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by
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Presidential Address, Canadian Population Society
Meetings of the Canadian Population Society, Toronto, 30 May - 1 June 2002

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Projecting the future of Canada's population: assumptions, implications, and policy

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Abstract: After considering the assumptions for fertility, mortality and international migration, this paper looks at implications of the evolving demographics for population growth, labour force, retirement, and population distribution. With the help of policies favouring gender equity and supporting families of various types, fertility in Canada could avoid the particularly low levels seen in some countries, and remain at levels closer to 1.6 births per woman. The prognosis in terms of both risk factors and treatment suggests further reductions in mortality toward a life expectancy of 85. On immigration, there are political interests for levels as high as 270,000 per year, while levels of 150,000 correspond to the long term post-war average. The future will see slower population growth, and due to migration more than natural increase. International migration of some 225,000 per year can enable Canada to avoid population decline, and sustain the size of the labour force, but all scenarios show much change in the relative size of the retired compared to the labour force population. According to the ratio of persons aged 20-64 to that aged 65 and over, there were seven persons at labour force ages per person at retirement age in 1951, compared to five in 2001 and probably less than 2.5 in 2051. Growth that is due to migration more so than natural increase will accentuate the urbanization trend and the unevenness of the population distribution over space. Past projections have under-projected the mortality improvements and their impact on the relative size of the population at older age groups. Policies regarding fertility, mortality and migration could be aimed at avoiding population decline and reducing the effect of aging, but there is lack of an institutional basis for policy that would seek to endogenize population.

Some of the first attempts to project Canada's population were rather disastrous. Considering only projections made by the federal government, Hurd (1939: 494), who also wrote various census analytic studies, projected that the population of Canada would reach 15.4 million in 1971. At the end of the war, demographers at the Dominion Bureau of Statistics, including Charles and Keyfitz, projected even lower figures. They projected that the 1971 population would be between 13.8 and 14.6 million (Charles et al., 1946: 19, 34). They further estimated that the population would reach a maximum of 15 million in 1990 (p. 5). We now know that already by 1951 the population already reached 14.0 million and by 1971 it was 21.6 million. These projections essentially failed to foresee the baby boom and they also anticipated that international migration would continue to be negligible, as it had been during the depression and the war.

While the Dominion Bureau of Statistics was recovering from these disastrous results by not engaging in projections, others were bolder at the Central Mortgage and Housing Corporation, the Economic Council of Canada, and the Office of the Chief Actuary of the Canada Pension Plan. Of course, the projections, associated with housing and economic futures could focus on the relatively short term. Least these institutions be off the hook, it is useful to observe that as recently as its 26th annual review, the Economic Council of Canada (1989) was projecting mortality based on the deaths per 1000 population. Having observed that the crude death rate had been constant for some time, it was held constant to 2040 without realizing that this required a rather heroic increase in life expectancy in an aging population. For instance, the projections by Statistics Canada (1990) were expecting the deaths to increase from 7.3 to 13.5 per 1000 population over forty years.

Coming back to the first generation of Statistics Canada projections, it is useful to observe that the recorded numbers for 2001 on total population (31.1 million) are within the band of the four projections released in 1974 (Statistics Canada, 1974). The closest is Projection B, based on a fertility of 2.2 and net immigration of 60,000 per year, which yielded a 2001 population of 30.7 million (only 1.4% off the mark after 30 years!). Especially in the context of the changes in definition wherein the non-permanent residents are now considered part of the population, and the adjustments now made for under-enumeration, these are rather accurate results. For the record, the band of projections for the year 2001 in this first generation was 28.4 to 34.6 million. However, there were compensating errors, with fertility being over-estimated and immigration being under-estimated. Consequently, in this Projection B, the population over 65 was projected to be 3,314,800 in 2001, while the current estimate is 3,917,900, representing a shortfall of 15 percent. In other words, this projection had expected that 10.9 percent of the population would be aged 65 and over, while the current estimate is 12.6 percent. The compensating errors of fertility and immigration at the level of the total population are not so gentle for sub-parts of the population.

Other subsidiary projections have also been rather far from the mark. Foot keeps telling us that we should be able to anticipate school enrolments. Yet the projections done at Statistics Canada by Zigmond and his colleagues in the mid-1970s were 31% off the mark for total full-time post-secondary enrolment by the mid 1980s (Zigmond et al., 1978: 126). It was not the demographics that were wrong, the people at the Education Division knew how the baby boom would mature

Table 1. Assumptions underlying Statistics Canada projections from 1971 to 1996 censuses

Projection	Total fertility rate			Immigration			Life expectancy M/F		
	L	M	H	L	M	H	H	M	L
1971 census	1.8	2.2	2.6	120,000	...	160,000		70.2/78.3	
1976 census	1.7	...	2.1	125,000	150,000	175,000		70.2/78.3	
1981 census	1.4	1.66	2.2	100,000	...	150,000		74.9/81.6	
1986 census	1.2	1.67	2.1	140,000	...	200,000		77.2/84.0	
1991 census	1.5	1.7	1.9	150,000	250,000	330,000	81.0/86.0	78.5/84.0	77.0/83.0
1996 census	1.3	1.5	1.8	180,000	225,000	270,000	81.5/85.0	80.0/84.0	78.5/83.0

Source:

1. Statistics Canada, 1974: 26, 59; 1979: 21, 29; 1985: 27, 41; 1990: 12, 26; 1994: 59; 2001: 57
2. Statistics Canada, Demography Division, special tabulations

as well as the people in the Demography Division, but they expected participation rates to be level, as they had been in the later part of the 1970s, especially for men. While reasonable at the time, this turned out to be a disastrous assumption as post-secondary participation rates grew after a period of being rather flat.

