Population Aging and Canada's Social Contract: COVID-19 Catalyst for Change

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Population Aging and Canada's Social Contract

COVID-19 Catalyst for Change

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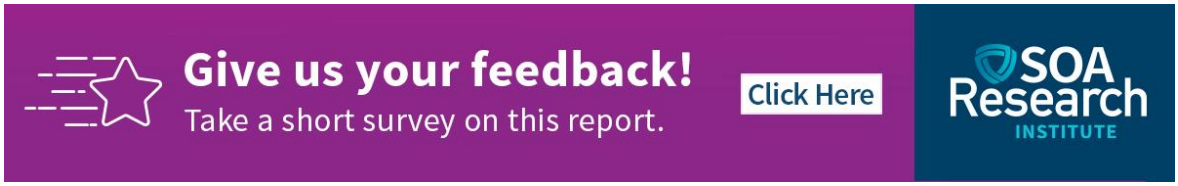

CONTENTS

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Abstract

This paper discusses potential developments with respect to social support systems arising from the impact of the COVID-19 pandemic and within the long-term context of an aging population, in three main sections. Any changes to social support systems have the potential to change the intergenerational social contract through revised benefits, reallocation of tax burdens or both. The first section of the paper outlines broadly areas where governments in Canada are taking or promising actions in response to COVID-19. One area is long-term care (LTC). The second section focuses the discussion on LTC, and the costs and implications of actions required to deliver LTC of acceptable quality, with respect to "catch-up" measures needed to address years of underfunding and lax attention to quality; policies around human resources, training requirements and immigration that may have far-reaching consequences; and care requirements of an aging population that are increasing beyond the capacity of family caregivers. Given budget constraints, increased expenditures on LTC will have an impact on spending on other social programs. Long-term spending decisions regarding budget envelopes require consideration, implicitly or explicitly, of a social discount rate (SDR). The third section discusses the question of how population aging and structure affects the SDR. We consider what the SDR might be in Canada and illustrate the trade-offs for spending on the various envelopes over different time horizons, which has ramifications for the social contract.

Introduction

It is unlikely that in enacting the British North America Act, the founding principle of the Canadian federation, which divides responsibilities federally, provincially and territorially,[1] consideration was given to how effectively it might function during a global pandemic. Laudably governments at all levels worked together reasonably well in addressing emergencies in the early stages of the pandemic. But given the division of responsibilities, not unsurprisingly provinces acted differently. The federal government tried to maintain a common resolve through consistent, frequent messaging backed by massive spending and transfers to other levels of government.

For Rousseau, individuals unable to supply all their needs cooperate with each other under the authority of the state to maintain their freedom, referred to as a social contract in his book by that name.[2] In democracies such as Canada, the social contract affects many aspects of citizens' lives, such as the rule of law involving legislation, an independent judiciary and policing; extensive social programs; and taxation and redistribution. The social contract may change over time. Recent notable examples in Canada include establishment of conditions for medical assistance in dying, legalization of cannabis and changes to relations with Indigenous peoples arising from the Truth and Reconciliation Commission.

Responding to a global pandemic has strained the social contract in a number of ways. Forced lockdowns, the call for mass vaccination and the limitation of access by unvaccinated persons to certain areas such as long-term-care (LTC) homes has seen increased demands for freedom accompanied by protests and convoys. The federal government has spent billions of dollars in excess of budget without presenting a plan of how the excess spending will be supported or what the longer-term view for the economy is. Parliament ceased to meet in its accepted format, combining a limit on the number of elected representatives who could attend physically and virtual access for others.

Although less dramatic than the shock of a global pandemic, population aging will also gradually strain the social contract. With the drop of fertility rates below replacement levels and an increase in life expectancy, the distribution of the population will change. An increasing proportion of people may live as long or longer after they have ceased working than the period for which they worked. This change will create financial and care demands. Canada has plans to increase its population through immigration, which will require citizens, employers and governments to adopt more flexible, supportive approaches and examine areas of accepted but systemic discrimination or prejudice. In this paper we will refer primarily to an intergenerational social contract as the general acceptance of policies and social programs that redistribute wealth between generations.

In the first part of this paper, four main government initiatives in response to the pandemic are discussed, with some observations regarding whether they are likely to continue to influence public policy or were primarily temporary measures in response to the pandemic. These four initiatives are vaccines, income support, LTC and child care.

In the second part of this paper, attention is directed to LTC. This is an area that has been neglected. As this paper shows, it has and will continue to be strongly impacted by demographic developments. It is argued that the challenges in addressing LTC will require considerable resources, which may result in increased taxation and curtailing or abandoning spending on other initiatives. As a consequence, the intergenerational social contract is likely to change.

[1] Hereafter, for simplicity, we use the term provinces to include the territories.
[2] Friend (n.d.) provides a brief history of social contract theory from Plato to modern day.

In the third part of this paper, we continue to explore the idea that spending priorities will be adjusted in the face of Canadian demographics. We examine how cost-benefit analysis may be affected by the choice of the social discount rate (SDR) to discount future outcomes. In previous research, which we highlight, we have found that both population aging and population structure are expected to have a dampening effect on real asset returns. Using this research, we make some observations regarding the potential impact that demographics may have on SDR. We identify spending trade-offs to reflect demographics and some implications for society's priorities.

Our objective is to help frame the following issues: how demographic considerations make LTC a significant challenge; how changing demographics are likely to affect the SDR; and together how there will be implications for the social contract. We raise these issues, but we do not pretend that this is a comprehensive treatment of this subject or that we know what the solutions are. We do hope to stimulate discussion regarding these issues to provide a sounder basis for decisions that will be taken in the future.

