C.D. Howe Institute
COMMENTARY

ECONOMIC GROWTH AND INNOVATION

Faster, Younger, Richer?

The Fond Hope and Sobering Reality of
Immigration's Impact on Canada's Demographic
and Economic Future

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In this issue...

More and younger immigrants cannot, on their own, offset the impact of low past fertility on Canadian workforce growth, old-age dependency, and incomes per person. Later retirement, higher fertility, and faster productivity growth are more powerful tools to ease the stress of demographic change on Canadian living standards.

THE STUDY IN BRIEF

For Canadians to expect more, younger immigrants to counteract the effects of low past fertility on workforce growth and aging would be a serious mistake. While immigration has been a key driver of Canadian population growth, it cannot, on its own, offset demographic trends that threaten our future living standards.

Current fertility and immigration rates, moderately rising life expectancy and historical productivity growth can be expected to depress workforce growth, boost the ratio of Canadians 65 and over to those of working age (the old-age dependency ratio) and depress growth in incomes per person. Despite some popular commentary, offsetting or even noticeably mitigating these trends would require unrealistic increases in immigration.

- Only improbably huge increases – for example, near-term, net immigration rates more than 2.5 times those of the recent past – could offset the impact of lower past fertility on workforce growth.

- Even huge increases and extreme age filters favoring younger workers could only slow the coming increase in Canada's old-age dependency ratio. The terminal populations in projections where immigration is used to control the ratio range from over 60 million to over 200 million.

- Most striking are the weak projected results of using immigration to maintain growth of output per person. Forecasts tend to produce explosive population growth, with ludicrous terminal numbers in the billions or even trillions.

Major policy reforms aimed at mitigating the impact of a slower-growing and aging population on Canada's workforce and incomes hold at least as much promise as changes to immigration. Delaying the normal age of retirement could help both workforce growth and old-age dependency in the near term. Higher fertility would help achieve both goals in the next generation and beyond, and faster productivity growth would boost real incomes per person more than any conceivable immigration strategy.

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INDEPENDENT • REASONED • RELEVANT

Canadians increasingly worry that demographic change threatens their future living standards. This concern is well placed: declining fertility and rising life expectancy are exerting powerful pressure on the growth and age structure of Canada's population.

Current fertility and immigration rates, moderately rising life expectancy and historical productivity growth can be expected to depress workforce growth, boost the ratio of Canadians 65 and over to those of working age (the old-age dependency, or OAD ratio) and limit growth in output per person to rates below past experience.

At first glance, immigration appears a useful tool to address this challenge. Canada is a major recipient of immigrants. On average, from 1971 to 1988, annual net immigration equalled some 0.43 percent of the resident population; from 1989 to 2007, it was 0.67 percent. Especially with fertility rates flagging, immigration has been a major and growing contributor to growth in the potential workforce, which we define as the population aged 18 to 64 (Figure 1).

Since immigrants tend to be younger on average than people already resident in Canada (Figure 2), immigration affects the country's age profile. This means that immigration can affect such key measures as the OAD ratio and average output and income per Canadian. In this *Commentary*, we quantify those effects and draw conclusions about the relative merits of immigration policy in addressing these challenges.

On the sobering side, we show that the large increases in immigration necessary to offset or even noticeably mitigate the effects of past birth-rate declines on Canada's workforce growth, age structure and income per person are unrealistic – a conclusion highlighted by the staggering numbers for Canada's total population in the terminal year of many of our projections.

Granted, higher immigration can remedy specific labour-market gaps and can modestly mitigate the imminent slowing and eventual reversal in Canada's labour-force growth. Still, only improbably huge increases – for example, near-term, net immigration rates more than 2.5 times those of the recent past – can offset the projected impact of natural population decrease on workforce growth. In contrast to the terminal population in our Baseline scenario outlined below – nearly 47 million Canadians in 50 years' time – the terminal populations in the forecasts where we rely on immigration to bolster workforce growth range up to 60 million.

Immigration's limited practical power to alter Canada's demographic future emerges even more strikingly from our investigations of its impact on the ratio of potentially retired to potentially working Canadians. Even huge increases and extreme age filters can only slow the coming increase in Canada's OAD ratio. The terminal populations in the scenarios where we use immigration to control the ratio range from over 60 million to over 200 million.

Most striking of all are the projected results of our attempts to use immigration to influence growth of output per person. Although increases in immigration can boost the relative size of the working-age population, they also add to the total population among which the resulting increases in output are divided. As a result, the net effect of a given rise in immigration is quite weak. For this reason, our forecasts along these lines tend to produce explosive population growth, with ludicrous terminal numbers in the billions or even trillions.

To conclude on a more positive note, we offer three other potential solutions in contrast to immigration's limited effects on workforce growth, age structure and output per person. They are:

- postponing the age at which we generally expect people to stop participating in the workforce from 65 to 70;

- raising the fertility rate from its current level of 1.54 to its replacement level of 2.1 children per woman; and
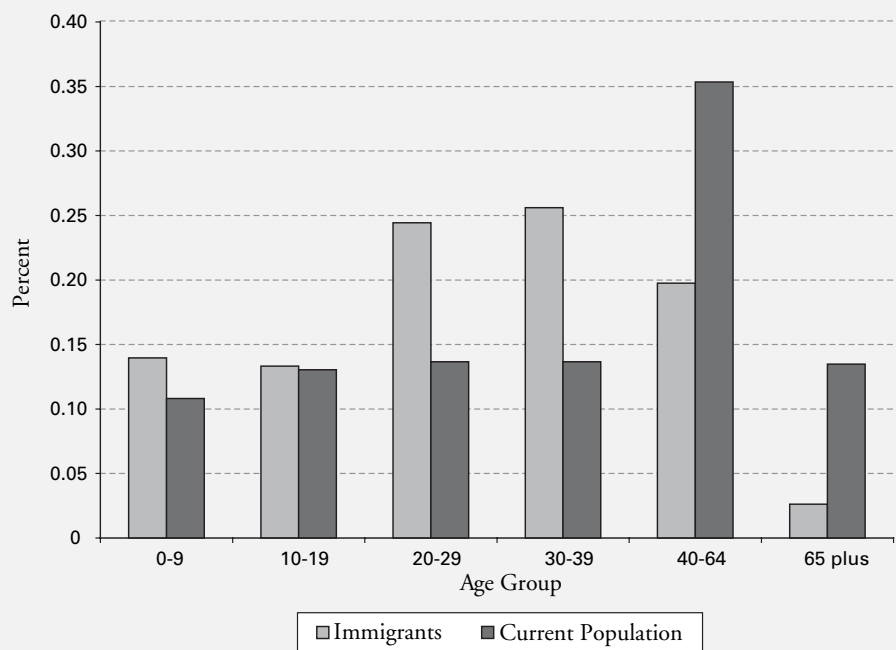
Figure 1: Contributions of Immigration and Natural Increase to Growth in Canada's Working-Age Population
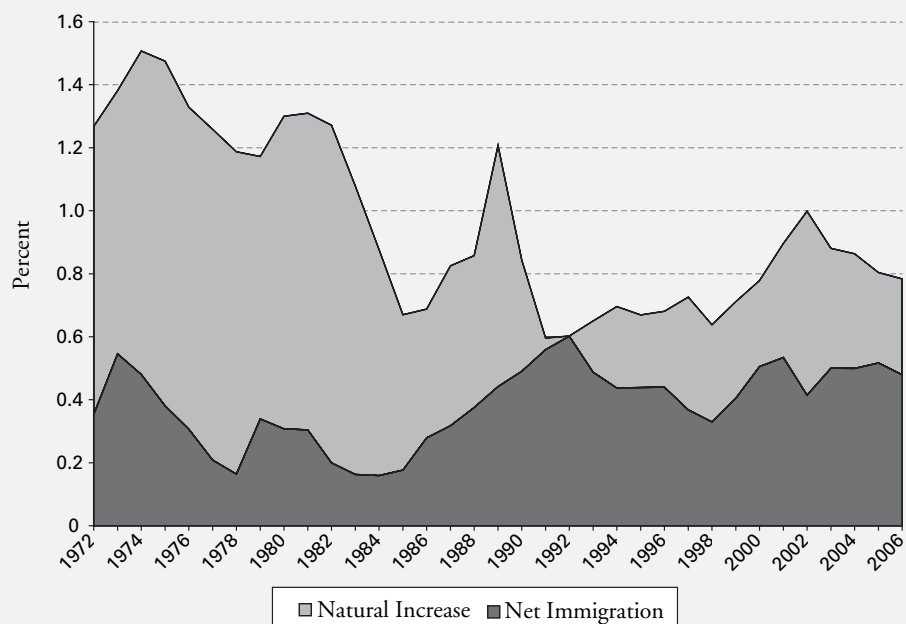
Sources: Statistics Canada and authors' calculations.