Fertility:

Starting with fertility, it is useful to observe that most Canadian demographers involved in projections took some time to conclude that fertility would go **below replacement and stay there**. In the first generation of projections, a high of 2.6 was used, anticipating that what comes down could go back up again. The evolving demographics even passed through the low assumption of 1.8 by 1978, four years after the projections were released. While lower numbers were subsequently used for the high projection, the projections following the 1976, 1981 and 1986 censuses all used replacement fertility as a high assumption, just as those following the 1971 census had used it as a medium assumption (Table 1). There has been a tendency for demographers to consider that there is something magical about 2.1 as if it was hard-wired in the human population: if fertility is going down it will stabilize at 2.1; if it is below replacement it will return to 2.1. Evolving patterns in a number of countries show that the trends pay no attention whatsoever to the figure of 2.1.

This fixation with replacement fertility can also be seen in the CPP projections, shown in Table 2, which were still anticipating an ultimate fertility of 2.0 in 1985 even though we had not seen such figures since 1976. When the assumption was then changed to 1.85 it was held at this level into the 16th report (1993), even though we had not seen such figures since 1975.

Table 2. Summary of Key Ultimate Demographic Assumptions Used for Canada Pension Plan

Report #	Valuation Date	Ultimate Canada Fertility Rate	Net Migration Rate as a % of the Population	Life Expectancy at age 65 Males 2050	Life Expectancy at age 65 Females 2050
0	1964	3.00	0.50	n/a	n/a
1	1969	2.20	0.50	n/a	n/a
2	1972	2.20	0.50	n/a	n/a
3	1973	2.20	0.50	n/a	n/a
4	1973	2.20	0.50	n/a	n/a
5	1973	2.20	0.50	n/a	n/a
6	1977	2.10	0.47	16.0	20.7
7	1977	2.10	0.47	16.0	20.7
8	1982	2.00	0.32	17.1	22.4
9	1982	2.00	0.32	17.1	22.4
10	1985	2.00	0.32	17.3	22.4
11	1988	1.85	0.40	n/a	n/a
12	1988	1.85	0.40	n/a	n/a
13	1988	1.85	0.40	n/a	n/a
14	1991	1.85	0.40	n/a	n/a
15	1993	1.85	0.40	17.8	22.8
16	1993	1.85	0.40	17.8	22.8
17	1997	1.70	0.60	18.4	22.8
18	2000	1.64	0.52	20.3*	23.1*

* in 2075

Source:

1. Special tabulation from Chief Actuary, CPP.
2. Office of the Chief Actuary, 2001: 14 – 46.

The theoretical interpretation of fertility probably needs to start with the demographic transition, along with a second demographic transition, while the period of the baby boom was a lag time between these two transitions (Beaujot, 2000: 240-243). The first transition involved a change especially in the economic value and cost of children, and a changed cultural orientation toward the advantages of controlling one's reproductive destiny. The second transition involved various family changes, especially a greater looseness in the entry and exit from relations. Observing similar changes over a number of modern societies, Lesthaeghe (1995) has proposed that there are three stages in this transformation. The **first stage**, from about 1960 to 1970 included the end of the baby boom, the end of the trend toward younger ages at marriage, and the beginning of the rise in divorces. The **second stage** from 1970 to 1985 involved the growth of common law unions and eventually of children in cohabiting unions. The **third stage** since 1985 includes a plateau in divorce, an increase in post-marital cohabitation (consequently a decline in re-

marriage), and a plateau in fertility due in part to higher proportions of births after age thirty. We may be in a fourth **stage**, related to the extent of fertility recuperation at older ages. While we understand the reasons for delayed childbearing, there is lack of theory to explain differential recuperation.

I find that further theoretical reflections on the **dynamics of fertility in modern societies** needs to consider the proximate factors, of course, along with the value and cost of children, and the interplay of production and reproduction. My sense from qualitative surveys is that most people want children (Beaujot and Bélanger, 2001). Children are valued as a source of enjoyment in life, including the special relationships which children represent, and as long term links with other people. The costs are mostly in time and energy, given other interests and priorities that people have in life. Given the changed family models, the interplay of production and reproduction is felt not only by families but also by individual women and men. There are situations where this interplay makes it very difficult to have children, especially if most of the opportunity costs are borne by women (e.g. Ranson, 1998). But there are other situations where the division of paid and unpaid work enables a better sharing of the costs of children (Risman and Johnson-Sumerford, 1998, Beaujot and Liu, 2001). These questions of supportive marital relationships and flexibility at work are probably the factors most responsible for the extent of fertility recuperation after age 30. Childbearing has, after all been rather stable since the mid-1970s, while women's labour force participation has continued to rise. Although some of this has stability occurred through women's double burdens, there are also improvements in the sharing of the work on the part of men and the larger society (Coltrane, 1995). In his theory of low fertility, McDonald (2002) proposes that globalization creates risks, which can be averted through human capital investment and delays in childbearing. The societies with particularly low fertility have less progression beyond the first birth. He proposes that this is not due to differential values because desired family size is higher than actual childbearing. Instead it would be due to constraints, represented especially by opportunity costs for women. These opportunity costs rise with women's income and they can decrease with institutional arrangements like paid leave, part-time work with good benefits, and subsidized child care.