Part 1: Government Actions in Response to COVID-19

VACCINES

Although the administration of health care is firmly established as a provincial responsibility in Canada, it is recognized that some actions pertaining to health may be administrated more effectively at the federal level. According to the government of Canada (GoC) (n.d.1) the Public Health Agency of Canada (PHAC) is the federal agency responsible for immunization activities such as the bulk procurement of publicly funded vaccines, vaccine safety monitoring, vaccine recommendations, vaccination coverage assessment, immunization awareness and promotion, and the national monitoring and assessment of vaccine preventable diseases. Health Canada is the federal agency responsible for regulation of vaccines for human use (ibid.). The various levels of government also collaborate through a number of pan-Canadian initiatives, such as the National Advisory Committee on Immunization and the National Immunization Strategy (ibid.).

In the early months of the pandemic before vaccines were available, representatives of PHAC and the federal government had press conferences and made public health announcements, almost daily. As vaccines were approved for use in Canada and procured by the federal government for distribution to the provinces, the rollout logistics were determined and administered by the provinces. Public health guidance was provincial through a collaborative interplay between provincial governments and their science councils and health advisors. Some provinces established temporary restrictions regarding interprovincial travel.

As the pandemic drags on, pressure is growing to reduce significantly these massive expenditures, although it is anticipated that funds will be allocated for vaccine procurement and research on an ongoing basis.

The 2022 budget (GoC 2022, A1.13) shows the impact value of projected expenditures on protecting health and safety of CA$69.4 billion (B) of which more than CA$17.6 B is to support vaccine procurement, deployment, administration and testing.

INCOME SUPPORT

Once the global pandemic was declared, in the absence of a supply of approved vaccines and with an inadequate supply of personal protective equipment, the initial public health response was curtailment of a significant amount of economic activity. An immediate concern was that illnesses due to infection would rise rapidly and would be so severe that hospital beds and staff would be insufficient to be able to deal with those in need. Air travel was restricted. Limits were set for public gatherings. Many businesses were closed with the advice being that workers

work from home, where possible, and schools were closed. Restrictions were placed on entry to LTC, for both staff and visitors. This period is referred to colloquially as lockdown.

In recognition of the dramatic impact that cessation of much economic activity would have on individuals and the economy, a wide range of income support programs were implemented. These included income support for those unable to work because of the pandemic, increases in employment insurance benefits and reduction or elimination of qualification conditions, support for students, support for businesses with respect to payroll and space rental, deferral of loan payments with the cooperation of banks, and support for businesses especially heavily affected, such as airlines. All of these programs have proven to be temporary measures, although some programs were modified and extended depending on perceived need.

The 2022 budget (GoC 2022, A1.13) shows CA$282.8 B in respect of direct support measures from all programs.[3]

Canada has some history in experimenting with basic income programs. Multiple articles were written suggesting that the experience of the pandemic might result in the adoption of a type of universal basic income program. The Liberal Party of Canada adopted a resolution recommending implementation of a basic income program, but the prime minister and the premiers of Canada's two largest provinces, Ontario and Quebec, do not appear to support such an initiative, so it is unlikely to proceed. For more background see Andrews and Curtis (2021).

LTC

Part 2 discusses the challenges associated with addressing LTC.[4] This subsection provides brief background regarding the impact of COVID-19 on LTC.

The pandemic is continuing, so the final tallies and country comparisons of performance are incomplete. The Canadian Institute for Health Information (CIHI 2020, p. 2) reported that as of May 25, 2020, "while Canada's overall COVID-19 mortality rate was relatively low compared with the rates in other OECD countries, it had the highest proportion of deaths" occurring in LTC, and "in Canada, the mortality rate for those infected with COVID-19 in LTC was about 35%"; moreover, "in Canada, more than 9,650 LTC staff members were infected by COVID-19, representing more than 10% of the country's total cases … leading to absenteeism and staffing shortages."

Stall et al. (2020, p. E946) state that

> LTC homes have become the epicentre of the coronavirus disease 2019 (COVID-19) pandemic in Canada, with residents of these care homes accounting for more than 80% of the country's deaths. Residents of LTC homes are at high risk of contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), owing to their congregate living arrangements and exposure to staff with asymptomatic or pre-symptomatic SARS-CoV-2 infection. These residents are also at high risk of morbidity and mortality from COVID-19, as most are older adults with frailty and multimorbidity. There is widespread concern that despite these predisposing risks, LTC homes were both underprepared and underequipped to protect their residents.

The lethal combination of high rates of infection, numerous deaths, staffing shortages and prohibitions on visiting LTC residents generated considerable anxiety and confusion among LTC residents, their families, the general public,

[3] The programs are the Canada Emergency Wage Subsidy, Canada Emergency Rent Subsidy and Lockdown Support, Canada Emergency Response Benefit, Enhancements to Employment Insurance, Canada Recovery Benefit, Canada Recovery Sickness Benefit, Canada Recovery Caregiver Benefit, Canada Workers Lockdown Benefit, Canada Emergency Business Account-Incentive and Targeting Supports for Deeply Affected Businesses.
[4] LTC is not determined to be medically necessary under the Canada Health Act and, as such, does not fall under the same regulations as does the health care system.

and government and public health representatives (Picard 2021). During this stressful period, at the request of the premiers of Ontario and Quebec, the federal government sent members of the armed forces to provide assistance in certain especially hard-hit LTC homes in Ontario and Quebec. Their report on the conditions encountered does not make for pleasant reading.