Figure 2: Age Distribution of Immigrants and Current Canadian Population, 2006

Source: Statistics Canada.

- boosting productivity growth – the increase in real output per potential worker – by 1 percent.

While the uncertainties and challenges in these three options are varied and important, our simulations reveal them to be more powerful tools to address Canada's coming demographic challenges. In combination – and in contrast to plausible immigration scenarios – they could boost growth of output per person well above historical rates.

Notwithstanding our judgment that immigration benefits immigrants themselves and enriches Canada in many ways, our scenarios suggest that it is not, on its own, a promising tool to address the challenges posed by a slower-growing and aging population. Canadians should not let misplaced hopes about immigration distract them from other demographic and economic measures that can enhance living standards in a future characterized by slower workforce growth and a relatively larger population of seniors.

What Others Have Said

Although much commentary and advocacy treat immigration as akin to an elixir of youth, research on immigration at levels that appear economically and politically feasible has tended to yield more sober findings. A study by the RAND Corporation (Grant et al. 2004), for example, concluded that immigration could do little to mitigate the challenges created by low fertility in the European Union. Schertmann (1992) showed that a constant inflow, even of relatively young immigrants, may not rejuvenate low-fertility populations. Studies on Canada – for example UN (2004), Denton and Spencer (2005), and Guillemette and Robson (2006) – have found that the momentum of the resident population largely overwhelms immigration's influence.

Because most Canadians view immigration positively, however, and because immigration looks like an accessible policy lever, its potential demographic impact is a prominent theme in public discourse. Policymakers reflect this inclination. Citizenship and Immigration Canada's *2007 Annual Report on Immigration,* for example, refers to "the demographic reality of aging and shrinking

populations," inducing all developed countries to seek immigrants more aggressively (CIC 2007, 6) and notes: "In a few short years … Canadians who leave school for the workplace will only offset the number of retirements. Immigration will therefore be a key source of workforce growth in the future."

Strategies and Scenarios

Clearly, immigration's potential to improve Canada's demographic outlook excites the national imagination. We hope further numerical investigations of these impacts can illuminate how much or, more aptly, how little Canadians can realistically expect on this front.

Two Strategies

Attempts to influence population growth or age structure through immigration can work by modifying the amount or the age of immigrants. Though conceptually distinct, the two tend to run together. Since immigrants tend to be younger than the resident population, they are likelier to be of working age, or about to "age into" the workforce. So in the short run, greater numbers of immigrants will boost the workforce growth rate. Policies affecting the age profile of immigrants could amplify this effect.

At the same time, adding immigrants will lower the average age of the population and mitigate the increase in the OAD ratio. Again, policies to accentuate the relative youth of immigrants would amplify this effect.

When it comes to real per capita income, considerations similar to those relevant to age profile apply. Policies that boost growth of the workforce relative to growth of the population that is either too young or too old to work will also boost income per person over time.

Four Scenarios

We now proceed to simulate the effect of various immigration strategies on workforce growth, the OAD ratio and output per Canadian. We use a

## Table 1: Baseline Scenario: Assumptions and Results

Assumptions

Life Expectancy at Birth (years):	1997	2007	2017	2027	2037	2047	2057
Male	75.7	78.0	79.0	80.0	81.0	82.0	82.5
Female	81.3	82.7	83.7	84.7	85.7	86.7	87.5
Total Fertility Rate (per woman)	**1.55**	**1.54**	**1.54**	**1.54**	**1.54**	**1.54**	**1.54**
Net International Migration (as % of resident population)	0.54	0.66	0.65	0.65	0.66	0.66	0.66

Results							
Total Population (millions)	29.9	33.0	36.1	39.2	41.6	43.5	45.2
Old-age Dependency Ratio 65+/18-64 (%)	19.2	20.5	25.7	35.3	40.8	43.0	46.3

Note: Values for 1997 are actual, for 2007 are inputs into model from latest available data, and for 2017-2057 are projections.
Sources: Statistics Canada and authors' calculations.

Box 1: Selecting Younger Immigrants

The younger age profile of immigrants in the Younger scenario, in Figure 3, is illustrative rather than the product of any specific proposed policy change. It supposes a filter that tilts immigration policy strongly towards parents aged 20-29 with children. A stronger focus on refugees, the youngest category and on the economic class, combined with fewer family-class immigrants, who tend to be older, would produce this result, as would revising the points system to give greater weight to ages in this range. The Younger scenario is emphatically not something we recommend: it does not completely eliminate older immigrants, but might represent an extreme of what is feasible.*

