-1976, the annual level of immigration fluctuated from a high of 214,300 in 1973-74 to a low of 70,000 in 1961-1962. More recently the number has fluctuated between 142,200 in 1976-1977 to 82,200 in 1978-1979. With the steady decline in fertility level in the 1960s and 1970s, the ratio of net migration to total growth has been upward during 1966-1976 (Table 2). However, during 1976-1979 the contribution of net migration to total growth registered a drastic decline and reached the level of 3.4 percent (1978-79), the lowest since the 1930s. The phenomenal decline in immigration in 1978-79 has been responsible for the very low contribution of net migration to total growth in this year. However, the trend reversed in 1979-80 with a 63 percent increase in immigration over the preceding year.

TABLE 3. Expectation of Life at Birth (in years) by Sex, Canada, 1951-1976

Year	Expectation of Life at Birth		Annual Gain Since Preceding Year		Sex Differential
	Male	Female	Male	Female	Female-Male
1951	66.3	70.8	-	-	4.5
1956	67.6	72.9	0.26	0.42	5.3
1961	68.4	74.2	0.15	0.25	5.8
1966	68.8	75.2	0.08	0.20	6.4
1971	69.3	76.4	0.12	0.24	7.1
1976	70.2	77.5	0.18	0.22	7.3

Source : M.V. George, Population Growth in Canada (Catalogue 99-701), Table 5; Statistics Canada, Life Tables, Canada and Provinces, 1975-1977 (Catalogue 84-532).

Future Growth

Given the steadily decreasing trends in population growth, fertility rate and mortality level over the past two decades and the steep downward shift in immigration since 1976, what are the expected trends in national population growth? Future variations will continue to be mainly a function of the fertility rate, the number of women of childbearing age and the level of net migration. The future trend is examined on the basis of the results of the special illustrative projections developed by Statistics Canada at the request of the Department of Employment and Immigration.

Projection Series and Underlying Assumptions

The projections were developed for sex and single years of age as of June 1 of each year, using the 1979 current population estimates as their benchmark. The assumptions were developed primarily for the period 1979-1991, but the projections have been extended to 2001 and over with the assumptions held constant at the 1991 values. As compared with the latest official projections by Statistics Canada, this revision involves not only a shift in the benchmark date from June 1, 1976 to June 1, 1979, but also changes in projected levels of fertility, mortality and migration. Because of these changes, the series presented here differ from the official projections series(1).

Although there is only one mortality assumption, a slight revision has been made to the assumption for the official projections in order to incorporate the mortality changes during 1971-1976 as shown by the 1976 life tables. The revision here anticipates further improvement in mortality and assumes that the life expectancy at birth for Canada could reach 70.5 years for males and 79.0 years for females by 1981. From 1981, the mortality levels are assumed to remain constant. These assumed values are slightly higher than the ones previously projected for 1986.

Chart 1 shows how difficult it is to project fertility rates. Five assumptions on future fertility levels were developed to encompass the

(1) Statistics Canada, Population Projections for Canada and the Provinces, 1976-2001, Catalogue 91-520, Ottawa, 1980.

possible scenarios with regard to fertility changes. Of these five assumptions, two allow for an increase in the total fertility rate to 2.2 and 2.0 by 1991, two for a decrease in the rate to 1.6 and 1.4 by 1991 and one for a constant rate of 1.8 for the entire projection period. As stated earlier, the assumed levels for 1991 will remain unchanged for the period beyond 1991. These assumptions were chosen as they were considered adequate to encompass the upper and lower bounds of fertility levels which might be achieved by 1991.

Because of the wide fluctuations in the amount of net international migration, three migration assumptions were selected. These allow an annual net migration of 75,000, 50,000 and 25,000 during the projection period. International net migration has two components, viz., immigration and emigration. As in the case of the official projections, the net migration assumption implies a single assumption of 75,000 emigrants per year. The amount of net migration plus the number of emigrants, therefore, give the assumed amount of immigration.

Altogether, there were one assumption of mortality, five assumptions of fertility and three assumptions of net international migration. Various combinations of these assumptions yielded fifteen series of population projections. In addition to these, five projections were developed with combinations of the five fertility assumptions and a zero net migration assumption. Of these twenty projections, three have been selected for analysis in this paper. These are labelled as Series A, Series B and Series C. The underlying

assumptions of the three projection series are as follows:

Illustrative Projections Series	Total Fertility Rate by 1991	Average Annual Net Migration 1979-2001
A	2.2	75,000
B	1.8*	50,000
C	1.4	25,000

* From 1979 to 2001.

The three projections selected for analysis encompass the possible upper and lower bounds of those developed under the various fertility and migration assumptions. The differences in the projection results under different assumptions of fertility and migration tend to increase as the projection period becomes longer. For the short term, the differences in the results are negligible. For 1981, for example, the difference in the population size according to the high projection (total fertility rate of 2.2 and 75,000 net migration) and low projection (total fertility rate of 1.4 and 25,000 net migration) will be only 152,800 or 0.6 percent. The long run effects of projections may be determined by examining how sensitive they are to changes in the basic assumptions. A brief sensitivity analysis is attempted in Table 4 which gives the results of the various fertility alternatives based on a net migration of 50,000 and those for the various net migration alternatives based on a total fertility of 1.8. As may be seen from Table 4, alternative net migration assumptions result in the total population ranging from 26.97 million persons (with zero net migration) to 28.97 million persons (with 75,000 net migration). Thus, for every

additional annual net migration of 25,000 persons over the projected period, with a constant total fertility rate of 1.8, the population at the end of the period (2001) increases by 660.6 to 677.8 thousand persons. This number represents the total net migration over the period and the natural increase of the immigrants after their arrival in Canada. A constant change in total fertility rate of 0.2 with an annual

TABLE 4. Alternative Population Projections Under Different Fertility and Migration Assumptions, Canada, 2001

Scenarios	Population Size (000s)	Percentage of Male Population Aged		
		0-14 years	15-64 years	65 years and over
1979 Population	23,670.7	24.3	67.6	8.1
(i) <u>T.F.: 1.8</u>				
Net migration per year				
Zero	26,974.1	20.3	69.5	10.2
25,000	27,651.9	20.6	69.4	10.0
50,000	28,312.5	20.8	69.4	9.8
75,000	28,973.1	20.9	69.4	9.7
(ii) <u>Net immigration: 50,000 per year</u>				
T.F.				
1.4	26,968.0	17.4	72.3	10.3
1.6	27,629.2	19.1	70.8	10.1
1.8	28,312.5	20.8	69.4	9.8
2.0	28,976.6	22.3	68.1	9.6
2.2	29,654.7	23.8	66.8	9.4

T.F. = Total fertility rate.

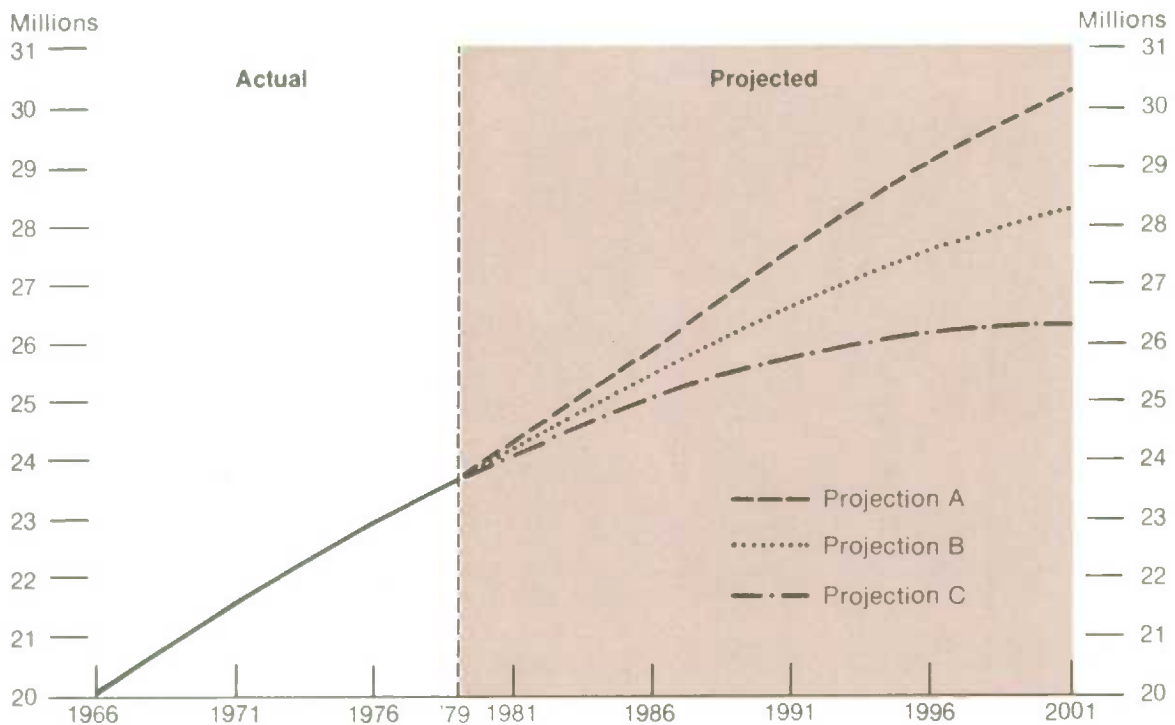
Source: Same as Table 1.

net migration of 50,000 throughout the projection period, on the other hand, would bring a change in total population of 661.2 to 678.1 thousand persons. These results show that the projected total population size is relatively insensitive to the choice of assumptions involving modest changes. However, the age distributions of the projected population are more sensitive to the choice of assumptions, especially the changes in fertility assumptions, although the direction of change is consistent in all cases. These can be seen from the projected percentages of male population for 2001 presented in Table 4. As may be expected, the lower growth scenarios have consistently higher percentages of persons 65 years of age and over and lower percentages of persons under 15 years of age. The main point to note from this brief sensitivity analysis is that, compared with net migration, small differences in the total fertility rate can have a larger influence on population projections and the impact is greater for long-term projections.

Total Population Growth

The expected population growth according to the three projection series is presented in Table 1 and Chart 2. The high projection (Series A) shows that Canada's population would increase from 23.7 million in 1979 to a maximum of about 27.5 million by 1991 and 30.3 million by 2001. According to the low projection (Series C), the total population in 2001 may not be lower than 26.3 million. If the current fertility level of 1.8 children per woman continues unchanged till the end of the century and there is an annual net migration of 25,000 persons, the total population in 2001 will be 27.7 million.

Chart — 2
Trends in Total Population, Actual and Projected Series,
Canada, 1966-2001



Source: Table 1

Although the total population will continue to increase till the end of the century, the growth rate will be downward according to the three projection series (Table 1). In projections A and B, the growth rates will increase in the two quinquennial periods between 1976 and 1986 and will fall thereafter. In the low projection (Series C), the growth rate will fall to 0.7 percent between 1996 and 2001. Thus, while the growth rate increased by 64 percent in the third quarter of this century, it will fall between 32 percent and 14 percent in the last quarter.

The relative contribution of natural increase and net migration to total future growth for the last quarter of this century shows that the excess of births over deaths will still account for most of the growth (Table 5). According to the Series B projection, 1.7 of the total growth rate of 2.6 percent (or 65 percent of the growth) between 1996 and 2001 will be due to natural increase. However, the contribution of net migration to growth will increase from 18 percent in 1976-1981 to 35 percent in 1996-2001. Such a trend shows the increasing importance of immigration to future population growth in Canada with a fertility level remaining below the replacement level.

Is Canada close to zero population growth? A fertility rate below the replacement level does not mean that a zero population growth (which could be achieved when births equal deaths and net migration is zero) will soon be reached in Canada. Assuming that the total fertility level will remain unchanged at 1.8 children per woman and net migration were reduced to zero, the population of Canada would continue to grow until about the year 2016 when the total population would reach 27.4 million. The population will start to decline thereafter with deaths exceeding births. Although current fertility is substantially below the replacement level, the long delay in reaching zero or negative growth may be attributed to the so called "population inertia" or to the "echo effect" of the baby-boom generation who will keep the size of the childbearing population large for many years to come. According to the Series B projection, the population will continue to grow till 2020. However, under the lower fertility and migration assumptions in Series C, the population will start to decline after 2005.

TABLE 5. Actual and Projected Components of Population Growth, Canada, 1951-2001

Year	Total Population (000's)	Percentage Change over Preceding Year		
		Total Population	Due to Natural Increase	Due to Net Migration
<u>(i) Actual</u>				
1951	14,009.4	-	-	-
1956	16,080.8	14.8	10.5	4.3
1961	18,238.2	13.4	10.4	3.0
1966	20,014.9	9.7	8.3	1.4
1971	21,568.3	7.8	5.5	2.3
1976	22,992.6	6.6	4.3	2.3
<u>(ii) Projection (Series B)</u>				
1981	24,167.6	5.1	4.2	0.9
1986	25,456.8	5.3	4.3	1.0
1991	26,639.7	4.6	3.6	1.0
1996	27,591.2	3.6	2.6	1.0
2001	28,312.5	2.6	1.7	0.9

For the period 1976-2001, net migration is obtained as a residual : total population change minus natural increase.

Source : same as Table 1.

Age Structure Evolution

The evolution of Canada's age structure and its expected changes tend to be dominated by two major demographic phenomena: the baby boom, and the baby bust following the former. The post-World War II baby boom has created a permanent but moving bulge in the age structure. The subsequent baby bust, resulting from the steady decline in fertility after 1959, is characterized by smaller age cohorts in contrast to the bulge caused by the baby boom. The baby bust, which occurred while the baby-boom cohorts were passing through the early stages of their

life-cycle, has complicated the planning processes in several key sectors and has forced policy makers to reduce facilities and opportunities projected on the basis of a larger population.

Two of the most striking changes in the age structure of Canada's population are the declining number and proportions of the population under the age of 15 years and the growing number and proportions of elderly persons 65 years of age and over. In 1951, 30 percent of the population was under the age of 15. This increased to 33 percent in 1966, mainly as a result of the baby boom; but by 1976 this proportion declined to 26 percent as a major consequence of the drop in fertility (Table 6). This decrease is expected to continue to about 22 percent in 1991 and 20 percent in 2001 (Series B). Under the low projection (Series C), this proportion will decrease to 20 percent in 1991 and 17 percent in 2001 (Table 7).

At the other end of the age spectrum was the considerable growth in the elderly population 65 years of age and over. The proportion of the population at these ages has been increasing steadily since 1961 and it is expected to increase under all three projection series. The number of the elderly will increase from 2.0 million in 1976 to 3.4 million by 2001 according to the medium projection (Series B). The proportion of the elderly will increase from 9 percent in 1976 to 12 percent in 2001 (Series B). Under the low projection, with a total fertility rate of 1.4, the proportion will increase to 13 percent by 2001.

TABLE 6. Recorded and Projected Growth of Population of Selected Age Groups, Canada, 1951-2001;
(Series B Projection)

Age Groups	1951	1956	1961	1966	1971	1976	1981	1991	2001
<u>(i) Numbers (000s)</u>									
All Ages	14,009.4	16,080.8	18,238.2	20,014.9	21,568.3	22,992.6	24,167.6	26,639.7	28,312.5
0 - 14	4,250.7	5,225.2	6,191.9	6,591.8	6,380.9	5,896.2	5,472.3	5,843.3	5,644.8
15 - 64	8,672.4	9,611.6	10,655.2	11,883.6	13,442.8	15,094.1	16,364.4	17,806.2	19,257.4
65+	1,086.3	1,243.9	1,391.2	1,539.5	1,744.4	2,002.3	2,330.9	2,990.2	3,410.3
<u>(ii) Proportion of Population (percent)</u>									
0 - 14	30.3	32.5	34.0	32.9	29.6	25.6	22.6	21.9	19.9
15 - 64	61.9	59.8	58.4	59.4	62.3	65.7	67.8	66.9	68.2
65+	7.8	7.7	7.6	7.7	8.1	8.7	9.6	11.2	12.0
<u>(iii) Dependency/Ratios (percent)</u>									
(0-14)/(15-64)	49.0	54.4	58.1	55.5	47.5	39.0	33.4	32.8	29.3
(65+)/(15-64)	12.5	12.9	13.1	13.0	13.0	13.3	14.2	16.8	17.7
(0-14,65+)/(15-64)	61.5	67.3	71.2	68.4	60.4	52.3	47.5	49.6	47.0

Source : Same as Table 1.

The proportion of the working-age population (25-64) will continue to increase according to Projection B; it will increase from 66 percent in 1976 to 68 percent by 2001. This increase will be the net effect of an increase in the proportion of population 45-64 years of age and a decrease in the proportion of population 15-44 years of age until the end of the century. The decline in the proportion of the latter group is the effect of the smaller size of the cohorts born since the beginning of the baby bust.

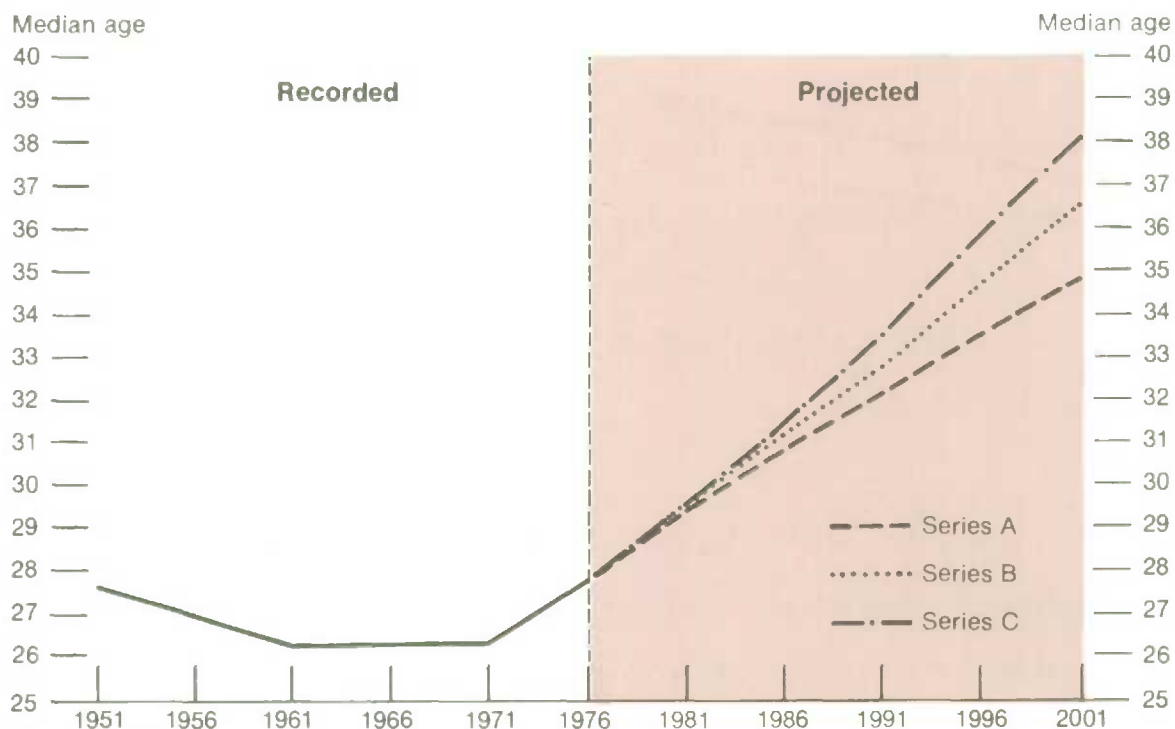
The median age of the population reflects the overall aging of the population. The median age started to increase after 1971 and it will increase under all three projection scenarios. The median age is expected to increase from 28 years in 1976 to between 35 and 38 years by 2001 (Chart 3).

TABLE 7. Indices of Age Structure, Canada, 1976-2001

Year	Percent of Total Population				Median Age (years)	
	0-14 years	15-44 years	45-64 years	65+ years		
1976	25.6	46.5	19.1	8.7	27.8	
Projection						
1981	A	22.7	48.7	19.0	9.6	29.4
	B	22.6	48.7	19.0	9.6	29.5
	C	22.6	48.7	19.1	9.7	29.5
1991	A	23.6	46.8	18.7	10.9	32.1
	B	21.9	47.6	19.2	11.2	32.8
	C	20.2	48.5	19.7	11.6	33.5
2001	A	23.0	43.4	22.3	11.4	34.8
	B	19.9	44.5	23.5	12.0	36.5
	C	16.6	45.7	24.9	12.8	38.1

Source : Same as Table 1.

Chart — 3
Recorded and Projected Median Age of Population,
Canada, 1951-2001



Source: Table 7

The Growth Rate as a Mechanism For Setting Immigration Targets

The future growth of population in terms of total size, components of growth and various age segments was discussed above. Here, with the help of a simulation model, an attempt is made to examine the level of immigration required to maintain a certain population growth level for the country. The simulation exercise makes it possible to derive the levels of immigration as by-products of desired annual rates of growth. For example, at given levels of fertility, mortality and emigration, the volume of immigration required to achieve a desired annual rate of growth of population has been derived. Thus, if the total fertility

rate continued at its current level of 1.8, mortality improved slightly to reach expectations of life at birth of approximately 70.5 years for males and 79.0 years for females by 1981, and then continued at those levels, and emigration continued at its currently estimated level of around 75,000 per annum, the volume of immigration required to achieve an annual rate of growth of 1.0 percent is estimated to vary from about 117,000 in 1979-80 to about 110,000 in 1982-83 and to about 263,100 in 2000-2001. Similar figures have been calculated for differing levels of total fertility rate (2.2, 1.8 and 1.4) and differing levels of rate of growth (1.00, 0.75 and 0.50 percent) and are presented in Table 8. They are also illustrated in Charts 4a, 4b, and 4c.

The Number of Immigrants Required to Achieve a Desired Rate of Growth of Varying Levels of Fertility

If the desired annual rate of growth is 1.0 percent, the number of immigrants required would depend upon the level of fertility. For example, if the total fertility rate continued at its present level of 1.8, immigration would have to gradually decrease from a level of about 117,000 in 1979-80 to about 110,000 in 1982-83 and then gradually increase to about 263,100 by the year 2001 (see Chart 4a). The decrease in the number of immigrants during 1979 to 1983 is due to a rise in the level of natural increase resulting from changes in age distribution during this period. As the level of natural increase falls after 1983, the number of immigrants has to increase to achieve the desired rate of growth of 1.0 percent.

TABLE 8. The Number of Immigrants Required to Achieve Various Growth Rates at Specified Levels of Total Fertility Rate, Canada, 1979-2001

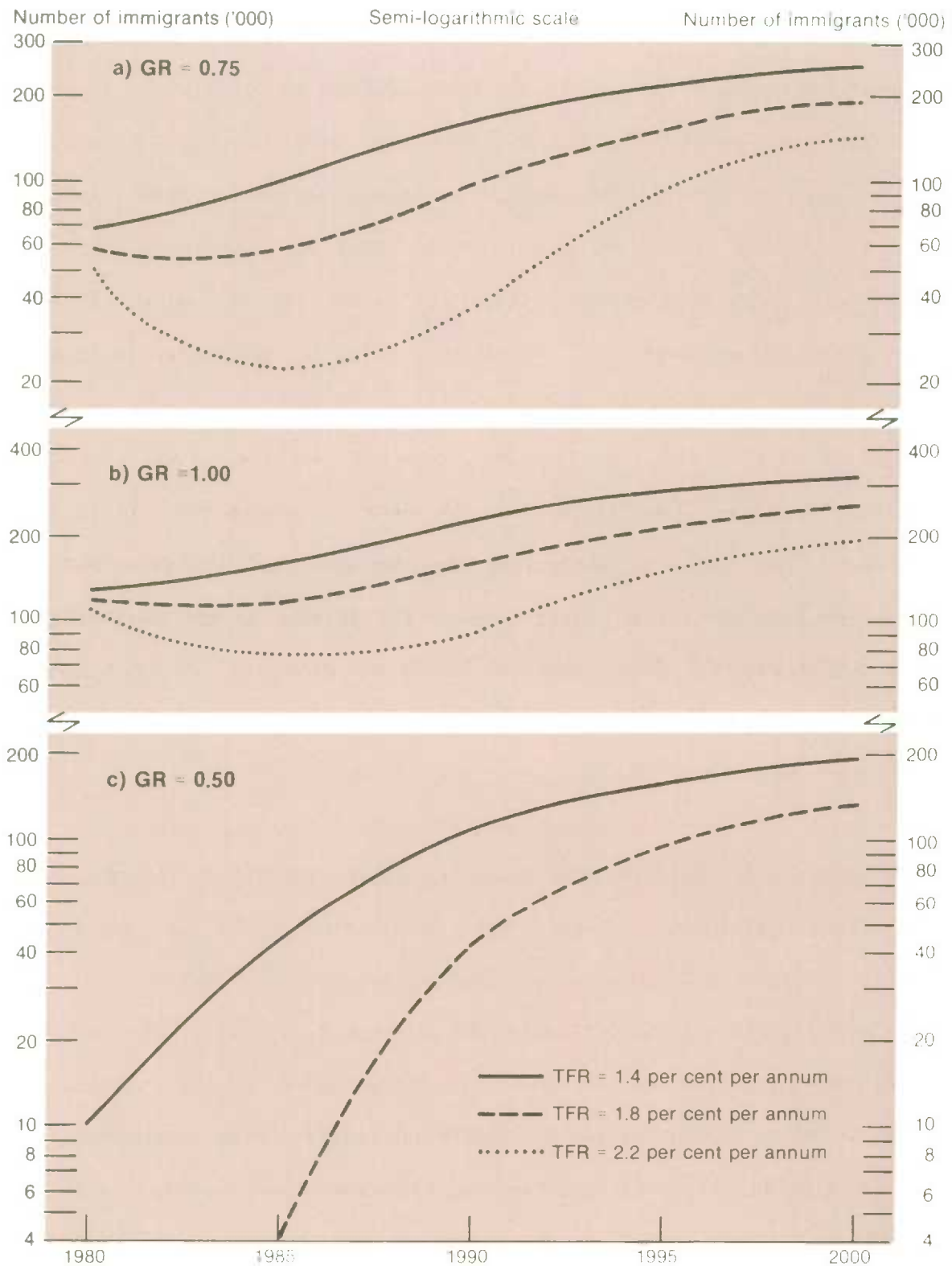
Year	Growth Rate (GR) (Percent Per Annum) and Total Fertility Rate (TFR)							
	GR = 1.00			GR = 0.75			GR = 0.50	
	TFR = 2.2	TFR = 1.8	TFR = 1.4	TFR = 2.2	TFR = 1.8	TFR = 1.4	TFR = 1.8	TFR = 1.4
1979-80	108,000	117,000	126,000	50,100	58,100	67,100	0	10,100
1980-81	93,000	112,000	128,000	40,100	54,100	69,100	0	13,100
1981-82	87,000	111,000	131,000	31,100	50,100	73,100	0	17,100
1982-83	83,100	110,000	139,000	27,100	52,100	80,000	0	26,000
1983-84	80,000	112,000	148,000	24,100	54,100	89,100	0	35,100
1984-85	78,000	116,000	159,000	22,100	57,100	100,000	4,100	45,100
1985-86	76,000	121,000	171,000	21,100	63,100	112,000	11,100	56,000
1986-87	78,000	128,000	180,600	23,100	69,100	122,000	17,100	68,100
1987-88	81,000	136,000	194,400	27,100	78,100	135,100	25,100	81,000
1988-89	86,100	147,100	209,200	31,100	87,100	149,100	34,100	95,100
1989-90	91,100	157,100	224,500	37,100	98,100	164,100	43,100	109,100
1990-91	98,100	169,100	240,500	44,100	109,100	179,100	53,100	124,100
1991-92	109,100	180,100	254,300	55,100	120,000	192,100	63,100	137,100
1992-93	123,100	189,100	264,100	69,100	130,100	201,100	74,100	145,100
1993-94	137,100	201,000	273,800	83,100	141,100	210,100	85,100	154,100
1994-95	150,100	212,100	283,400	96,100	152,100	218,100	95,100	162,100
1995-96	163,100	223,100	292,700	108,100	162,100	227,100	105,100	170,100
1996-97	174,100	233,100	301,700	119,100	171,100	235,100	114,100	178,100
1997-98	184,100	242,100	310,100	128,100	179,100	242,100	122,100	185,100
1998-99	193,100	250,100	318,000	137,100	187,100	249,100	129,100	192,100
1999-2000	199,100	257,100	325,400	143,100	193,100	255,100	136,100	197,100
2000-2001	204,100	263,100	332,200	148,100	198,100	261,100	141,100	203,100

If fertility were to decline to 1.4 by 1991 and then stabilized at that level during the 1990s, what volume of immigration would be required to achieve the desired rate of growth of 1.0 percent? It may be seen that the number of immigrants required would have to increase steadily from about 126,000 in 1979-80 to about 332,200 in the year 2001. In this case, as the level of natural increase goes on decreasing, immigration has to increase. On the other hand, if fertility began an up-turn to reach a level of total fertility rate of 2.2 by 1991 and then stabilized at that level during the 1990s, the number of immigrants required would have to decrease from about 108,000 in 1979-80 to about 76,000 in 1985-86 and from then on gradually increase to about 204,100 in the year 2001. The decrease in the number of immigrants during the period 1979-85 is due to a rise in the level of natural increase resulting from an upturn in fertility and changes in age distribution during this period. After 1986, as the level of natural increase falls, immigration would have to increase to achieve the desired rate of growth of 1.0 percent per annum.