Based on discussions at the 2001 IUSSP workshop on low fertility, I would conclude that Canada is not likely to be among the countries to experience "low-low fertility," and that a cohort projection of 1.6 to 1.7 is an easier assumption to defend. Societies are in less danger of particularly low fertility if there is state support for families and for gender equality, and if families of various types are accepted. It would appear that fertility can be sustained in post-modern family conditions, which include the acceptance of births in cohabiting relationships, the de-gendering of caring activities, and the flexibility of opportunities for both part-time and full-time work. While we are not completely there, it seems to me that Canada is moving in the right direction to avoid particularly low fertility.

Mortality

We notice for mortality that life expectancy has typically been under-projected, and thus the ultimate levels have been raised from projection to projection. Just as it was hard to think that fertility could move permanently to below replacement levels, the tendency has been to

anticipate a certain capping of improvements in life expectancy. There seems to be a tendency to pay attention in particular to things that are getting worse, like HIV-AIDS, without paying sufficient attention to things which are getting better. As of 1971, it was thought that the improvements in life expectancy were reaching some limit, and in effect the improvements had been declining from census to census, yet the changes over the period 1971-76 were larger than had been observed since 1951-56. It was also being anticipated that the divergence between women and men would continue to grow (Gee and Veevers, 1983). At a 1978 conference, I proposed that the 1976 divergence, of 7.3 years, was the end of an era of increasing differences. In effect, this divergence has now decreased to 5.4, not because women are dying more as some pessimists had thought, but because men have made significant gains.

It was largely unanticipated in the early 1970s that adult mortality would recede significantly. In effect, much of the previous gains had been due to reductions in infant and childhood mortality, along with less deaths of women in childbirth, and by the early 1970s there was little room for further improvements in these forms of mortality. But we subsequently saw improvements in cardiovascular mortality, then in accidental deaths, and now in cancer mortality (Dumas and Bélanger, 1997: 49-66; Belliveau and Gaudette, 1995). That is, all three of the modern causes of death are in decline. We can usefully speak of a fourth phase of the epidemiological transition toward delayed degenerative diseases and hybrid causes (Bah and Fernando, 1991). Delayed degenerative means that cardiovascular and cancer deaths are occurring at older ages. Hybrid mostly means “man made,” an over-confidence that produces recklessness in the face of danger. Certainly HIV-AIDS follows this pattern in terms of reckless sexual activity, however in other regards such as driving too fast and especially drinking and driving, the risks have declined.

The proximate factor or *cause of death*, requires a fuller analysis in terms of risk factors and treatment. It is probably safe to say that, for many major causes of death, both of these are in significant improvement, and there is room for further change. In terms of *risk factors*, with the exception of certain categories of youth, there is increased concern about health in areas ranging from diets and exercise, to harmful substances like smoke (Galambos and Tilton-Weaver, 1998; Millar and Beaudet, 1996). For accidental deaths, not only are there concerns with regard to greater safety measures at home, at work and on roads, but there has been a greater recognition of certain dangers such as drinking and driving. Especially with regard to cancer where the declines are slight, environmental quality may be an important avenue thought which to reduce risks, but this may be particularly difficult to achieve in a world where standards of living depend on high use of energy and other environmentally unfriendly forms of consumption.

It is the *treatment factors* that are particularly hard to predict, because they involve scientific and technological advances. While we complain about the under-funding of the health system, and rent seekers in that system are particularly apt at pointing to the deficit, there are several bases for optimism. First there is the high quality of the personnel in the health system, which would predict technological advance. Secondly, there is a public that is very sympathetic to further public spending for health. Finally, there is a growing willingness to seek help from the health system; the interactions with the system are increasing much faster than population growth or aging would predict.

While it is easy to have 20/20 hindsight to the effect that we were conservative in anticipating past changes, are we being conservative in anticipating further changes? I think so. For instance, the most recent median assumption showing a life expectancy of 82.0 is lower than that used for projections in the United States at 86.7 and Mexico at 85.5 (Germain et al., 2001). Oeppen and Vaupel (2002) propose that life expectancy will continue to rise at 2.5 years per decade, as it has in the past 150 years. In the high assumption from Statistics Canada, the ultimate life expectancy is 81.5 for men and 85.0 for women. The reduction of the differential, to 3.5 years, is in the right direction, but it could even be lower. Without having any data, Keyfitz (1989) has suggested that the biological basis for this differential could be as low as three years. Until the revisions for the year 2000, the United Nations used a projection model where the highest possible life expectancy was 85; this has now been revised to show 92.5 years. Why not use at least 85 years for Canada, which is among the handful of top countries in the world.

International migration

If the mortality assumptions have tended to be low, the immigration assumptions have varied considerably, based on the levels at the time of the various projections. Notice, for instance, that the projections following the 1981 census used a range from 100,000 to 150,000, while those following the 1991 census used 150,000 to 330,000. In this later figure we see some of the magic of round figures, 1% is an attractive number to use in policy statements, but it probably has little demographic basis.