Figure 3: Age Distribution of Immigrants: Actual and Hypothetical Younger
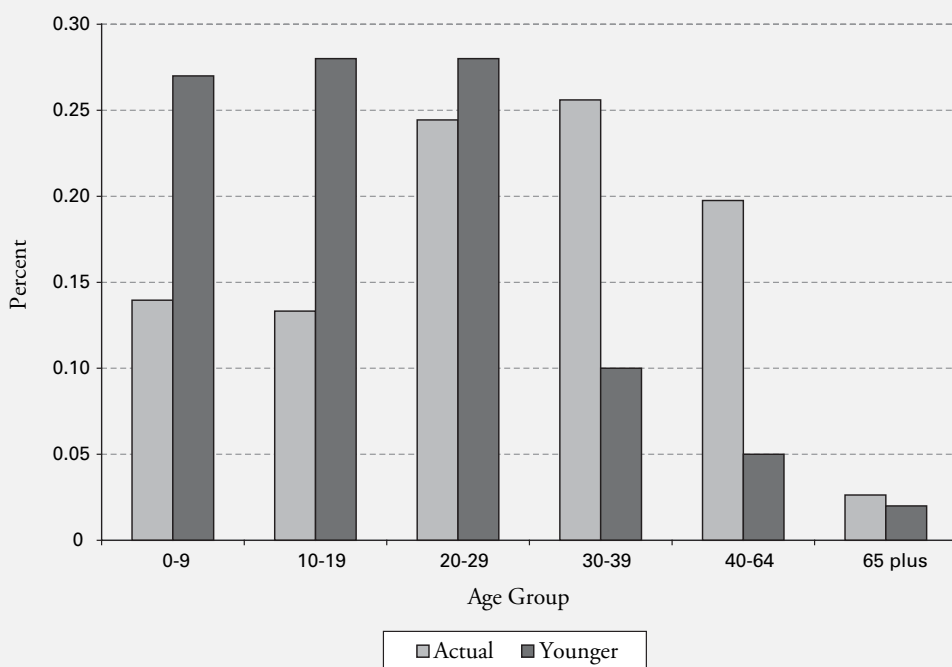
* In the Independent and Skilled Worker categories, the current point system gives a maximum of 10 points to people aged 21-49, with two points deducted per year either side of that range, and zero for people 16 and under or 54 and older.
Sources: Statistics Canada, authors' figures.

Figure 4: Growth in Working Age Population
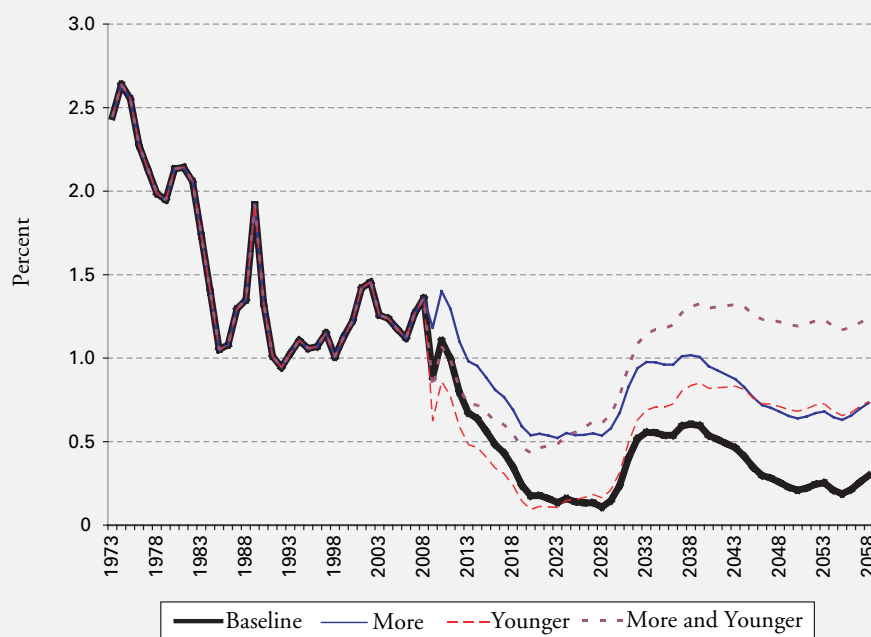
Sources: Statistics Canada and authors' calculations.

model maintained at the C.D. Howe Institute (derived from ILO 2002) to project Canada's future population based on some straightforward assumptions (Table 1 summarizes some key assumptions and results in our Baseline scenario):

- Each province's total fertility rate remains at its 2006 level through the projection period.

- Life expectancy at birth by sex rises at rates akin to those in Statistics Canada's "medium" assumption for improvement.

- A constant share of the population of each age and sex emigrates every year.[1]

We consider four immigration scenarios:

1. A "Baseline," in which the annual (gross) flow of immigrants remains at the 2007 level relative to the resident population (0.7 percent), with the same age distribution observed from 2003 to 2007.

2. A "More" scenario, in which (gross) immigration annually rises to 1 percent of the

resident population, with the same age distribution observed from 2003 to 2007.

3. A "Younger" scenario, in which immigration continues at its 2007 rate, but with a younger age structure, as shown in Figure 3 (see Box 1).

4. A "More and Younger" scenario, in which immigration rises to 1 percent of resident population and has the younger age structure shown in Figure 3.

Impacts on Workforce Growth

Figure 4 shows the actual growth of the workforce since 1972, with projections through the year 2058 in the four scenarios. The Baseline projects a continued decline in workforce growth, with the baby boomers' exit from the workforce stalling growth in the 2020s. Workforce growth resumes in the 2030s and then stabilizes near 0.3 percent around 2050, with net immigration and natural

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1   Emigration averages 0.06 percent of the resident population in all our scenarios. Younger immigrants appear likelier to emigrate again (Aydemir and Robinson 2006), so scenarios that feature a younger age profile of immigrants may understate the gross flows required to achieve a given net figure.

Figure 5: Evolution of the Old-Age Dependency Ratio
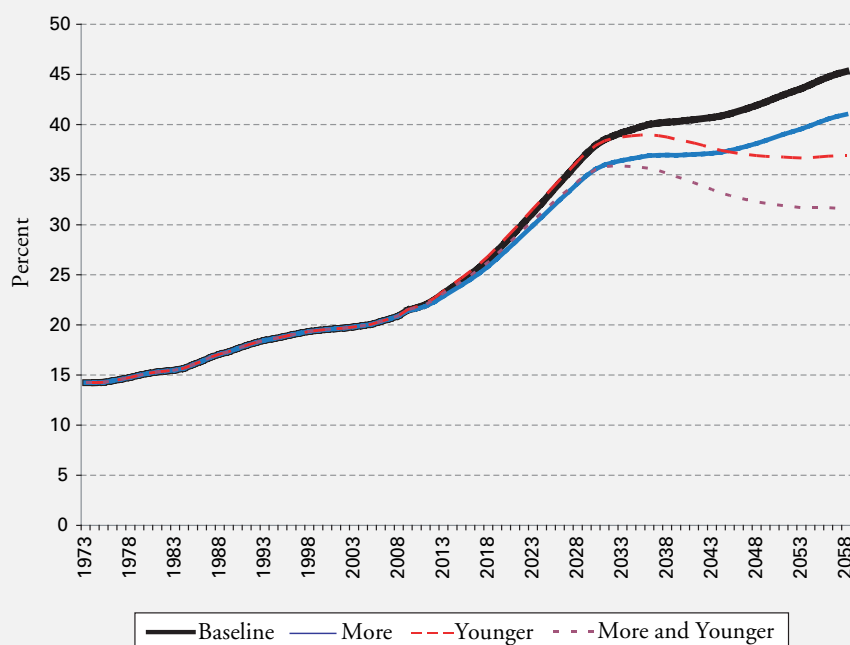
Sources: Statistics Canada, authors' calculations.

increase at current fertility rates marginally exceeding age-related departures. In this Baseline, Canada's total population rises from about 33 million at the start to almost 47 million in 2058.[2]

The other three scenarios illustrated in Figure 4 show how immigration can affect workforce growth. The More scenario yields a growth rate of 0.8 percent annually until 2058, consistently higher than the Baseline rate, though still averaging below all but the weakest growth years in the past quarter century. In this scenario, total population would exceed 55 million by 2058.[3]

Workforce growth in the Younger scenario initially dips below the Baseline rate due to the arrival of many under-18s. As the first wave of these younger people enters the workforce, the growth rate stabilizes in the 2050s, at a level marginally above that in the More scenario. Population in this scenario is just shy of 50 million by 2058.