In general, the lower the fertility level, the higher the number of immigrants required to achieve a desired rate of growth.

At lower levels of desired rates of growth, for example, 0.75 and 0.50 percent per annum, the number of immigrants required to achieve these rates of growth would, of course, be smaller than those required at 1.0 percent per annum. These are illustrated in Charts 4b and 4c, respectively.

Chart — 4
The Number of Immigrants Required to Achieve a
Given Growth Rate (GR) at Specified Levels of
Total Fertility Rate (TFR), 1980-2000



Source Table 8

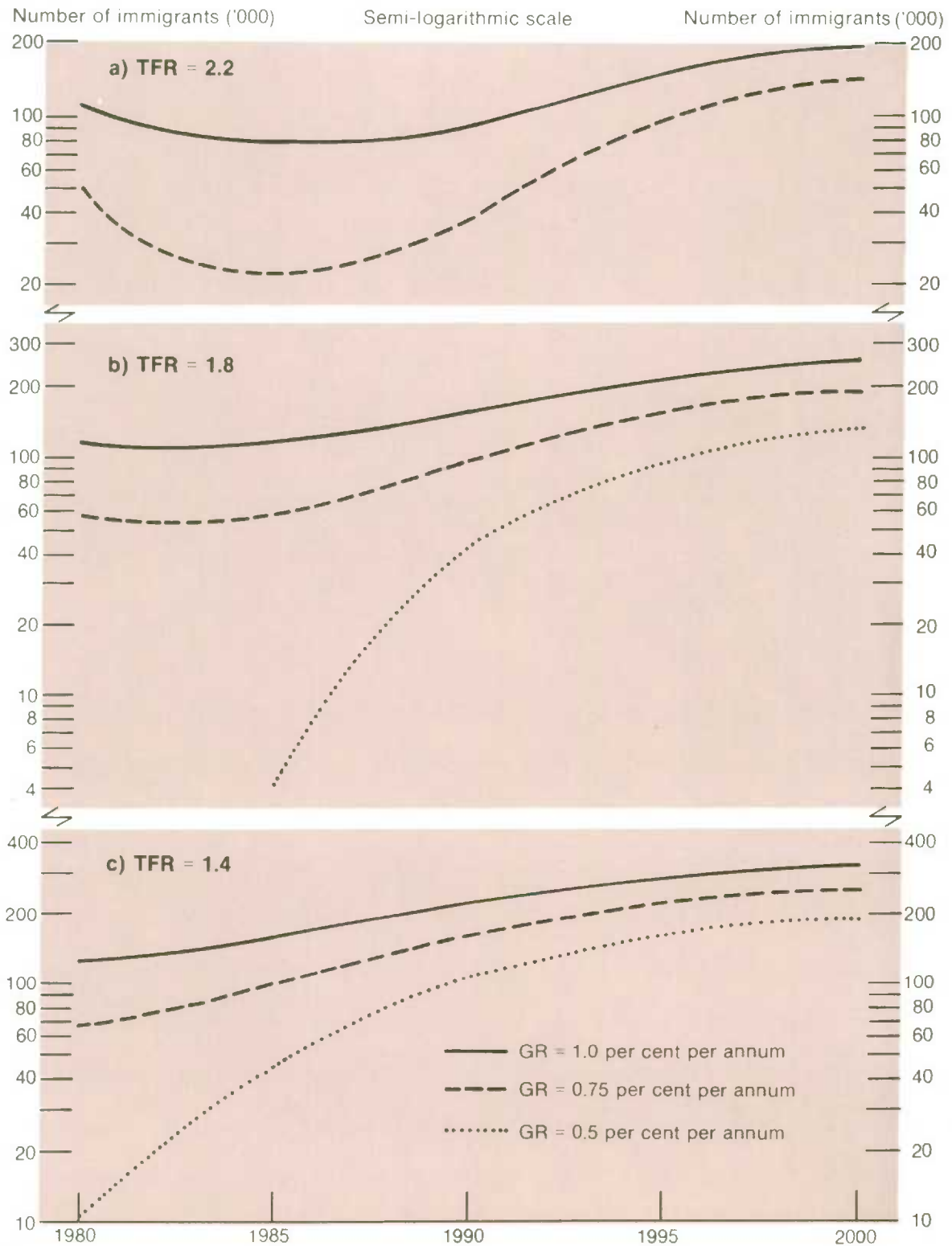
The Numbers of Immigrants Required to Achieve Desired Rates of Growth at a Given Level of Fertility

The figures presented in Table 8 could also be examined from a slightly different standpoint. For example, Charts 5a, 5b and 5c present the varying numbers of immigrants according to the desired annual rates of growth of population at each level of total fertility.

The general conclusion to be derived is that at each given level of fertility, the higher the rate of growth desired, the higher the number of immigrants required to achieve it.

Table 8 shows that if the desired rate of growth is 0.75 percent per annum, the number of immigrants required would be only about half of those required under the growth rate of 1.0 percent in the beginning of the period but would increase gradually to about 73 percent (if the total fertility rate were 2.2) and to about 79 percent (if the total fertility rate were 1.4) by the year 2001. Why is there such a relatively large difference in the numbers of immigrants required at the beginning of the period and a relatively small difference at the end of the period between the two rates of growth? The explanation lies in the constant volume of emigration used in the projections. At the beginning of the period, when the volume of net migration is small, emigration is relatively more important and the differences in the numbers of immigrants can be quite considerable as indeed it was in the above case. With the lapse of time, as the volume of net migration increases considerably, the constant volume of emigration loses its relative importance and hence the differences in the numbers of immigrants also

Chart — 5
The Number of Immigrants Required to Achieve Specified Growth Rates (GR) at a Given Level of Total Fertility Rate (TFR), 1980-2000



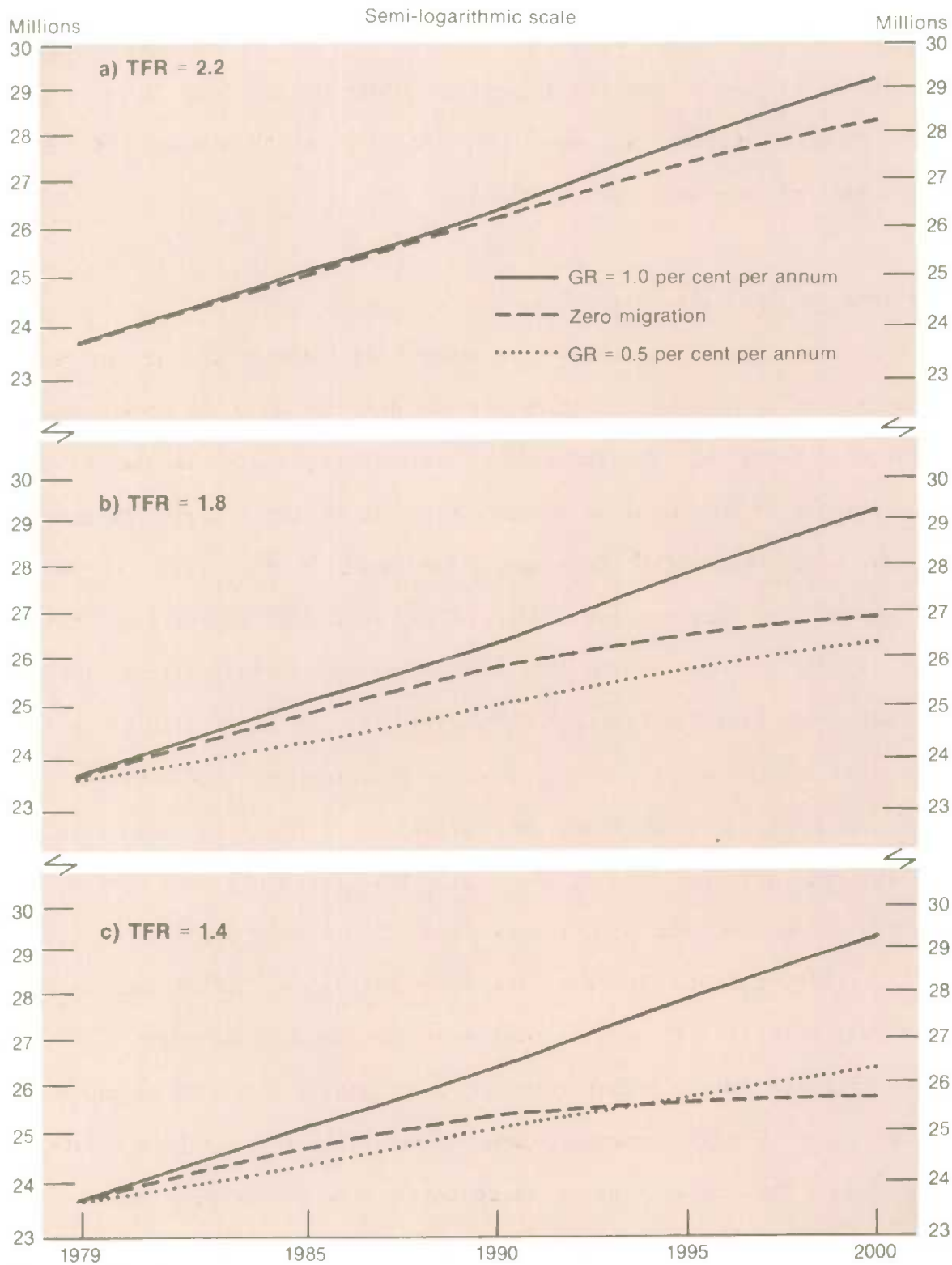
Source: Table 8

decreases. Again if the desired rate of growth is 0.50 percent per annum, the numbers of immigrants required would only be fractions of those required for the higher rate of growth of 0.75 percent at the beginning of the period but would increase gradually to about 71 percent (if the total fertility rate were 1.8) and to about 78 percent (if the total fertility rate were 1.4) by the year 2001.

Variations in Total Population Size

The sizes of total population associated with the differing regimes of immigration designed to produce various desired rates of growth are presented in Table 9. For purposes of comparison, the sizes resulting in the absence of migration at specified levels of total fertility rate are also presented. All these are illustrated in Charts 6a, 6b and 6c. It may be seen that the total size in the year 2001 ranges from 26.4 million when the annual growth rate is 0.50 percent to 29.5 million when the growth rate is 1.0 percent. (The latter total is about 11.5 percent higher than the former.) In the absence of migration, the total size varies according to the level of fertility. Thus, if the total fertility rate declines to 1.4, the population size would only be about 25.7 million as compared with levels of 27.0 and 28.3 million if the total fertility rate continues at its current level of 1.8 or increases to 2.2 respectively. It may be noted that the total population in the absence of migration is higher than the total population with an annual rate of growth of 0.50 percent at lower levels of fertility (see Charts 6b and 6c). This holds true at least until 1994 and happens because, with the latter rate of growth, emigration exceeds immigration during this period, thereby reducing the total population.

Chart — 6
The Size of Population Resulting from a Desired
Annual Growth Rate (GR) and from Zero Migration at a
Specified Total Fertility Rate (TFR), Canada, 1979-2000



Source: Table 9

TABLE 9. The Size of Population Resulting From Desired Annual Rate of Growth From Zero Migration at Specified Level of Total Fertility Rate, Canada, 1979-2001

Year	Millions				
	Desired Annual Rate of Growth (Irrespective of Fertility Level)		Zero Migration		
	1.0%	0.5%	Total Fertility Rate		
			2.2	1.8	1.4
1979	23.671	23.671	23.671	23.671	23.671
1980	23.908	23.788	23.874	23.865	23.856
1981	24.146	23.910	24.089	24.065	24.040
1982	24.389	24.034	24.317	24.270	24.222
1983	24.632	24.157	25.551	24.474	24.399
1984	24.877	24.278	24.791	24.678	24.567
1985	25.125	24.399	25.035	24.880	24.727
1986	25.374	24.522	25.283	25.078	24.875
1987	25.627	24.645	25.532	25.271	25.013
1988	25.881	24.768	25.780	25.457	25.138
1989	26.140	24.892	26.026	25.634	25.249
1990	26.402	25.016	26.268	25.802	25.345
1991	26.668	25.141	26.506	25.961	25.426
1992	26.937	25.266	26.735	26.110	25.493
1993	27.206	25.391	26.950	26.247	25.550
1994	27.478	25.518	27.153	26.373	25.598
1995	27.752	25.645	27.343	26.488	25.637
1996	28.029	25.772	27.521	26.592	25.665
1997	28.309	25.900	27.687	26.685	25.685
1998	28.591	26.028	27.842	26.770	25.697
1999	28.876	26.156	27.989	26.845	25.700
2000	29.163	26.285	28.127	26.913	25.696
2001	29.453	26.415	28.260	26.974	25.686

Conclusion

The projections presented in this paper bring to light some of the implications of recent major demographic changes on the future growth and structure of Canada's population. The most important changes have been the post-war baby boom followed by an unprecedented decline in the birth rate; these have significantly affected the total growth rate and the age structure of the population. Changes in age structure are associated with recent social and economic events and have implications for the future.

First, the shrinking proportion of the young population under age 20, following three decades of growth resulting from the baby boom, raises the problems of redundant infra-structures, excess capacities and declining economic sectors. The declining school-age population, for example, has made it necessary to make significant adjustments for educational and child-related institutions and services.

Second, with a significant increase in the proportion of the elderly population, the issues of retirement, pensions, social security, health care, housing schemes and a range of social and welfare programmes to the 65+ age group will become increasingly prominent.

Third, the baby-boom cohorts, who have faced continual competition while passing through the various life cycles, will have to bear the additional responsibility and burden of supporting an aging society.

The aged-dependency ratio (the population over 65 years of age to the population aged 15-64 years) is increasing while the child-dependency ratio (under 15 years of age) has and will continue to fall (Table 6).

The simulations presented show how immigration can be used as a tuning mechanism for achieving a desired growth rate under different assumptions of fertility level. Thus, the results presented are useful in gauging the relative importance of immigration on growth rates and as such provide basic demographic inputs for setting annual immigration targets. They also demonstrate that in setting annual immigration quotas, the short-term considerations, such as the employment situation and the demand for occupational skills, alone are not sufficient. It is equally important to take into account the long-term effects of such factors as size, growth rates and the age-sex composition of the population.

PAPER 4

**RECENT DEVELOPMENTS IN INTERPROVINCIAL MIGRATION IN CANADA
AND POSSIBLE SCENARIOS FOR THE 1980s**

by

Jeanine Perreault and Ronald Raby
Statistics CanadaIntroduction

The beginning of the 1970s was marked by a reversal of the interprovincial migration trends of the previous decade. Net inward migration became negative in value in Ontario while it turned positive in Saskatchewan and the Maritimes. The balance of migration in Alberta increased sharply, particularly after 1973, while that of Quebec and Manitoba remained negative. An interesting question asked at that time, and which is still relevant today, is: are these changes cyclical in nature? Could they be temporary modifications linked to economic fluctuations, or are they far-reaching modifications in the country's demographic space characterized by a westward shift in the pole of attraction and a corresponding decline in the attraction previously exerted by Ontario? The purpose of this paper is to attempt to determine whether the trend is continuing or is showing signs of abating. The data are derived from family allowance records for the period 1970-1980.

Trends Observed in the 1970s

Table 1 shows the trends in the interprovincial mobility rate in Canada. The decade has been divided into two periods: 1970-75 and 1975-80. An examination of Table 1 reveals few changes in the mobility rate of Canadians over the decade: slightly less than 2 percent of the population changed their province of residence. While the average rate over the last five years is slightly lower than that of the previous period (17.1 per thousand as compared with 18.6 per thousand), these data seem to indicate that the migration habits of Canadians are relatively stable.

TABLE 1. Interprovincial Mobility in Canada, 1970-80

Year	Total Interprovincial Migrations	
	Numbers	Rate per Thousand Population
1970-71	404,372	18.8
1971-72	398,571	18.4
1972-73	389,599	17.8
1973-74	436,412	19.6
1974-75	416,890	18.5
1970-74 (Average)	409,169	18.6
1975-76	374,528	16.4
1976-77	397,835	17.2
1977-78	404,940	17.3
1978-79	395,725	16.8
1979-80	418,706	17.6
1975-80 (Average)	398,347	17.1

Source: Statistics Canada, International and Interprovincial Migration in Canada, 1961-1976, Catalogue 91-208, Ottawa, 1977; and all subsequent issues of this same publication series.

What are the poles of attraction? Where are the migrants coming from, where are they going? An examination of Table 2 reveals that the Maritimes continue to be the destination of about 15 percent of interprovincial migrants, and to be the origin of approximately the same percentage of all migrants. The proportion of all migrants moving to Quebec has declined from 9.2 percent to 7.1 percent. The proportion of migrants from Ontario has increased. On the other hand, Ontario is receiving a declining proportion of migrants (only 23.4 percent in the second five-year period as compared with 25.6 percent in the first). Alberta has become increasingly popular as a province of destination and now rivals Ontario in this respect. Alberta and British Columbia together account for up to 40 percent of all migrants.

TABLE 2. Migrants by Province of Origin and Destination, 1970-75 and 1975-80.

Province	Percentages			
	Migrants: where they come from		Migrants: where they go to	
	1970-75	1975-80	1970-75	1975-80
NFLD.	3.1	3.0	2.9	2.7
P.E.I.	1.0	1.0	1.2	1.1
N.S.	5.8	5.6	5.9	5.9
N.B.	4.8	4.5	5.2	5.1
QUE.	14.3	14.4	9.2	7.1
ONT.	24.1	25.7	25.6	23.4
MAN.	8.7	8.5	7.2	6.4
SASK.	9.3	5.9	5.8	7.0
ALTA.	14.4	15.5	16.4	22.4
B.C.	13.3	13.8	19.1	17.3
YUKON AND N.W.T.	1.4	1.8	1.5	1.5
CANADA	100.0	100.0	100.0	100.0

Source: As for Table 1.

TABLE 3. In-migration to Alberta by Province of Origin, 1970-80

YEAR	Percentages											
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	YUKON & N.W.T.	TOTAL
1970-71	0.5	0.3	2.2	1.9	5.8	14.7	12.3	27.2	-	32.4	2.6	100.0 (59,503)
1971-72	0.5	0.4	2.2	1.5	4.4	19.2	11.4	26.0	-	31.3	3.1	100.0 (61,181)
1972-73	0.5	0.3	2.0	1.3	4.7	18.8	12.0	24.6	-	32.4	3.2	100.0 (62,749)
1973-74	1.1	0.4	2.1	1.4	4.4	20.8	11.4	23.4	-	31.6	3.1	100.0 (72,082)
1974-75	1.0	0.5	2.4	1.5	4.5	22.4	11.4	16.6	-	36.6	3.1	100.0 (79,884)
1975-76	1.0	0.5	2.5	1.6	5.0	25.1	10.6	12.8	-	37.8	3.0	100.0 (76,210)
1976-77	1.5	0.5	3.3	1.7	6.3	25.9	10.8	12.3	-	34.5	3.2	100.0 (84,815)
1977-78	2.7	0.5	3.3	2.2	9.4	28.3	9.6	13.2	-	27.9	2.9	100.0 (88,625)
1978-79	2.5	0.4	3.1	2.3	7.1	29.4	11.7	12.6	-	27.6	3.2	100.0 (92,033)
1979-80	2.1	0.4	3.3	2.7	7.6	34.4	12.3	11.8	-	23.0	2.5	100.0 (105,051)

Figures in brackets refer to the number of in-migrants to Alberta.

Source: As for Table 1.

An examination of in-migration to Alberta by province of origin (Table 3) shows clearly two distinct periods: the first one, 1970-77 during which British Columbia is the leading "supplier" of migrants to Alberta; a second one, 1977-80, during which British Columbia gradually loses this distinction to Ontario: these ten years are marked by a continuous increase in Ontario's share of in-migrants to Alberta (34.4 percent in 1979-80), and the upward trend continues. These data seem to indicate that this shift in migration was a two-stage process. In the first stage, neighbouring provinces were the first to respond to Alberta's economic boom, supplying more than 50 percent of its migrants. In the second stage, they were replaced in this capacity by more distant provinces. A counter-trend then emerged, fuelled partly by return migration to British Columbia and Saskatchewan.

An examination of the data on in-migrants to British Columbia by province of origin in Table 4 clearly illustrates this trend. As might have been expected, the largest proportion of in-migrants to British Columbia in recent years has been supplied by Alberta. In 1979-80, for example, just over 40 percent of the in-migrants to British Columbia came from Alberta, and this trend is on the rise. The increase in this proportion since 1975 is no doubt attributable in part to return migration, and this trend can be expected to continue over the next few years. (On the other hand, some of these migrations may be 'two-step' movements, that is, a move to Alberta being followed subsequently by a move to British Columbia). Unfortunately the available data do not allow return migrations or 'two-step' migrations to be identified.

TABLE 4. In-migration to British Columbia by Province of Origin, 1970-80

YEAR	Percentages											TOTAL
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	YUKON & N.W.T.	
1970-71	0.7	0.2	2.9	1.9	9.0	23.6	10.9	15.5	33.2	-	2.0	100.0 (71,115)
1971-72	0.6	0.2	3.4	1.6	6.6	24.6	10.3	12.8	37.1	-	2.8	100.0 (75,235)
1972-73	0.7	0.2	2.2	1.7	7.0	24.6	10.9	12.1	37.6	-	3.0	100.0 (77,851)
1973-74	1.0	0.3	2.6	1.7	5.7	27.3	9.5	11.1	38.0	-	2.9	100.0 (88,145)
1974-75	1.1	0.3	3.7	1.7	6.5	29.5	10.8	9.4	34.1	-	2.9	100.0 (77,711)
1975-76	1.0	0.3	3.1	1.6	6.4	30.0	10.0	8.2	36.5	-	2.8	100.0 (58,276)
1976-77	0.9	0.3	3.8	1.6	7.7	27.8	8.5	7.6	37.8	-	4.1	100.0 (62,810)
1977-78	0.9	0.2	3.7	2.0	8.1	27.7	9.5	7.4	37.5	-	2.8	100.0 (67,251)
1978-79	0.9	0.4	3.4	1.7	7.4	28.7	9.7	7.0	37.9	-	2.8	100.0 (70,684)
1979-80	1.0	0.3	3.0	1.4	5.7	26.1	10.9	7.9	40.7	-	3.0	100.0 (86,896)

Figures in brackets refer to the number of in-migrants to British Columbia.

Source: As for Table 1.

TABLE 5. In-migration to Ontario by Province of Origin, 1970-80

YEAR	Percentages											TOTAL
	NFLD.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	YUKON & N.W.T.	
1970-71	6.3	1.2	10.3	7.5	39.8	-	8.9	4.9	8.8	11.9	0.4	100.0 (128,486)
1971-72	6.3	1.4	9.7	7.6	37.4	-	10.4	4.4	10.2	12.2	0.4	100.0 (109,224)
1972-73	6.5	1.4	8.8	6.8	38.0	-	10.2	3.8	9.8	14.1	0.6	100.0 (96,003)
1973-74	8.0	1.3	10.7	6.9	34.6	-	8.6	4.5	11.6	13.2	0.6	100.0 (104,720)
1974-75	6.0	1.3	10.8	6.9	32.8	-	10.8	3.6	10.2	16.9	0.7	100.0 (84,965)
1975-76	6.3	1.3	9.8	7.0	33.3	-	9.5	3.4	11.9	16.6	0.9	100.0 (81,141)
1976-77	6.1	1.2	9.9	7.1	35.9	-	9.1	3.3	12.5	14.2	0.7	100.0 (92,628)
1977-78	4.9	1.0	8.3	6.0	44.2	-	7.7	2.9	13.1	11.2	0.7	100.0 (107,055)
1978-79	5.3	1.2	8.4	6.5	39.9	-	8.8	3.2	13.9	12.0	0.8	100.0 (93,903)
1979-80	5.5	1.0	8.3	6.0	38.8	-	8.7	3.4	15.8	11.6	0.9	100.0 (90,726)

Figures in brackets refer to the number of in-migrants to Ontario.