Ontario established the Long-Term Care COVID-19 Commission, which acknowledged that Ontario was not prepared to deal with the pandemic, identified many long-standing issues with LTC, and made 85 recommendations (Marrocco, Coke and Kitts 2021). Other provinces are also proposing actions to address the conditions in LTC. The Standards Council of Canada (SCC), Health Standards Organization (HSO) and Canadian Standards Association (CSA Group) are working collaboratively on developing two new national standards for LTC that will be shaped by the needs and voices of Canada's LTC home residents, workforce and local communities, as well as broader members of the public.[7] Various commentators, such as Armstrong and Cohen (2020), have called for the federal government to establish standards for LTC, with compliance being connected to federal-provincial transfer payments.

Additional federal financial support to the provinces of $CA4 B was announced through the 2022 budget (GoC 2022) and prior budget and economic statement during the pandemic.

CHILD CARE

Like so much guidance throughout the pandemic, different ones have been found in different jurisdictions and at different times. Guidance regarding day care was not an exception. In most jurisdictions the immediate reaction when the lockdown was declared was to close day care centers. This shifted a huge burden for child care to families. Because the guidance regarding young children was not to vaccinate them, it would be unrealistic to keep day cares closed until children are vaccinated. After a few months, day care centers reopened cautiously, where cautiously meant closing if an outbreak occurred and trying to monitor attendees so that those exposed to COVID-19 stayed home. Although this approach has meant that more day cares can be open, there are consequences. Typically, children experience only mild effects from COVID-19, but they can transmit the disease to family members and others with whom they come in contact, furthering the virus's spread. This was particularly true before a large proportion of the population was vaccinated.

Lockdowns of businesses and closures of schools shifted considerable burdens to parents in households with children. After the initial period of full closure of day care, in households where child care was in place before the pandemic and continued, both parents could continue to work, if work was available. However, where parents relied on schools to provide care for children and the parents were unable to arrange or afford child care to replace schooling, a significant additional demand was placed on them. Mainly this burden for child care and supervision was borne by women. The economic impact of COVID-19 was referred to as a "she-recession"[8] because of the drop in female labor force participation and the unequal care burden borne by women.

Compared to child care in other provinces, the model used in Quebec was considered progressive and transformative. Although Quebec did not get every policy aspect correct and faced implementation challenges and inequities, it is generally agreed that making licensed child care extremely affordable for Quebec families with children of preschool and school age was a considerable accomplishment (Cleveland, Mathieu and Japel 2021). It helped to boost female labor force participation, without a net cost to governments at either the federal or provincial level (Fortin 2019).

During the pandemic, the federal government undertook to negotiate transfers to provinces that adopted affordable child care programs on a province-wide basis following the Quebec model. In March 2022, Ontario was the final province to sign an agreement with the federal government regarding early years and child care, on a much more affordable basis, although buy-in by day-care providers will be required to implement change effectively. According to the Childcare Resource and Research Unit (2012), a national child care program was proposed by the

Royal Commission on the Status of Women in 1970. Given that such a program was discussed for many years but not implemented until after the pandemic was declared, it seems appropriate to attribute the implementation of a national program to COVID-19.

The combined additional federal contribution to early learning and the child care system, announced by the Liberal Party since it formed the government in 2015, is CA$30 B[5] over five years through fiscal year ending in 2025 (GoC 2022). With the fiscal year beginning in 2025, CA$9.2 B ongoing will be invested in child care, including the Indigenous Early Learning and Child Care (GoC 2022, p. 114).

Part 2: Challenges in Addressing LTC

Many reports and papers have been written regarding the challenges that Canada's aging population poses with respect to providing adequate quality care for that population. This part does not explore any of these challenges in depth. Rather it frames the issue to set the stage for the discussion of the social contract in part 3. It does so by providing major headings with a few paragraphs of explanation supported by various references.

1. The cost is expected to increase significantly—more than triple—in absolute terms and in proportion to today's levels.

Discussing their projection to 2050 of the future costs of LTC in Canada, MacDonald, Wolfson and Hirdes (2019, p. 35) state "if public policy on long-term care continues on its current track, public sector long-term care costs will more than triple by 2050 (from $22 billion to $71 billion, in constant dollars)." From figure 3a in MacDonald et al. (2019, p. 23) it appears that the projected annual costs in constant 2019 dollars for institutionalized LTC (ILTC) will grow from just under $20 billion in 2019 to over $60 billion in 2050. Although the actual dollar amounts for ILTC are not quite as large as cited in MacDonald et al. (2019), they are still very large, and they are expected to triple.

2. Canada's gross domestic product (GDP) cannot be expected to grow comparably, meaning tax rate increases and/or changes to spending priorities will be required.

These ILTC amounts are financed by the public. To provide perspective, unless GDP grows roughly in line with expenditures, or there is a change in spending priorities,[6] tax rate increases are required. Canada's GDP would have to experience real growth of approximately 6.45% per year between 2019 and 2050 to triple[7]—not something contemplated by any forecasters of which we are aware.[8]

3. The government's focus is on a narrow definition of LTC, but to meet the requirements of Canada's aging population will require attention to a broader set of issues, care for the long term (C4LT).