On both empirical and theoretical grounds, international migration is the hardest to project. Empirically, the main generalization seems to be that if immigration is going up, it will eventually come down, and if immigration is going down it will eventually come back up. Given this variability, I would propose that we use long term averages of at least 10 years if we are to base assumptions on past trends. Another empirical generalization seems to be that higher levels of immigration are linked with higher levels of emigration, and thus immigration and emigration assumptions should be linked.

Theoretically, mortality has a certain simplicity in the sense that everyone dies, and only once, of a given cause, and there are also certain biological constraints for fertility, but migration is considerably more complex. At the micro level, some live and die in the same place, others are always moving, and some even return to where they started. While people are adventurous, especially when they are young adults, my orientation is to think that there is a natural tendency not to move. Staying represents integration in family and community, and consequently it is in circumstances when individuals are less integrated that there is a tendency to move. Much movement is associated with life course changes like leaving home, going to school, getting a job, starting or ending a relationship, retiring, and entering an old-folks home. When people are at stages where they are more prone to move, the push and pull factors have much to do with where they move (Beaujot, 1991: 162-164; Goldscheider, 1971). My theoretical sense would be that, at the micro level, social and life-course questions associated with extent of integration in family and community are more responsible for whether people move, and economic questions more responsible for the choice of destination when people do move.

At the macro level, which is particularly important when considering international migration, there are push and pull factors, along with various barriers between places of origin and potential places of destination. These barriers, represented especially by policy, are probably the main way in which to understand shifting trends (Beaujot and Matthews, 2000). At the very least, we need to appreciate that levels of immigration are a function of things happening within Canada and others happening outside of the country, along with the links across countries, both in the short and longer terms (Simmons, 2001).

Given the out-migration pressure associated with the demographic transition, the medium term will show no shortage of a potential pool of people who want to come to Canada, and these outside pressures are probably increasing (Golini, 1996; Castles and Miller, 1993). The factors that have been analysed from within Canada have been especially economic and demographic, but I would propose that they should be seen as more social and political. At various times, the case has been proposed that Canada needs immigrants, either for economic growth or to overcome demographic stagnation. These arguments are strong and they may misrepresent core demographic and economic questions. While immigration is probably favourable to economic growth, is it far from being a major factor (Economic Council of Canada, 1991; Green and Green, 1999). Immigration can sustain demographic growth, but it can only slightly reduce the pace of population aging (Li and Wu, 2001).

The fact that unemployment is one of the better predictors of immigration can probably be mostly interpreted in social and political terms (Veugelers and Klassen, 1994; Foot, 1994; Simmons, 1994). In spite of the research to the effect that immigration contributes little to unemployment, there is a social and political tendency to be less favourable to immigration when economic conditions are more difficult (Palmer, 1996, 1999). That is, when the social mood is more favourable, there is a tendency to see immigration positively, especially in terms of increasing the cultural richness of Canada, contact with a broader pluralistic world, and being generous to the disadvantaged. When the climate is less favourable, there is a sense that we should first look after ourselves, or a felt need to retrench, to reduce the pace of change. Some theorists have seen natural tendencies toward opening and closing over intervals of time (Klapp, 1978).

Politically, the orientation has often been to follow the social climate, and thus not to deviate excessively from public opinion. Nonetheless, it is interesting to observe that the Conservative government continued its orientation of “planned controlled growth” through the recession of the early 1990s. The party was on record as having judged it a mistake on the part of the Liberal government to have reduced immigration in the recession of the early 1980s. In addition, in the early 1990s the governing party was at an all-time low in political opinion, having alienated various groups from the West who wanted more say in government, and from Quebec seeking a renewed constitution. It may be that the party sought the support of interest groups surrounding immigration, both multi-cultural groups and business interests, as a means to make public opinion inroads in these difficult political times (Foot, 1994).

If this interpretation is correct, to the effect that receptivity to immigration is mostly a function of social and political climate, then predictions of changes in trends are particularly difficult. This

also indicates that extending a short term level (say the last three or five years) is subject to considerable difficulty. However, an average over a longer term has a better chance of catching the swings of both opening and closing. For instance, as a low assumption, one could use the average of the entire post-war period, and as a high assumption that of the past ten years (150,000 and 200,000 respectively). There are certainly a number of people who are seeking to make a case for higher immigration. If these interests are politically ascendant, it would be wise to suggest an even higher assumption, like the 270,000 used by Statistics Canada.

Implications for population growth

The first release from the 2001 census shocked some people who did not have a good sense of the underlying demographics. We have known for some time that natural increase would be down, and that it will eventually become negative; it should not be surprising to find that growth is slower and that net international migration comprises a larger share of population change.

Seeing that population growth was slower, some people concluded that the population was on the verge of decline. This misconception was amplified by the *Globe and Mail* with the front page story that Canada's population would decline within nine years. This prognosis, of course, paid no attention whatsoever to Statistics Canada's projections, and was based on the rather heroic assumption of zero immigration (Baxter, 1998). Even in the low projection from Statistics Canada (2001), negative natural increase starts only in 2015, and population decline starts in 2030. This "mistake" as the *Globe and Mail* (2002: A22) admitted the next day, may have been prompted by the media orientation to be sensational, but it played into the interests of those who want to make a case for higher immigration. For instance, Baxter is quoted as saying that "if we didn't have immigration, we'd stop regenerating our labour force in about four years" (Hutchinson, 2002: 32) This implies that there is little regeneration associated with the numbers of people leaving Canadian schools to enter the labour force.