Source: As for Table 1.

Table 5 shows in-migration to Ontario. Historically, Ontario has been the preferred province of destination of interprovincial migrants; this was especially true in the 1960s and the beginning of the 1970s. An interesting phenomenon emerges here: the proportion of in-migrants to Ontario who come from Alberta has almost doubled in ten years, from 8.8 percent in 1970-71 to almost 16 percent in 1979-80. This trend can no doubt be expected to increase in future, if, as is believed, it is fuelled in part by return migration to Ontario.

Table 6 shows the population exchange of Ontario and Alberta with the rest of the provinces. As can be seen, in 1970-71 Ontario was the province of origin or destination of 52 percent of all migrants. In 1979-80, Ontario continues to rank first in total volume of migration, but with a reduced percentage (only 48 percent). During the second half of the decade, exchanges involving Alberta take on increased importance: in 1979-80, Alberta is the province of origin or destination of

TABLE 6. Migrations to and from Ontario and Alberta, 1970-80

Year	Migrations to and from Ontario	Migrations to and from Alberta	Total Number of Migrations in Canada
1970-71	209,706 (52%)	112,100 (28%)	404,372 (100%)
1971-72	204,368	118,787	398,571
1972-73	191,046	119,934	389,599
1973-74	212,325	141,929	436,412
1974-75	199,464	137,193	416,890
1975-76	183,462	127,798	374,528
1976-77	193,272	144,305	397,835
1977-78	204,018	151,481	404,940
1978-79	195,875	153,697	395,725
1979-80	201,030 (48%)	179,169 (43%)	418,706 (100%)

Source: As for Table 1.

43 percent of interprovincial migrants, as compared with 28 percent in 1970-71. Should this trend continue, Alberta could soon rank first in the total volume of interprovincial migration.

The mobility rate is a relative measure of the turnover of the population in a given province. (It is obtained by summing in and out-migrants and dividing this sum by the population of the province.) As can be seen in Table 7, the mobility rate declined in all provinces except Alberta, the only province to record an increase in its mobility rate over the decade: in 1979-80, this rate reached close to 9 percent, revealing a considerable turnover of its population.

By comparison, Ontario is far less affected by these migratory movements, as they involved only 2 percent of its population. It is interesting to note that Quebec has the lowest mobility rate of any

TABLE 7. Mobility Rates by Province, 1970-71 and 1979-80*

Province	Per 100 Population	
	1970-71	1979-80
NFLD.	4.3	4.1
P.E.I.	7.1	6.0
N.S.	6.0	5.0
N.B.	6.6	5.1
QUE.	1.8	1.3
ONT.	2.8	2.4
MAN.	6.4	6.1
SASK.	6.9	5.6
ALTA.	7.0	8.8
B.C.	5.7	5.2
YUKON & N.W.T.	21.3	21.2

* See text for definition of mobility rate.

Source: As for Table 1.

province. This low degree of mobility supports the probable influence of cultural and linguistic barriers on mobility.

The observed changes in the direction of migratory movements are also found in the net migration figures. Table 8 shows a static comparison of net migration for each five-year period. As can be seen, Ontario went from a net migration gain of close to 30,000 persons in 1970-75 to a net migration loss of close to 47,000 persons in the 1975-80 period. In Alberta, on the other hand, net migration tripled to more than 137,000 persons for the period 1975-80. Saskatchewan rebounded from severe losses to record a net gain of close to 16,000 persons for the 1975-80 period. British Columbia's balance of net migration deteriorated somewhat over the second half of the decade.

The static comparison given in Table 8 does not permit the beginning of these changes to be pinpointed in time or any signs of further change to be detected. Such observation can only be

TABLE 8. Net Interprovincial Migration: A Static Comparison for the Periods 1970-75 and 1975-80

Province	1970-75	1975-80
NFLD.	- 6,152	- 6,306
P.E.I.	3,327	2,913
N.S.	3,587	5,024
N.B.	9,820	12,829
QUE.	- 102,963	- 145,945
ONT.	29,887	- 46,751
MAN.	- 29,940	- 42,400
SASK.	- 70,774	15,938
ALTA.	40,854	137,018
B.C.	116,847	72,899
YUKON & N.W.T.	5,508	- 5,217

Source: As for Table 1.

TABLE 9. Annual Net Inward Migration by Province, 1970-80

Province	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
NFLD.	-3,704	910	-537	-3,316	495	592	-1,398	-2,610	-1,872	-1,018
P.E.I.	222	290	923	502	1,390	649	1,027	979	-116	374
N.S.	-3,825	-371	4,276	1,274	2,233	3,895	179	668	1,384	-1,102
N.B.	-420	612	2,077	1,448	6,103	6,561	2,632	1,876	1,133	627
QUE.	-37,995	-20,461	-20,072	-15,136	-9,299	-12,642	-22,996	-46,905	-32,110	-31,292
ONT.	47,266	14,080	960	-2,885	-29,534	-21,180	-8,016	10,092	-8,069	-19,578
MAN.	-7,350	-8,312	-5,771	-1,596	-6,911	-4,238	-4,164	-7,158	-10,934	-15,906
SASK.	-24,176	-19,207	-16,164	-11,604	377	5,845	6,750	2,015	1,711	-383
ALTA.	6,905	3,575	5,564	2,235	22,575	24,622	25,325	25,769	30,369	30,933
B.C.	20,143	27,044	27,333	30,496	11,831	-4,419	2,120	15,657	20,111	39,430
YUKON & N.W.T.	2,936	1,840	1,411	-1,418	739	317	-1,459	-383	-1,607	-2,085

Source: As for Table 1.

be accomplished by studying these movements on an annual basis. An examination of the year-to-year changes in net migration (Table 9) reveals that, in Ontario the decline in net migration was apparent by 1970. (Ontario's net migration for the previous year (1969) was 53,000.) The year 1974-75 marks a turning point: Ontario's net migration reached a nadir of around -30,000 persons; in Alberta, on the other hand, this marks the beginning of a major upswing, as a net migration gain of some 22,500 persons is recorded (as compared with 2,000 the previous year).

It is interesting to note the inverse relationship between the levels of net migration for Ontario and Quebec over time: a decline in Quebec's net migration situation is accompanied by an improvement in that of Ontario, and vice versa. In 1974-75, for example, Quebec recorded a substantial net migration gain, while Ontario sustained the worst losses in its history. A similar inverse relationship was also observed between Alberta and British Columbia, at least up to 1976-77. Since then, the two provinces have kept pace with one another, with British Columbia even surpassing Alberta in 1979-80. In British Columbia, the turning point was observed a few years later, towards 1977-78, under the combined effect of declining out-migration and rising in-migration.

Possible Scenarios for the 1980s

The first part of this paper highlighted the changes in interprovincial migration over the past ten years. The year 1973-74 was identified as a turning point in interprovincial migration trends; it

marked the beginning of the oil boom in western Canada following the escalation of prices on international markets. It was also observed that, far from being arrested, the westward shift in the pole of attraction had accelerated(1).

The study of the past is interesting mainly because it helps us to consider and anticipate the future. Trying to identify some recent trends which would appear to continue for the next few years is a complex task in itself. This second section outlines the four migration scenarios selected by Statistics Canada as plausible eventualities for the 1980s(2). The conceptual approach will be examined first.

The choice of projection method was based on two fundamental aspects of migration: first, the rather unstable nature of migration (erratic movements, the magnitude and at times even the direction of which are difficult to predict); and second, the difficulty of finding adequate source data - that is, flow as opposed to stock data - which are up-to-date and can be readily accessed to keep pace with any changes in trends. The selected approach therefore represented a compromise: an attempt was made to select, from several migration patterns of the past, scenarios that were likely to recur in the future. The following basic

-
- (1) For two authors, Termote and Fréchette, who studied interprovincial migration in Canada for the period 1951-76, this reversal in the migration patterns was already noticeable in 1965-69 and is to be considered an essential feature of the spatial restructuring of Canada's population. See Termote, M. and Fréchette, R., Les variations du courant migratoire interprovincial, Institut national de la recherche scientifique (I.N.R.S.), Montréal, 1979.
 - (2) These scenarios as well as the method of projection are presented in Statistics Canada, Population Projections for Canada and the Provinces, 1976-2001, Catalogue No. 91-520, Ottawa, 1980.

assumption was therefore made - namely, that the demographic and non-demographic factors that might influence future trends are present, implicitly, in current and past trends. This was not to deny the importance of the socio-economic factors; these were acknowledged in an implicit manner.

The various steps in the procedure were as follows:

1. An observation period was selected

The 1961-1978 period was chosen because:

- (i) it offers a sufficiently wide variety of migration patterns;
and
- (ii) it is of an adequate length.

2. Appropriate source data were selected

Annual estimates of migration (family allowance records) were chosen because:

- (i) they correspond closely to 'flow' statistics;
- (ii) they describe annual in and out-migration (origin and destination); and
- (iii) the movements are recorded soon after they occur (that is, a recent and significant change is rapidly detected).

3. Migration patterns within this period were identified

Three migration patterns were identified:

- (i) the 1960s (characterized by the strong attraction exerted by Ontario);

- (ii) the reversal of this trend at the beginning of the 1970s; and
- (iii) the recent westward shift of migration favoring Alberta and British Columbia.

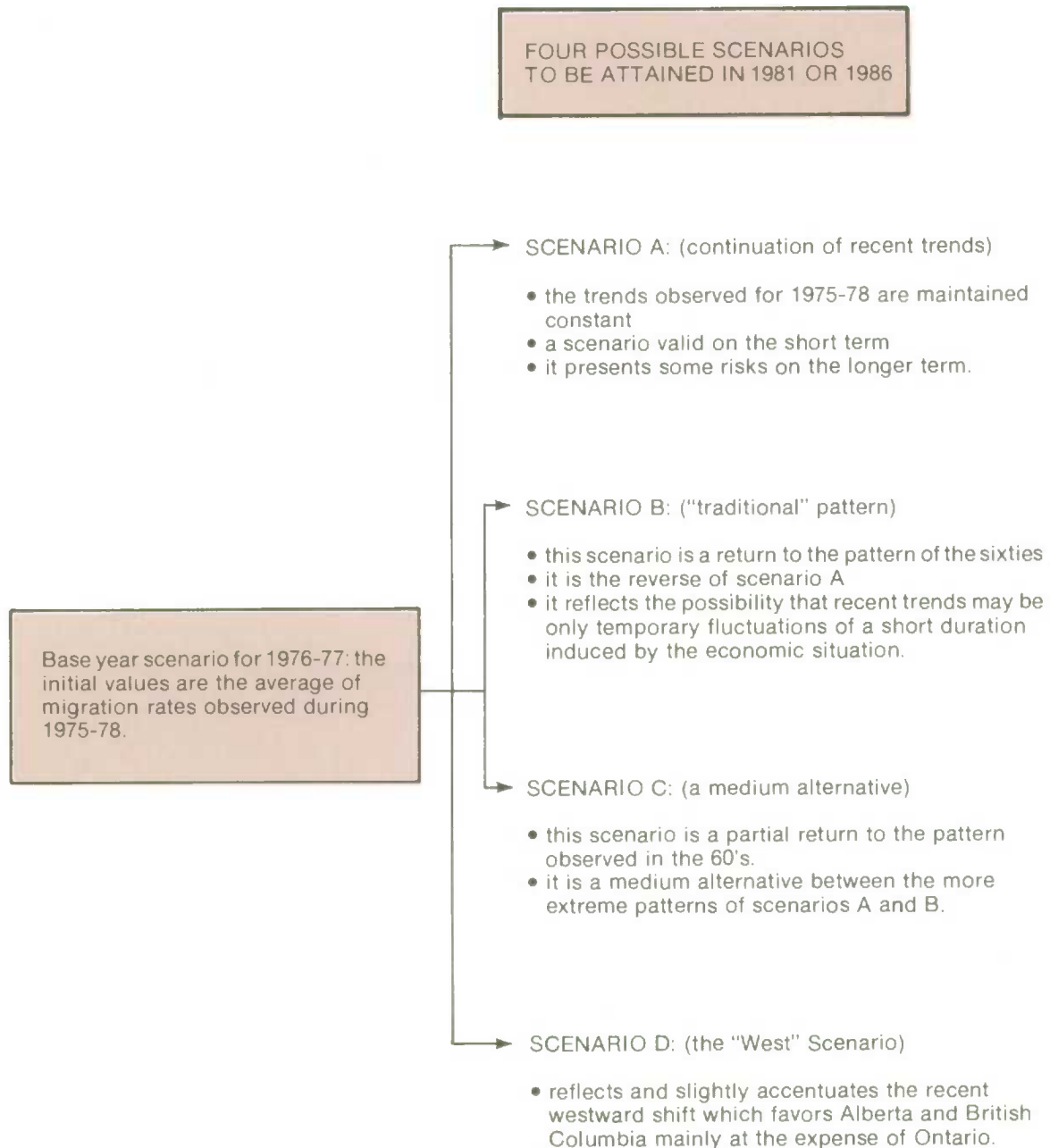
4. A method involving the use of out-migration rates and in-migration proportions for each province, by age and sex, was selected and, for each scenario:

- (i) out-migration rates were first calculated for each province;
- (ii) the total number of out-migrants from a province was then obtained by multiplying the out-migration rates by the population of that province for the year in question;
- (iii) total out-migrants from all provinces were summed; and
- (iv) the total number of migrants was then redistributed among the provinces in the form of in-migrants (by applying the in-migration proportions).

This method presents two basic advantages. First, since out-migrants from one province are in-migrants to another province no adjustment is necessary, and therefore, at the national level, the number of in-migrants equals the number out-migrants and net migration equals zero. Secondly, rates have their usual advantage over absolute values by permitting the linking of migration and the total number of potential migrants.

Four scenarios were selected; they are presented in Chart 1. As mentioned previously, our purpose in using this approach was to offer users plausible scenarios for the next ten years. Its

Chart — 1
Possible Scenarios For the Short Term and the Middle Term



Note: It is assumed here that the migration rates will move gradually from their recently observed levels ("initial" values) to some "final" values reflecting selected scenarios, over a 5 or 10 year period. The use of this approach make the projections valid on the short term.

practical interest lies in the fact that the user is faced with a choice among various possible scenarios. His choice is dictated by his own judgement and his own perception of the future; upon reflection he thus recognizes the conditional and probabilistic nature of the projection.

Medium term or annual projection?

Obviously, the scenarios offered do not cover all eventualities: they are averages valid for the next 10 or 15 years. While the projections are revised every five years, more pronounced trends sometimes emerge. Such is the case at the present time in Alberta and British Columbia, where net inward migration is higher than expected.

For the purposes of short-term projections, covering 1 to 3 years, the Demography Division of Statistics Canada offers users a special request service:

- the most recent annual estimate is used as the base population;
- the migration hypotheses are adjusted to reflect new developments in interprovincial or international migration.

Comparison with Official Estimates

It is interesting to compare the four suggested scenarios (which were developed during 1977-78) with the most recent estimates. The results of this comparison are presented in Table 10.

For provinces marked with an asterisk in Table 10, the estimated net migration lies outside the range offered by the four scenarios. The

TABLE 10. Net Interprovincial Migration: Comparison between the Projected Numbers and the Estimated Ones
(Total Numbers over the 1976-80 Period)

Province	Estimates	Projections			
		Scenario A	Scenario B	Scenario C	Scenario D
NFLD.	- 6,898	- 6,697	- 11,406	- 9,043	- 7,901
P.E.I.	2,264	4,155	1,876	3,039	3,582
N.S.	1,129	7,428	- 934	3,268	5,259
N.B.	6,268	12,414	2,865	7,633	9,945
QUE. *	- 133,303	- 108,505	- 83,857	- 96,194	- 102,512
ONT.	- 25,571	- 21,420	6,428	- 7,528	- 31,570
MAN. *	- 38,162	- 17,045	- 22,305	- 19,681	- 18,470
SASK.	10,093	16,110	- 2,497	6,793	11,352
ALTA. *	112,396	100,322	73,097	86,750	106,692
B.C. *	77,318	11,207	32,818	21,990	21,150
YUKON and N.W.T. *	- 5,534	2,031	3,916	2,969	2,474

* Estimate outside range of values offered by the four scenarios.

largest discrepancy between the selected scenarios and the estimates was recorded in British Columbia, whose recent balances of migration have been extremely large, even greater than those of Alberta. It would be interesting to conduct a study comparing the economic growth of these two neighbouring provinces vis-à-vis data on their migration patterns.

Conclusion

1. Ontario still plays a key role in determining the level and pattern of interprovincial migration in Canada and remains the main partner of all provinces to the east of it; Ontario still ranks first in 1979-80 in terms of the volume of migration exchanges with the other provinces.
2. Alberta and British Columbia are playing an increasingly large role in interprovincial migration exchanges, and are now competing with Ontario; they are the destination of close to 40 percent of interprovincial migrants and this trend is increasing.
3. It is possible that, in the future, a relative saturation in Alberta, and perhaps subsequently in British Columbia, may be observed: this may
 - (i) result in return migration to the source provinces;
 - (ii) reduce the number of departures to the western provinces;
 - (iii) compel analysts to remember that in spite of all the analyses, migration maintains its cyclical nature, and that to predict the magnitude of these movements or their turning points is far from easy.

PAPER 5

AN ANALYSIS OF AGE DISTRIBUTION BY OCCUPATION:

CANADA, 1971-85

by

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Introduction

One of the more underdeveloped areas in labour market analysis is the demographic dimension of occupational analysis. This partly reflects the lack of suitable occupational data and partly certain conceptual difficulties associated with inter-occupational mobility. This study represents an explanatory investigation into a, heretofore, largely unexamined area in labour market analysis.

In determining occupational shortages or imbalances, the age profile (distribution) of an occupation is of considerable importance since it directly affects occupational attrition, that is, labour market exit through (i) death (mortality) and (ii) changes in participation rates (including retirement). Attrition gives rise to a replacement demand which has to be considered in conjunction with net new job creation in arriving at overall occupational demand. Thus attrition plays an important role in determining manpower requirements and occupational imbalances. Occupations in which the average age is very high, for example, will tend to have a high attrition rate relative to those occupations in which the average age is low. Occupations which are

relatively "old" or skewed towards the older age groups are of considerable policy concern since the natural aging of these occupations may have significant implications for future training requirements and manpower policy initiatives.

This study involves an analysis of the age distribution of selected number of occupations based on data from the Census of Canada and the attrition model or routine employed in the Canadian Occupational Forecasting Model (COFOR) of the Federal Department of Employment and Immigration(1). The methodology is relatively simple; it involves the aging of occupational stocks from a benchmark year (in the present case the 1971 Census year) and applying mortality and participation rates to these stocks over time(2). The rate at which the occupation is growing is also accounted for by distributing new entrants (including immigrants) over selected age groups. The attrition model employed in COFOR and used here is subject to a number of limitations which will be discussed below:

The aging or the change in the age distribution of an occupation depends to a large extent on the growth of the occupation which in turn reflects industry growth in which the occupation is concentrated, or if

(1) COFOR generates occupational demand projections for some 500 occupational groups under a specific set of assumptions regarding economic and industrial growth. Future trends in occupational demand or requirements have two components, one arising from industrial growth (net job creation) and the other from the need to replace people as they leave the labour force (attrition). Replacement requirements can be regarded as either incremental demand or a reduction in supply.

(2) Account is also taken of the joint probability of mortality and withdrawal.

spread evenly over all industries, on general economic growth conditions. For instance, a rapidly growing occupational group will tend to have a strong influx of relatively younger workers, which will tend to keep the average age of the occupation low relative to an occupation which is growing slowly and in which the older cohorts have greater weight.

On average one might expect a significant increase in attrition to occur in the 1980s relative to the 1960s and 1970s as a result of the demographically-led aging of the work force. The slowing of youth population and labour force growth in the 1980s will tend to push upwards the average age of the labour force, leading to relatively higher attrition. One of the purposes of this study is to assess the implications of certain assumptions involved in projecting occupational age distributions and to indicate in what areas there is significant room for methodological improvement.

A. THE CALCULATION OF AGE/SEX DISTRIBUTION IN THE COFOR MODEL

1. Attrition and Occupational Aging

As noted, there are two sorts of attrition which result in occupational requirements in COFOR: mortality and changes in participation rates. A detailed estimate of the sex and age composition of the experienced labour force by occupational group was obtained from the census. It was assumed that the male/female ratio for each occupation was constant over time. As people in each occupational group grew older over the period

to 1985, age/sex-specific mortality tables were applied to calculate probable deaths each year. Age/sex-specific labour force participation rates were also used to calculate attrition due to labour force withdrawals. For age/sex groups in which labour force participation rates increase with aging, no attrition is assumed. When labour force participation rates decline with age, the decline in the rate is multiplied by the stock of that age/sex group for each occupation, to calculate the occupational requirements arising from labour force withdrawal.

The assumptions made in the attrition calculations are necessitated by certain data limitations. They imply, for example, that mortality rates are the same for a given age/sex group, regardless of occupation, since occupation-specific mortality tables are not available. Similarly, the labour force participation rates imply that the probability of retirement would be the same for a given age/sex group, regardless of occupation. Another important assumption is that there is no mobility or transfer among occupations in the attrition routine. That is, the group in occupation "X" in 1971 will remain there and not move to other occupations. This assumption is not, of course, appropriate in step-up occupational groups, for example, engineers who move into managerial positions over time. In this case, there would tend to be an overestimation of the average and median age of the occupation over time. The assumption may be less restrictive for certain occupations such as dentists and other self-employed occupations, where occupational mobility would appear to be quite low.

2. Gross Requirements by Occupation(3)

As noted earlier, an important dimension in determining the age distribution of an occupation is the method of allocating new labour force entrants to specified age groups. New entrants to an occupation are required as replacements for those who have left the labour force due to death or a decline in participation rates. In addition, entrants will be required for any increases in employment growth over the period considered. Gross requirements for an occupation are the sum of these two components. The sources of new entrants for a particular occupation include young people leaving the educational system, immigrants, re-entrants and inter-occupational mobility. In the COFOR model, new entrants are allocated to the 15-34 age group by single year of age on the basis of the 1971 Census male/female proportions. These entrants are then "aged" together with those remaining in the occupation by using the appropriate age/sex-specific mortality rates (an individual who is 20 this year will be 21 next year with a different applicable mortality rate). Similarly, the age/sex-specific participation rates are used to calculate attrition due to withdrawals from the labour force. The COFOR estimates of age/sex distribution by occupation for 1985 were examined in order to determine whether any significant changes from 1971 distributions could be identified.

(3) It should be noted that "occupation" here refers to the groupings by 4-digit CCDO (Canadian Classification and Dictionary of Occupations), some of which include large numbers of occupations with widely varying skills.

B. ANALYSIS OF OCCUPATION BY AGE

A brief analysis was made of the 1971 occupational distribution by age to illustrate the different occupational structure for different age groups. Tables 1 and 2 show the proportion of each five-year age group who were employed in each occupational group, at the highly aggregated level of 2-digit CCDO which divides employment into twenty-three broad groupings(4).

The concentration of older persons in some occupations may be due to declining industries/occupations (for example, farmers) or to occupational change (for example, managers) or re-entry into a different, often lower skill occupation (for example, security guards). To a large extent, younger workers tend to train for and enter industries and occupations which have good employment opportunities (job availability), resulting in their concentration in the occupations which are an increasing proportion of total employment. In many cases older workers may be unable to compete for these jobs because of their different education levels and training, for instance, the major expansion in teaching positions in the 1960s was mainly filled by younger persons and not through occupational mobility. Similarly, the high proportion of teenagers in some occupations may be the result of concentration in "teenage occupations", that is, part-time, part-year low-skilled jobs.

(4) Exceptions were made for the Armed Forces (CCDO 611), who are not included in the COFOR model, and for owner/farmers (CCDO 711) whose age distribution is considerably different from those employed in the other agricultural occupations (CCDO 71). Since females in these two occupations represented a negligible proportion of CCDO 61 and 71, they are not shown separately.

TABLE 1. Occupational Distribution by Age, Males

Occupational Group (including CCDO code)	Percentages											
	Age Groups											
	Total	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 +
11 Managerial	5.5	0.2	2.4	5.1	6.2	6.9	7.3	7.7	8.0	7.2	6.2	4.3
21/23 Natural/Social Science	4.7	1.5	5.8	7.6	6.4	5.2	4.5	4.3	3.5	2.7	2.4	2.1
27 Teaching	2.4	0.2	2.3	5.1	4.4	2.9	2.1	1.7	1.4	1.2	1.0	0.7
31 Medicine/Health	1.5	0.4	1.4	1.7	1.7	1.6	1.6	1.7	1.5	1.4	1.3	2.0
41 Clerical	7.6	7.8	11.5	8.0	6.2	5.9	6.0	6.8	7.5	7.8	8.1	7.1
51 Sales	10.0	11.1	8.6	9.6	10.2	10.2	10.6	10.2	10.5	10.3	9.5	10.8
611 Protective Services	3.5	2.6	3.8	4.0	4.1	4.2	3.4	3.1	2.5	2.4	2.8	4.5
Rest of 61 Other Service	5.8	9.9	4.8	3.7	4.2	4.7	3.4	5.5	6.4	7.8	9.9	9.7
711 Farmers	4.0	0.4	0.9	1.8	2.8	3.6	4.7	5.6	6.6	7.2	8.1	13.5
Rest of 71 Other Agriculture	3.2	15.2	3.7	1.6	1.4	1.5	1.5	1.6	1.8	2.2	2.5	4.7
73,75												
77 Fishing/Forestry/Mining	2.7	2.6	3.4	2.8	2.9	2.8	2.7	2.6	2.4	2.3	2.0	1.3
81/82 Processing	4.9	4.8	5.9	4.7	4.6	4.6	5.0	4.9	4.9	4.9	4.7	2.4
83 Machining	4.0	2.0	4.2	4.5	4.5	4.3	4.3	4.5	4.1	3.9	3.4	1.9
85 Product Fabricating/Repair	8.5	5.4	8.7	9.2	9.6	9.4	9.2	8.8	8.6	8.4	7.7	5.1
87 Construction	9.9	6.2	9.4	9.2	10.6	11.8	11.8	11.0	10.4	10.0	10.1	5.4
91 Transport	5.8	3.4	5.1	5.9	6.6	7.1	7.0	6.7	6.2	5.7	4.7	2.4
93 Material Handling	2.9	5.8	3.7	2.5	2.4	2.5	2.7	2.6	2.6	2.5	2.4	1.1
95 Other Crafts	1.7	0.9	1.5	1.6	1.7	1.8	1.9	1.8	1.8	2.0	2.1	1.5
99 N.E.C.	2.6	5.2	3.4	2.0	1.8	1.9	2.1	2.2	2.4	2.7	2.7	2.0
Occupation not stated	7.4	13.3	8.1	8.0	6.4	5.6	5.3	5.7	5.7	6.1	7.3	15.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Not shown: 25, Religion; 35, Art, Sports (Total 1.4%).