Certain diseases occur more often in the senior population, and the prevalence of most chronic diseases increases with age and over time (PHAC 2020, p. 4). We believe C4LT is the correct definition of care on which to focus. It deals with all the care needs of our Canadian population, whether delivered at home or elsewhere and whether on a paid or unpaid basis. As a society committed to fairness, providing for quality care for all citizens should be our

[5] The federal investment, new child care spaces and new early childhood educator jobs expected is shown in the 2022 budget (GoC 2022, p. 116) by province.
[6] A decision to run deficits leading to an increase in debt as a percentage of GDP is considered a change in spending priorities.
[7] As projected by MacDonald et al. (2019) and referenced in point 1 above.
[8] By way of comparison, https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=CA indicates that annual GDP growth in Canada reached or exceeded 5% only once in the period 1998–2018.

goal. It is insufficient to direct our attention only to those in ILTC, and to assume that all others will have their needs met appropriately.

Our system is based on the assumption that the majority of care will be "given" on an unpaid basis by family, friends, and volunteers. The Petro-Canada Caremakers Foundation (2020) quotes an estimate of 75% of care being provided on an unpaid basis, with an estimated value of $26 billion to $72 billion per year. MacDonald et al. (2019, p. 26) estimate that unpaid hours per caregiver per year will increase from 290 to 415 between 2019 and 2050. In an infographic, Eales et al. (2022) estimate that in 2018, 7.8 million caregivers provided 5.7 billion hours of unpaid care, for an equivalent economic value of CA$97.1 billion.

4. It will continue to be challenging to find an adequate supply of trained Personal Support Workers (PSWs) willing to work for low wages.

Paid care provision is primarily delivered by PSWs. According to a Job Bank report (GoC n.d.2) the prospects for employment in this job for the period 2019 to 2028 are fair to good (the highest rating) depending on province. As well as strong demand, supply factors affect this rating. The supply factors include higher average-age workforce leading to higher retirements, low wages resulting in turnover, and unattractiveness to graduates, meaning positions are more likely to be filled by immigrants.

According to a 2009 survey of PSWs in Ontario (CRNCC 2010), the top three reasons for considering leaving the job are related to scheduling, wages and working conditions, all mentioned by more than 40% of respondents. The CRNCC (2010) reports that recruitment and retention are problems for this job classification. Although wages could be addressed by raising them, such a response would add to the cost concerns discussed. Scheduling could be improved by hiring workers on a full-time basis. This has cost implications, including entitlement to certain statutory benefits, such as Canada Pension Plan and Employment Insurance, so it is seldom the preferred course of action by employers. The scheduling and the work activities make the working conditions less than ideal, and it is unlikely that the inherent nature of the work can be changed or that wages will be increased substantially. Hence, finding an adequate supply of trained PSWs who are prepared to work for low wages is likely to be an issue for the indefinite future.

5. The changing distribution of the age 65 and older population is likely to produce greater care requirements and reduced capacity to provide sufficient unpaid caregiving.

The information in this subsection has been calculated by the authors using data downloaded from Statistics Canada Table 17-10-0057-01 (release date Sept. 17, 2019),[9] which provides multiple population projections by age. On initial glance, the proportion of the population age 65 and over is projected to remain at approximately 21% on the slow-aging projection.[10] But there is a hint at cause for concern on the fast-aging projection[11] because the proportion age 65 and older is projected to increase from 22.7% in 2030 to 25.3% in 2050. These aggregates hide a real area for concern, which is the changing distribution of the population age 65 and older, with a greater proportion of the distribution living at higher ages.

[9] https://doi.org/10.25318/1710005701-eng.

[10] Summary of the main assumptions: the total fertility rate reaches 1.79 children per woman in 2042/2043 and remains constant thereafter; life expectancy at birth reaches 85.6 years for males and 88.8 years for females in 2067/2068; and the immigration rate reaches 1.08% in 2042/2043 and remains constant thereafter.

[11] Summary of the main assumptions: the total fertility rate reaches 1.40 children per woman in 2042/2043 and remains constant thereafter; life expectancy at birth reaches 88.0 years for males and 91.3 years for females in 2067/2068; the immigration rate reaches 0.65% in 2042/2043 and remains constant thereafter.

As MacDonald et al. (2019) observe regarding caregiving requirements, it is important to consider the population age 85 and older. By our calculations, the proportion of the population age 85 and older is expected to increase from 2.6% in 2030 to 4.4% in 2050 on the slow-aging projection, and from 2.4% (2030) to 5.1% (2050) on the fast-aging projection.

We define the senior women's caregiving (SWC) ratio as the age 85 and older population (both sexes) divided by the female population less than age 65, and the super senior women's caregiving (SSWC) ratio as the age 85 and older population (both sexes) divided by the female population less than age 75. These ratios give an indication of the caregiving burden of the over age 85 population that might be borne by women. The SWC ratio increases from 6.7% in 2030 to 11.3% in 2050 on the slow-aging projection, and from 6.2% in 2030 to 13.2% in 2050 on the fast-aging projection. The SSWC ratio increases from 5.8% in 2030 to 10.1% in 2050 on the slow-aging projection, and from 5.3% in 2030 to 11.8% in 2050 on the fast-aging projection. This is a striking indicator of how the distribution of the population over age 85 is projected to change, which is likely to result in a significant increase in care burden, especially for women.