As we enter an era of slower growth, and some areas are in decline, we will need to change the descriptive statistics that we use. For instance, since 1993, net migration has been larger than natural increase. While this is an appropriate way to describe change, it is also useful to note that annual births in the period 1996-2001 were in the order of 341,000 while immigrants numbered 210,000, or births outnumbered immigrants by 63%

In a projections mode, we can use the concept of replacement migration. One of the definitions of replacement migration is the number of immigrants necessary to avoid long term population decline, in the context of below replacement fertility. Ryder (1997) uses the concept of replacement migration in the sense of the level of migration that would achieve the same ultimate population size as we would achieve if fertility were at replacement levels. Using the vital rates of the early 1990s, Ryder places the replacement net migration figure at 167,225, which might be translated into an immigration of 215,000. Other studies have used this idea, suggesting that immigration somewhat above 200,000 would prevent population decline at current levels of fertility and mortality (see Beaujot and Matthews, 2000). We see this in the intermediate projection from Statistics Canada, with an immigration of 225,000, the population continues to grow until 2040, that is into the foreseeable future.

Implications for the labour force

The United Nations Population Division (2000) has given two other meanings to replacement migration. Besides having enough migration to prevent the population from declining, a second scenario seeks to use migration to maintain the size of the population aged 15-64. When one realizes that the labour force now includes the baby boom, this kind of replacement migration would in effect seek to have a permanent baby boom (Leridon, 2000). This is not unlike the proposition that David Foot had made in the mid-1980s, to select immigrants that would fill-in the baby bust, and to avoid bringing immigrants who were at the same age as the baby boom (Foot, 1987). This seems to treat immigrants as disembodied demographic entities who have an age but lack other things like family connections.

If the objective is to maintain the size of the labour force, it is useful to appreciate that there are other factors that can be manipulated, at least in a projections mode. McDonald and Kippen (2001) have outlined scenarios where, besides immigration, other factors are considered, in particular the participation rate in the labour force (including ages at entry and departure, and women's participation) and the level of fertility. For Canada, along with United States, New Zealand, Australia and Singapore, decreases in labour supply can be avoided through continuation of the present fertility, immigration and labour force participation rates. These results are similar to those obtained by Denton and colleagues where an immigration of 200,000 per year shows the labour force declining slowly between 2026 and 2036, but the size in 2036 is 16 percent larger than in 1996 (Denton et al., 1997: 38-39). Compared to the other sixteen countries studied by McDonald and Kippen (2001), Canada and Australia are seen as having "moderate fertility, high immigration and low labour force participation". With zero net immigration, the current fertility and labour force participation rates are shown to bring declines in labour supply after about 2015. With current immigration, the labour force rises only slowly but does not decline. Increased labour force participation rates, moving men's rates at ages 35+ toward their rates in 1970 and moving women's rates at ages 25+ toward Swedish rates, would lead to large increases in labour supply (25% increase from 2000 to 2030). A return to fertility of 1.8 would bring growth of the labour force after 2025, compared to holding fertility and migration constant.

The 2001 Annual Report to Parliament (Citizenship and Immigration, 2001: 2) observes that 70% of labour force growth is due to immigration. This figure is derived by looking at the change in the size of the labour force between two censuses, used as a denominator, compared to the number of labour force participants who had arrived in the previous five years. That is, of the change in the size of the labour force, what percentage is due to immigration. When the labour force is growing slowly, this figure is not very meaningful. For instance, if the labour force grew from 10,000,000 to 10,000,001 but one member of the labour force was an immigrant of the past five years, then 100% of the labour force growth would be due to the arrival of that one person. It would seem more appropriate to look at the relative size of the internal and external sources of entry into the labour force. For instance, the size of cohorts turning say 20 these days is about 408,000, while immigration is about 210,000. Of course, neither group would be completely in the labour force. If we estimate that 90% of those coming to labour force ages will be in the

labour force at some point, and that 90% of immigrants aged 15-64 will also be in the labour force, then we would have 507,000 additions to the labour force, of which 72% would be due to internal recruitment and 28% due to immigration. It seems absurd to say that our labour force will not be renewed unless we have immigration! Clearly, immigration is an important source of recruitment, but this should not be exaggerated. Depending on immigration can also make us lazy with regard to other sources of recruitment, both in terms of appropriate educational investments and population groups that have lower labour force participation. For instance, the average hours worked per week is 37.9 for employed men and 32.3 for women. Applied to the 45% female in the labour force, increasing women's average hours to that of men would be comparable to a 6.6% increase in the size of the labour force. At ages 25 and over, the employment rate is 69.1 for men and 55.8 for women. Reducing that difference by half would be equivalent to a 4.4% increase in the labour force.

Implications for aging and retirement

The third scenario of replacement migration used by the United Nations (2000) seeks to maintain the relative size of the population aged 15-64 to that aged 65 and over. As recognized by the authors of the report, this scenario leads to absurd results, sometimes assuming that the whole world move to one country to prevent an increase in the proportion aged 65+ compared to that aged 15-64 (Coleman, 2000). This is the strong sense of "replacement migration," with migrants eventually replacing the original population (Lachapelle, 2001). As indicated by various projections, including those from Denton et al. (1997), there is not a demographic solution to aging.