Source: 1971 Census.

TABLE 2. Occupational Distribution by Age, Females

Occupational Group (including CCDO code)	Percentages											
	Age Groups											
	Total	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 +
11 Managerial	2.0	0.3	1.2	1.8	2.2	2.4	2.6	2.9	3.0	2.8	2.5	1.8
21/23 Natural/Social Science	1.6	1.0	2.2	2.3	1.5	1.3	1.3	1.3	1.4	1.3	1.3	0.9
27 Teaching	7.1	0.8	8.8	13.0	9.6	7.4	6.0	5.1	5.5	6.4	6.3	4.3
31 Medicine/Health	8.2	3.8	10.8	12.0	9.9	8.0	7.2	6.6	6.8	6.8	6.3	4.0
41 Clerical	31.8	30.8	42.3	34.6	31.8	30.6	29.4	28.9	26.5	24.0	21.8	14.6
51 Sales	8.4	11.1	4.9	4.2	6.1	8.3	10.2	11.4	12.6	11.9	10.6	8.5
61 Service	15.1	23.9	10.6	9.9	11.9	13.7	15.2	16.5	18.1	19.7	21.4	17.4
71 Agriculture	3.6	3.5	1.0	2.0	3.6	4.7	5.1	5.4	5.2	5.2	4.6	5.5
81/82 Processing	2.0	2.1	1.6	1.7	2.1	2.5	2.5	2.4	2.2	2.1	1.9	1.0
83 Machining	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.4	0.3	0.3	0.3
85 Product Fabricating/Repair	5.1	4.3	4.1	4.6	5.9	6.6	6.4	5.9	5.0	4.7	4.6	3.6
87 Construction	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
91 Transport	0.3	0.2	0.2	0.2	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.2
93 Material Handling	1.4	1.7	1.2	1.2	1.4	1.6	1.6	1.5	1.3	1.2	1.0	0.5
95 Other Crafts	0.5	0.4	0.5	0.4	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.2
99 N.E.C.	0.7	0.9	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.6	0.4
Occupation not stated	10.8	13.7	8.5	9.5	10.5	9.6	9.2	9.0	9.7	11.1	14.8	34.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Not shown: 25, Religion; 35, Arts, Sports; 73, Fishing; 75, Forestry; 77, Mining (Total 0.9%).

Source: 1971 Census.

If an occupation has a concentration of teenagers and lower proportions for ages 20-24, this may be the result of the increased numbers employed in other occupations because of the entry of those in higher skill occupations and not due to movement of the teenagers into other occupations. The 15-19 year-olds may stay in their original occupation, but they would be a lower proportion of the increased labour force.

In order to identify possible changes in the age distribution of an occupation over time, the 1971 age distributions of various occupations were analysed, together with the 1985 age distribution as estimated by COFOR. This process may identify the changing age structure of an occupation in response to differing employment growth rates and attrition rates. In addition, it has served as an assessment of the implications of the assumptions underlying the attrition routine.

Forty-four occupations were chosen for the initial analysis. The choice was made in order to cover a variety of characteristics, including higher/lower skill levels, blue collar/white collar, high/low 1971 median ages and high/low growth and attrition rates. In addition an effort was made to pick "visible" occupations which would simplify the assessment of intertemporal changes in age distribution.

Analysis of these 44 selected occupations showed that, whatever the 1971 age distribution had been, the 1985 data had a concentration of employment in the 30-39 age group, about 40 percent for both

males and females. Rough estimates of labour force distribution by age for 1985 do not show a similar major concentration in this age group (Table 3). The standard COFOR routine for labour force entry and the lack of adjustment for occupational mobility results in the concentration in this age group. Identification of changing age structures of the occupations in response to differing employment growth and attrition rates was not possible in most cases because of the overwhelming impact of the assumptions on which the projections were based.

The 1971 age distributions differ quite significantly from the age distributions projected in COFOR, and from knowledge of the various occupations it can be concluded that the standard labour force entry routine is not appropriate. For example, it is known that newsboys aged 15-19 in 1971 will not be newsboys aged 30-34 in 1985.

Because of the impact of the application of a standard formula for entry age of gross requirements over the years to 1985, comments will be concentrated on the 1971 distributions, highlighting the possible entry/exit patterns for various types of occupations and the specific problems associated with the age/sex distribution in relation to the COFOR estimates.

The following section will then identify the effect of the COFOR distribution of labour force entrants on the estimates of attrition and, therefore, on estimates of gross requirements. Possible ways in which some of the problems might be solved will be suggested.

TABLE 3. 1985 COFOR Estimates by Age Compared with Estimated Labour Force^o

Age Groups	Thousands					
	Males			Females		
	Employed: COFOR	Estimated Labour Force*	Difference Labour Force less Employed	Employed: COFOR	Estimated Labour Force*	Difference Labour Force less Employed
15-19	97.1	508.2	411.1	82.4	411.3	328.9
20-24	465.5	1,019.4	553.9	367.1	769.8	402.7
25-29	905.1	1,047.5	142.4	520.8	632.2	111.4
30-34	1,592.0	945.1	- 646.9	819.9	533.5	- 286.4
35-39	1,649.4	885.9	- 763.5	798.1	512.2	- 285.9
40-44	1,137.5	709.3	- 428.2	495.2	413.3	- 81.9
45-49	697.2	576.4	- 120.8	277.3	326.7	49.4
50-54	529.2	538.9	9.7	198.9	282.5	83.6
55-59	471.0	472.3	1.3	173.8	235.0	61.2
60-64	351.8	353.5	1.7	123.2	159.3	36.1
65+	200.5	194.4#	- 6.1	77.0	92.4#	15.4
Total	8,096.3	7,250.9	- 845.4	3,933.8	4,368.2	434.4
Total Both Sexes	12,030.1	11,619.1	- 411.0			

* Based on 1976 population, adjusted for mortality rates and using 1976 Census participation rates.

Estimated as percentage of ages 60-64, using 55% for males (65% in 1971) and 58% for females (68% in 1971).

^o Assuming net immigration of zero.

1. The Benchmark: Average Distributions, 1971 and 1985

All Occupations

Overall, the attrition or aging of the 1971 occupational stock will result in people in that occupation being older than in 1971. However, it is known that it is not always appropriate to "age" those in a particular occupation because of transfers out of occupations. Similarly, a standard application of entry ages in proportion to those aged 15-34 who were employed in an occupation in 1971 is also not always appropriate. Entry ages will vary with skill levels and the entry age may be over age 34 for some occupations, such as managers.

Table 4 shows the age distribution for "All Occupations" for males and females for 1971 and 1985, and provides a "benchmark" for comparison with individual occupational distributions(5). The gross requirements for "All Occupations" for the period 1978-1985 are 20.6 percent for growth in employment and 16.1 percent for attrition; the 1971 median ages are 37 years for males and 34 years for females(6).

Variations from this benchmark are in many cases not surprising and can be explained readily; for example, the occupations skewed towards younger age groups such as for service station attendants and newsboys, or to older age groups such as

(5) Excluding the Armed Forces.

(6) The figures on age, growth, attrition, proportion of immigrants and proportion of females are given in Appendix Table A.

for managers and farmers. The 1985 distributions, however, show a major concentration of employment (about 40 percent for both males and females) in the 30-39 age group, and to a lesser extent in the 40-44 age group, accompanied by significantly lower proportions for ages 15-24 and to a lesser extent for ages 45 and over. This is a combined result of

- (i) the automatic aging process;
- (ii) not taking account of occupational mobility; and
- (iii) the spreading of all entrants over ages 15-34 which has a distorting effect on the attrition rates of females and neglects entry at older ages by immigrants and females re-entering the labour force.

TABLE 4. Age Distribution for All Occupations: 1971 Census and 1985 COFOR

Age Groups (chosen to highlight differences)	Percentages			
	Males		Females	
	1971 Census	1985 COFOR	1971 Census	1985 COFOR
15-24	22.1	6.9	30.8	11.4
25-29	12.9	11.2	12.3	13.2
30-39	21.3	40.1	17.8	41.1
40-44	10.4	14.0	9.3	12.6
45+	33.4	27.7	29.8	21.5

2. Teenage and Teenage/Older Worker Occupations (Chart 1a)

Certain occupations have employment which is heavily concentrated in the 15-19 age group, for example, half of those employed as service station attendants (CCDO 5145) in 1971 were teenagers. The COFOR estimates show only 5 percent of the employed as teenagers in 1985, with the concentration switched

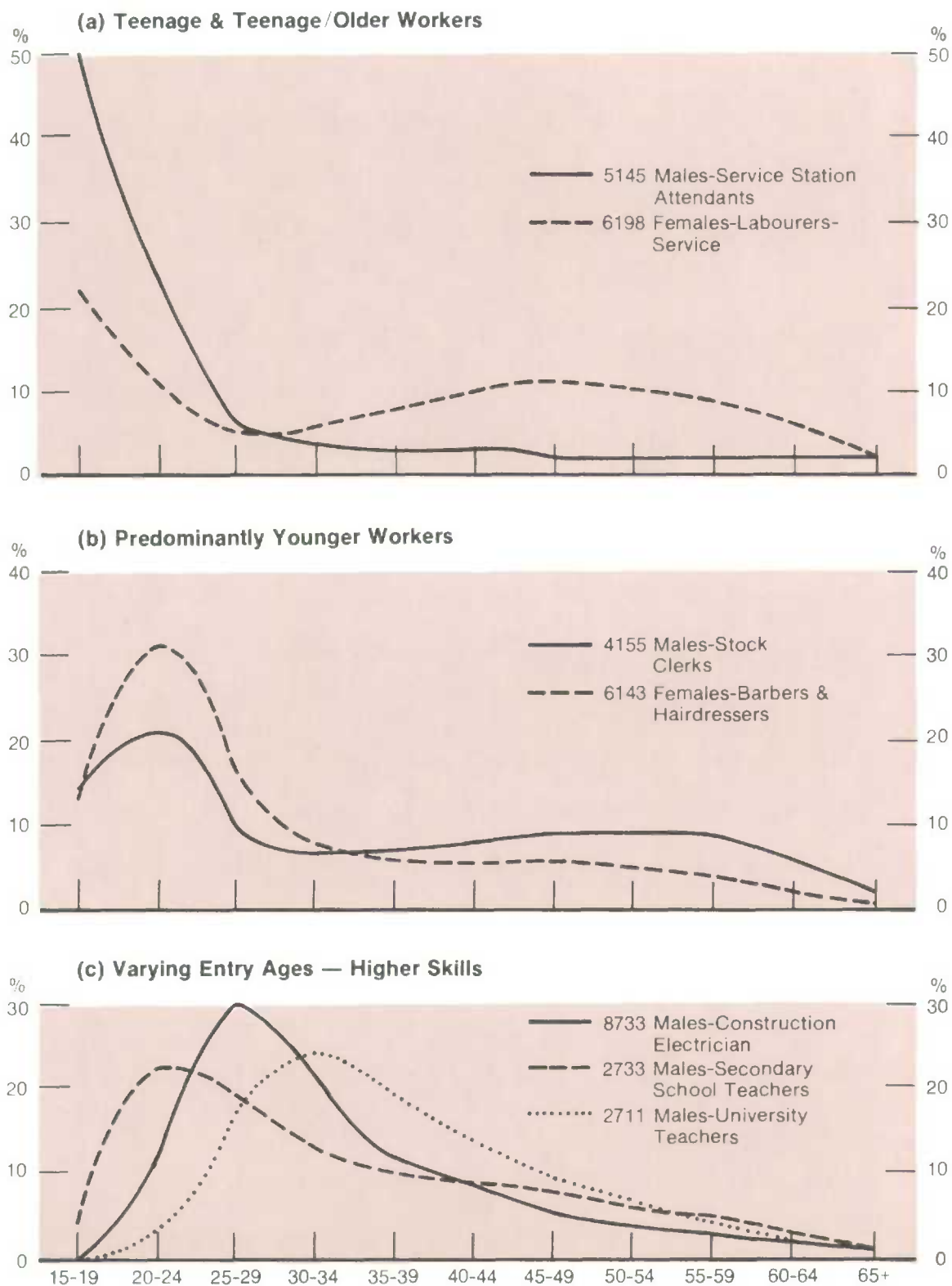
to the 30-34 age group. These occupations are generally low skill and many of those employed may be working on a part-time or part-year basis. Teenagers are likely to move to entirely different occupations on a permanent basis later. Some of the teenage occupations, for example, newsboys, represent an extreme example of inter-occupational mobility where one hundred percent of the people employed will move to other more permanent occupations within a short period of time.

The concentration of older workers in some of these usually low skill occupations may be a result of persons whose skills are redundant or who have never acquired a skill. A high proportion in this illustrative group, Labourers in the Service Industries (CCDO 6198), are immigrants who may have entered the country as dependants. They may lack labour force skills and may also not be fluent in either of the official languages. This particular occupational group includes occupations such as laundry workers, kitchen helpers and bus boys.

3. Predominantly Younger Workers (Chart 1b)

These occupations are relatively low skill or provide for entry at low skill levels and training or learning on the job. The concentration of employment is in the teenage and 20-24 age groups. Females in the Barbers and Hairdressers occupational groups (CCDO 6143) have relatively few older persons, 30 percent aged 35 or more compared with a 49 percent average for all females. Males in this occupational group do not have a similar

Chart — 1
Occupational Distribution by Age Group



Source: 1971 Census

age distribution. Almost 38 percent of males in this occupational group are immigrants and the median age is 37 years for males compared with 27 years for females. About 13 percent of the males are aged 60 or more compared with an average of just over 8 percent, and only about 15 percent are under age 25 compared with the average for all males of 22 percent.

Males in the Stock Clerks occupational group (CCDO 4155) have a concentration in the younger age groups, and slightly above average proportions for those aged 50 or over. This is probably an occupation which provides entry into more highly skilled clerical and other occupations.

4. Varying Entry Ages - Higher Skills (Chart 1c)

The occupations shown here illustrate the varying entry ages for some of the higher skill occupational groups. For Construction Electricians (CCDO 8733) the entry age is generally 20-24 and this group also includes younger persons because of the inclusion of apprentices. Secondary school teachers (CCDO 2733), most of whom require university degrees, are concentrated in the 25-29 age group, with some aged 20-24. University teachers (CCDO 2711), most of whom require at least M.A. and usually a Ph.D., are concentrated in the age group 25-34, with only 3 percent aged less than 25; the latter are probably university students employed as part-time teaching assistants.

Although the age distribution of an occupation will be affected by the growth of employment in previous years, replacements are always required because of attrition and therefore the pattern of age distribution for the younger ages will tend to reflect the age of entry. Since entry ages for university teachers range up to 34, the standard COFOR calculation allocating entrants over the age range 15-34 may be a reasonably good approximation in this case, although there may be some occupational mobility at ages older than this with entrants from other occupations. For most other occupations the 15-34 age range is either too broad, that is, entry ages are at the lower end of this range, or too low in occupations which rely on upward occupational mobility for their labour supply.

5. Predominantly Older Workers (Chart 2a)

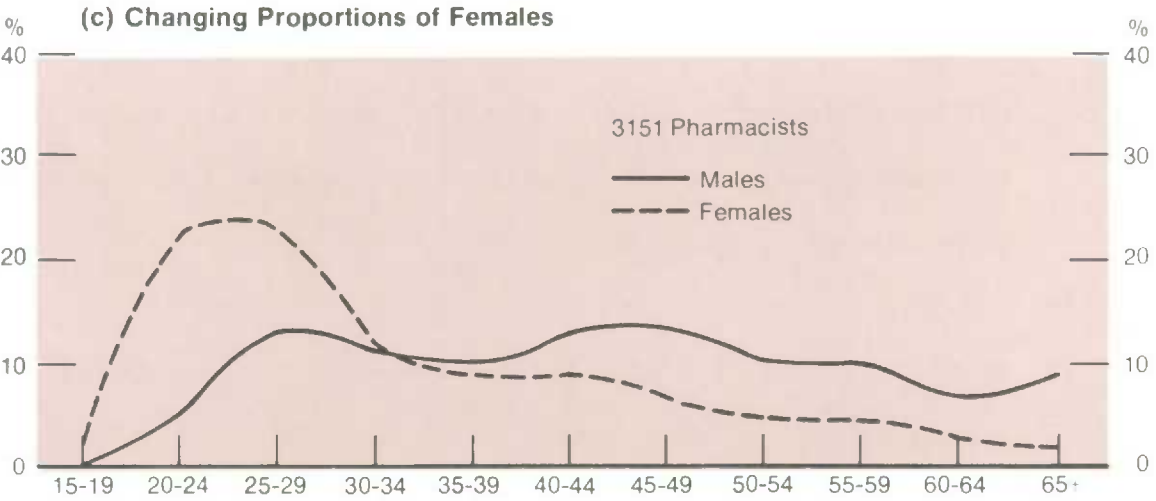
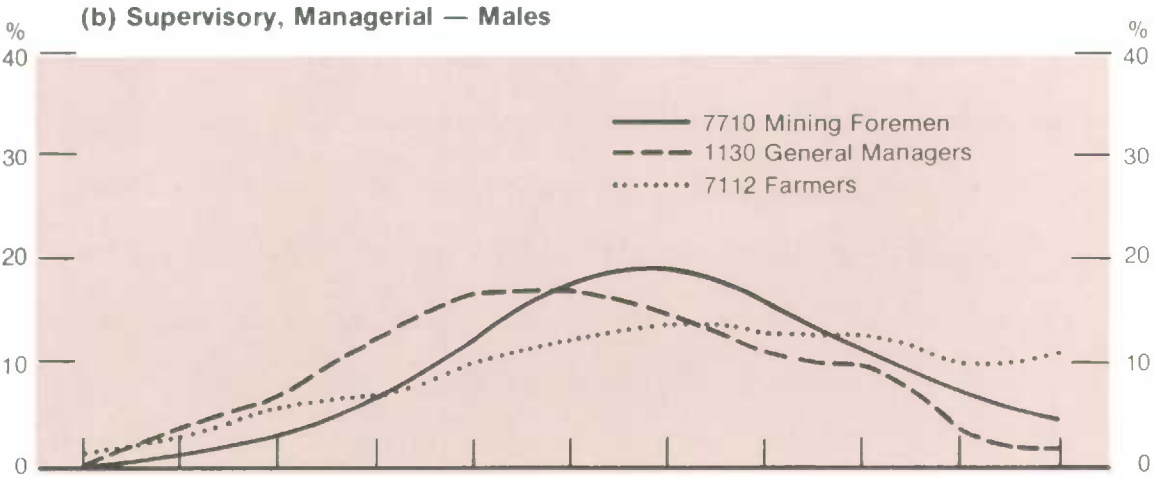
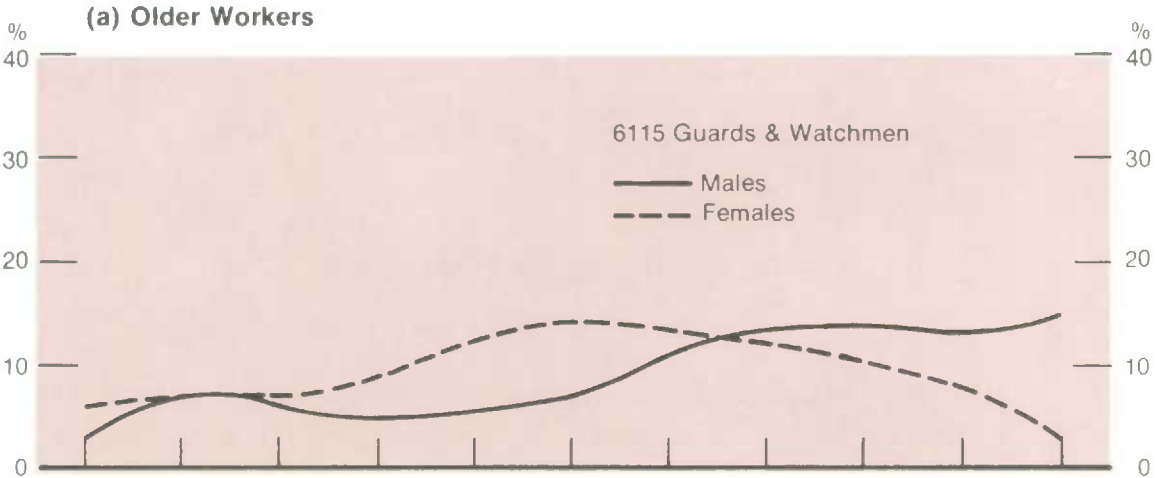
These are lower skilled occupations which had a heavy concentration of older workers in 1971, and median ages were well above the average. For the occupational grouping Guards and Watchmen (CCDO 6115) only 16 percent of males were aged less than 30 compared with a 35 percent average; for females 20 percent were under 30 compared with 43 percent on average. Males are also more heavily concentrated in the older age groups, with 42 percent aged 55 or over compared with an average of about 15 percent. In all of the occupations which were analysed for this report, the concentration for females occurs at ages about ten years younger than for the males.

There is very little evidence to ascertain whether the employees have remained in these occupations because of a lack of education/training while young, or whether an unknown proportion may have entered the occupations because of structural adjustment resulting in a loss of skill and lack of retraining opportunities. In some cases, the positions may be occupied by immigrants, including wives originally not destined for the labour force who may be entering the labour force with few skills and/or with minimal knowledge of either of the two official languages. In the occupation illustrated here it is known that the entry age is relatively high, because of practices such as the use of veterans as security guards. Under the current method of calculating entry to an occupation, the COFOR estimates show a heavy concentration of workers in younger age groups in 1985 since these occupations have high attrition rates due to the concentration of older workers, and many of them also are projected to show average employment growth.

6. Supervisory and Managerial Occupations (Chart 2b)

These occupations will invariably be filled by inter-occupational mobility as persons become more skilled in their chosen occupations and progress up the skill ladder to more senior positions. Farmers are also shown here although many of those becoming farmers (that is, generally self-employed) do so through inheritance of farms rather than through promotion up a skill ladder.

Chart — 2
Occupational Distribution by Age Group



Source: 1971 Census

The concentration of employment is among the older groups and entry will also be at ages generally above 35. However, the COFOR 1985 estimates result in a shift to younger ages because of the allocation of entrants over the 15-34 age group.

7. Changing Proportions of Females (Chart 2c)

In 1971 there was a heavy concentration of younger females in the occupational group for Pharmacists (CCDO 3151), reflecting the trend for more females to enter this occupation. The COFOR allocation of entrants in proportion to the 1971 age/sex distribution for ages 15-34 will tend to dampen the effect of this change which is concentrated in the younger age groups. Females as a proportion of the total employment for each age group represent 62 percent of those aged 15-19; 60 percent of those aged 20-24; 35 percent of those aged 25-29 and only 24 percent of the 30-34 age group.

The concentration of males at older ages probably represents many persons who are in management/store ownership positions but continue to consider themselves as pharmacists because of regulations regarding the presence of qualified pharmacists in drug stores.

C. THE PROBLEMS AND POSSIBLE SOLUTIONS

The above analysis has considered certain general occupational age distributions and the effects on them when a standard labour

force entrant procedure is used for projections over time. As noted in previous sections, the age of entry into an occupation in the COFOR model is assumed to be between 15 and 34 years of age, with the proportions assigned to individual years of age and to males and females on the basis of 1971 data. This section will identify the problems encountered with such an entry allocation mechanism and suggest ways in which some of the associated problems might be overcome.

1. Age of Entry Into an Occupation

The age of entry into different occupations varies considerably according to the type of occupation. Entry into certain occupations is invariably through inter-occupational mobility, (for example, managers), while attrition from certain occupations may be obvious (for example, service station attendants). For other occupations the identification of entry age may be impossible (for example, guards and watchmen), and one cannot identify whether these people remain in their jobs, enter from other occupations or are the result of re-entry to the labour force or immigration.

Initial entry into the labour force can be illustrated by participation rates, although the extent of offsetting movements into and out of the labour force cannot be determined. The peak participation rate for females is reached by age 20-21 (70 percent) after which there is a fairly rapid decline to age 34 (52 percent), followed by a slight increase over the years to

age 42 (54 percent) and then a fairly steep decline over the older years.

The participation rate for males is very high by age 20 (81 percent) but continues to increase at a decreased rate to age 25 (91 percent) and finally reaches the peak rate by ages 32-34 at 93.5 percent. For ages 25-50 the rate is virtually unchanged. Census data (that is, the benchmark year) may show more younger people in the labour force since there is a seasonal increase in their participation rates in June when the census is taken. Many of the younger people who are employed may still be in the educational system and not in a permanent occupation.

These participation rates indicate that a person's initial entry to the labour force is most likely to occur between the ages of 15-24, although the initial entry occupation may not be permanent. The female participation rate reaches its peak of 70 percent at ages 20-21 and that of males is at 91 percent by age 25. Inter-occupational mobility is likely to be very high during these years as young people try a number of relatively low skill, temporary and part-time jobs.

Future development to refine the COFOR estimates would focus on varying the labour force entrant age by occupation, making it 15-19 for some, 15-24 for others and 20-30 for others. Certain occupations such as newsboys, service station attendants and managers may have to be dealt with individually

to account for occupational change at different ages. An associated difficulty with this would be their allocation to or from various occupations. There are very few obvious transfer groups; one is Nurses in Training (CCDO 3133) to Graduate Nurses (CCDO 3131).

The allocation of immigrants presents another problem since the entry age may be significantly higher than the 15-24 age range which accounts for the bulk of labour force "first time" entrants. Rough estimates show that male immigrants destined for the labour force had a significantly different age distribution from the COFOR allocation to the 15-34 age groups, with 28 percent of immigrants in the 15-24 age group compared with 48 percent for COFOR and 24 percent of immigrants aged 35 and over, an age group to which no entrants are allocated under the COFOR method (Table 5).

TABLE 5. Age Distribution of Male Immigrants and COFOR Labour Force Entrants

Age Groups	Percentages	
	Estimated Male Immigrants Destined for the Labour Force*	COFOR Entrants: 1971 Census Distribution of Employed Aged 15-34
15-19	7	17
20-24	21	31
25-29	28	28
30-34	19	24
35+	24	nil
TOTAL	100	100

* Source: Employment and Immigration Canada. A crude estimate from published data which do not show the age distribution except for total immigrants.