Even the More and Younger scenario cannot avoid a dip in workforce growth below 0.5 percent annually within the next two decades, before growth in the working-age population stabilizes later at rates closer to those of recent history. Total population at the end of this scenario is about 60 million.

Impacts on Old-Age Dependency

The dependency ratio has been rising since 1971, but will start a steeper climb around 2012, as increasing numbers of baby boomers pass age 65. Figure 5 shows the evolution of the OAD ratio since 1971, along with projections through 2058 in the four scenarios.

In the Baseline, with immigration rising from just under 245,000 in 2009 to over 340,000 in 2058, and having an age structure like that of the recent past, the OAD ratio rises by almost 0.8 percentage

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2   Statistics Canada's population projection under a "medium growth, recent migration trends" scenario is 43 million by 2056 (Statistics Canada CANSIM Table 052-0004).

3   Statistics Canada projects 51 million people in 2056 with 1 percent immigration (Statistics Canada CANSIM Table 052-0004).

Figure 6: Projected Growth Rates in Real GDP per Capita – Decadal Averages
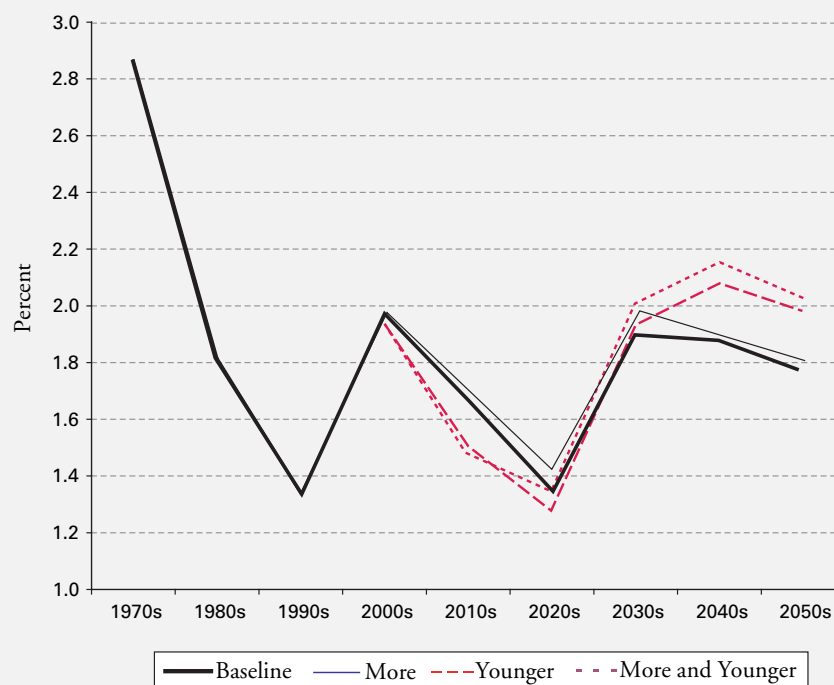
Sources: Statistics Canada, authors' calculations.

points annually until 2030. Although its climb then slows, as the rapidly falling post-baby boom birthrate shrinks the number of people passing age 65, the ratio still keeps rising. So the total increase over the projection period is from about 21 percent today to over 45 percent by 2058.

In the More scenario, population aging is slower than in the Baseline, but the direction does not change: the OAD ratio passes 41 percent by 2058. In the Younger scenario, the ratio differs little from that in the Baseline in the early years, while the under-18s are still maturing to working age. When they begin entering the workforce in large numbers after about 2030, the ratio stabilizes, remaining around 37 percent through to 2058.

Finally, the More and Younger scenario shows the combined effect of both changes. This scenario would see the OAD ratio rising from 21 percent today to more than 35 percent by the mid-2030s. It

then falls again, ending the projection at just under 32 percent. Therefore, in a numerical sense, a very aggressive pursuit of younger immigrants could prevent the OAD ratio rising above a peak of about 35 percent some 25 years from now. Before considering the moral and other problems of this scenario, however, we note that the ratio under these scenarios would still rise much faster between 2006 and 2030 than at any time over the past 35 years.

Impacts on Real Per Capita Income Growth

To complete the picture, we consider similar projections for growth in real income per person. These projections require an assumption about productivity, or growth of real output per potential worker.[4] For transparency, we use a very simple assumption: that output per working-age person

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4   Assuming equivalent growth in output and income per potential worker means that we implicitly assume no change in net factor payments abroad per potential worker. Changes in immigration on the scale we consider might affect Canada's net external balance and comparative rates of return. Many of our scenarios are so implausible, however, that elaborating those effects seems speculative to the point of irrelevancy, so we assume that output and incomes grow in step with each other.

Figure 7: Immigration Rate Required to Maintain 1.3% Growth in Working-Age Population
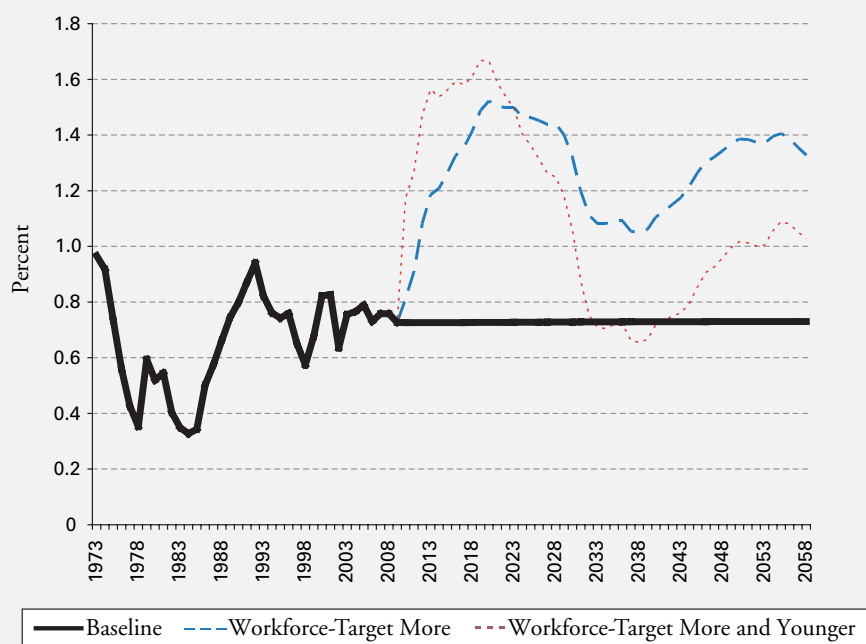
Sources: Statistics Canada, authors' calculations.