We have also tended to under-project population aging. By under projecting the decline in both fertility and mortality, the earliest population projections had some compensating errors, that is, they projected too many births and too many deaths. While these compensate at the level of the total population, they both act the same way in terms of aging; that is, both under projections have under-estimated the population aging. On the third component, the traditional assumption has kept constant the age distribution of immigrants at arrival. With the world population aging, the average age at arrival has also been increasing, which also translates into an under projection of the population aging.

It is probably in terms of anticipating aging that population projections play their most important role. For most uses of projections, for instance in anticipating housing, labour force trends or other provisions of the welfare state like health, education and welfare, a fairly short time horizon is sufficient, and thus the demographic projections need not be particularly accurate. However, long term population projections are essential in anticipating the relative size of the labour force and the retired population. This is particularly relevant to the Canada/Quebec Pension Plan, where we need a sense of the change in relative numbers of contributors and recipients (Beaujot, 2000).

For purposes of the Canada Pension Plan, the ratio of population aged 20-64 to 65+ is a particularly useful measure of the age structure, since it gives this sense of the relative numbers of beneficiaries and contributors. Table 3 presents such figures from 1951 to 2100, using the

Table 3. Ratio of population aged 20-64 to population aged 65+, Canada, 1950-2100

Historical data			
1951	6.97		
1976	6.49		
2001	4.86		
Statistics Canada medium projection (from 1971 census)			
2001	5.35		
Statistics Canada projections in 2001			
Low (Projection 1)	3.04	2.42	
Medium (Projection 2)	3.04	2.45	
High (Projection 3)	3.05	2.51	
Projected in CPP for (year)			
Report 0 (1964)	2000	2050	2100
Report 6 (1977)	6.22	5.61	
Report 12 (1988)	5.62	3.47	
Report 17 (1999)	4.83	2.48	2.32
Report 18 (2000)	4.92	2.39	2.17
	4.90	2.36	2.23*
Projected with alternate immigration levels (year)			
Zero immigration	2016	2036	
100,000	3.36	1.79	
200,000	3.54	2.02	
300,000	3.70	2.22	
400,000	3.86	2.40	
500,000	4.00	2.59	
	4.15	2.70	

Note: * in 2075

Source:

1. Statistics Canada, 2001: 183 -- 185; Denton et al., 1997: 39, 41
2. Office of the Chief Actuary, 2001: 18

results from Statistics Canada and various reviews of the Canada Pension Plan. For instance, Projection B from the first generation of Statistics Canada projections, which has very accurately projected the total population 30 years later, significantly under-projected the beneficiaries in comparison to the contributors. The same applies to the earlier projections from the Canada Pension Plan for the year 2000. The revisions of the Canada Pension Plan projections have been in the direction of reducing the proportion of contributors in relation to beneficiaries. Overall, it is useful to observe that this ratio changed from 6.97 in 1951, to 6.49 in 1976 and 4.86 in 2001,

and can be expected to decrease to about 3.0 in 2026 and 2.5 in 2050 (Table 3). These are rather amazing numbers: what was once close to seven persons in the labour force ages per person at retirement ages, has changed to under five, and will further change to under three persons in labour force ages per person at retirement ages.

In the 1970s, we largely concluded that fertility had the largest impact on the age structure. This made sense as fertility declines reduce the number of young persons in the age structure and thus bring aging. We have since called this “aging at the bottom.” However, we should have known that fertility was not the only factor, given that the proportion 65 and over was 7.2% for men and 8.9% for women in the 1971 census. Since the births of males and females was following the same trends, it must have been the mortality advantages of women that were showing up in these differences. There is now much awareness of aging, especially the aging baby boom, which has been called “aging at the middle,” and the effect on retirement, but we are underestimating the ways in which the improved mortality conditions at adult and older ages are producing “aging at the top,” that is in the number of survivors at older ages. The latest revisions to the projections for the Canada Pension Plan use a life expectancy at age 65 of 21.7 or a total of 86.7 years in 2075. That is, if someone were to spend the whole 45 years between 20 and 64 in the labour force, there would be another 21.7 years of retirement, or about two years in the labour force per year of retirement. There is now clearer understanding that low fertility brings aging, as does the movement of the baby boom through the age structure, but we may not be sufficiently appreciating how past and potential mortality declines at adult and older ages are another significant factor in aging. The future will see very significant changes in the number of years of retirement compared to those in the labour force.

In comparison, immigration levels have a relatively small impact on population aging. Based on the population projections following the 1996 census, Loh and George (2001) find that zero net immigration gives a figure of 29.8% aged 65 and over in 2051, compared to 25.4% at these ages with an immigration of 225,000 per year, which is already double the proportion aged 65 and over in 2001. For the population aged 65 and over, the alternative mortality assumptions have a larger impact than the alternative immigration assumptions (George et al., 1997).

In effect, these considerations bring into question some of the underlying assumptions which were present when our public pension plans were being instituted (Beaujot and Richards, 1996). The mid-1960s were a time of considerable demographic growth in a relatively young population. Families largely followed the breadwinner model, with relatively few lone parents. It was also a time of economic growth, with much confidence that the future would be able to fund an expanding welfare state. Socially, there was interest to expand social security, especially to benefit the elderly who were a significant pocket of poverty (Myles, 2000). Given the relatively small numbers of elderly, it was possible to establish programs without particularly high total costs, anticipating that economic growth would keep up to future costs. As the plan took in more funds than it distributed in the earlier years, because only past contributors could be recipients, there was an irresistible urge to use these extra funds to address other needs in the welfare state, by adding widowhood and disability provisions, and granting full benefits to those retiring in 1976 after just ten years of contributions.