There is a heavy concentration of immigrants in some occupations and perhaps immigration data could be used to make an assessment of their entry over a wider range of ages than the COFOR allocation. Individual occupations would have to be considered since the age distribution of immigrants will vary by occupation(7). However, it is not entirely clear how one would allocate immigrants' dependants such as females who enter Canada as "spouses" and subsequently join the labour force. Some data on this could be extracted from past or future longitudinal studies of various immigrant groups.

An attempt should be made to solve at least some of these problems for some occupations; the age distribution at entry has a major effect on attrition rates for future years and the attrition rates are an integral part of the estimates of gross requirements, indicating the possible concentration of future training needs.

2. Females in the Labour Force

The participation rate for females reaches a peak at ages 20-21 and shows a fairly steady decline between these ages and age 30. However, from the "age of entry" analysis, and using common sense, it is known that many of the females entering higher skilled occupations will be entering these occupations between the ages of 20-24, either from outside the labour force

(7) Analysis of some of the skilled trades is already under way with the extraction of data on intended occupation and age of each immigrant.

or from a previous "teenage" part-time occupation while still in the educational system. There must be major occupational shifts between the ages 20-30 for females since higher skilled entrants are more than offset by the withdrawal from the labour force of a high proportion of female workers (including some higher skilled workers) with a net result of a major drop in the participation rate between these ages.

Allocation of labour force entrants over the 15-34 age range will tend to dampen the drop in the participation rates; for example, if the entry age for an occupation is in the age group 15-19, allocation over ages 15-34 spreads entrants into age groups which have already had a major decline in the participation rate. This will have a significant effect on the attrition rates for females and consequently on the gross requirements for many occupations.

It might be possible to vary the application of female participation rates by groups of occupations to reflect the entry of higher skilled workers, so that the rapidly declining participation rates would be applied to occupations more likely to be the ones accounting for much of the labour force withdrawal. Participation rates by education levels are available and these could be applied to groups of occupations for which varying levels of education are required. This could be used as a proxy for the variation of participation rates by occupation.

3. Labour Force Entry by Older Workers

(a) Females

The COFOR model assumes there is no attrition when there are increases in labour force participation rates, that is, no allowances are made for the re-entry of women into the labour force which results in the increase in the participation rate for females aged 30-44. There are no data available which would permit identification of the occupational groups into which these women go. It could be assumed that many of them enter the low-skilled occupations, but many others may enter with varying skill levels. This is an area where more information is required since a significant proportion of the re-entrants may require either skill upgrading or re-training in order to obtain suitable employment.

(b) Immigrants

As shown previously, the entry of immigrants into the labour force covers a wide range of ages. Some information on this could be extracted from intended occupation/age data for immigrants destined for the labour force; this is already being done for some of the skilled trades. However, it would not be possible to identify immigrant spouses and dependants who may subsequently join the labour force, but do not indicate an intended occupation.

4. Proportions of Females by Occupation

In occupations where the proportion of females is increasing the change may be dampened when new entrants are spread over the 15-34 age groups, for example, Pharmacists (CCDO 3151). In other occupations the age/sex distribution may be skewed towards an older entry or a mixed young/old entry which will be distorted by the use of a standard entry age. For example, Farm Workers (CCDO 7182) where the median age is 20 for males, and 42 for females; the occupational grouping, Labourers, Service Sector (CCDO 6198), shows a similar male/female age difference.

It is also interesting to note that the model in its present form results in 1985 employment which not only shows a major difference from the estimated age distribution of the labour force, but indicates an overall shortage of workers, even with zero unemployment. This labour force estimate assumes no immigration and is therefore likely to be too low. The overall shortage is estimated at about 411,000 workers, but this represents a shortage of 845,000 males and a surplus of 434,400 females. Many occupations are predominantly male or female and future employment opportunities will be affected by the differing rates of expansion of the male or female occupations, as well as by the expansion rates of occupations in which both males and females are employed.

This estimate, showing a male shortage and a surplus of females, could partly be the result of the way entrants are

are treated, that is, re-entry of females is not explicitly dealt with; occupations in which there are increasing numbers of females, for example, pharmacists, may have the effect of increasing proportions of females being dampened by the use of ages 15-34 for entrant allocation.

However, it still appears likely that unless increasing numbers of females enter the "male" occupations their unemployment situation will worsen; this is because many of the traditionally female occupations are projected to have a slow growth, and others are beginning to be affected by the spread of technological change into the clerical and service sectors. The problems may be even greater for highly educated females because of their heavy concentration in the very slow growth occupations/industries of teaching and public service. It is also likely that the participation rates for females will increase up to 1985; this will result in the numbers in the labour force being higher than indicated by the estimates based on the 1976 participation rates.

D. Conclusion

A much more comprehensive analysis of occupations by age and other characteristics is needed in order to improve the basic methodology underpinning occupational forecasting. Attrition rates are an important element of the gross requirements for an occupation, and changes will therefore affect estimates of the number of entrants needed to replace deaths and withdrawals from the labour

force(8). In turn, gross requirements data are required to determine the longer term focus of training requirements, including CEIC (Employment and Immigration Canada) financed training; improvement in the accuracy of gross requirements data is important for departmental policies.

Analysis of the various entry ages for different occupations will provide information which can be used to allocate entrants over the appropriate age range for each occupation. This will result in higher attrition rates for females because, for the majority of occupations, the entry ages will be concentrated at ages well below 34, and the stock of entrants will then be adjusted downwards because of the drop in female participation rates between the ages of 21 and 30. There will also be higher attrition rates for occupations where there is a concentration of women re-entering the labour force at older age levels.

In addition to this, occupations can be classified according to their approximate education levels and female participation rates by education can be used in order to take account of the fact that many women must be entering occupations at ages when the average female participation rate is falling. This process will also result in much higher attrition from many occupations.

(8) It should be noted that the totals for each occupation are determined by projections of industry employment and will not be altered by any change in estimates of labour force entry ages.

Some estimates can also be made to allow for the fact that immigrants will be entering occupations after having worked in their own countries. This information can be obtained for immigrants destined for the labour force, and rough estimates could be made for the entry of dependants. Since these immigrants will be entering the Canadian labour force at ages higher than the average for the occupation, this older age distribution will lead to higher attrition rates.

Data are needed for occupational mobility in order to adjust the entry/exit patterns by occupation. This will also provide more information on requirements for the entry level jobs as distinct from jobs which are obtained after experience/learning on the job. Adjustment for this will result in much higher attrition levels due to exit from teenage and lower level jobs. Entry at older ages for the occupations requiring more experience will also increase attrition due to deaths and participation rate declines in these occupations.

Data on re-entry occupations for females who have spent a few years out of the labour force would also be needed in order to allocate entrants at older ages for these occupations.

Until further analysis is done it is not possible to identify what effect variation of entry age by occupation and adjustment for some inter-occupational mobility will have on the totals, although we do know that all the adjustments will result in higher attrition

and therefore increases in gross requirements. Data on inter-occupational mobility are needed to produce a viable model, and we are pleased to note that Statistics Canada may be able to provide us with some information on this at a later date. Occupational change data can also be extracted from CEIC files if there is an intervening period on unemployment insurance.

APPENDIX TABLE A. Some Characteristics of the Occupational Groups

Occupational Group (including CCDO code)	1971 Median Age		1978-1985 (percent)		1971: Percentage		
	Males	Females	Growth	Attrition	Females	Male Immigrants *	Female Immigrants #
All Occupations	37	34	20.6	16.1	34.3	20.3	20.0
1130 General Managers	48	49	17.2	40.3	3.7	26.3	26.0
1133 Administrators, Teaching	40	47	2.7	35.0	20.6	12.5	8.8
2711 University Teachers	37	36	1.3	9.6	16.7	47.9	42.0
2731 Elementary School Teachers	29	30	1.6	16.2	82.3	16.8	11.7
3131 Nurses	31	31	24.0	18.2	95.8	28.3	19.1
3151 Pharmacists	44	31	16.6	19.6	23.1	11.1	20.5
4111 Secretaries	41	29	23.1	20.6	97.4	15.6	16.1
5145 Service Station Attendants	20	23	24.7	6.1	4.3	8.4	10.2
6115 Guards and Watchmen	52	43	27.9	28.1	7.1	19.7	13.9
6143 Barbers and Hairdressers	37	27	37.8	19.2	63.2	40.3	23.9
6191 Janitors and Cleaners	48	45	21.4	23.6	32.4	29.6	37.8
6198 Labourers, Services	22	39	29.5	16.1	47.0	29.8	32.9
7112 Farmers	49	52	- 4.6	24.8	3.3	15.0	25.5
7182 Farm Workers	20	42	1.5	13.0	46.2	8.5	16.3
7710 Mining Foremen	43	-	40.4	14.0	-	14.3	-
8563 Sewing Machine Operators	37	37	11.5	19.7	90.1	52.4	51.5
8733 Construction Electricians	32	(35)	25.9	8.7	(0.4)	20.8	(27.1)
8781 Carpenters	43	(37)	23.4	18.0	(0.5)	27.0	(35.5)

* As a percentage of total males.

As a percentage of total females.

Source: 1971 Census and Employment and Immigration Canada.

PAPER 6

THE EFFECT OF CHANGING AGE AND SEX COMPOSITION OF THE LABOUR FORCE ON
THE UNEMPLOYMENT RATE IN CANADA: RECENT TRENDS AND FUTURE PROSPECTS*

by

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Statistics CanadaIntroduction

Despite strong economic expansion since the 1960s, the Canadian unemployment rate has remained higher than that in most, if not in all, of the industrialized countries(1)(2). The unemployment rate stayed above the 5 percent mark at all times during the 1970s. In 1978 the rate was 8.4 percent, surpassing the levels reached during periods of relative economic stagnation in the late 1950s and early 1960s.

In Canada, as elsewhere in the developed world, causes of the recent increase in the unemployment rate are not yet fully understood. In spite of the sustained interest of social scientists in this subject, a central issue still remains unresolved: how much of the increase in the unemployment rate is attributable to changes in demographic conditions and how much is due to economic policies, social change,

(*) An earlier version of this paper was presented at the Annual Meeting of the Canadian Population Society, June 1980, Montreal. I am grateful to Ian Macredie, Frank Millerd, George Mori, Douglas Norris and Jenny Podoluk for comments on that paper, and to Claude Dufresne for computer programming.

(1) Economic Council of Canada, People and Jobs: A Study of the Canadian Labour Market, 1976, (Information Canada, Ottawa), pp. 59-62.

(2) O.E.C.D. Canada, OECD Economic Surveys, 1978, (Paris).

industrial and technological factors(3)(4). This paper examines only the demographic part of the issue, and does not claim, therefore, to resolve the controversy over the complex interaction between social, economic and demographic factors. An attempt is made to provide some measure of the contribution of the changes in the demographic composition of the labour force to the unemployment rate in the late 1960s and the 1970s. The analysis is primarily based on the data from the Labour Force Surveys of Statistics Canada for the period 1966-78.

It is known that certain demographic groups, characterized by a higher than average unemployment rate, could over time constitute increasing proportions of the labour force, and other things being equal, could produce an increase in the overall unemployment rate. Thus increasing unemployment in the industrialized countries has been

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- (3) Antos, Joseph, Wesley Mellow, and Jack E. Triplett, 'What is the current equivalent to unemployment rates of the past?', Monthly Labour Review, 102, 1979, pp. 36-47.
- (4) Cain, Glen C., 'The unemployment rate as an economic indicator', Monthly Labour Review, 102, 1979, pp. 24-35.
- (5) Gallaway, Lowell E. and Zachary Dyckman, The full employment-unemployment rate: 1953-1980, Journal of Human Resources, 5, 1970, pp. 487-510.
- (6) Perry, George L., Changing labor market and inflation, Brookings Papers on Economic Activity, 3, 1970, pp. 411-447.
- (7) Economic Council, 1976, loc.cit., pp. 75-77.
- (8) Wachter, Michael L., The Demographic Impact on Unemployment: Past Experience and Outlook for the Future. Demographic Trends and Full Employment. Special Report No. 12, Washington, D.C., National Commission for Manpower Policy, 1976, pp. 27-29.
- (9) Easterlin, Richard A., What will 1984 be like? Socio-economic implications of recent twists in age structure, Demography, 15, 1978, pp. 397-421.

interpreted as a trend associated with the changing demographic composition of the labour force(5)(6)(7)(8)(9)(10)(11)(12)(13)(14). The major factors responsible for this phenomenon are the "baby boom" and other socio-economic factors related to the influx of youths and women into the labour force.

Like most industrialized countries, Canada experienced an unprecedented increase in its birth rate immediately after World War II. The crude rate rose from 20.1 per 1000 population in 1937 to 28.7 per 1000 population in 1947, remained around 27-28 between 1946 and 1957, and then started to decline(15). The relatively large number of children born during the so-called baby-boom period matured in the 1960s and 1970s. The coming of age of the baby-boom cohort coincided with the dramatic increase of women in the labour force. Canada showed an increase in the women's labour force participation rate from 30 percent in 1961 to 40 percent in 1971 and to 45 percent in 1976(16).

(10) Easterlin, Richard A., Michael L. Wachter, and Susan M. Wachter, Demographic influence on economic stability: the United States experience, Population and Development Review, 4, 1978, pp. 1-21.

(11) O.E.C.D., Youth Unemployment, 1978, (Paris).

(12) Bowers, Norman, Young and marginal: an overview of youth unemployment, Monthly Labor Review, 102, 1979, pp. 4-18.

(13) Clogg, Clifford C., Measuring Underemployment: Demographic Indicators for the United States, (Academic Press, New York), 1979, pp. 45-76.

(14) Flaim, Paul O., The effects of demographic changes on the nation's unemployment rate, Monthly Labour Review, 102, 1979, pp. 13-23.

(15) Statistics Canada, Vital Statistics, 1978, Catalogue 84-204 Annual, Ottawa.

(16) Ashagrie, K. and Leeroy Murray, Canada's Female Labour Force, 1980, Catalogue 98-804E, Statistics Canada, Ottawa.

Thus it appears that the increasing number of youths and women in the labour force was a direct consequence of the baby boom and other socio-economic changes, rather than of any specific labour force demand. It also appears that the recent increase in the Canadian unemployment rate is largely a function of the crowding of youths and women in the labour force at a time when there was a slackening of economic conditions.

Data Source

This analysis uses the Revised Labour Force Survey data of Statistics Canada for the period of 1966-1978. The survey which is carried out monthly includes a sample of about 56,000 households across the country. (Prior to January 1976, approximately 35,000 households were included in the sample.) The sample has been designed to represent all persons in the population 15 years of age and over residing in Canada, with the exception of residents of the Yukon and the Northwest Territories, persons living on Indian reserves, inmates of institutions and full-time members of the armed forces(17)(18). It is to be noted that beginning in January 1976, substantial revisions to the Labour Force Survey were introduced. For example, the revised survey covers the population 14 years and over(17)(19).

(17) Statistics Canada, Methodology of the Canadian Labour Force Survey, Catalogue 71-526, 1976, Ottawa.

(18) Statistics Canada, Guide to Labour Force Survey Data, Catalogue 71-528 Occasional, 1979, Ottawa.

(19) MacDonald, Bruce, Conceptual, definitional and methodological changes in the Labour Force Survey, Research Papers No. 3, 1977, Labour Force Survey Division, Statistics Canada, Ottawa.

However, comparable sets of data using the revised survey as the standard are published for the period 1966-1978(20). The data refer to the specific week covered by the survey each month, normally the week containing the 15th day. The labour force is composed of that portion of the population covered who, during the reference week, were employed or unemployed.

The employed includes all persons who, during the reference week;

- (i) did any work at all; and
- (ii) had a job but were not at work due to illness, vacation, etc.

The unemployed includes those persons who, during the reference week;

- (i) were without work, had actively looked for work in the past four weeks (ending with the reference week), and were available for work;
- (ii) had not actively looked for work in the past four weeks but had been on layoff for twenty-six weeks or less and expected to return to work; and
- (iii) had not actively looked for work in the past four weeks but had a new job to start in four weeks or less from reference week, and were available for work(17).

The unemployment rate refers to the number of unemployed persons as a percentage of the labour force.

(20) Statistics Canada, Historical Labour Force Statistics - Actual Data, Seasonally Adjusted Data, Catalogue 71-201 Annual, 1979, Ottawa.

This paper uses the published annual averages of the labour force and unemployment data by age and sex. Although data were not available by five-year age groups, they were sufficient to examine the issue in a reasonable manner(21).

Some Recent Unemployment Trends

Several important demographic features of the Canadian unemployment rate can be ascertained from Table 1.

First, although there was an overall increase in the unemployment rate for all demographic groups, the patterns varied markedly by age and sex. For example, between 1966 and 1978, while the overall rate increased by 5 percentage points, males experienced only a 4.3 point increase and females experienced a 6.2 point increase. There was about a 3.5 percentage point increase in the rate for persons 25 years and over as compared with about an 8 point increase for young adults (20-24 years old) and about a 10 point increase for teenagers (15-19 years old)(22).

(21) For 1966-69, the "revised" data were available for age group 15-24 years rather than 15-19 years and 20-24 years, separately. Figures for these age groups were obtained by applying the weights from the original surveys to the revised totals for the age group 15-24. I am thankful to Bruce MacDonald of the Economic Characteristics Staff, Statistics Canada for suggesting this procedure.

(22) For conceptual as well as practical reasons, the male and female labour force has been divided into three age groups: teenagers (15-19 years), young-adults (20-24 years) and persons 25 years and over. It is well known that these three groups tend to behave differently in the labour market. Moreover, the time-series data were not available for refined age groups. The nomenclature of these age groups is for the sake of convenience only. The term "youths" refers to both teenagers as well as young adults.

Table 1. Unemployment Rate by Age and Sex, Canada

Sex and Age Group	Percentages												
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
<u>Male</u>													
15-19	8.6	10.1	11.8	11.4	15.1	16.3	15.3	12.6	12.1	15.4	16.3	18.1	18.5
20-24	4.7	5.4	6.8	6.6	8.8	9.3	9.6	8.2	7.7	10.5	11.1	12.6	12.7
25+	2.6	3.0	3.5	3.2	4.1	4.3	4.1	3.4	3.3	4.3	4.2	4.9	5.2
Total	3.3	3.9	4.6	4.3	5.6	6.0	5.8	4.9	4.8	6.2	6.3	7.3	7.6
<u>Female</u>													
15-19	7.3	8.1	9.1	10.1	12.5	13.6	12.4	11.7	10.9	14.4	15.1	16.7	17.2
20-24	2.8	3.4	4.5	4.1	5.8	7.1	7.4	7.3	7.4	9.1	9.8	11.7	11.5
25+	2.7	2.8	3.3	3.7	4.4	5.0	5.7	5.4	5.1	6.5	6.6	7.4	7.7
Total	3.4	3.7	4.4	4.7	5.8	6.6	7.0	6.7	6.4	8.1	8.4	9.4	9.6
<u>Both Sexes</u>													
15-19	8.0	9.2	10.6	10.8	13.9	15.1	14.0	12.2	11.6	14.9	15.7	17.5	17.9
20-24	3.9	4.6	5.8	5.5	7.5	8.4	8.7	7.8	7.6	9.9	10.5	12.2	12.2
25+	2.6	2.9	3.4	3.4	4.2	4.5	4.6	4.1	3.9	5.0	5.1	5.8	6.1
Total	3.4	3.8	4.5	4.4	5.7	6.2	6.2	5.5	5.3	6.9	7.1	8.1	8.4

Source: Statistics Canada, 1978, Catalogue 71-201 Annual. (See also footnote (1).)

Second, the unemployment rates have been consistently higher for youths (15-24 years old) than for other age groups, and the gaps between them have been widening in recent years. In the case of males, for example, the difference between the rates for teenagers and that for persons 25 years and over increased from 6 percentage points in 1966 to 13.3 percentage points in 1978. The corresponding increase for females was from 4.6 points to 9.5 points.

Third, the gaps between the overall rates for males and females have widened. This seems to have happened due to two factors: the sex difference in the unemployment rate for youths has narrowed, leaving the female rate to be only slightly lower than the male rate; the gap between the rate for males 25 years and over and that for females 25 years and over has increased from almost nothing to 2.5 percentage points.

It is clear that, although there has been a general worsening of the employment situation since the mid-1960s, the situations of certain groups have deteriorated more than others. Table 2 further supports this observation. The ratios of group unemployment rates to the unemployment rate for males 25 years and over are presented in the form of an index so that the relative positions for various groups could be compared(23). It is clear from this table that relative to males

(23) The index of the relative unemployment rate (RU) was computed as follows (see (6)):

$$RU = \left(\frac{U_{it}}{U_t} \right) / \left(\frac{U_{i66}}{U_{66}} \right) \times 100$$

where U_{it} refers to the unemployment rate for the demographic group i for year t , and U_t refers to the unemployment rate for males 25 years and over for year t .

Table 2. Index of the Relative Unemployment Rate by Age and Sex, Canada, 1966-1978

(Males 25+ = 100)

Year	Male				Female				Total
	15-19	20-24	25+	15+	15-19	20-24	25+	15+	
1966	100	100	100	100	100	100	100	100	100
1967	102	99	100	102	96	105	89	94	97
1968	102	107	100	103	93	119	90	96	98
1969	108	114	100	106	112	119	112	112	105
1970	111	119	100	108	109	131	103	108	106
1971	115	119	100	110	112	153	112	117	110
1972	113	129	100	111	107	167	134	130	115
1973	112	133	100	113	122	199	153	150	124
1974	111	129	100	114	117	207	149	148	123
1975	108	135	100	113	119	196	145	144	122
1976	117	146	100	118	128	216	151	153	129
1977	111	142	100	117	121	221	145	147	126
1978	108	135	100	115	118	205	142	141	124

Source: Derived from Table 1. (See footnote (3).)

25 years and over, females in general, and young adults in particular, have experienced an aggravated unemployment situation. Surprisingly, however, the relative position of teenagers has deteriorated only slightly.

Demographic Contributions to the Unemployment Rate

How well can the rise in the unemployment rate be explained by the influx of youths and women in the labour force? Some preliminary answers to this question can be found in Table 3. The unemployment rate increased for the groups which showed a high increase as well as for the groups which showed little or no increase in their proportion of the labour force. For example, between 1966 and 1978, when the unemployment rate for women aged 25 years and over increased by 5 points (from 2.7 percent to 7.7 percent), their proportion in the labour force increased 6 points (from 20.8 percent to 26.7 percent). However, during the same period, when the unemployment rate for teenagers increased by 10 points (from 8 percent to 18 percent), their share in the labour force increased by only one point (from about 10 percent to about 11 percent). Similarly in the case of young adults, about an 8 percentage point increase in the unemployment rate was accompanied by less than a 2 percentage point increase in their share of the labour force. Even here, there was a twofold increase in the unemployment rate, from 2.6 percent in 1966 to 5.2 percent in 1978, for males 25 years and over who experienced about an 8 percentage point decline in the proportion of the labour force.

Table 3 . Labour Force Composition by Age and Sex, Canada, 1966-1978

Year	Percentages								Total
	Male				Female				
	15-19	20-24	25+	15+	15-19	20-24	25+	15+	
1966	5.44	8.23	55.01	66.69	4.74	5.74	20.83	31.31	100.00
1967	5.40	8.42	54.00	69.92	4.76	5.99	21.34	32.08	100.00
1968	5.45	8.56	53.33	67.34	4.68	6.37	21.61	32.66	100.00
1969	5.25	8.75	52.70	66.70	4.59	6.63	22.08	33.30	100.00
1970	5.48	8.70	52.18	66.36	4.66	6.54	22.43	33.64	100.00
1971	5.54	8.72	51.34	65.60	4.80	6.74	22.86	34.40	100.00
1972	5.86	8.64	50.65	64.15	4.97	6.63	23.24	34.85	100.00
1973	6.13	8.60	49.66	64.39	5.18	6.69	23.74	35.61	100.00
1974	6.36	8.68	48.89	63.93	5.39	6.72	23.94	36.07	100.00
1975	6.27	8.62	48.21	63.10	5.29	6.91	24.70	36.90	100.00
1976	6.02	8.66	47.73	62.40	5.20	6.98	25.41	37.60	100.00
1977	6.08	8.67	47.21	61.96	5.07	7.10	25.88	38.04	100.00
1978	5.98	8.65	46.49	61.11	5.05	7.12	26.72	38.89	100.00

Source: As for Table 1.

Thus the relation between the excess supply of labour and the unemployment rate seems to hold only for women. In spite of a very low increase in their share of the labour force, youths experienced a high increase in their unemployment rate.

In the above analysis, any clear inferences about the relative contributions of demographic and other factors responsible for the increase in the unemployment rate would be difficult to establish. The conventional method to examine this is to estimate the rate, using a fixed (standard) composition of the labour force, and to compare it with the observed rate. In this case, age-sex adjusted unemployment rates were calculated for various years using the weights of 1966, the year with the lowest unemployment rate during the period under examination(24).

Table 4 indicates that, if the age and sex composition of the labour force during 1966-78 remained at the 1966 level, the unemployment rate would have been 8.0 instead of 8.4 in 1978. This would imply that during 1966-78, changes in the age and sex composition of the labour force were responsible for increasing the unemployment rate by only 0.4 percentage points, leaving therefore a substantial portion to be explained by other factors.

(24) The adjusted unemployment rate U_t' was calculated using the following formula:

$$U_t' = \frac{\sum_i (U_{it} \cdot L_{i66})}{\sum_i L_{i66}}$$

where, U_{it} refers to the unemployment rate of the i_{th} demographic group for the year t ; and L_{i66} refers to the labour force of the i_{th} demographic group for 1966.

Table 4 . Observed and Adjusted Unemployment Rates by Sex, 1966-1978

Year	Total			Male			Female		
	Observed	Adjusted*	Difference	Observed	Adjusted \emptyset	Difference	Observed	Adjusted \emptyset	Difference
1966	3.36	3.36	.00	3.34	3.34	.00	3.41	3.41	.00
1967	3.82	3.81	.01	3.86	3.85	.01	3.74	3.71	.03
1968	4.50	4.50	.00	4.58	4.55	.03	4.35	4.40	- .05
1969	4.43	4.41	.00	4.32	4.26	.06	4.66	4.74	- .08
1970	5.67	5.64	.03	5.58	5.54	.04	5.84	5.88	- .04
1971	6.19	6.11	.08	5.96	5.85	.11	6.63	6.69	- .06
1972	6.22	6.08	.14	5.81	5.65	.16	6.97	7.03	- .06
1973	5.54	5.33	.21	4.92	4.70	.22	6.66	6.70	- .04
1974	5.34	5.11	.23	4.75	4.52	.23	6.39	6.40	- .01
1975	6.91	6.63	.30	6.21	5.92	.29	8.12	8.17	- .05
1976	7.11	6.76	.35	6.34	5.99	.35	8.39	8.47	- .08
1977	8.11	7.72	.39	7.29	6.87	.42	9.44	9.60	- .16
1978	8.36	7.99	.37	7.55	7.15	.40	9.64	9.83	- .19

* Adjusted using the 1966 age and sex distribution of the labour force as a standard.