Figure 8: Immigration Rate Required to Stabilize Old-Age Dependency Ratio
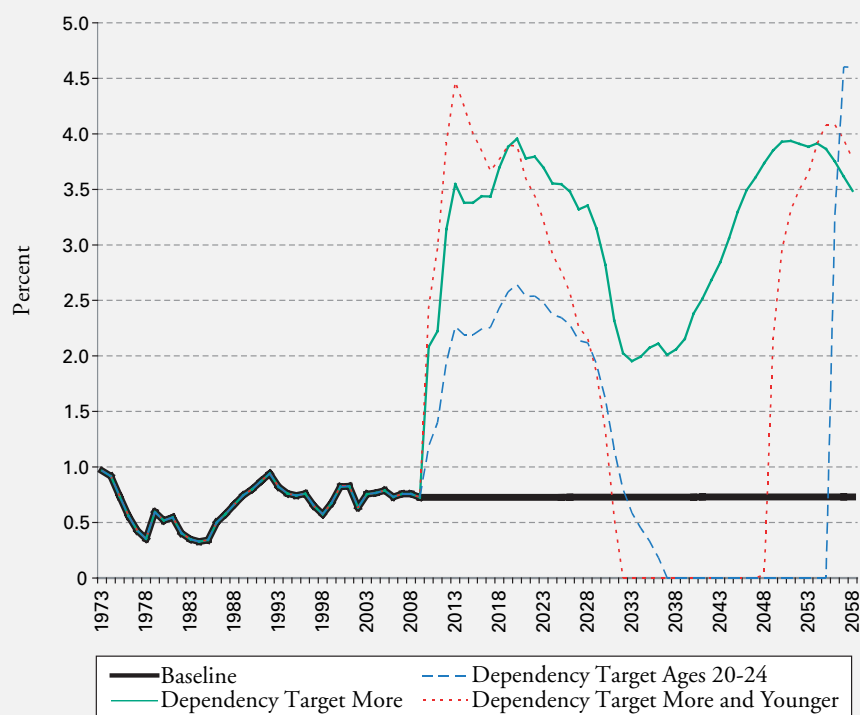
Sources: Statistics Canada, authors' calculations.

increases over the next half-century at the same rate of just over 2 percent that it increased during the 1995-to-2007 stable-inflation period when the gap between actual output and the economy's productive potential was, on average, almost exactly zero. Figure 6 presents the average projected growth rate per decade, along with actual average decadal growth rates since 1972.

In the Baseline, real output per person grows at an average annual rate of 1.71 percent from 2009 to 2058. The depressing impact of the retiring baby boom generation comes in the 2020s. While growth is faster in the other three scenarios, the differences with the Baseline are so small that they only show in the second decimal place: the More, Younger, and More and Younger scenarios show growth in real output per person of 1.76 percent, 1.75 percent and 1.79 percent, respectively. In the scenarios targeting younger immigrants, the large numbers who enter the country while still below working age temporarily reinforce the dip in growth, before boosting the rate later on.

Target-Based Policies

Our four scenarios do not exhaust the range of conceivable immigration-policy responses to slower workforce growth, population aging and less robust increases in real income per person. One informative approach to confronting these challenges is to approach them from the other end, picking a demographic or economic target and asking what immigration policy could achieve it.

Targeting Workforce Growth

What immigration level, for example, would maintain growth in the Canadian workforce at the 1.2 percent rate that prevailed from 2004 to 2008? Again, we can think of two routes to achieving this result: increasing numbers, which we call the "Workforce-Target More" scenario, or changing both numbers and immigrants' age distribution, the "Workforce-Target More and Younger" scenario. Since a change in age distribution alone, with unchanged total numbers, cannot achieve the target, we leave that option out.

The rates of immigration needed under these two scenarios, with a comparison to the Baseline, are illustrated in Figure 7. Achieving the target workforce growth rate requires an immediate and large increase in immigration: in both scenarios, immigration rates double in the next decade.

The higher initial jump under the Workforce-Target More and Younger scenario occurs because it brings in more under-18s. As they mature into the working-age population, the immigration required to maintain workforce growth falls below that envisaged in the Workforce-Target More scenario. The pronounced immigration dip in the 2030s in Workforce-Target More, and the even larger one in Workforce-Target More and Younger, occurs when people who immigrated as children begin entering the workforce, reducing the total numbers required for workforce growth. Once this maturing-in effect peters out, required immigration stabilizes at about double current rates. Canada's total population in these scenarios would be over 66 million by 2058.

Targeting the Old-Age Dependency Ratio

In the same spirit, we can ask what immigration rate would stop the OAD ratio rising above 21.5 percent, the ratio we expect in 2009. Figure 8 illustrates the answer in similar fashion to the workforce-growth targets. It plots the immigration required to stabilize the ratio in two parallel scenarios: one in which only immigration numbers change, the "OAD-Target More" scenario and one in which both numbers and age distribution change, the "OAD-Target More and Younger" scenario. As with the workforce target, a change in age distribution alone cannot do the trick.

Under OAD-Target More, the required immigration increase is immediate and colossal: a spike to almost 4 percent of the population in the first five years. The dynamics of reproduction and aging among the newly arrived immigrants reduces the required inflow to just over 2 percent of the population by 2035; then it rises again, surpassing 3.5 percent by 2050. By the end of the period, Canada's population would be an eye-popping 210 million.

Under OAD-Target More and Younger, with the younger immigrants in Figure 3, the timeline of immigration required to cap the OAD ratio initially resembles OAD-Target More, but the delay in under-18s reaching working age lifts the early peak and deepens the later valley. Immigration spikes even higher initially, drops to zero by 2032, then rockets up again after 2045. By the end of the period, Canada's population would pass 127 million. The scale and volatility of immigration is no more realistic in this scenario than in OAD-Target More.

These huge numbers do not result merely from too weak an age filter on immigration. Even a ferociously stringent filter cannot stabilize the OAD ratio. Suppose, for example, that *all* new immigrants were equally distributed in the age-range 20 to 24, for an average age of 22. This scenario appears in Figure 8 as OAD-Target Ages 20-24. Because the OAD ratio defines older people as age 65 or beyond, such a 20-24 filter would ensure that every single immigrant lowers the ratio on arrival and for at least 40 years afterwards. Even so, immigration would have to spike over 2 percent initially and remain that high for another 20 years. Between 2012 and 2030 under that scenario, Canada would admit an average of 1.7 million 20- to 24-year-olds annually, compared to about 24,000 in that age range now. Terminal population in this scenario is 86 million.

Targeting Growth of Real Income

As an alternative to targeting demographic variables, we consider trying to boost growth of real income – assuming, as described above, that output per potential worker grows at the same rate as during the 1995-2007 period. The most compelling target is growth in income per person, since that is what matters for average living standards. As hinted by the very small differences in per-person income growth among the scenarios already described, however, immigration is a very weak lever for changing income per person. This is because even with strong age filters to enhance the impact of higher immigration on the relative size of the workforce, adding people to the population spreads

any resulting boost to output over a larger number of potential claimants. Attempts to boost growth rates of income per person in our simulations produce explosive population numbers that mount rapidly into the billions or even trillions, so we do not pursue this targeting option further here.

To round out our exploration of targeting, we instead explore the implications for real income per person of aiming at a less challenging target such as growth in aggregate real income, or GDP. We use both models with higher numbers of immigrants (Output-Target More) and one with higher numbers as well as younger ages (Output-Target More and Younger) to achieve the GDP growth target.