6. Past neglect and under financing need to be addressed.

Concerns have surrounded care provision now and have been for many years. Estabrooks et al. (2020, pp. 656–657) provide a long list, which includes integration across communities, continuing care and acute care sectors have not been optimized; systematic reduction of regulated staff in ILTC; inadequate levels of properly oriented dietary, laundry and housekeeping staff; systematic failure to deal with the consequences of population trends in aging; dementia prevalence; and fewer family caregivers for older adults. Picard (2021, p. 46) also has a long list, which includes that LTC "is neither universally accessible nor affordable to all," "infection control is poor" and "no one is ultimately responsible for ensuring elders get the care they need in a timely, accessible fashion." Hence, we are not worrying about the future on a sound base of care, but just the opposite. We have decades of neglect (Picard 2021) and underfinancing (Estabrooks et al. 2020) with which to be concerned as we face tomorrow's challenges in delivering care.

7. The whole environment regarding care provision and care giving needs to be made fairer and the basis of thinking about it changed.

Another important consideration in building a system of C4LT that is sustainable and acceptable within a just society is to address issues of social injustice embedded in the current system. Briefly, these include the following.

PSWs who provide the majority of paid provision are among the lowest paid workers and are mainly women, and many are part of a visible minority (CRNCC 2010). When one observes the intersection of women and visible minorities, in a context of low pay, it is reasonable to seek assurances that there is no discrimination.

Although both men and women participate in unpaid caregiving, women's participation tends to be more extensive, more frequently resulting in a modification to paid-work activities. The Change Foundation (2019, p. 9) reports "55% of male caregivers are full-time employees, compared with 41% of female caregivers, 16% of women are part-time employees, compared to 9% of men." Having to modify paid-work activities to provide unpaid care not only results in an immediate reduction in income but may also have longer term repercussions in terms of promotion and stature, if trying to reenter the workforce, and long-term consequences for retirement pensions and savings (Curtis and Rybcyznski 2015). The unequal impact by sex is unfair. The assumption that we can provide C4LT using a predominantly unpaid workforce is systematically unfair.

Our whole manner of thinking about caring in economic terms needs rethinking. In traditional economics, a foundational assumption is that individuals are rational agents who make choices to optimize their welfare. This line of reasoning is challenging to defend in the context of an aging population, in which employment practices regarding retirement age are relatively rigid. In such a context, it is not unexpected that individuals will experience

much longer retirement periods than expected and may not be able to earn and save sufficiently during their working period, especially if expensive care is required. Given that our care requirements are difficult to predict with accuracy, is it reasonable that individuals should bear that risk? Or is it a risk that the state might accept, such as it has done for medically necessary services, or income after age 65 (through Old Age Security)?

Also, GDP does not include unpaid work. This may place the correct monetary value on a decision, but not the correct value when one includes human suffering or societal contribution. For example, in the ILTC setting with waitlists filled with applicants who are not working and are not paying for care, little change occurs to GDP if the residents die in ILTC (as they did during COVID-19) and are immediately replaced. Judged with a lens that values human life, the economic GDP measure does not accurately capture value. But unless we rethink what we value and how to measure it, we are unlikely to make dramatic changes.

8. The pandemic will change the assumptions on which the analysis is based and our future priorities.

We are still living in a global pandemic that was declared more than two years ago. It will take years to assess the impact that COVID-19 has had and will have on our society. This short section lists some items already observed that may impact this analysis.

The demographic assumptions used by MacDonald et al. (2019) and on which the population projections provided by Statistics Canada were prepared, were prepandemic. In 2020 life expectancy dropped.[12] Fertility intentions have dropped to a low of 1.40 children per woman,[13] a rate not projected to occur until 2042/2043 on the fast-aging projection (see footnote 12). Both life expectancy and fertility rates affect demographic projections and the population distributions, which, in turn, have implications for care requirements and capacity for care delivery.

The appalling number of deaths in LTC in Canada, worst among OECD comparators (CIHI 2020), has drawn the attention of the public, the government and the military. At least in the short term, politicians will be paying more attention to LTC, which may help to address some of the accumulated issues. For example, the Ontario government has announced[14] that it is investing CA $933 million in 80 new LTC projects.

However, throughout the pandemic, governments at all levels have increased spending and are running deficits. Once the pandemic is behind us, undoubtedly calls will be made to rein in spending, to try to balance budgets and to forego tax increases. In such an environment, will improvements to LTC remain a priority? If LTC remains an area of systemic injustice, it may be easy to shirk responsibility to meet or add to commitments in this area.

Part 3: SDR Implications

In Part 1 the government's response to the pandemic was outlined. It resulted in increases in spending affecting most citizens. However, the intergenerational effects of this spending varied. Vaccines and the encouragement of the entire eligible population to be vaccinated were intended to keep all generations safe from infection. However, the risk associated with infection tended to be highest among the older generations, and the older generations have tended to receive more vaccination doses and to be eligible earlier. Unless the income support initiatives result in permanent program changes, they are likely to be a cost that will be borne by future generations of taxpayers. In the short to medium term, spending to improve LTC will benefit older people who require care directly and also benefit those caregivers who are somewhat younger and whose care burden may be reduced or made more

12 https://globalnews.ca/news/8541293/life-expectancy-in-canada-statscan/.
13 https://www150.statcan.gc.ca/n1/pub/45-28-0001/2021001/article/00041-eng.htm.
14 https://news.ontario.ca/en/release/60796/ontario-making-historic-investment-to-modernize-long-term-care.

manageable so they can pursue employment or other activities.[15] The revisions to day care programs will have beneficial consequences for children and for their parents, potentially for many generations to come. As a package of programs in response to a global pandemic, these expenditures are broad ranging and not inconsistent with the intergenerational social contract. But when the pandemic is over and the costs of these programs are incorporated in tax rates and/or significant reduction in program spending is implemented, what will be the impact on intergenerational social contract? Increased day care spending appears to be a permanent change. As noted in part 2, underfunding of LTC has been chronic, demographic pressures suggest a need for more spending, and a calamitous human tragedy occurred in ILTC during the pandemic. All of this suggests tilting spending that will have an impact on the social contract.