\emptyset Adjusted using the 1966 age distribution of the labour force as a standard.

It is interesting to note that the change in the age composition of the labour force influenced the male and the female rate in opposite directions. For example, if the age composition remained at the 1966 level, the male rate in 1978 would have been 7.2 percent instead of 7.6 per cent, whereas the female rate in 1978 would have been 9.8 percent instead of 9.6 percent. Therefore, the changing age composition of the labour force raised the male rate by 0.4 percentage points, but reduced the female rate by 0.2 percentage points. Since most of the increase in the women's labour force has been for the prime-age groups in which women tend to be more committed to work and less susceptible to unemployment, the change in age composition may have decreased their employment rates.

The standardization technique used here does not measure the "pure" effect of change in demographic composition. The effects of changes in the composition of the labour force and changes in the unemployment rates of individual groups are not clearly separated out. Kitagawa's component method has been used frequently to handle such a problem(25). In the present case, for example, where the specific rates and composition are classified by two factors, age and sex, the difference between two unemployment rates (for example, between 1966 and 1978), according to this technique, is separated into two components: one reflecting the difference in the age-sex composition only, and the other reflecting the difference in the age-specific rates only. The first component is further split into three sub-components:

(25) Kitagawa, Evelyn M., Components of a difference between two rates, Journal of the American Statistical Association, 50, 1955, pp. 1168-1194.

- (i) the part which is attributable to the net effect of change in age, independent of sex;
- (ii) the part which is attributable to the net effect of change in sex, independent of age; and
- (iii) the part which is accounted for by differences in age-sex composition but which is not allocated independently to age or sex(26).

The results of Kitagawa's component analysis are shown in Tables 5 and 6. The net effect of the compositional change on the increase in the unemployment rate is too low (0.22 percentage points for 1966-78) to give much credibility to the "influx" hypotheses. The effect of changes in the age composition (net of the sex composition) is 0.13 percentage points and the effect of changes in the sex composition (net of the age composition) is only 0.08 percentage points for the entire period under examination. For any single year, the effect of these two components never exceeded 0.05 percentage points. A very substantial part (4.78 points) of the overall 5 percentage points increase in the unemployment rate was accounted for by the changes in the rate of individual groups.

(26) In the present case where the unemployment rate and the labour force population are cross-classified by two factors, I (age) and J (sex), the following formula was used to calculate the change in the overall unemployment rate ($t_{..}-T_{..}$) between two dates:

$$t_{..}-T_{..} = \sum_i \sum_j \frac{t_{ij} + T_{ij}}{2} \left(\frac{N_{ij}}{n_{..}} - \frac{N_{ij}}{N_{..}} \right) + \sum_i \sum_j \frac{\frac{N_{ij}}{n_{..}} + \frac{N_{ij}}{N_{..}}}{2} \left(t_{ij} - T_{ij} \right)$$

The first component measures changes in IJ - composition, and the second component measures changes in IJ - specific rates only. In the former case, the average rate of two dates has been used as standard, whereas in the latter case, the average IJ composition of the corresponding two dates has been used as standard. For details of the computational procedures see Kitagawa, *ibid.*

Table 5 . Components of Total Increase in the Unemployment Rate, 1966-1978

Period	Total Increase	Increase Due to Change in the Demographic Composition				Increase due to the Change in the Unemployment Rate		
		Total	Age Net of Sex	Sex Net of Age	Age-Sex Jointly	Total	Male	Female
1966-1967	.46	.01	.01	.00	.00	.45	.34	.11
1966-1968	1.14	.01	.01	.00	.00	1.13	.82	.31
1966-1969	1.07	.00	.00	.00	.00	1.07	.64	.43
1966-1970	2.31	.03	.02	.00	.01	2.28	1.47	.81
1966-1971	2.83	.05	.04	.00	.01	2.78	1.70	1.08
1966-1972	2.85	.10	.08	.02	.00	2.75	1.56	1.19
1966-1973	2.18	.14	.10	.03	.01	2.04	0.94	1.10
1966-1974	1.98	.17	.13	.03	.01	1.80	0.80	1.00
1966-1975	3.55	.20	.14	.05	.01	3.35	1.73	1.62
1966-1976	3.75	.20	.13	.06	.01	3.55	1.81	1.74
1966-1977	4.74	.22	.14	.07	.01	4.52	2.39	2.13
1966-1978	5.00	.22	.13	.08	.01	4.78	2.54	2.24

Table 6 . Components of Annual Increase in the Unemployment Rate, 1966-1978

Period	Total Increase	Increase Due to Change in the Demographic Composition				Increase Due to Change in the Unemployment Rate		
		Total	Age Net of Sex	Sex Net of Age	Age-Sex Jointly	Total	Male	Female
1966-1967	.46	.01	.01	.00	.00	.45	.34	.11
1967-1968	.68	.00	- .00	.00	.00	.68	.48	.20
1968-1969	- .07	-.01	- .01	.00	.00	-.06	-.17	.11
1969-1970	1.24	.02	.02	.00	.00	1.22	.82	.40
1970-1971	.52	.03	.02	.00	.00	.49	.23	.26
1971-1972	.02	.04	.04	.01	- .00	-.02	-.13	.11
1972-1973	- .67	.05	.04	.01	.00	-.72	-.61	- .11
1973-1974	- .20	.05	.04	.01	.00	-.25	-.14	- .11
1974-1975	1.58	.00	- .01	.01	.00	1.57	.92	.65
1975-1976	.20	.00	- .03	.01	- .00	.20	.09	.11
1976-1977	.99	.01	.01	.01	- .00	.98	.57	.41
1977-1978	.26	.02	.01	.02	- .00	.24	.15	.09

It seems clear, then, that the unemployment rate increased not because the relative size of the demographic groups with high unemployment had grown, but because the unemployment rate for them increased over time.

The findings are not completely new. By adjusting for age, sex, region and industry, Denton et al. found that the combined effect of all changes had raised the Canadian unemployment rate by about half a percentage point over the 1953-73 period and only by about one or two-tenths of a point in the period 1966-73(27). According to various comparable studies, the contribution of demographic factors has been relatively larger for the U.S. unemployment rate than for the Canadian rate (28)(29)(30). Flaim's study which is more revealing than most, showed that the U.S. unemployment rate in 1977 would have been 0.8 percentage points lower, if the age-sex composition of the labour force were at the 1957 level and 0.5 points lower if the composition were at the 1967 level(30). Of course, as various researchers have noted(31)(32), various methodologies may come up with differing

(27) Denton, Frank T., Christine H. Feaver, and A. Leslie Robb, Patterns of Unemployment Behaviour in Canada, Discussion Paper No. 36, 1975, Economic Council of Canada, Ottawa.

(28) Cagan, Phillip, The reduction of inflation and the magnitude of unemployment, in Contemporary Economic Problems, Washington, D.C., American Enterprise Institute for Public Policy Research, 1977, pp. 15-52.

(29) Council of Economic Advisors, Economic Report of the President, 1978, U.S. Government Printing Office, Washington, D.C.

(30) Flaim, Paul O, 1979, loc. cit.

(31) Antos et al, 1976, loc. cit.

(32) Cain, Glen C, 1979, loc. cit.

estimates, but not so different as to reverse one's conclusion that the recent unemployment rates are too high to be explained by the change in the demographic composition of the labour force. In our judgement, this conclusion applies more cogently to Canada than to the United States.

Future Prospects

In popular as well as scientific literature, good employment prospects have been projected for the 1980s. This thinking is based on two interrelated assumptions. First, there will be a gradual movement of the baby-boom cohorts into age groups which experience lower unemployment rates than others. Second, as a consequence of the rapid decline in the birth rate during the 1960s, there will be a reduction in the young population during the 1980s. As a result, the youths of the 1980s will have less competition in the labour force than the youths of today. Flaim, in analyzing the U.S. data, concluded that by the end of the 1980s, "The changes in the structure of the labour force will yield an overall unemployment rate at least half a percentage point lower than it would have been under 1977 conditions. And much of this improvement should come about during the early 1980s"(33).

(33) Flaim, Paul O, 1979, loc. cit. p. 17.

In Table 7 projected unemployment rates are produced for the period 1978-1991, based on two sets of assumptions(34). The first set shows the Canadian unemployment rate as it would be if only the population structure changed but the age and sex structures of the labour force and of unemployment remained at the 1978 level(35); whereas, the second set shows the unemployment rate as it would be if the age and sex structure of the population and labour force changed but the structure of the unemployment rate remained at the 1978 level(36).

- (34) For these projections the unemployment structure by age and sex was assumed to remain constant. Before being misled by this exercise, it must be made clear that projections of the unemployment rate have not been made per se. Rather the unemployment rates have been calculated using the changing age and sex structure of the population and the labour force but retaining the structure of the unemployment at the 1978 level. Thus the projected unemployment (U_t) at time t is calculated as follows:

$$U_t = \frac{\sum_i (U_{i78} \cdot P_{it} \cdot L_{it})}{\sum_i (P_{it} \cdot L_{it})}$$

U_{i78} refers to the unemployment rate of the i th demographic group for 1978; P_{it} refers to the projected population for the i th demographic group for year t ; and L_{it} refers to the projected labour force participation rate for the i th group for year t .

- (35) Following Basavarajappa and George(37), the projected population by age and sex from Series 4 of Statistics Canada Population Projections(38) was used for these calculations. This projection assumed the total fertility rate to be 1.7 per woman, expectation of life at birth to be 70.2 and 78.3 years for males and females, respectively, and an annual net gain from international migration to be 50,000 persons by 1991.
- (36) In order to project the labour force participation rates by age and sex, the participation rates were linearly regressed against time for the period 1966-78. The resulting rates of change were reduced exponentially so that by 2001, the changes will be zero. This was done following the methods used by the U.S. Bureau of Labour Statistics(39). These annual rates of change were used to extrapolate the participation rate up to 1996. (See Appendix Table A). The projected participation rate for each age and sex group was then applied to the corresponding projected populations. These projected labour force populations by age and sex were then applied to the 1978 unemployment rate in order to obtain the projected unemployment rates for selected years.

Table 7 . Projected Unemployment Rates, 1978 to 1991

Percentages

Selected Year	Assumption I*			Assumption II#		
	Total	Male	Female	Total	Male	Female
1978Ø	8.4	7.6	9.6	8.4	7.6	9.6
1981	8.2	7.5	9.5	8.3	7.5	9.5
1986	7.9	7.1	9.2	8.1	7.3	9.2
1991	7.7	6.8	9.0	7.9	7.0	9.0

* Population structure changes but the specific participation rates and unemployment rates remain at the 1978 level.

Population structure and specific participation rates change but specific unemployment rates remain at the 1978 level.

Ø Observed rates.

For the first set of projections it is found that, by 1991, changes in the population structure alone would reduce the unemployment rate to 7.7 percent, 0.7 percentage points lower than the 1978 level. Between 1978 and 1991, the male rate would decline from 7.5 percent to 6.8 percent and the female rate would decline from 9.6 to 9.0 percent. According to the second set of projections, the decline in the unemployment rate during 1978-91 would be of a lesser degree; that is by 1991, the rate would be 7.9 percent, only 0.5 points lower than the 1978 level.

(37) Basavarajappa, K.G. and M.V. George, An analysis of components of change in the labour force participation rate, 1961-1976 and 1976-1991, A paper presented at the Federation of Canadian Demographers Conference held in Montreal, 1979.

(38) Statistics Canada, Population Projections for Canada and the Provinces, 1976-2001, Catalogue 91-520 Occasional, 1980, Ottawa.

(39) Fullerton, Howard and Paul O. Flaim, New Labor Force Projections to 1990, Monthly Labor Review, December 1976, 99(12), pp. 3-13.

It must be stressed, however, that the above projections are based on some very simplistic assumptions and therefore should not be taken literally(40). In fact, as experts would agree, these two sets of projections are not sophisticated enough to predict the future prospects of labour force and unemployment. The intent here was to show that the changes in the population and/or labour force composition are not likely to exert as strong an influence on the future unemployment rate as many would tend to believe. For example, even if the age and sex structure of the labour force and unemployment remains unchanged (which is completely unrealistic to assume), the unemployment rate would not be reduced by more than one percentage point by the end of this decade.

Conclusion

The major purpose of this study was to estimate the impact on the Canadian unemployment rate of changes in the demographic composition of the labour force. Using Labour Force Survey data it was found that over the 1966-78 period the unemployment rate increased by 5 percentage points, reaching 8.4 percent in 1978; however, changes in the age and sex composition of the labour force only raised the unemployment rate by something in the order of a quarter of a percentage point. The unemployment rate increased not because of the growth of the relative size of the demographic groups with high unemployment, but because of increases in the unemployment rate in those groups.

(40) Most extrapolation techniques of this sort are atheoretical in nature. Socio-economic variables which seem to influence the labour force participation are not taken into account. Also, the tapering procedure so that the rate of change is assumed to reduce to zero by 2001 is arbitrary. Moreover, the adjustment for the non-civilian, institutional populations has not been made in these projections.

Furthermore, on the basis of some simplistic projections, it was also found that future changes in the composition of the labour force are unlikely to reduce the unemployment rate markedly. Even if the structure of the labour force and unemployment remained at the 1978 level and the structure of the population changed, the reduction in the overall unemployment rate may not be larger than three quarters of a percentage point over the 1978-91 period.

APPENDIX TABLE A . Labour Force Participation Rate by Age and Sex,
1971 to 1999

(Selected Years Only)

Sex and Age Group	Percentages						
	Actual			Projected			
	1971	1976	1978	1981	1986	1991	1996
<u>Men</u>							
15 and over	77.3	77.6	77.9	78.1	78.2	77.8	77.5
15-19	45.4	52.6	54.8	57.8	62.2	65.6	67.5
20-24	82.8	85.1	85.8	85.7	85.4	85.2	85.1
25-54	95.2	94.8	95.0	94.6	94.1	93.8	93.6
25+	82.7	81.1	81.0	80.3	79.2	78.3	77.8
<u>Women</u>							
15 and over	39.4	45.2	47.8	50.8	55.0	57.8	59.5
15-19	40.4	47.0	48.0	51.4	55.9	59.4	61.1
20-24	62.3	67.4	70.3	73.9	78.8	82.5	84.6
25-54	43.1	52.1	56.6	62.8	71.2	77.6	81.2
25+	35.4	41.1	44.0	47.0	51.5	55.0	56.9
<u>Both sexes</u>							
15 and over	58.1	61.1	62.6	64.3	66.4	67.6	68.3

PAPER 7

THE IMPACT OF DEMOGRAPHIC CHANGE
ON THE CANADIAN LABOUR MARKET

by

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Introduction

The Canadian labour market is currently in a process of transformation as a result of major demographic changes in the post-war period. The precipitous decline in fertility in the 1960s, combined with a continued increase in female labour force participation, will have significant implications for the structure of the labour market in the 1980s. The purpose of this paper is to explore some of the major post-war demographic developments as they relate to the functioning of the labour market and to assess the impact of a changing demographic structure on the labour force composition in the 1980s.

The paper is structured as follows. Section I deals with linkages between demographic changes and the labour market. Section II very briefly reviews the demographic changes that are likely to take place during the 1980s and discusses the likely impact of these changes on labour force participation rates, age-sex composition of the labour force and the unemployment rate.

I: LINKAGES BETWEEN DEMOGRAPHIC CHANGE AND THE LABOUR MARKET

The size of the labour force of a country is basically determined by the size of the working age population (non-institutional civilian population, 15 years and over) and the participation rate. Changes in the size of the working age population in turn depend upon natural population growth and net immigration. Natural population growth is basically determined by the birth rate and death rate; net immigration depends on the level of per capita income and the aggregate unemployment rate of the country relative to world levels, in addition to immigration policy. Linkages between demographic change and the labour market are schematically presented in Chart 1.

The birth rate is determined by the fertility rate which is subject to a variety of social and economic influences(1). There is a direct positive relationship between the fertility rate and the marriage rate; an increase in marriage rate is likely to increase the fertility rate and vice versa, other things remaining the same. A higher income level and a lower unemployment rate tend to increase the fertility rate via an increase in the marriage rate. But the desire to have children may also be directly affected by the income level. The relationship between fertility and income is rather complex since fertility, income and labour force participation rate are interrelated phenomena, as discussed below.

(1) Easterlin, R.A., The Economics and Sociology of Fertility: A Synthesis in Charles Tilley (ed.), Historical Studies of Changing Fertility, 1978, Princeton University Press, Princeton.

Demographic Change and Participation Rates

Demographic changes such as changes in the age structure of the population and trends in fertility behaviour of females directly affect participation rates. Higher age groups are usually associated with higher participation rates and, up to a point, population aging tends to increase the level of labour market participation. Thus, as the population and labour force age in the 1980s, one might expect an upward push on the aggregate participation rate. Similarly, increased fertility tends to reduce the labour market participation of women and vice versa.

The direction of causality between fertility and labour force participation (that is, whether the decision to have children affects the decision to participate in the market or whether the desire to work affects the number of children) is somewhat ambiguous(2). Several studies have indicated that a wife's childbearing responsibilities constrain her labour market activity(3)(4). On the other hand, the wife's labour force activity or plans often have been found to be good predictors of her expected fertility(5)(6)(7). A recent study indicates

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- (2) Conger, D.J., and J.M. Campbell, Simultaneity in the Birth Rate Equation: The Effects of the Education, Labor Force Participation, Income and Health, Econometrica, May, 1978.
- (3) Bowen, W.C., and T.A. Finegan, (1969), The Economics of Labour Force Participation.
- (4) Sweet, J.A., Labour force re-entry by mothers of young children, Social Science Research, 1, 1972.
- (5) Bumpass, L., and C.F. Westoff, The Later Years of Childbearing, 1970, Princeton University Press, Princeton.
- (6) Ryder, N.B., and C.F. Westoff, Reproduction in the United States, 1971, Princeton University Press, Princeton.
- (7) Whelpton, P.K., et. al., Fertility and Family Planning in the United States, 1966, Princeton University Press, Princeton.

that the dominant effects are from fertility to labour force participation in the short run and from labour force participation to fertility in the long run(8).

Recently, it has been conjectured that besides the direct effect described above, fertility behaviour may have a pronounced impact on participation levels indirectly through changes in "relative income"(9) (10). The expression "relative income" refers to the earning capacity of young adults (age 15-24) relative to that of their parents, and their ability to live in the style to which they had become accustomed prior to marriage. The central idea underlying the hypothesis is that if young adults find it easy to earn enough to attain the desired living standard, then marriage and childbearing will be encouraged(11). On the other hand, if it is hard to earn enough to support the desired life style, the resulting economic stress may lead to deferment of marriage, postponement of childbearing and entry into the labour market of married women.

(8) Cramer, J.C., Fertility and Female Employment: Problems of Causal Direction, American Sociological Review, April 1980.

(9) Easterlin, Richard A., Population Labour Force and Long Swings in Economic Growth: The American Experience (National Bureau of Economic Research) 1968.

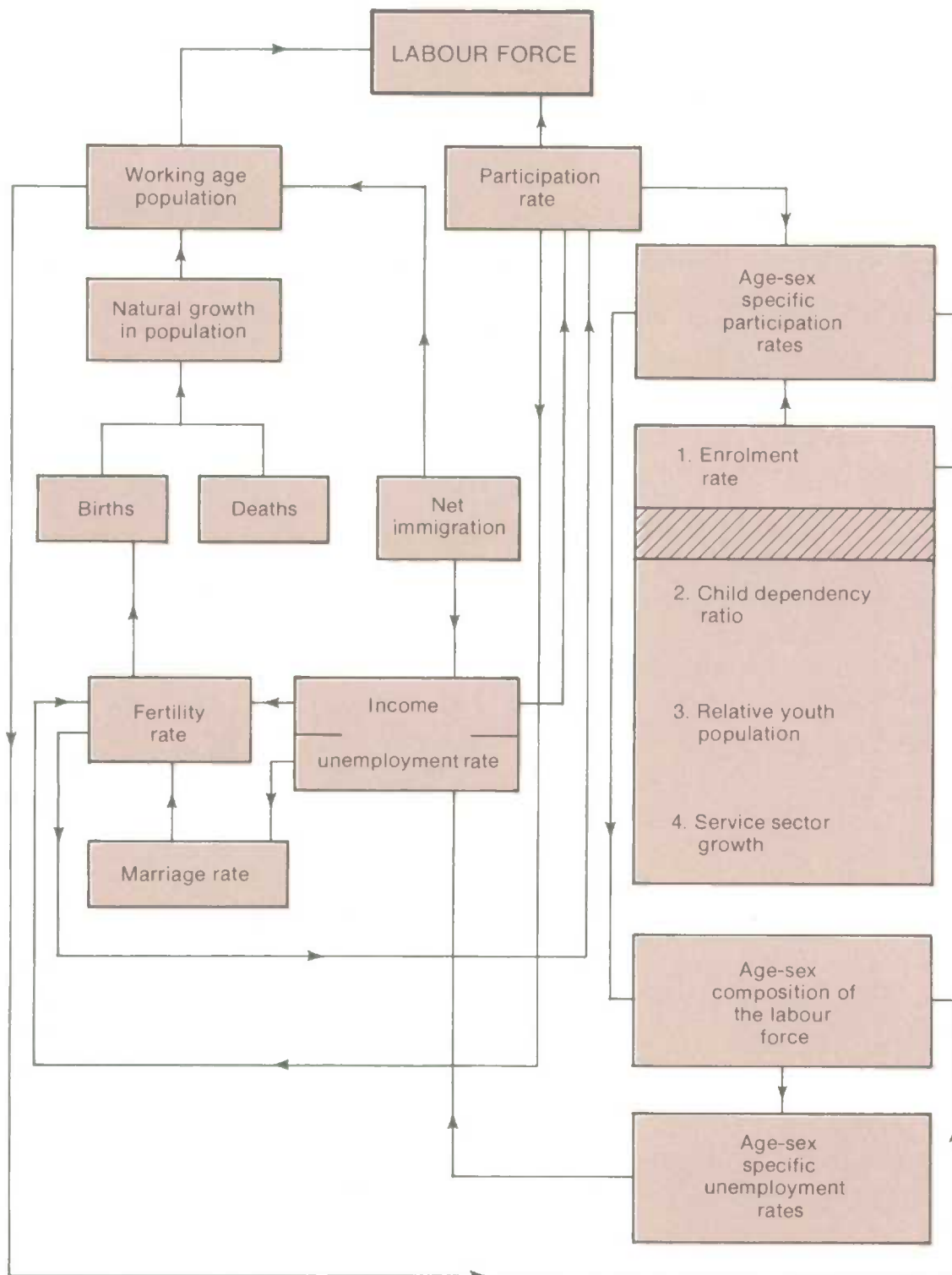
(10) Wachter, M.L., Intermediate Swings in Labor Force Participation, Brookings Papers on Economic Activity, 2, 1977, pp.545-576.

Wachter, M.L., A Labor Supply Model for Secondary Workers, Review of Economics and Statistics, May 1972.

(11) It is assumed that young persons form their economic aspirations or expectations from the income and material environment in which they grow up, which, in turn, depends upon their parents' income.

Chart — 1

Schematic Representation of Linkages Between Demographic Change and the Labour Market



Applying this analytical framework to the post-war baby boom, the implication for participation behaviour is as follows: the entry of the baby-boom cohort into the labour market has swelled the supply of young adults in the 1960s and 1970s which, in turn, has led to a steep relative decline in wages and living standards of young people. In an attempt to maintain family income, married women have been entering the labour market in large numbers (with a corresponding decline in fertility). This might have been a factor accounting for the substantial increase in female participation during the 1960s.

Relative Income Hypothesis

Wachter conceptualizes relative income, that is, the current living standard in relation to the past standard as the ratio (Y/Y^*) , where Y is the current family income and Y^* is the anticipated or desired income level(12). Y^* is a function of past own-family income and the current family income of other age groups. Symbolically, the desired income level,

$$Y^*_{i,t} = g(\sum \alpha_i Y_{i,t-i}, \sum \beta_j Y_{j,t}),$$

where α s and β s are weights, and i and j refer to a particular group and to all other groups respectively. The first term reflects the own lagged aspiration effect, while the second term measures the contemporaneous influence of "keeping up with the other cohorts".

(12) This section is taken from Matthew J. Robertson and Arun S. Roy, Labour Force Participation and the Relative Income Hypothesis, Department of Employment and Immigration, Ottawa, 1980 (mimeo).

It seems to have been overlooked that the Easterlin-Wachter hypothesis in reality consists of two separate sub-hypotheses.

Sub-hypothesis I.

Fertility depends upon the relative income where relative income refers to the current family income level relative to desired income level, the desired income level being determined by the past own-family income (more precisely, parental income).

Sub-hypothesis II.

Fertility depends upon the relative income where relative income refers to the current family income level relative to desired income level, the desired income level being determined by the contemporaneous income level of other age groups.

Evidence on Desired Income Level

Even from a purely logical point of view, the argument that the desired income level of a family is determined by the living standard enjoyed by the head of the household in the parental home is rather tenuous. Studies by Easterlin or Wachter have not provided any direct tests of Sub-hypothesis I. This is primarily because of the difficulty in capturing aspects of parental family background presumed to determine aspirations. The available measures of family background include parental occupation and parental education and these do not fully capture the standard of living effect on the desired income level. A

recent study, which makes use of sibling data, facilitates a more appropriate test of Sub-hypothesis I(13). It permits one to control family background - and so standard of living - and then examine the relationship between current income and number of children. The results of the study do not support what is described above as Sub-hypothesis I(14). Siblings can be assumed to have shared the same living standard and family background in the parental home before they entered the labour force. Sub-hypothesis I implies that brothers with more income should have more children; those with less income, fewer. The data did not support this hypothesis.

Evidence on Relative Income Changes

Sub-hypothesis II, however, appears to rest on somewhat firmer ground. That there has been a sharp and continuous decline in the relative income of young workers during the 1960s is evident from available Canadian income data. The median income of males under age 25 relative to the median income of males aged 35-44 declined from 39 percent in 1961 (about the time when the post-war baby-boom cohort began to enter the labour force) to 24 percent in 1971. The post-war baby-boom cohort entered the age group 25-34 around 1971 and since then the

(13) Olneck, M.R., and Barbara L. Wolfe, A Note on Some Evidence on the Easterlin Hypothesis, Journal of Political Economy, October, 1978.