Figure 9, analogously to Figure 6, shows the average projected growth rate per decade in real income per capita when we use immigration as a tool to raise future growth in total real GDP to the same average rate that prevailed from 1995 to 2007. The average per-person income growth rates from 2009 to 2058 for Output-Target More and Output-Target More and Younger are both 1.76 percent – somewhat higher than the Baseline rate of 1.71 percent.

In the Output-Target More and Younger scenario, output growth dips below the Baseline until the large number of young immigrants "age into" the workforce. We also look at the effects of our extreme age filter where only individuals aged 20 to 24 are admitted (Output Target Ages 20-24). This yields higher growth in income per person, with an average gain of 1.80 percent over the 2009-2058 period. None of these scenarios, however, prevents the projected decline in output growth rates in the 2020s as the resident population ages. Canada's population in the final year of the output target scenarios using age filters is between 65 million and 70 million.

Discussion

So far, these simulations have made modest concessions to realism. Noting all the caveats about, and possible consequences of, immigration policies such as those just illustrated would require a substantial book. But several nonetheless merit highlighting: caveats about large changes in

Figure 9: Projected Growth Rates in Real GDP per Capita – Decadal Averages

Sources: Statistics Canada, authors' calculations.

immigration numbers, their impact on the domestic population, and concern where such flows of immigrants would come from.

Numbers and Age Profile Are Not Independent

To begin, we repeat that immigrant numbers and age-structure are conceptually distinct, but tend to vary together. As Beach et al. (2006) document, factors such as the state of the economy, the emphasis on different immigration streams, and the point scores awarded potential economic-class immigrants affect both volumes and the average ages of immigrants. The tendency for numbers and age to vary together illustrates a more general point: other priorities for immigration policy do not figure in our simulations. Ignoring older immigrants when aggressively seeking younger ones, for example, would impede family unification and reduce average immigrant education and work experience.

Another caveat in any discussion focused on growth, relative size and output of the workforce is that newly arrived immigrants have lower employment rates than Canadian-born contemporaries. Analysis of population groups from the 2007 Labour Force Survey (Figure 10) shows that the employment rate of immigrants, when compared to the employment rates of people born in Canada, is a function both of age and length of time since arrival (Gilmore 2008). Although immigrants in the 55-and-up age group who have been in Canada for more than five years have higher employment rates than Canadian-born contemporaries, this effect is small in economic terms, since employment rates among 55-and-ups are low to begin with. More important, the employment rates of younger and more recent immigrants are below those of Canadian-born contemporaries. Overall, then, our simulations overstate the immediate impacts of higher and younger immigration on the population actually employed.

Figure 10: Employment Rates: Immigrants vs. People Born in Canada, 2007
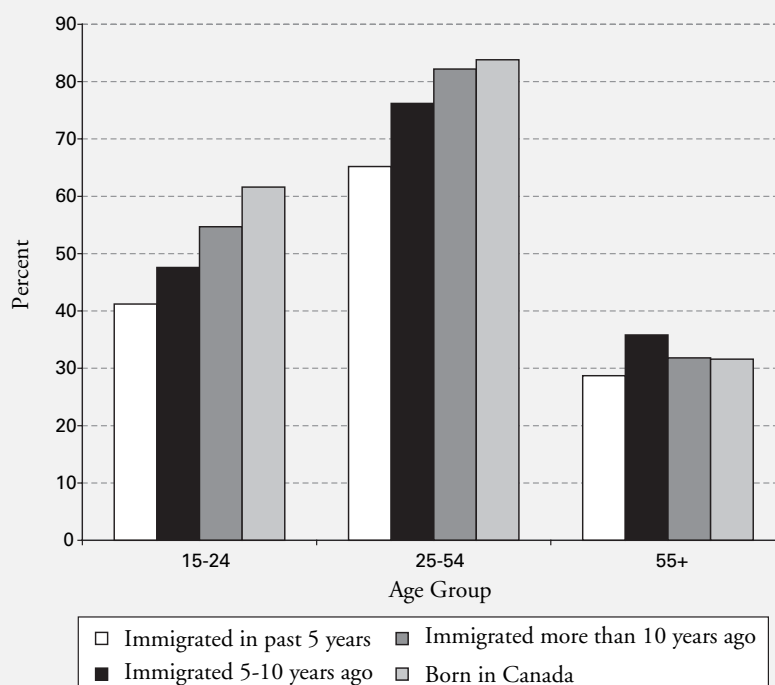
Source: Statistics Canada.

Judging the Scale of Potential Flows: Canada's Absorptive Capacity

Clearly, Canada can take in substantial immigration. At around one-fifth, the share of Canada's population born outside the country puts it fifth among 29 OECD countries (OECD 2009). Nevertheless, changes in the volume and/or age structure of immigration on the scale contemplated in these simulations raise some questions.

Expressing immigration relative to the total resident population is misleading, for example, when using immigration to change the population's age structure. If Canada recruited younger immigrants far more aggressively, resident young people would notice such impacts as intensified competition in the job market. The volumes of immigration in our simulations are huge, not just compared to past experience, but compared to the resident population in the relevant age range. For example, the population aged 20 to 24 is now about

2.3 million. In the admittedly extreme OAD-Target More and Younger scenario, the annual inflow would equal more than 10 percent of the population of contemporaries already in Canada, as opposed to less than 1 percent in the Baseline scenario. Such an accelerated inflow would severely depress wages in that age group.

No less arresting are the changes in Canada's population under other scenarios explored here. In our Baseline scenario, population falls slightly short of 47 million in 50 years' time – a figure that some might say would overstress the carrying capacity of the country's land, cities and infrastructure. In the More and Younger scenarios, the terminal populations are 56 million and 60 million. In the targeting scenarios presented here, the terminal populations range from 65 million to over 200 million; in those not presented where growth in per-person incomes was the target, the numbers were orders of magnitude higher yet. We doubt any

appreciable number of Canadians would support strategies to multiply the country's population by two, three or 10 times, even if such increases held out the prospect of maintaining growth of the workforce, stabilizing the dependency ratio or maintaining growth in living standards.

Judging the Scale of Potential Flows: Source

Another perspective on the scale of these imaginary immigration flows comes from considering their potential source. As international competition for skilled labour increases, so does the range of alternative destinations. The world contains billions of young people, but the partial data on migration by age that exist suggest that Canada's proposed draws would be huge compared to the numbers that actually cross national borders in a given year.

Indeed, in recent years, only some 330,000 people in the 20- to 24-year-old age range have immigrated to 12 major countries, including Canada.[5] As a very rough approximation in the OAD-Target More scenario, Canada would have to divert roughly two-thirds of all the people in this age range who currently go to 11 countries that compete with Canada for such immigrants. For Canada to "sell" itself as a destination for a much larger share of young immigrants would clearly require enormous effort. As well, to achieve this objective, the standards applied to the economic migrants within this age range would surely fall.

Three Alternatives: Later Retirement, Higher Fertility and Faster Productivity Growth

For a final perspective on immigration as a boost to the workforce and a way of maintaining the youth-fulness of Canada's population structure, we compare it to three other workforce/demographic tools.