From the early stages of training, actuaries and economists are taught to calculate the net present value of projects by discounting future costs and benefits. The model of the rational man as decision maker is one that bases all decisions on an expected value calculated by discounting all future relevant factors. These approaches assume a discount rate. On this line of thinking, if the project involves social costs and social benefits, then the SDR is the appropriate rate of discount. Although it is highly unlikely that all decisions are made on this basis, especially ones with personal and political implications, this approach does provide a rational starting point for evaluating social alternatives.

The question that we are considering in part 3 is as follows. If, for individuals, personal discount rates vary by a number of factors (Huffman, Maurer and Mitchell 2019), including age, and if an aggregate population comprises individuals of different ages, and if the age structure and age distribution of the aggregate population shifts to being older, what are the implications for the discount rate of the aggregate population, if any? The SDR is applied in evaluating projects and policy appraisal involving aggregate populations, albeit potentially including populations that are not yet born.

A further question is then, if population structure and age affect aggregate population decisions, might a change in population structure and age affect the SDR? For example, when fertility rates fall below replacement levels for extended periods, then intergenerational equity requires some adjustment: perhaps via financial transfers from older to younger generations (through taxes or bequests), perhaps by lowering the SDR to give greater weight to future net benefits with longer time horizons (which tend to benefit younger age or unborn groups), and perhaps by immigration (which may broaden the tax base and change labor market conditions). If the answer to this question is yes, then a further question is how and to what extent? We discuss considerations in answering these questions but do not purport to answer the questions conclusively.

One consideration identified by Slomka, Shepherd and Fields (2020) is whether the SDR is intended to be descriptive or prescriptive. As empiricists, we are concerned with describing the factors that influence SDR, so our approach is descriptive. As pragmatists, we recognize that decision makers may have specific objectives in mind and may prefer or choose a prescriptive approach. Moreover, decision makers' priorities may change over time, and decision makers themselves may change. Carney (2021) makes strong arguments regarding why we need to move away from the status quo in decision making and reevaluate the values that will frame future decision making in view of the challenges laid bare by the triple crises of credit, COVID-19 and climate change. Speculating on the possible objectives and the relative weightings of various objectives of decision makers is beyond our area of expertise and the scope of this paper, and so we confine our thoughts to the descriptive.

The literature regarding the SDR continues to grow, especially in regard to how to evaluate the impact of global warming. To review this literature is beyond the scope of this paper. In this part we introduce four methods that

[15] Leisure for economists, but perhaps more nuanced for others.

have been used to determine the SDR. The rates for a selection of countries based on the different approaches is presented. We continue the discussion focusing on one method, Social Rate of Time Preference (SRTP), and we review briefly selected literature regarding the level of the SRTP and how it may change over time. We also review briefly other work that we have done regarding the impact that population aging and population structure have on the return on various asset classes. We then make some observations on how population aging and population structure may affect the SDR. We provide some numerical illustrations of the impact of incremental changes in SDR.

NUMERICAL ILLUSTRATIONS

Gutterman (2020, p. 151) provides a table showing the present value of a future cash flow discounted using various interest rates. The table illustrates the impact of discounting, as well as the significant difference in present value of using a lower rate, such as 2%, compared to a higher rate, such as 4%. For example, using the discount factors in Gutterman (2020), CA$500,000,000 payable in 200 years has a present value of CA $9,525,000 at 2% and CA$195,000 at 4%—a striking 48 times difference in present value. Although not shown in the table, at 0% interest CA$500,000,000 payable in 200 years has a present value of CA$500,000,000. In this subsection we provide some additional illustrations.

The construction of the Highway 407, a toll road, which provides access to the greater Toronto area (GTA) in Ontario, Canada's most populous province, began in 1993.[16] In 1995 the Ontario government faced a CA$101.9 billion debt, and the net debt to GDP ratio had climbed to 30.4% (Di Matteo n.d.). As a means to address these fiscal challenges, consideration was given to privatizing certain public projects, including hospitals and Highway 407. In 1999 Highway 407 was leased to conglomerates of private entities and investors for a period for 99 years for $3.1 billion.

We analyze this decision's relative merit for the public by considering alternative rates of discount to compare the income to the public, that is, original payment plus discounted taxes to be received over the lease period, to the opportunity cost to the public, that is, discounted net income over the lease period, which is foregone. All post-1999 figures[17] were deflated to 1999 dollars, using the Consumer Price Index. Challenges are faced in making projections over an extended time horizon, which add to the uncertainty of such analyses. Some are noted and can be seen from Figure 1, which shows the reported net income and taxes, deflated to 1999 Canadian dollars.