If we have seen these changes in the first 35 years of the Canada Pension Plan, what about in the next 50? For instance, can we expect changes in the ages of working life and retirement? Most important, I would suggest, are further potential changes in mortality. In two articles marking the beginning of a new millennium, writers in the *Globe and Mail* suggested that, within a hundred years, we could be living forever (Robinson, 2000; Sawyer, 2000). The frontiers of biological research are expanding exponentially. Can our demographic projections keep up?

Implications for population distribution

The first release from the 2001 census showed the implications of the changing demographics on population distribution. We are seeing that immigration can bring important changes to population distribution, especially when natural increase is lower. Relative to the existing population, immigrants are not as evenly distributed over space as births. Consequently, growth that is due to immigration rather than natural increase brings changes to the overall population distribution. Population growth is likely to continue to favour four major urban regions: Ontario's extended Golden Horseshoe, Montreal and adjacent region, British Columbia's Lower Mainland and southern Vancouver Island, and the Calgary-Edmonton corridor. Together these four regions comprised 51% of the nation's population, compared to 41% in 1971 (Statistics Canada, 2002). With the partial exception of Quebec, the associated provinces are exactly those which had more growth in the latest inter-census period. In effect, all other provinces either grew less than 0.5% over the five years, or declined.

Not only is the distribution of the immigrant population rather different from that of the Canadian born, but their subsequent re-distribution tends to further accentuate this geographic selectivity. Both the foreign born and the native born are more likely to move to provinces that have larger populations, more economic opportunities, and higher proportions of foreign born (Edmonston, 1996; Beaujot and Matthews, 2000). The regional integration of immigrants follows especially on economic questions and the links established between sending and receiving areas (Massey et al., 1994). Globalization creates both migrant populations due to economic displacements, and employment opportunities in large cities. Migratory exchanges tend to be perpetuated between places of origin and destination.

Immigration is now driving the urbanization trend. In several census metropolitan areas, the 2001 census showed slower growth in the core municipalities than in the adjacent surrounding areas. Statistics Canada has called this a "donut effect" which includes the high growth of Barrie and Hamilton around Toronto. The 2001 census may confirm what was observed in 1996, where several metropolitan areas showed outward internal migration balanced by high international immigration. For the total metropolitan areas, the net internal migration of the 1991-96 period represented a net departure of 156,000 persons, while 971,000 immigrants had arrived in the five years preceding the census (Beaujot and Matthews, 2000). Internal migration was positive in ten of the metropolitan areas, but in these cities the recent immigrants were more numerous than net internal migrants. In eight metropolitan areas the immigrant arrivals were insufficient to compensate for the net departure by internal migration. In the remaining seven cities (Edmonton, Halifax, London, Montreal, Sherbrooke, St. Catharines-Niagara and Toronto) there was a

negative net internal migration but compensated by high international arrivals, over the 1991-96 period.

Outside of metropolitan areas there are few immigrants. In 1996, 43.0% of the Canadian-born population was living outside of census metropolitan areas, but this was true for only 6.5% of the 1991-96 immigration cohort. We may be evolving two countries, one with high proportions foreign born, growth and diversity, while the other is on the verge of decline. People leave the smaller places for good reasons: lack of employment, lack of educational opportunities for the children, lack of employment of other family members. Except economic prospects that would enhance given rural areas and smaller towns, it is hard to think of bases for a more even distribution of immigrants. The demise of small towns and rural areas has nothing to do with immigration. However, as population change is due more to immigration than to natural increase, the differentials associated with receiving areas are likely to grow.

Population policy: can we endogenize the demographics?

While it is not popular to talk about population policy, let me finish with comments along these lines. Even the Cairo conference on Population and Development tended to avoid setting demographic goals at the macro level or promoting population policy, preferring instead to promote services that would allow individuals to control their reproductive destiny. In effect, there has been much repression in the name of population control. It is essential that ethical questions be brought forward and that only acceptable means be adopted. In terms of childbearing, as the Cairo conference indicates, people should have the means to make free and responsible decisions on the number and timing of their children. Policy that would infringe on this human right must be condemned, along with deliberate incentives that would constrain behaviour (United Nations, 1994: 32). People should not be constrained to have the children that they do not want, and they must be permitted to have the children that they want. However, I would argue that it is legitimate for the society to call for a certain behaviour that would enhance collective well-being, in childbearing as in other domains.

Demographics are precisely at this juncture of individual and collective interests (Demeny, 1986). The number of children to have, and where to live, are immensely personal questions, but the society also has an interest because these behaviours influence collective well-being. The number and composition of its membership is of clear interest to the whole society, and there is a legitimate basis for inter-personal influences in regard to the associated behaviours which are far from purely private.

What might we suggest as a population policy for Canada, in the sense of a vision of the preferred demographic future and a discussion of the means to move in that direction. In my view, this might start with two elements: (1) the advantages of some population growth or at least avoiding decline, and (2) slower rather than more rapid aging. Substantial demographic growth can be economically useful, or at least it has been in the past, but avoiding decline is probably more important from an economic point of view (United Nations, 2000). Decline would mean various superfluous investments and difficult adjustments of various kinds, and it would include particularly significant aging. On the other hand, environmental arguments point

to the disadvantages of high growth. While population growth could encourage more environmentally friendly consumption and technology, there is no avoiding the direct multiplier of population size on environmental impact, given our standards of living based on high use of energy and other forms of damaging consumption (Daly, 1999). In the context of uncertainties associated with environmental questions, the wise course of action would be to seek to minimize the impact (LeGrand, 1998).