Later Retirement

One way to increase Canada's potential workforce is by pushing back the normal retirement age. Advances in longevity and shifts toward later workforce entry and less physically demanding occupations mean that the equivalent of working until age 65 in 1970 is now working until at least age 70. Yet, for a variety of reasons, people are retiring earlier than they did in 1970.[6] A later average or standard retirement age would provide a medium-term boost to workforce growth. To put some numbers behind this straightforward point, we use the Baseline projection and move the age at which the population is assumed to become inactive to 70 from 65, raising it three months every year between 2009 and 2028.

Higher Fertility

A second, admittedly much more speculative, change would be a rise in the fertility rate. Because pro-natal policies are uncertain in their impact, not to mention politically controversial, we use a simple benchmark: a rise in the total number of births expected over a typical woman's lifetime from the current national value of 1.54 to 2.10, which is approximately the replacement rate, over the next 10 years.[7]

### Impact of Later Retirement and Higher Fertility

The impact of later retirement and higher fertility on growth in the working-age population, which by the end of the shift in retirement age, would be defined as 18 to 69, appears in Figure 11. The Figure also contrasts those growth rates with growth of the working-age population in the Baseline as well as in the More and Younger scenarios.

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5   See www.migrationinformation.org/GlobalData/countrydata/country.cfm (accessed February 2009). Data on migration flows are extremely spotty. For this illustrative exercise, we took the values from the latest year available for each country.

6   For examples of the early-retirement incentives built into pension plans, see Schirle (2008).

7   The replacement rate is the number of children that a couple would need to have to exactly replace themselves in the population: two plus a small increment to allow for the fact that some female children do not live long enough to bear children of their own.

Figure 11: Projected Growth in Working-Age Population with Gradual Rise in Retirement Age or Fertility Rate
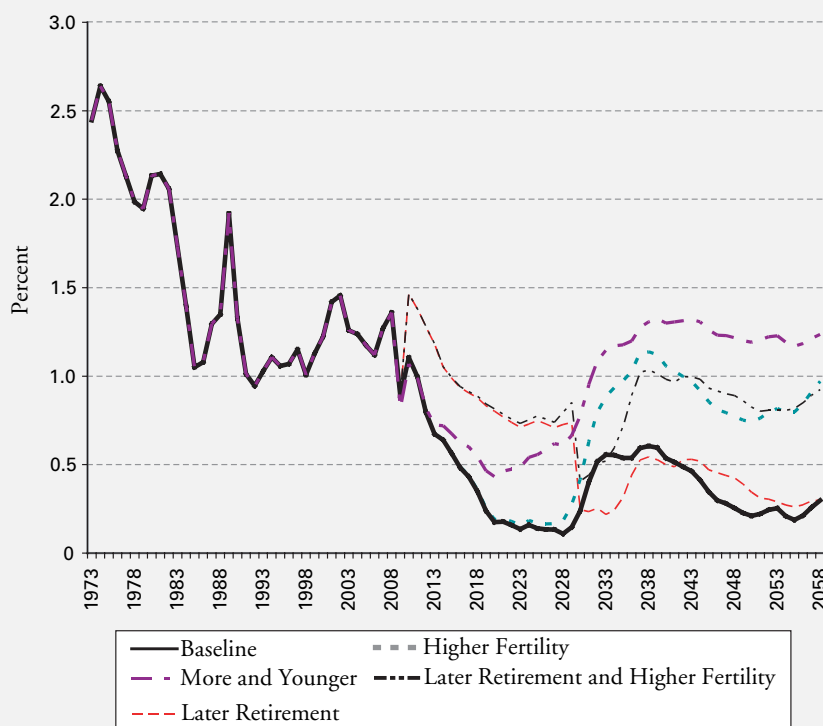
Sources: Statistics Canada, authors' calculations.

The later retirement age would raise the growth rate of the working-age population relative to the Baseline for a couple of decades. By 2030, the lengthening of normal working life would be complete and the average growth rates would no longer differ appreciably from those in the Baseline scenario. Since timing of retirement does not affect the size of the population, the projected terminal population in the Later Retirement scenario is the same as that in the Baseline.

Rising fertility rates naturally take time to affect the growth rate of the working-age population. Once the additional newborns begin to enter the workforce some 18 years later, however, their impact is considerable. Under this rising fertility scenario, the growth rate for the working-age population accelerates for almost a decade starting in the late 2020s, and averages not far short of 1 percent annually through the end of the projection period. Terminal population in this scenario is 56 million (Table 2).

The impact of later retirement and higher fertility are interesting to look at together as one combined scenario. The transitions just described would mean that the impact of higher fertility would pick up about the same time that the impact of later retirement is tailing off, meaning that together, they would have an immediate and sustained impact on Canada's potential workforce.

What of the OAD ratio? Figure 12 compares the evolution of the OAD ratio under the redefinition involved in the later retirement scenario with the evolution of the ratio assuming higher fertility. It also contrasts these ratios to their counterparts in the Baseline and More Younger Scenarios.

Not surprisingly, later retirement reduces the OAD ratio relative to the Baseline in the near term, and both delays and mutes its eventual rise. Higher fertility has no impact until the new youngsters reach working age, but then caps the ratio around 40 percent after 2020.

When viewed together, the influence of higher fertility would kick in shortly after the initial impact

Figure 12: Projected OAD Ratio with Gradual Rise in Retirement Age or Fertility Rate
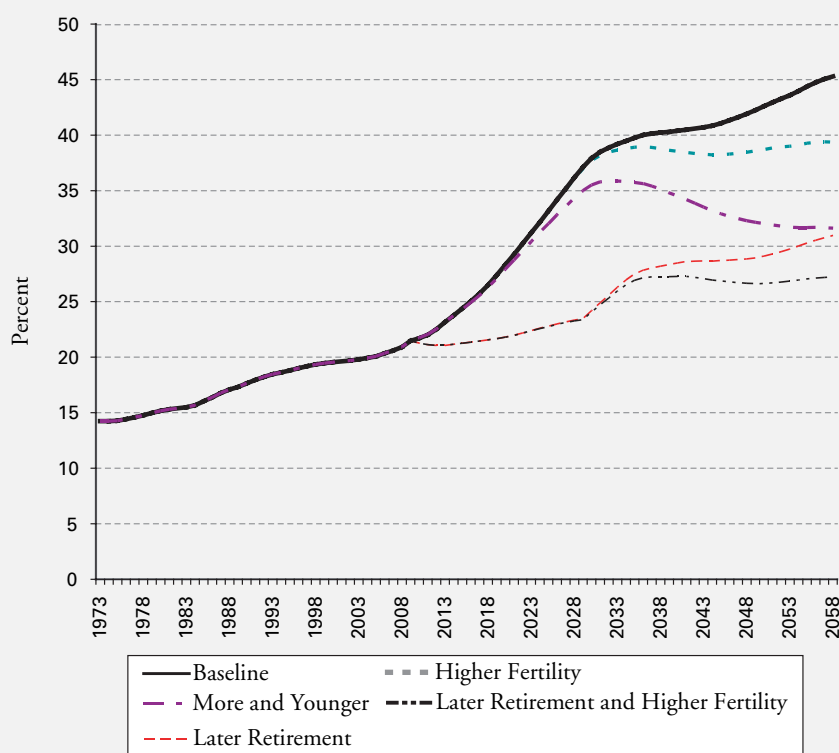
Sources: Statistics Canada, authors' calculations.