- Tax accounting is done on a smoothed basis, resulting in tax revenues for accounting purposes, even though net income may be negative. Note that we have credited the public with all tax revenues, even though a majority of the taxes will be paid to the federal, rather than the provincial, government.[18]
- Net income starts negative but after 2009 was rising rapidly, primarily because of additional construction around the GTA, which meant that Highway 407 became a more important means of access. Note the increase from 2014 to 2019. However, when discounting, especially at higher rates, the earlier years of lower revenue figure more prominently in the present value calculation.
- Two significant events affected net income and taxes: the financial crisis of 2008 reflected by the 2009 decline in both, and COVID-19, which resulted in a sharp drop from the 2019 peak. The global pandemic continues and presents a challenge in how to adjust projected figures. We took the average of the net income and the taxes for three years before COVID-19 and used that figure for the net income and taxes in

[16] For more history, see https://www.407etr.com/en/highway/corporate/background-information1.html.
[17] Source of data https://en.wikipedia.org/wiki/Ontario_Highway_407#Financial.
[18] If only the provincial share of taxes were considered as public revenue to evaluate the decision, SDR up to 5.56%, rather than 4.93% as shown, would result in lost opportunity cost to the public.

2022. We made this assumption by treating COVID-19 as a once-in-a-hundred-year occurrence, and so we did not include the numbers from 2020 and 2021.

- We then, to project beyond the reported data, made a year-on-year assumption of growth rate to be equal to 2%, which is in the ballpark for Canada's historical average but less than the expected growth rate of GDP for 2022.

Figure 1

HIGHWAY 407 DEFLATED REVENUE FLOWS

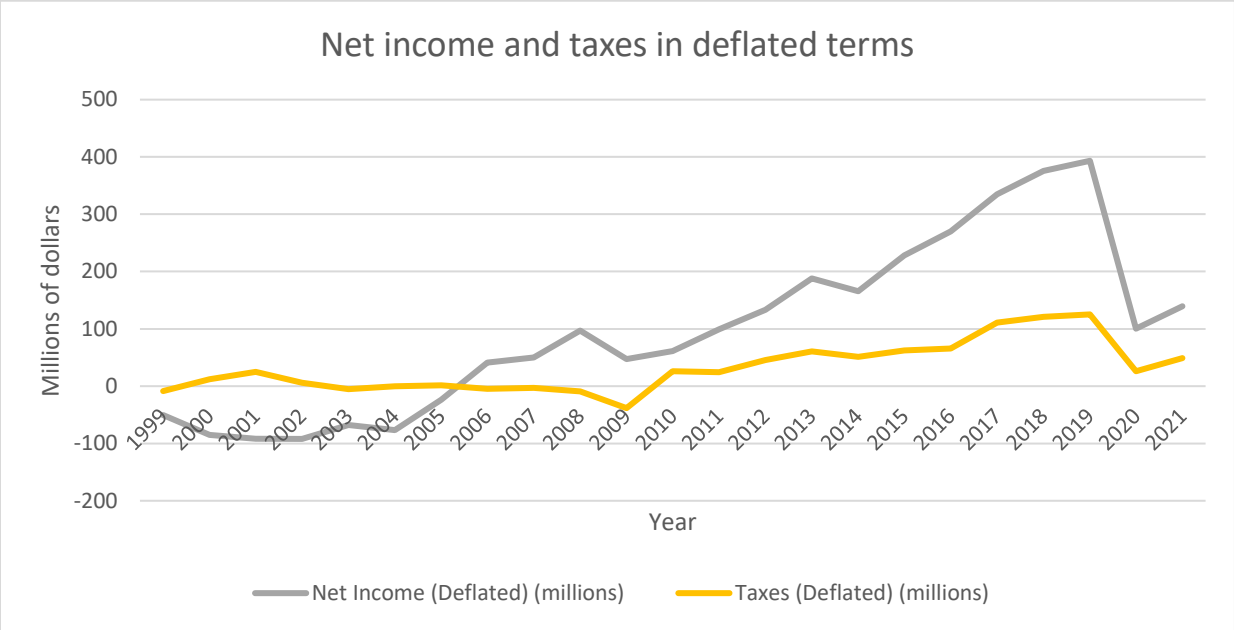

Table 1 shows the year in which the opportunity cost to the public exceeds the projected income, using various discount rates, applied to the projected figures.

Table 1

BREAK-EVEN YEAR WHEN NET OPPORTUNITY COST EXCEEDS INCOME AT DIFFERENT SDR

Discount rate (SDR)	0%	2%	3.5%	4.5%	4.93% or higher
Break-even year	2028	2035	2047	2068	No break-even point in the 99-year lease

From the above analysis we can see that if we use a SDR of less than 4.93%, then the decision to privatize is costly to the public. Whereas if the SDR is higher than 4.93%, then the decision to privatize has a net benefit for the public. The indicators cited in this paper and the arguments regarding pressures to reduce the SDR suggest that it is

unreasonable to assume as high a SDR as 4.93%; therefore, the decision to privatize for the agreed price will be costly to the public.[19]

Gutterman (2020) discusses intragenerational and intergenerational equity. From an intragenerational perspective, one might argue that the decision to privatize has merit; for example, at 3.5% SDR the public's revenues exceed the opportunity cost until 2047, arguably longer than a generation, especially if generation is narrowly defined as the one that elected the provincial government that made the decision. However, if one believes that governments making long-term decisions should consider intergenerational equity, then one should use a lower SDR, perhaps even 0%.

The foregoing example illustrates some of the challenges in evaluating long-term decisions with implications for future generations. It shows how different choices of SDR affect the assessment of the decision. Quite a different burden of cost-sharing can be found among generations, some of which are yet unborn when the decision is taken. The social contract among generations is affected by decisions taken, and there are trade-offs.