In terms of specific components, **fertility** is key for both growth and aging. There is clearly limited potential for leverage in regard to fertility, some would say there is none. However, reflections on countries that have particularly low fertility, for instance in Southern and Eastern Europe, suggest that these very low levels occur when women have opportunities in education and the labour force, but the family remains traditional (McDonald, 1997). If women have to absorb the family work, especially once there are children, they are particularly oriented to emphasizing their roles in the paid work sphere, where opportunities are more equal. Fertility in a modern society may be sustained by policies that would support families, regardless of family type, reduce gender dependencies in families, and prompt a better sharing of earning and caring activities between men and women (Beaujot, 2000). This would not likely bring fertility above replacement, but it may allow more people to have the children that they originally intended. That is, we should seek to remove the barriers to childbearing through better sharing in the costs of children by fathers and the broader society.

Mortality is easier since longer and healthier lives are a widely shared value. As indicated earlier, in an era of delayed degenerative and hybristic mortality, key are the risk factors and treatment. This points to the importance of continued public education on risk factors, along with advances in treatment. It also points to the various other bases for disadvantage that discourage individuals from taking control of their lives. Other risk factors are environmental, where more research is needed, but there is considerable evidence on the impact of environmental quality on population health. In effect, there is more knowledge on the effect of environment on population than the effect of population on environment. But here again, the greater danger is the lack of political will to conclude from the research in a policy direction.

That leaves **international migration**, where the policy basis is best established. While the immediate demographics of immigration are reasonably well established, the role that these should play in determining immigration levels is far less clear. There are the short term benefits to the labour market, along with the short term costs of integration, but the long term benefits of a larger population depend on the relative weight given to economic and environmental considerations.

While immigration targets work quite well, there is need for more discussion on the basis for setting these targets in terms of both number and composition. Even the Immigration Legislative Review (1997: 2) observed that, for many, levels of immigration were not an “intriguing topic” and that the important questions were Not just numbers. The costs and benefits of immigration to the receiving society need fuller analysis, especially in terms of the differential costs and benefits to different interests and parts of the society. For instance, it is concluded in Sweden that by avoiding the cheap solution of guest workers, the society was prompted to make more

space for women in the labour force, including policies that would allow workers to have children (Hoem and Hoem, 1997). While immigration is appreciated in terms of bringing diversity, richness, pluralism and contact with a broader world, population renewal that is excessively based on migration rather than fertility means much change and possibly less potential for socializing new members into a common society. If one considers immigration in terms of pressures from outside of Canada, one way to handle these pressures is through higher immigration, along with fair trade and international assistance (Golini, 1996). Clearly, higher immigration is of interest to individuals who are seeking to migrate to Canada, and it is often of interest to sending societies. I would agree with the Economic Council of Canada (1991) that the case for immigration should not be made in demographic or economic terms, but in socio-cultural terms. While immigration slightly reduces aging, it is an exaggeration to say that immigration will correct the age structure. Similarly, immigration probably brings net macro-economic benefits, including a source of labour market renewal, but internal considerations are more important to macro-economic growth (Green and Green, 1999). Instead, the case for immigration needs to be made in terms of pluralism, cultural dynamism, humanitarian concerns, and openness to a broader world. Thus the level and composition of immigration needs to be based on a political judgement regarding the kind of society that we want to build. We need to evolve a society that will have good adaptive capacity, by being both diverse and cohesive. Thus the judgement is not demographic nor economic, but in terms of the kind of immigration that will maximize the sometimes contradictory elements of diversity and cohesiveness.

We may agree or disagree on these specifics, but the broader problem is the lack of an institutional basis for policy that would seek to endogenize population. Looking at the Australian case, McNicoll (1995) finds that there are various impediments to population policy in liberal democracies. Besides the lack of a political basis for long-term planning, the emphasis on individual welfare, and the lack of attention to scale, there is also a tendency for “government to see its constituency only in terms of organized groups and its role that of arbitrating competing claims” (p. 18). In the Canadian case, Pal (1993) has analysed how various “civil society” groups, often set up by the state, are also seeking rents through the political system and may control agendas based on specific interests. It would appear that these interests relate less to the population as a whole, than to specific concerns like those of family, feminism, environment, health, multi-culturalism or refugees. That is, the potential constituents to discussion of population policy are absorbed in distinct political domains and they are consequently responsive to separate rather than common interests. Some of the constituents would even be against any discussion of population policy (Hodgson and Watkins, 1997).

There is much room for further research. We need to enhance our understanding of the trends in the components of population change in order to have a more secure bases for the projections assumptions. We need further analyses of the implications of both the actual and the potential demographic change. We also need further thinking on the policy side of the evolving demographics. In encouraging demographers to think of policy, I am heartened by our basic democratic orientation to count everyone equally in the total population. While there is room for those who think of the interests of specific groups, like the elderly, children, women, visible minorities, families, or immigrants, there are also advantages to looking at the whole population, and its welfare, counting everyone equally.

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