(14) The data are derived from a sample of males who attended public schools in Kalamazoo, Michigan between 1928 and 1950. School records identified the siblings. There were 1,243 men interviewed, 705 of which could be paired with at least one brother who also completed an interview, both had been married and had reported income and number of children. Interviews resulted in 352 pairs.

relative income of this group has also begun to decline, although the magnitude of the decline is rather small(15). The total family income of families headed by a person under age 25 relative to that of families headed by one aged 45-54 years also suggests a similar decline during the 1960s(16). The changes in relative income thus lend support to the Easterlin-Wachter hypothesis that older and younger workers are imperfect substitutes for one another. Welch concludes in a recent study that the pressure of a work force whose average age is rapidly declining reduces wages of new entrants(17). It is also important to note that there was a sharp fall in the fertility rate at roughly the same time as the relative income of young workers declined and the participation rate of young females increased.

It can be expected, therefore, that an increase (decrease) in the proportion of young people in the population will bring about a decrease (increase) in their relative income and have a positive (negative)

(15) Robertson, Matthew J., and Arun S. Roy, loc. cit.

(16) The relative income of families headed by a person under age 25 declined from 72 percent in 1961 to 64 percent in 1972. A similar trend is noticeable since 1972 for the relative income of families whose head is 25-34. The income data on the whole indicate that the decline in the relative income of young persons was of a smaller magnitude in a family context than in the case of individual males, the potential decline in family income possibly having been somewhat offset by the entry of additional family members, especially young wives, into the labour market. It is also notable in this context that the proportion of two-earner families has been increasing in recent years and that the growth in two-earner units has been concentrated in younger families. For details see reference at footnote(15).

(17) Welch, Finis, Effects of Cohort Size on Earnings: The Baby-Boom Babies' Financial Bust, Journal of Political Economy, October 1979.

effect on their participation rates. Logically, one might expect that the participation rates of older demographic groups would at the same time be reduced, reflecting the corresponding rise in their relative incomes, though the reasoning for these groups is less persuasive than for young people.

Empirical Analysis of Participation Behaviour

Two empirical models, A and B, are designed and estimated for the period 1954-77, using annual data. Participation behaviour is analyzed and projected to 1990 for males and females separately, broken down by seven age groups in each case.

The following specification has been used for Model B which is an extension of Model A. Model A is similar to Model B in all respects except that the former does not incorporate the relative-income variable.

-
- (18) The long-run growth path of GNE was obtained by multiplying the benchmark productivity level by cyclically-adjusted employment for each year. The 1964 productivity level was taken as the benchmark productivity. See Department of Finance, Canada's Economy - Medium-Term Projections and Targets, 1978, Ottawa.
- (19) While the variable, RPY, measures the impact of changes in relative wages on the participation rate, the time trend captures among other things (such as long-term trends reflecting longer-run socio-economic developments) changes in absolute wages, real as well as nominal. Both a time trend and an absolute wages variable cannot be used due to the problem of high collinearity between the two.
- (20) A lagged dependent variable was used as an explanatory variable to capture the process of partial adjustment to desired participation levels.

Model B Specification

$\ln PR_{i,t} = f[\text{GAP}, \psi(T), \text{RPY}, \text{ENROL}, \text{SE}, \text{BW}, \text{CDR}, \text{RDUM}, \ln PR_{i,t-1}]$ (18)
where:

- PR_i = labour force participation rate of the i th group.
- GAP = cyclical gap defined as the percent deviation of the current Gross National Expenditure (GNE) from the long-run growth path of GNE(18).
- $\psi(T)$ = a non-linear time-trend specification, where T is a continuous time-trend with values 1, 2, 3, etc. RT is reciprocal of T and $TK = T : (T+K)$ where K is a constant. K is chosen such that \bar{R}^2 is maximized.
- RPY = proportion of working age population 15-34 years to proxy relative-income effects associated with the post-war baby boom(19).
- ENROL = full-time secondary school enrolment rate, used for age group 15-19 and post-secondary enrolment rate, used for age group 20-24.
- SE = percentage of total employment comprised of service sector jobs.
- BW = ratio of unemployment insurance benefits to wages.
- CDR = child dependency ratio defined as the number of children four years of age or below as a proportion of female population aged 20-44.
- RDUM = a dummy variable to take account of the revision of the Labour Force Survey in 1976.
- $\ln PR_{t-1}$ = a lagged dependent variable(20).

The variable, GAP , serves as a proxy for cyclical changes in employment conditions(21). The estimated partial regression coefficient

(21) In most studies, an unemployment or employment rate has been used as a proxy for cyclical changes in employment conditions. Since the unemployment (or employment) rate and the participation rate are definitionally related, the correlation between them could be spurious. For this reason, the cyclical gap is preferred to the unemployment (or employment) rate in the present study.

on GAP could be either positive or negative indicating the discouraged-worker or additional-worker effect, respectively(22). An increase in the school enrolment rate is expected to have a negative influence on the participation rate of young persons. An increase in service sector employment (SE) generally means an expansion of employment opportunities for women and young men and hence SE is expected to be positively related to their participation rates. The liberalization of the unemployment insurance scheme in 1971 could have induced some people to enter the labour force in order to be eligible for unemployment insurance benefits. Secondly, the liberalization of the unemployment insurance scheme could have prevented some unemployed people from withdrawing from the labour force. The variable, BW, is thus expected to be positively related to participation rates especially for young men, and women whose labour force attachment is relatively volatile. The variable, CDR, serves to reflect the presence of children in the family which tends to constrain labour market activity of women; and thus CDR and the female participation rate are expected to be negatively related.

The reason for using a proxy variable, RPY, instead of a direct relative-income measure is twofold. First, a direct relative-income

(22) A reduction in the size of the cyclical gap in the algebraic sense (that is becoming more negative or less positive) tends to decrease employment and increase the unemployment rate, other things remaining the same. A decline in the family income due to unemployment of the household head induces participation (additional-worker effect); lower wages and decreased vacancies, on the other hand, discourage participation (discouraged-worker effect). Thus, a positive coefficient for the cyclical gap variable would indicate a net discouraged-worker effect and a negative coefficient a net additional-worker effect.

measure would be endogenous. A fall in relative income would induce greater participation which in turn, would affect relative income. The ratio of youth population, on the other hand, is exogenous to the participation equation. Second, the construction of an appropriate relative-income variable, involving both contemporaneous comparisons across age groups and lagged comparisons on past own behaviour, poses enormous data problems. An increase in RPY is expected to reduce the wages and hence the income of young persons relative to others. With a view to maintaining "desired" income levels, young men as well as married women tend to increase their labour force participation. Thus, RPY and participation rates of young men and married women are expected to be positively related.

Regression Results

In carrying out the regression analysis, many alternative variable specifications were used. The final regression equations were chosen when they met a threefold criterion; namely, these equations provided the expected signs on the variable coefficients, provided reasonable projections of participation rates(23), and also provided the highest R^2 (that is, the highest explanatory power).

As already mentioned, Model B is similar to Model A in all respects except that it incorporates in addition to all variables in Model A, a demographic variable (proportion of working-age population aged 15-34)

(23) Projections of participation rates were considered as unreasonable, for instance, if these were explosive and exceeded 100 percent, or when female participation rates turned out to be higher than male participation rates.

to represent relative income. The introduction of this demographic variable improved the goodness of fit (R^2) in four age-sex group equations while it had no effect in the others. The results of the study indicate, as expected, that the relative-income variable has a positive effect on the participation rate of younger persons (less than 35 years of age). As explained above, an increase in the proportion of youth population by reducing their relative income tends to increase their participation rates. Quantitatively, the response of the participation rate of younger people to a change in the proportion of youth population is quite large relative to prime-age males(24). The results of the present study with respect to the relative-income hypothesis are generally consistent with findings reported for the U.S. by Wachter(25).

The impact of the liberalization of the unemployment insurance scheme on the participation rate has been taken into account by using a variable defined as the ratio of average weekly Unemployment Insurance (U.I.) benefits to average weekly wages. During the sample period (1954-77), there was a significant increase in the ratio of U.I. benefits to wages reflecting to a considerable extent the introduction of new U.I. regulations in 1971. Quantitatively, the effect of an increase in the benefit wage ratio is much larger in the case of younger

(24) In the case of older males and females (35 and over), the relative-income variable has the expected negative effect on their participation rates except for three groups, namely, males 20-24 and 25-34, and females 35-44. For these three groups, the variable coefficient had the wrong sign and hence Model B projections are not acceptable for them.

(25) Wachter, M.L., (1977), loc. cit.

workers and females than prime-age males, as might be expected. These findings are consistent with the available empirical evidence on the impact of unemployment insurance on labour force participation(26).

The regression results of the present study generally indicate the predominance of a net discouraged worker effect in the case of females and younger males. For prime-age males, on the other hand, a net additional-worker effect predominates.(27) The available time-series evidence for Canada on the predominance of the net discouraged-worker effect or the additional-worker effect is far less conclusive than the cross-sectional evidence.

For younger persons (aged 15-19), the full-time secondary school enrolment rate was used as a variable affecting their participation rate and as expected, it was found to exert a negative influence.

The results generally support the hypothesis that an expansion in service sector employment increases participation of younger males and females. In the case of prime-age males, on the other hand, an increase in service sector employment is seen to reduce their participation. One possible explanation for this is that as service sector employment increases relative to total employment, job opportunities for prime-age

(26) For details see: Bodkin, R.G., and A. Cournoyer Legislation and the Labour Market: A Selective Review of Canadian Studies, in H.G. Grubel and M.A. Walker (eds.), Unemployment Insurance: Global Evidence of its Effects on Unemployment, 1978, Fraser Institute, B.C.

(27) The cyclical gap variable is statistically significant in only three age-sex groups (Model A).

males are reduced relatively and this reduces their labour force participation. An alternative explanation is the negative-income effect of an increase in service sector employment. As job opportunities in the service sector increase, married women and younger males increase their labour market participation increasing family income and leading to reduced work effort in the case of prime-age males.

Composition of Labour Force and Unemployment Rate

Age-sex specific participation rates in conjunction with the composition of the working age population determine the composition of the labour force (Chart 1).

In recent years, attention has been drawn to the impact of demographic changes on the aggregate unemployment rate(28). Over the last two decades, the Canadian economy has experienced a significant secular upward drift in the aggregate unemployment rate. For instance, the average unemployment rate increased from 4.8 percent over the 1961-71 period (a complete business cycle) to 6.7 percent in the 1971-78 cycle. At cyclical peaks, the respective unemployment rates (conventionally described as "full employment/unemployment rates") were 3.4 percent and 5.3 percent for the peak years 1966 and 1974. This upward movement in the unemployment rate between the two peak years was largely the result of changes in the demographic structure of the labour force. Demographic changes operate to increase the aggregate unemployment rate through two channels: changing labour force composition and changing group unemployment rates.

(28) Gallaway, L.E., 1979, Manpower Economics

As is well known, there has been a substantial difference in the growth rates of the labour force among demographic groups over the 1966-74 period. Both the youth and adult female labour force grew much faster than that for adult males primarily reflecting the maturing of the large number of young people born during the baby boom of the 1940s and 1950s, the rapid rise in the participation rate of women, the increase in the number of two-earner families and the trend towards earlier retirement among older male workers. As a result of the differential growth rates, the age-sex specific shares of labour force in 1975 have changed significantly from what they were in 1966.

A measure of the compositional effect on the change in the full employment/unemployment rate can be computed for the 1966-74 period by first deriving an overall unemployment rate based on the 1966 age-sex specific rates and the 1974 age-sex specific labour force weights, and then subtracting the actual rate for 1966 from the result(29). An empirical estimate based on this method indicates that the unemployment rate in the cyclical peak year of 1974 would have been 0.2 percentage points lower than it actually was, given the group rates for that year, if the composition of the labour force had been as it was in 1966.

(29) Algebraically, the procedure can be written as:

$$x = \frac{\sum(U_{i66} \cdot W_{i74})}{\sum W_{i74}} - \frac{\sum(U_{i66} \cdot W_{i66})}{\sum W_{i66}}$$

where U_{i66} represents the i th group's unemployment rate for 1966; and W_{i74} and W_{i66} represent the i th group's labour force in 1974 and 1966, respectively.

The other channel through which the aggregate unemployment rate is affected is by changes in unemployment rates of some or all individual demographic groups. One way to ascertain which group unemployment rates have drifted upward is by regressing annual unemployment rates of each demographic group on annual unemployment rates for prime-age males and on time. The contribution of each group's unemployment rate to the increase in the full employment/unemployment rate over the period 1966-74 was computed by multiplying the estimated time trends by the 1974 labour force weights (see Table 1). The sum of all contributions is precisely that portion of the 1.9 percentage points difference between the 1966 and 1974 unemployment rates that is not explained by changing labour force composition (1.74 percentage points). Roughly one-half reflected a rise in unemployment rates of prime-age females, and another half the increased unemployment rates of younger people, especially those in the 20-24 age group. The negative contribution of older males and the positive contribution of older females roughly offset each other.

II: DEMOGRAPHIC CHANGES IN THE 1980s AND IMPLICATIONS FOR THE LABOUR MARKET

During the post-war period, Canada's population grew much faster than that of the U.S. and most other industrialized countries. This was mainly due to the post-war baby boom which was more pronounced in Canada than in the U.S. or elsewhere. Beginning in the late 1950s, however,

the rate of growth of Canada's population entered a period of steep decline. From a growth rate of 3.3 percent during 1956-57, the population grew by only 1.2 percent in 1976-77, a drop of over 2 percentage points in two decades. Before proceeding to analyze the impact of demographic changes on the labour market in the 1980s, it would be useful to review briefly the major demographic changes which are likely to occur in Canada.

TABLE 1. Contributions of Group Unemployment Rates, by Age and Sex, to 1966-74 Increase in Full-Employment/Unemployment Rate, Canada

Sex	Age Group			
	15-19	20-24	25-54	55+
Males	-0.04	0.30	-	-0.11
Females	0.21	0.42	0.86	0.10

Source: Calculated as $T_i \cdot L_i(1.74) / \sum (T_i L_i)$, where T_i is time trends in group unemployment rates and L_i is group labour force in 1974. See Department of Employment and Immigration, The Impact of Demographic Change on Unemployment in Canada, Ottawa, July 1974 (mimeo).

Projected Demographic Trends for 1980s

Population Size and Growth Rate

Population projections produced by Statistics Canada indicate that Canada's population will continue to grow at a slower rate throughout the rest of the present century than in the recent past. The growth rate of population is projected to decline to 1.0 percent by 1986 as compared with 1.2 percent in 1976 and 2.1 percent in 1961. The declining growth rate of population mainly reflects a projected decline

in the total fertility rate from 1.9 in 1970 to 1.7 in 1991(30).

Shifts in Age Structure

The demographic projections indicate that there would be a noticeable change in the age structure of the population. During the 1980s, while proportions of young people aged 24 and under will decline dramatically, the proportion of persons aged 45 and over will increase significantly. The proportion of population aged 15-24 is projected to decline from 19.6 percent in 1977 to 17 percent in 1985, and to 14.2 percent in 1991. The largest overall increase will occur in the 35-44 age group. The proportion of population aged 65 and over will also increase significantly during the 1980s.

Progressive Aging of Population

Canada will continue to experience a progressive aging of its population over the next two decades as a result of a projected further decline in the birth rate and the lagged effect of the decline in fertility during the 1960s and 1970s. For example, the young dependency ratio (the number of persons under 17 years of age in relation to the

(30) Statistics Canada has generated four alternative sets of population projections to the year 2001. These are based on two alternative scenarios relating to the total fertility rate; called "high" (increasing from 1.9 in 1976 to 2.1 by 1991) and "low" (falling to 1.7 by 1991). Three alternative assumptions are made for the net immigration level, namely, "low" (50,000 per year), "medium" (75,000 per year) and "high" (100,000 per year). Qualitative differences underlying the four sets of projections are not significant. Projection No. 3 which incorporates the low fertility assumption and medium immigration assumption has been used through-out this paper for discussion and analysis. For details see Statistics Canada, Population Projections for Canada and the Provinces, 1976-2001, Ottawa, 1980, Catalogue 91-520.

number of persons aged 18-64) is expected to fall significantly and, at the same time, the old age dependency ratio (the number of persons 65 years of age and over in relation to the number of persons aged 18-64) is expected to rise. Furthermore, the median age of Canada's population is expected to increase from 28.4 in 1977 to 31 years in 1986.

Projections of Participation Rates and Labour Force*

Labour force projections for the 1980s have been generated by combining projections of participation rates based on Models A and B (see Section I) with population projections which are taken as exogenously given. Population projections used here are those described as Projection 3 (for details, see discussion above). Using the two Models outlined in Section I, participation rate projections were generated to 1990 under the following assumptions:

- (i) The Canadian economy will return to its longer-run growth track by 1983;
- (ii) The school enrolment rate will decrease to 1986 and stabilize thereafter;
- (iii) Service sector employment relative to total employment will continue to increase;
- (iv) There will be no radical changes in the legal retirement age (65 years);
- (v) The ratio of unemployment insurance benefits to wages will remain at the 1977 level through 1990;
- (vi) The variables concerning the effects of relative income and the presence of young children are determined by population projections. The population projections indicate that the proportion of young children (four years of age and younger) and the proportion of population age 15-34 will diminish gradually over the projection period.

The above set of assumptions may be described as a "base case" or "reference" scenario. The choice of these assumptions was made with a view to present a set of generally accepted assumptions when

* The authors wish to thank Serge Bertrand for many helpful comments and suggestions in the preparation of this section.

there was no evidence that alternatives would have been more realistic. A number of simulations were carried out to analyze how sensitive the projections were to variations in these assumptions within a reasonable range. The simulations suggest that changes in the assumptions alter the participation rates of component groups but do not alter the main trends(31).

Growth and Composition of Labour Force in 1980s

As already discussed earlier, population projections indicate that, while the youth population (15-24) will grow at a much slower rate, the prime-age population (25-54) will grow at a much faster rate than during the last decade. This reflects the fact that the baby-boom cohort will enter the adult age group (25 years and over), as it ages, but will not be fully replaced by new youth of working age because of the sharp decline in fertility and birth rates in the 1960s. Of the working age population the youth group will, therefore, actually decline in the 1980s (especially after 1985), while the population of adult men and women will continue to grow (Table 2). The net result of these demographic developments is a working age population in the 1980s which

(31) In the base case, it is assumed that service sector employment would continue to increase but at a slower rate than in the 1960s and early 1970s. For sensitivity analysis, a simulation was made with the alternative assumption of a levelling off in the share of service sector in total employment. The simulation results show that changing the service sector employment growth assumption in this manner brings about a levelling off in the participation rate of adult females. This is somewhat neutralised by an increase in the participation rate of adult males, possibly due to the fact that, as service sector employment growth levels off and married women find it increasingly harder to find employment to sustain family income, older men tend to increase their labour force participation. The participation rate of young person remains virtually unaffected as does the aggregate participation rate.

will be significantly older than during the 1970s. As higher age groups usually have higher participation rates, the effect of these demographic developments on participation behaviour will be to increase the aggregate participation rate.

TABLE 2. Projections of Growth in Working-Age Population for Selected Age-Sex Groups

Selected Groups	Average Annual Growth (Percent)				
	1960-65 (Actual)	1970-75 (Actual)	1975-79 (Actual)	1980-85	1985-90
Youth Group (15-24)	5.0	2.8	2.4	- 1.4	- 2.6
Adult Males (25+)	1.2	2.4	1.7	2.4	2.0
Adult Females (25+)	1.6	2.8	5.1	2.4	2.2
Total (all age groups)	2.2	2.6	3.2	1.4	1.2

Source: Statistics Canada, Population Projections for Canada and the Provinces, 1976-2001, 1980, Catalogue 91-520.

Demographic developments may also affect participation behaviour by changing the relative-income position of the youth population. If the youth group improves its relative-income position during the 1980s because a reduced size in population exerts smaller downward pressure on wages, there may be less need for younger married women to participate in the labour market to supplement family income. Thus, relative-income effect on participation might dampen somewhat the long-run upward trend in the female participation rate.

The continued upward movement in the aggregate participation rate in the 1980s (Tables 3 and 4) is the net result of several diverse trends in the participation behaviour of different demographic groups.

TABLE 3. Participation Rate: Historical Trends and Projections

Year	Percentages			
	Young Persons* (15-24)	Adult Females (25+)	Adult Males (25+)	Total
1955	53.0	19.4	86.3	52.9
1960	50.3	24.5	86.5	54.2
1965	48.1	28.6	85.5	54.4
1970	56.0	34.5	83.3	57.8
1975	62.9	40.0	81.9	61.1
1978	64.4	44.0	81.0	62.6
1980	65.6	45.9	80.5	63.4
1985	68.7	50.1	80.2	65.6
1990	68.3	53.5	79.6	66.3

Source: 1955, 1960 Old Labour Force Survey
 1960-1978 Revised Labour Force Survey
 For projections, see Department of Employment and
 Immigration, An Analysis of Labour Force Participation:
 Underlying Factors and Future Trends, August 1980 (mimeo.)

* Old Labour Force Survey: Youth Group is aged 14-24 years.
 The same applies to other tables.

The upward trend in adult female participation will continue, though at a slower pace than in the past; the participation of adult males will decline slightly; and the participation rate of younger persons will increase mainly because of an expected increase in the participation rate of females aged 20-24.

Projections of the present study indicate that the participation rate of young persons will continue to increase until 1985 and will become stable thereafter, mainly reflecting the assumed levelling off in the enrolment rate after 1985. Changes that are expected to occur in the growth of the youth labour force are quite dramatic. Projections show a decline in the youth labour force after 1980 (Table 5), mainly attributable to a sharp reduction in the size of the youth population caused by a substantial drop in the birth rate during the 1960s.

TABLE 4. Projected Rates of Labour Force Participation, 1978 - 1990
Male, Female and Both Sexes

Age Group	Percentages											
	Male Participation Rates To 1990				Female Participation Rates To 1990				Aggregate Participation Rates To 1990			
	1978	1980	1985	1990	1978	1980	1985	1990	1978	1980	1985	1990
15-19	54.8	55.8	57.3	56.7	48.0	49.2	50.0	50.0	51.5	52.6	53.6	53.4
20-24	85.8	85.1	84.0	83.3	70.3	72.5	77.9	80.6	78.1	78.6	80.9	81.9
25-34	95.6	95.3	94.7	94.2	59.0	61.3	67.1	72.4	77.2	78.2	80.8	83.3
35-44	96.0	95.9	95.7	95.5	58.3	61.2	66.3	70.1	77.2	78.6	81.0	83.2
45-54	92.9	92.7	92.3	91.9	51.0	53.6	59.2	63.9	71.9	73.1	75.7	77.8
55-64	76.6	75.6	74.2	72.9	32.8	34.3	38.1	41.3	53.7	53.9	54.8	56.5
65 +	15.1	14.6	13.6	12.3	4.5	4.4	4.2	4.2	9.2	8.8	8.2	7.6
TOTAL	77.9	77.8	78.2	77.8	47.8	49.6	53.4	55.7	62.6	63.4	65.6	66.5

Source: Department of Employment and Immigration, An Analysis of Labour Force Participation: Underlying Factors and Future Trends (mimeo), August 1980.

The adult male labour force is projected to grow faster during the 1980s than in recent years (Table 5), reflecting a faster growth in the adult population (Table 2), and more than neutralizing a downward trend in their participation rate (Table 3). The downward trend in the participation rate of adult males is partly attributable to a decision to take early retirement due to the availability of more liberal retirement benefits in recent years.

The adult female labour force is also projected to increase at a slower rate than during 1970-75 though it will probably continue to be the fastest growing component of the labour force. Growth in the adult

TABLE 5. Projections of Growth in Labour Force for Selected Age-Sex Groups

Selected Groups	Average Annual Growth (Percent)				
	1965-70* (Actual)	1970-75# (Actual)	1975-79# (Actual)	1980-85Ø	1985-90Ø
Youth Group (15-24)	3.6	5.8	2.4	- 0.5	- 2.4
Adult Males (25+)	0.9	2.1	1.7	2.2	1.9
Adult Females (25+)	4.6	6.1	5.1	4.5	3.6
Total (all ages)	2.2	3.9	3.2	2.1	1.4

* Source: Old Labour Force Survey. Youth group is aged 14-24 years.

Source: Revised Labour Force Survey.

Ø Department of Employment and Immigration, An Analysis of Labour Force Participation: Underlying Factors and Future Trends, August 1980 (mimeo).

female labour force during the 1980s is mainly attributable to the upward trend in their participation rate (though this upward trend slows down); the rate of growth in the adult female population will decline.

The projected upward movement in women's participation reflects a continued growth in service sector employment, a reduced fertility rate, and long-run socio-economic factors such as the changing role of women in society.

The differential labour force growth rates of major demographic groups imply a significant shift in the composition of the labour force (Table 6). The share of the youth group will decline almost as sharply in the future as it rose in the past, the share of adult women will likely continue to rise rapidly, and contrary to recent experience, the share of adult men will slowly increase instead of decreasing.

TABLE 6. Composition of Labour Force for Selected Age/Sex Groups; Historical Trends and Projections

Year	Percentages			
	Young Persons (15-24)	Adult Females (25+)	Adult Males (25+)	Total
1955	22.8	14.1	63.1	100.0
1960	21.9	17.3	60.8	100.0
1965	23.4	19.6	57.0	100.0
1970	25.4	22.4	52.2	100.0
1975	27.2	24.6	48.2	100.0
1980	26.4	27.7	45.9	100.0
1985	23.2	30.7	46.1	100.0
1990	19.1	33.8	47.1	100.0

Source: 1970, 1975 Revised Labour Force Survey
1980-90, Department of Employment and Immigration, An Analysis of Labour Force Participation: Underlying Factors and Future Trends, August 1980 (mimeo).

The Impact of Demographic Change on Unemployment in the 1980s

Up to this point, attention has focussed on the supply side, particularly with respect to labour force composition. However, the effects which demographic change have on aggregate and group unemployment rates have to be considered within the framework of a simultaneous equation system wherein both supply and demand factors interact. Single equation models of the type developed by Wachter, wherein the unemployment rate of each demographic group is determined solely by cyclical factors and the baby boom (captured by a relative-population variable), are incomplete(32). A complete demographic analysis would include endogenous supply feedback that would involve, for example, the impact of the females and youth labour supply on their own unemployment rate. The relative-population variable employed in empirical studies may simply be picking up time-trend (and participation) effects rather than substitutability and complementarity among groups.

In order to assess the impact of demographic change on unemployment rates, the following (simultaneous) structure linking demographic change to the labour market was estimated(33). The equation of the model

(32) Wachter, M.L. and S.M. Wachter, The Fiscal Policy Dilemma: Cyclical Swings Dominated by Supply Side Constraints, in The Economic Consequence of Slowing Population Growth, T.J. Espersshade and W.J. Serow, eds., Chapter 4, 1978. The basic model is a "cohort overcrowding" structure under the assumption of imperfect wage flexibility and substitution possibilities, particularly between younger workers and older (prime-age) males.