Table 2: Terminal Population Numbers

Scenario	Population in 2058, millions
Baseline	46.8
More	55.6
Younger	49.6
More and Younger	59.8
OAD Target More	210.0
OAD Target More and Younger	127.4
OAD Target Ages 20-24	85.5
Workforce Target More	66.6
Workforce Target More and Younger	66.0
Output Target More	69.8
Output Target More and Younger	68.9
Output Target Ages 20-24	64.5
Higher Fertility	55.6

Source: Authors' calculations.

Figure 13: Projected Growth Rates in Real GDP per Capita – Decadal Averages
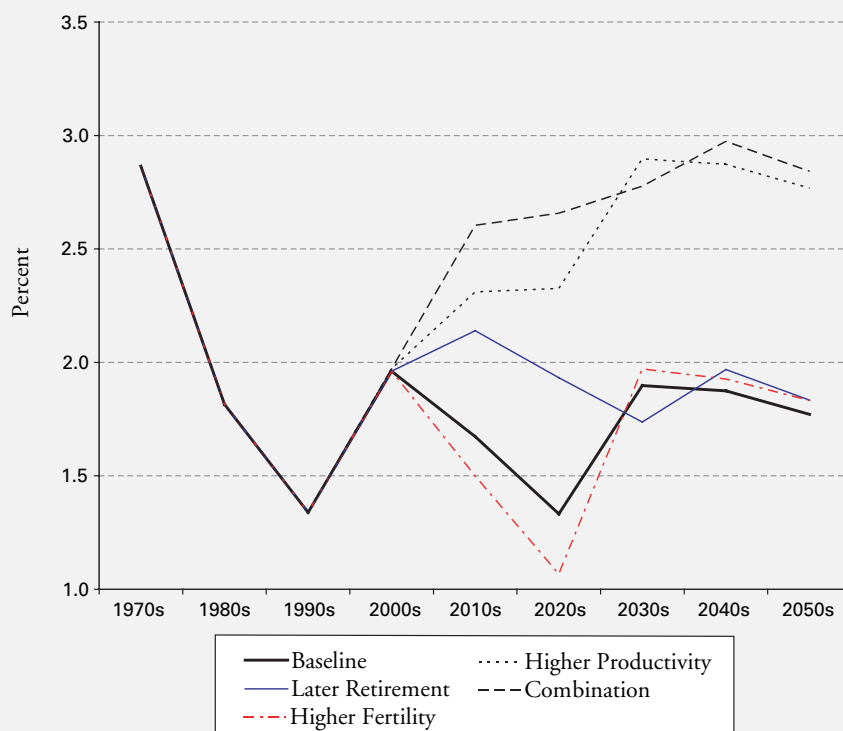
Sources: Statistics Canada, authors' calculations.

of later retirement on the growth of the OAD ratio had ceased, resulting in a ratio consistently even lower than in the More and Younger Scenario throughout the projection period.

Faster Productivity Growth

Of course, improvements in productivity would directly improve the outlook for living standards, whatever the underlying patterns of workforce growth and OAD. For our final comparison, we illustrate the difference that 1 percent faster productivity growth would make to our Baseline scenario and, for the sake of holding out an ambitious, but not completely unrealistic alternative future, how the same improvement in productivity growth would change the Later Retirement and Higher Fertility scenarios.

For our Faster Productivity scenario, we raise the growth rate of output per worker above the 2 percent average improvement in our baseline, adding about 0.1 percentage point per year for a

decade and then leaving the rate constant at about 3 percent thereafter. Like later retirement, faster productivity growth does not affect total population, so terminal population in this scenario is again the same as in the Baseline.

Figure 13 shows the effect on growth of income per person and compares it to the Baseline as well as the Later Retirement and Higher Fertility scenarios. The effects of higher productivity are striking: the average growth rate in per-person income over the 2009-2058 period in this scenario would be 2.62 percent, compared with 1.71 percent in the Baseline, 1.92 percent under Later Retirement and only 1.66 percent under Higher Fertility, which increases the size of the population among which aggregate income must be shared. A very ambitious "combination-of-good-things" scenario with higher fertility, retirement age and productivity yields average growth rates of 2.75 percent in income per person between 2009 and 2058.

These results show the power a modest and gradual change in the normal retirement pattern has to change workforce growth and the OAD ratio in

comparison with significant changes in both the volume and age-structure of immigration. An increase in the fertility rate is a far less certain, and far more controversial, object of policy. Over time, however, it too would have tremendous power to change the age structure of Canada's population, on a par with some of the more extreme immigration scenarios.

Clearly, faster productivity growth holds the greatest promise for raising living standards in the years ahead. Boosting productivity growth is a complicated endeavour, and many of the means for achieving it are also politically controversial. Unlike later retirement, however, faster productivity growth involves an ongoing, rather than a one-time, shift. And unlike higher fertility, it increases incomes without increasing the number of people among whom the higher incomes must be divided.

Conclusion

The message of these simulations is that we should not overstate the contribution immigration can make to maintaining workforce growth, keeping Canada young and boosting living standards.

Workforce growth is the easier of the two demographic variables to address with immigration. Even so, immigration rates equal to 1 percent of the already resident population would not prevent Canada's workforce growth dipping to historic lows in the 2020s. Furthermore, the immigration levels required – even with major efforts to attract a larger share of younger people – to maintain workforce growth at current rates would be well outside the realm of economic or political feasibility.

An aging population is an even more difficult challenge. Increasing immigration to 1 percent of population per year without varying its age distribution would slow the rise in the OAD ratio only marginally. And raising immigration to this level while recruiting younger immigrants

aggressively would still not prevent an historic rise in the ratio. Only extreme and unpalatable policies, such as rapidly increasing immigration to well over 3 percent for decades could come close to stabilizing the OAD ratio.

Per-person income growth is the most difficult target of all. The inescapable consequence of larger numbers of arrivals is a larger population among which to share any resulting increase in aggregate output. Even very large changes in immigration flows or extreme policies to shift the age-structure of immigrants cannot affect future growth of income per person by more than a few tenths of a percentage point. Furthermore, attempts to maintain per-person income growth at historic rates through immigration alone produce preposterous population numbers. Indeed, the contrast between the projected populations for Canada in the final year of the projections illustrates vividly how weak a tool immigration is, on its own, to decisively shape Canada's demographic and economic future.

If Canadians are prepared for major policy reforms to mitigate the impact of a slower-growing and aging population on Canada's workforce, age structure and income growth, other tools have – at least in a numeric sense – at least as much promise as immigration. Delaying the normal age of retirement can help both workforce growth and the OAD ratio in the near term. Higher fertility would help achieve both goals in the next generation and beyond, and faster productivity growth will do more for real income growth than any conceivable immigration strategy.

Even if Canadians do choose higher immigration, and even if they choose to target younger immigrants for demographic reasons, such measures need to be complemented with other policies to delay retirement, raise fertility and boost productivity if Canada truly wishes to transform its demographic and economic future.

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