(33) This section is taken from Smith, R. and M. Robertson, Unemployment, Wages and Demographic Change in Post-war Canada, (forthcoming).

describe the unemployment rate for prime-age males, the unemployment rate of youth and women relative to males over age 25, the labour supply of youth and women, and absolute and relative wage levels. The aggregate unemployment rate is definitionally related to the prime-age male unemployment rate. These latter three variables are in turn explained behaviorally in terms of the variables of the system. Finally, the system is closed with specification of wage and relative-wage equations. Prices are assumed to be determined outside the labour market (product market or externally generated) and output is exogenous.

TABLE 7. Unemployment Rate Projections to 1985

	Percentage		
	High Growth	Low Growth	1979
Prime-Age Male	4.3	5.0	4.6
Women and Youth	6.7	8.7	9.9
Total	5.8	6.3	7.5

In order to assess the impact of demographic change in the labour market to 1985, the reduced form of the model was obtained under equilibrium conditions (steady-state) and a number of assumptions were made with respect to the exogenous variables. Two projections were made (Table 7) under conditions of high and low economic growth to

1985(34). While the projections are exploratory, they indicate a significant drop in the unemployment rate of youth and women(combined). This largely reflects the drop in the supply (and unemployment rate) of young workers. The projections appear to be quite sensitive to the economic growth assumptions.

The main factor accounting for the decline in the unemployment rate of youth and women (combined) is the decline in the working-age population (supply) relative to prime-age males, modified by the effect of a decline in the relative supply of women and youth on relative wages and demand. The main factor in the lower unemployment rate results primarily from the decline in the youth population. The decline in the prime-age male (25-54) unemployment rate largely reflects real output growth and is estimated to decline to 4.0 percent by 1985 if the economy operates close to potential, while rising to 5.0 percent under only modest growth conditions.

(34) The high growth scenario has the economy operating at close to capacity in 1985. In the low growth scenario the economy operates well below potential. The other assumptions are the same for both high and low projections. These assumptions involve a steady-state rate of inflation of 10 percent, a projection of working age population from Statistics Canada (Number 3 Projection), the minimum wage variable rising to \$5.00 in 1985, a tax-adjusted unemployment insurance benefit of wage ratio of 36 percent and inventory accumulation (percent of GNP) equal to the average of the 1970s.

SUMMARY OF THE DISCUSSION

Paper 1 Canadian Fertility Trends

The first contributor, Dr. Zsigmond (Statistics Canada), queried the point that family allowances had little effect on fertility levels by referring to examples on the international scene where governments had influenced fertility with financial incentives.

In reply, John Samuel (Employment and Immigration) stated that family allowances in Canada were currently at too low a level to have any impact on fertility; a comparison of the family allowance program in Quebec with that for the rest of Canada indicated that Quebec's slightly higher rate of payment had little or no impact on fertility. He agreed that in some East European countries, apart from family allowances, the governments concerned had given loans to couples for buying furniture, etc. and the repayments had been waived depending on the number of children born; however, at best, these measures had produced only some temporary impact.

A further question from Bali Ram (Statistics Canada) related to Dr. Samuel's speculations about the future course of fertility. He felt two contradictory hypotheses had been presented - firstly, that there would be a baby boom in the near future; and secondly, that as more and more women entered the labour force, fertility would continue to decline until a point of stability was reached. He added that this question had been raised time and time again in the United States and elsewhere and

he would like to know what position Dr. Samuel took on this issue.

In responding to Bali Ram, John Samuel (Employment and Immigration) said he had presented three scenarios for the future: firstly, higher fertility; secondly, fertility fluctuating around the replacement level of 2.1 children per woman; and thirdly, even lower fertility. These assumptions had been given to him by Statistics Canada. He referred to the examples of two countries in Europe, Sweden and the Federal Republic of Germany, where fertility levels (in terms of the total period fertility rate) were currently around 1.6 and 1.4 respectively. On balance, he was more inclined to favour the third scenario for Canada, and hence this was the reason why Employment and Immigration had used the assumption of 1.4 as the low level of fertility in their population projections.

Paper 2 The United Nations' Recommendations For Immigration And Emigration Statistics, And Their Application To Canada

Leroy Stone (Statistics Canada) stated that Canada had been under considerable pressure from other countries to keep better track of the human resources that were flowing into and out of the country. He pointed out that it was reasonable to expect that such pressure would increase in the future and, hence, Canada would be faced with increasing demands to make improvements to immigration and emigration statistics which were of the kind proposed by John Kelly in his paper. He then asked if one of the representatives of the Department of Employment and Immigration could indicate whether their department would be able to

expand the scope of the information it published on immigration to Canada.

In response to this request, Bob Gordon (Employment and Immigration) explained that a distinction had to be made between the definition of an immigrant as defined by his department and the completeness of the statistics that were collected and then published.

With reference to the first question he indicated that it was unlikely that Canada's definition of an immigrant would be changed because the definition was set down in legislation. However, he added that it might be a comparatively easy task to include additional tables in his department's immigration publication for persons who were not currently counted as immigrants, particularly since much of the additional data were already being collected and provided to users upon request. He stated that a major benefit of the approach proposed by John Kelly was that it would provide users with the data they needed to arrive at the United Nations' definition of an immigrant, without necessitating any change in the official Canadian definition of an immigrant. He indicated that senior officials in his department would be requested to examine the situation in detail in order to determine whether it would be feasible to proceed in the manner which had been suggested in the paper.

As far as emigration statistics were concerned, Mr. Gordon indicated that the question of enumerating persons leaving Canada had been explicitly discussed by a parliamentary committee prior to the

formulation of the new Immigration Act. Although consideration of emigration was felt to be important when new immigration targets were being formulated, it had been decided for both policy and budgetary reasons that the relevant statistics would not be collected. In addition, some Members of Parliament had felt that, in an open type of society like Canada's, it would be undesirable to give the appearance of exercising any control over persons leaving Canada, and particularly over permanent residents of Canada. Consequently, he was not very optimistic about the possibility of Canada being able to collect better emigration statistics in the near future.

Mike Ethier (Employment and Immigration) stated that some time ago his department had considered whether it should publish statistics on non-immigrant visa holders who had been granted temporary admission to Canada for a specified period of time; the department had decided not to include them in the publication because of the concern that there might be some misinterpretation of such data. He felt that the matter could now be re-examined in order to determine if the problem of possible misinterpretation could be resolved by clearly labelling the additional tabulations as relating to non-immigrants. He explained that if this approach were to be followed, the selected aggregation of the available data on immigration to Canada - that is, resulting from the combination of several different published tabulations - would then correspond more closely with the United Nations' definition of an immigrant.

Paper 3 The Future Growth and Structure of Canada's Population: Results
And Implications of Some Demographic Simulations

Arun Roy (Employment and Immigration) enquired about the possible implications for future immigration policy that could arise from the simulation results presented in the paper.

K.G. Basavarajappa (Statistics Canada) replied by saying that, even though some of the simulations pointed to a considerable increase in immigration, the answer was not as simple as that. He suggested one had to look at the implications for the labour force with respect to unemployment, the occupational skills needed and those already in surplus, etc. while setting annual immigration quotas. However, he felt that the study showed the importance of keeping the long-term effects in view, and not simply short-term objectives, while setting the annual immigration quotas. With regard to policy, he considered it was more the concern of the Department of Immigration.

Bob Gordon (Employment and Immigration) took the floor and indicated that projections of the kind presented were periodically requested from Statistics Canada and formed some part of the policy-making process in line with the requirements of the Immigration Act. He reminded the audience that of all the demographic variables (births, deaths, immigration, emigration and internal migration) immigration to Canada was the one most controlled by government; section 7 of the Immigration Act required the demographic rationale as part of the background for the setting of a target level for the number of

"permanent" immigrants. It was made clear that although many other issues were involved in determining a target level - for example, public opinion and the need for particular kinds of workers - policy makers were very interested in seeing and taking account of the likely demographic outcome of establishing a certain level of permanent immigration and the longer-term implications of some very short-term decisions on immigration.

Dr. Zsigmond (Statistics Canada) addressed a question to the conference participants on whether there was a demographic policy for Canada; a second question related to the factors which officials took into account when discussing and defining a desired population growth.

K.G. Basavarajappa (Statistics Canada) said the first question was essentially a rhetorical one. He did not think that anyone could provide a simple or unique answer: the absence of having a definitive statement was sometimes described as a policy in itself - that of "laissez-faire"; but at least with respect to immigration, which forms an important component, there were clear statements as to its purpose, goals, the volume and so on.

With regard to the second question, what rate of growth was desirable? K.G. Basavarajappa indicated it was not easy to answer this question either: before answering one had to consider many other questions reflecting different possible standpoints - for example, would one give an answer from the point of view of feeding the population adequately, the utilization of resources, providing full employment,

etc. or some combination of these?

John Samuel (Employment and Immigration) said the question on demographic policy had been asked many times before, although he did not know whether anyone had tried to answer it. He wondered how one would define such a policy, in terms of the growth rate or the total size of the population? He recalled comments made by politicians in this regard; in particular, statements by two previous ministers at Employment and Immigration who had both indicated that, in their view, 50 million persons was about the optimum population for Canada. However, he was not aware of many studies that had come up with any figure at all: some 50 years ago a Dr. Jeness had made a study which came up with a figure referred to as the "carrying capacity" for Canada; to do something similar now would require consideration of a number of factors and a gigantic effort. He concluded by saying the question on demographic policy was very complex and difficult to answer positively.

Paper 4 Recent Developments In Interprovincial Migration In Canada And Possible Scenarios For the 1980s

A comment in the paper by Jeanine Perreault and Ronald Raby was that the population of Alberta could eventually move towards a "saturation" point. Serge Bertrand (Employment and Immigration) asked for some elaboration of this point given that there was some suggestion of a possible shortage of labour.

In reply Jeanine Perreault (Statistics Canada) said that she had used the word "saturation" in relation to the capacity of a province to absorb all its newcomers. She agreed that in certain key sectors Alberta could be faced with a shortage of skilled labour. However, in order for Alberta to sustain such a high influx of migrants over a long period of time she felt a basic socio-economic infra-structure would be required: in the meantime, the provincial capacity for absorption being limited, tensions would be inevitable. Jeanine Perreault suggested that return migrations could occur as some former migrants might prefer to go back home or to provinces where such an infra-structure already existed, and that this could exacerbate the labour shortage.

Leroy Stone (Statistics Canada) agreed with the remarks made about the possibility of what Jeanine Perreault called "saturation". He added that it was not necessary to conceive the concept of "saturation" in order to account for the substantial changes in the regional patterns of migration; changes in the international economy which affected the provinces differentially could also be important. He thought it was advisable, when defining demographic scenarios, to consider the social and economic changes that might be associated with the continuation of any one of the scenarios for a given period of time. This point was not meant to be a criticism but rather to indicate a belief that what had been outlined in the paper marked a tremendous improvement by Statistics Canada in its development of assumptions for migration projections.

Jeanine Perreault thanked Leroy Stone for his comments and concurred with him on the importance of acknowledging social and economic factors of migration more explicitly; she also pointed out that it was planned to study the possibility of using that kind of approach to project migration in the next round of population projections.

Two further questions were posed concerning the paper on inter-provincial migration.

Firstly, Joseph Norland (Statistics Canada) commented upon the fact that there were some fluctuations in the figures for the decade presented in Table 9 which were hard to explain. The examples of British Columbia and New Brunswick were cited. He asked whether there had been any changes to the calculation procedures or methodology which might have affected the comparability of the estimates, and if there was any feeling for the differential accuracy of the estimates among the various provinces.

Ronald Raby (Statistics Canada) indicated that the database used for the 1970-74 period was not identical to that post-1974; in 1974 there had been a modification to the family allowance system whereby children aged 0-17 years became eligible rather than just those aged 0-15 years as previously; as a result more families and more children were included within the system. Moreover, he continued, for years prior to 1974, the only information available was the number of migrant families: in 1974, the Department of Health and Welfare started to provide the number of migrant children - that is, the number of migrant

families by size of family. However, all things being considered, Mr. Raby felt that these changes did not explain the fluctuations because the associated methodology had been modified accordingly. For example, he stated that the "adjustment factors", which are used to derive an estimated adult out-migration rate from that for children, had been calculated so as to take into account the change in the scope of the population eligible for family allowances; on the other hand, he reminded the audience that the "adjustment factors" for the period June 1971 to May 1976 had been computed using the 1971 Census data (from a question on place of residence 5 years earlier), while the corresponding factors for the period since June 1976 had been based on the 1976 Census results.

With regard to accuracy, Ronald Raby stressed that the numbers of in-, out- and net migrants were estimates and, thus, subject to errors: it was possible the exact levels of migrant flows were under- or over-estimated but there were no other sources of data available at the present time which would allow any evaluation to be made of their quality; plans were in hand, however, to consider the use of other administrative records, such as Medicare and Income Tax files, as a means to check the validity of the family allowance data. Mr. Raby summarized his answer by stating that the estimates of net migration reflected the fluctuations inherent in the basic data - that is, the number of families receiving family allowances who move from one province to another - and that he believed the current time series of estimates gave a good indication of the trends in interprovincial migration.

Secondly, Denis Gauthier (Economic Council of Canada) asked whether the figure (209,706) given for Ontario in Table 6 represented the total number of in- and out-migrations, and if so, whether the corresponding percentage should have been 26 rather than 52 percent. The point here was that if the number of in- and out-migrants for the ten provinces and two territories are summed the total number of persons obtained would be 808,744, not 404,372.

In reply, Ronald Raby (Statistics Canada) agreed that the data referred to the sum of the in- and out-migrants and thus to the gross migration in Ontario. He indicated that at the national level, the in-migrants and the out-migrants were the same people, and the total number of interprovincial migrants was indeed 404,372; but for any particular province the in-migrants and out-migrants were not (generally) the same people, so he felt it was correct to say that in 1970-71, out of a total number of 404,372 migrants in Canada, some 209,706 (or 52 percent) had moved either to or from Ontario. He stated that the percentages for all provinces could not be added meaningfully because of the overlap which is inherent in migration flows - two provinces are always involved in each movement.

Paper 6 The Effect Of Changing Age And Sex Composition Of The Labour Force On The Unemployment Rate In Canada: Recent Trends And Future Prospects

Kim Farrall (Statistics Canada) posed two questions. His first question related to the introductory comments in the paper concerning the impact of the influx of youths and women in the labour force on the

unemployment rate: he asked for more details on the history of the hypothesis and who had first developed it. His second question on the relevance of the analytical approach dealt with the consequences of one assumption that was made in applying the method: he stated that an implicit assumption underlying the analysis of age-sex unemployment behaviour appeared to be that the interaction effect was zero; he wondered, therefore, whether it was meaningful to hold the age structure constant in order to analyse unemployment rates by sex without taking into account this interaction effect.

Bali Ram (Statistics Canada), in replying to the first question indicated that quite a few papers had been published in the United States and Canada which dealt with the hypothesis that as more and more youths and women enter the labour force the unemployment rate increases: the hypothesis had not been developed by a certain individual but had been cited here and there in the literature (particularly during the late 1970s), in newspapers and by politicians. (Reference was made by Dr. Ram to two articles by Paul Flain and Glen Cain dealing with the hypothesis and which had been published in Monthly Labor Review, 102 (1979).)

His answer to the second question was "yes", by confirming that one could use a fixed age-sex structure as a standard and examine its impact on the varying unemployment rates. He explained that he had used a popular technique developed by Kitagawa (Journal of the American Statistical Association, 50, 1955) to decompose the effects of age and sex, and to show the relative importance of these two variables on the

unemployment rate; he also cited for information a further article by Antos et al., in the same issue of the Monthly Labor Review, which compared different methodologies for examining the impact of demographic factors on the unemployment rate. In this case, Bali Ram indicated that the impact was so small and, therefore, there was not much use in going into the details of decomposition.

K.G. Basavarajappa (Statistics Canada) elaborated on the questions raised by Mr. Farrall about the procedure used to decompose the difference between two unemployment rates into several components: it was an algebraic procedure which split the difference in the unemployment rate at two points in time into one component due to changes in the age-sex composition of the labour force and another due to changes in age-sex and/or other specific rates. He felt the confusion had arisen because the increased influx of women and young adults in the labour force, both of which influence the unemployment rate, was thought of by Mr. Farrall as giving rise to a compositional effect; whereas, he continued, much of this effect could be apportioned by the present procedure to changes in the age-sex specific unemployment rates. The latter resulted because the influx of women increased the female-specific unemployment rate while that of young adults increased age-specific unemployment rates at younger ages. Further, the interaction component was not assumed to be zero; it had been obtained separately and, as usual, had turned out to be negligible.

A. Romaniuc (Statistics Canada) referred to the conclusion arrived at by Dr. Bali Ram in his paper that demographic changes, in spite of

their considerable magnitude, had little, if any, impact on the current unemployment situation in Canada. His conclusion seemed to contradict Professor Easterlin's study whereby the so-called "stagflation" - a combination of both high unemployment and high inflation - had been triggered, at least partly, by changes in the age structure of the population - namely a large influx of young cohorts into the labour force, resulting from the post-war baby boom. The question was whether the contradictory conclusions were the outcome of the respective methodologies which these studies had utilized.

He continued by saying that one might wonder whether the standardization method applied by Dr. Ram was apt to isolate the demographic-related effects in a relationship that, in itself, was a complex one. This complexity arose, among other things, from the fact that individuals are both producers and consumers, and that the variation in the demand for goods and services of a given age group might affect the overall and possibly age-specific employment levels. Furthermore, the compartmentation between older and younger workers was far from being complete. Depending on the situation, the older, more skilled workers might take the jobs of younger, less skilled workers and vice versa. In other words, the "substitution" principle between these two groups of workers could operate, within certain limits at least, and thus affect the relationship between age structure and unemployment levels. He concluded by saying that it would be desirable for further research to be carried out along these lines before one could conclude more firmly that the age structure had no effect on the unemployment situation in Canada.

Paper 5 An Analysis Of Age Distribution By Occupation: Canada, 1971-85

Paper 7 The Impact of Demographic Change On The Canadian Labour Market

In relation to the paper on "the impact of demographic change on the Canadian labour market in the 1980's", Ian Macredie (Statistics Canada) asked whether the two participation behaviour models described had been tested with historical data.

Arun Roy (Employment and Immigration) replied that both models A and B had been tested with annual data for the period 1954-77 and had performed well in catching the turning points during the sample period. He added that projected and actual participation rates for 1978 had been compared also; the projected rates were fairly close to the actual historical rates but a slight tendency to underestimate the participation rates had been noted.

At this juncture, as a result of a question by Joseph Norland (Statistics Canada), the discussion focussed on the relationship between fertility changes and labour force participation rates; in particular what could be said about the validity of the relative-income hypothesis.

Matthew Robertson (Employment and Immigration) indicated that the relative-income variable did not appear to have any significant effect on the overall participation behaviour, although it might modify a trend-dominated type of model. His second point related to what the relative-income variable was actually measuring; it was a proxy variable

and, in terms of the work he and his colleagues had done, he thought it would not be a very important factor in the prospective overall change in participation rates, except for some component groups where it might have some effect.

To add to what Dr. Robertson said, Arun Roy (Employment and Immigration) stated that their objective in this particular exercise was simply to examine the impact that a relative-income variable might have on participation rates and not to test the validity or otherwise of the relative-income hypothesis as such. In that connection, he recalled that they had some reservations about the validity of the relative-income hypothesis as formulated by Easterlin and Wachter, whose conception of relative income was of the current family income relative to some kind of desired living standard. He questioned what was meant by desired living standard, and added that the relative-income model actually consisted of two separate hypotheses; according to sub-hypothesis I the desired living standard meant that accustomed to prior to marriage and before starting a family, and according to sub-hypothesis II to that enjoyed by other cohorts in a cross-sectional context. However, the sibling data from the U.S. had not confirmed the relative-income effect of the first type. Arun Roy concluded by stating that in the present paper the relative-income variable had been introduced in an attempt to reflect the relative-income effect of the type described as sub-hypothesis II.

Ian Macredie (Statistics Canada) enquired whether in the statements regarding female labour force participation and fertility any account

had been taken of the phenomenon that the participation rate of females with children had been growing faster than for those without children.

Arun Roy (Employment and Immigration) replied that the question was indeed an interesting and intriguing one to which he did not have a definite answer; current knowledge about the relationship between fertility and participation decisions was at best ambiguous, with no firm indication of the direction of causality. He considered it worth exploring how, in a micro context, participation behaviour was affected by the successive addition of children to a family and, over time, by such institutional factors as the availability of better day-care services.

Sheila Isaac (Employment and Immigration) broadened the discussion and asked whether it was possible to be more specific when estimating participation rates, unemployment rates and employment growth by reconciling them with estimates of which occupations were going to expand and of the extent to which females were moving into non-traditional occupations. Rough estimates contained within her paper had indicated that unless there was some movement into non-traditional occupations the female unemployment rate would rise in relation to that for males. She further explained that there had not been much progress to date on the movement to non-traditional occupations; maybe many women wanted to continue being secretaries, nurses, etc., even though these fields were not likely to offer many employment opportunities.

Amy Kempster (Statistics Canada) agreed that, on the basis of the evidence presented, the female labour market could face problems with respect to traditional occupations in the 1980s. However, she wondered what effect this would have on fertility levels - for instance, if unemployment during the 1980s were to increase, and hence the participation rate to decline, might not fertility be expected to rise accordingly?

John Samuel (Employment and Immigration), however, judged that, given developments in Canada and abroad, the assumption of women not trying to enter non-traditional occupations but deciding to have children instead could be wrong. He believed more and more women were entering and would continue to enter non-traditional occupations, and, therefore, that fertility would not rise as a result of problems within the female labour market.

During the course of this discussion Dr. Zsigmond (Statistics Canada) informed the participants from the Department of Employment and Immigration of some interesting and potentially useful new information in this area of research. In 1976, for each province (excluding Quebec), all those in their last academic year, either in colleges or universities, were surveyed to obtain their field of study, sex, age, etc.; these persons were re-interviewed some two years later to ascertain their activity and job satisfaction within the labour market; as a result, it was possible to study, for instance, the unemployment rate in 1978 specific for a field of study. Dr. Zsigmond cited that from this study the unemployment rate two years after graduation by

field of study had varied between 2 and 28 percent.

Sheila Isaac (Employment and Immigration) disagreed with John Samuel's point by speculating that the movement into non-traditional occupations would not happen that quickly: looking back over the past 25 years, for example, one could gauge the extent to which women were still excluded from the blue-collar trades. In relation to the comment by Dr. Zsigmond, Sheila Isaac felt that, while the new data source appeared to be very interesting, it would be at least 1985 before those currently in the education system would graduate into higher skilled occupations and therefore have any impact upon the labour market. Nonetheless, Employment and Immigration were interested in using this new information to further establish a link between education and the work force.

K.G. Basavarajappa (Statistics Canada) commented on the many sets of labour force projections prepared by individuals and organizations; he indicated, however, that there was no "official" set of labour force projections which was consistent with the "official" set of population projections for Canada and the provinces. He further mentioned that there was a large demand for such projections - Statistics Canada having been approached many times by users - and it seemed an opportune time to examine the feasibility of producing them.

CONCLUDING REMARKS

by

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The workshop which we had today has been a most instructive and illuminating one, and it would be useful to review a few of the more important points made in the different presentations.

The paper by John Samuel was an excellent introduction to the workshop because it showed us the importance of basic demographic variables in Canadian society and, in particular, some of the overall fertility levels which our country may experience in the future. It highlighted a number of different possibilities for the future and explained why there can be no assurances provided at this time as to what will lie ahead of us.

In his presentation on international migration statistics, John Kelly enumerated a large number of important gaps which exist in our knowledge of Canada's immigration and emigration flows; he provided us with a variety of concrete and useful suggestions which not only would help us to obtain improved statistics on international migration, but would also enable Canada to comply more closely with the United Nations' recommendations for international migration statistics.

The paper by K.G. Basavarajappa and M.V. George brought to light the implications of recent demographic changes on the future growth and structure of Canada's population; it also enabled us to gauge the relative importance of immigration on growth rates, and to see how immigration could be used as a tuning device for achieving particular growth rates.

Finally, in the morning session, Jeanine Perreault and Ronald Raby demonstrated how the structure of the population is changing geographically. They showed in very dramatic form the westward shift of our population - how Ontario is no longer the main recipient, how even people in Ontario are leaving to go to Alberta.

In the afternoon session, the emphasis changed to questions concerning the labour force. Sheila Isaac and Matthew Robertson demonstrated to us that some of the traditional assumptions included in the modelling of the labour market create serious problems because they do not take into account the varying age distributions within different occupations, or the age of entrance and exit from an occupation; nor do they take into account inter-occupational mobility. One of the main reasons for this situation is the lack of the required data, and here, I believe, Statistics Canada faces a real challenge to provide more information of this kind.

Bali Ram, in his paper, showed that one cannot blame the youth and women for all the increases in unemployment during the last decade; but Arun Roy and Matthew Robertson have shown that even so, in the 1980s

there will be less competition amongst the youth for the available jobs. This could have an effect of lowering that cohort's unemployment rate in the years to come, and, possibly in that way, have an impact on unemployment as a whole.

In conclusion this workshop has been very informative. The workshop has demonstrated that different departments and agencies can benefit a great deal by collaborating with one another on matters of mutual concern. Indeed, several specific topics have been identified which are of interest and concern to both Statistics Canada and Employment and Immigration Canada; consideration should be given to having both agencies collaborate with one another in the future on the work that they undertake on them. Some of the more important topics for which there may be considerable potential for closer interdepartmental collaboration are:

- 1) further studies of the possible impact of demographic factors on the labour market and of the demographic correlates of unemployment;
- 2) closer interdepartmental collaboration on the assembling of appropriate demographic data and the preparation of explanatory background papers which can be supplied to senior officials for their consideration when formulating new immigration targets for Canada; and

- 3) closer interdepartmental collaboration on identifying cost-effective ways of improving the quality, scope and international comparability of statistics on immigration and emigration flows for Canada.

I would like to thank all those who were responsible for making this occasion possible: to Dr. Fellegi, first of all, for inviting Employment and Immigration to join with Statistics Canada in hosting the workshop; also to John Samuel and John Kelly who between them looked after most of the administrative arrangements as well as being authors of two of the papers presented. To all those who prepared papers for the workshop and who contributed to the discussion I express gratitude on behalf of everyone present. Thank you very much.

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