In the context of an aging population, and a world population that is projected to begin to decline this century, the question of whether budgets should be directed away from education toward expenditures of greater benefit to older persons is likely to arise. Dee and West (2011) discuss the noncognitive returns[20] to reducing class sizes in elementary schools. Even assuming no growth in productivity, they calculate that the internal rate of return of a one standard deviation reduction in class size is 3.6%.[21] In our terminology, if the SDR is less than 3.6%, it is worth undertaking. If expenditures were redirected from class size reductions to an expenditure immediately beneficial to older persons, such as building more LTC facilities, would the internal rate of return exceed 3.6%? The analysis of this question is beyond the scope of this paper. However, it is an important analysis to undertake when making decisions with long-term results that have intragenerational and intergenerational consequences.

ALTERNATIVE METHODS TO DETERMINE THE SDR

Zhuang et al. (2007)[22] describe four methods to determine the SDR, based on two fundamental approaches, the SRTP and the Marginal Social Opportunity Cost of Capital (SOC). The SRTP "is the rate at which a society is willing to postpone a unit of current consumption in exchange for more future consumption [and] … is based on the argument that public projects displace current consumption, and streams of costs and benefits to be discounted are essentially streams of consumption goods either postponed or gained" (ibid., p. 4). The SOC "is based on the argument that resources in any economy are scarce; that government and private sector compete for the same pool of funds; that public investment displaces private investment dollar by dollar; and…public investment should yield at least the same return as private investment" (ibid., p. 9). These two approaches tend to produce significantly different rates.

The other two approaches to determine the SDR try to provide some balance between the SRTP and the SOC. The Weighted Average Method calculates a weighted average of SOC, SRTP and the cost of foreign borrowing, with the weights representing the proportions of money collected from each source. The Shadow Price of Capital (SPC)

[19] A news item commenting on the sale indicates that the original plan was that the highway would pay for itself over 30 years and then become toll-free (https://www.cbc.ca/news/canada/highway-407-sold-1.191438). Note that time period corresponds closely with a 2028 breakeven point calculated at a SDR of 0%.

[20] A vast literature is found on cognitive returns to class size, beginning with Project STAR that is controversial (see, for example, Loveless and Hess 2006/2007 and Woessmann 2006/2007). Our brief review of this literature did not provide any insight regarding an internal rate of return or SDR related to the potential net benefits to class size reduction. The discussion regarding noncognitive returns is presented solely as an illustration, because the cited article (Dee and West 2011) calculated an internal rate of return.

[21] At 1% and 2% rates of productivity growth, the internal rate of return for a one standard deviation in class size reduction is 4.6% and 5.6%, respectively (Dee and West 2011).

[22] Readers interested in this subject may wish to consult this paper.

approach also attempts to reconcile the SRTP approach with that of SOC and, at the same time, to address limitations of the weighted average approach. Because the expenses of a public initiative may result in gains that can also be reinvested in the private sector, future consumption streams may be worth more even though current consumption is displaced. As a result, the overall cost of a public project is equal to the sum of current consumption that is directly displaced and future consumption streams that are foregone as a result of private investment displacement. Similarly, the total benefit of a public project is the sum of those that are consumed immediately and those that are enjoyed in the future as a result of reinvestment. According to Zhuang et al. (2007) four steps should be used to calculate the SPC, the final one being to compute the net present value of these cost and benefit streams at SRTP.

COUNTRY RATES

The following brief description illustrates some of the range in rates attributable to the various methods.

Zhuang et al. (2007) states that the U.S. Office of Management and Budget uses a SOC approach with a rate of 10% before 1992 and 7% thereafter, whereas the U.S. Congressional Budget Office and General Accounting Office uses the SRTP approach, stating the rate basis will be the rate on marketable Treasury debt with maturity comparable to project span, as does the U.S. Environmental Protection Agency, which suggests a rate of 2% to 3% for intergenerational discounting accompanied by sensitivity analysis.

Zhuang et al. (2007, p. 17) state that Canada uses a rate 10% based on the SOC approach. Subsequently, Boardman et al. (2010) state that the current SDR of 8% used by Canada is too high and should be revised downwards. Boardman et al. (p. 338) suggest that Canada use an "SDR of 3.5 percent (with sensitivity analysis that varies between 2.5 percent and 7.0 percent) for intragenerational projects,[23] and between 1.5 percent and 3.5 percent for projects with intergenerational impact." They use an approach based on a weighted social opportunity cost of capital that refers to the SPC.

According to Zhuang et al. (2007, p. 19), European countries tend to use the SRTP approach: "Germany uses 3%, based on values of real long-term government bond rate. Norway has been using a 3.5% discount rate after 1998—also based on real government borrowing rate. France's Commissariat General du Plan in 2005 lowered its project discount rate to 4% based on the SRTP approach. Italy uses the SRTP approach to derive a 5% discount rate, while Spain adopts 4–6% for different sectors." In the following discussion, where we use SDR we will be referring to SRTP unless otherwise stated.[24]

SRTP COMPONENTS

Slomka et al. (2020) state that the SDR is a crucial component of the U.K. government's approach to project and policy appraisal, and that the UK government's guidance since 2003 has stipulated a 3.5% SDR. They discuss theoretical considerations regarding the determination of the SDR, which are summarized in the following paragraph.

Citing the U.K. Treasury's Green Book, Slomka et al. (2020) identify four parameters of the STRP (r), for projects of 30 years or less. These are a rate of time preference (δ), a risk parameter (L), the elasticity of marginal utility with

[23] Those less than 50 years.

[24] Taking a more global perspective, according to Zhuang et al. (2007), SDR in developing countries tends to be based on the SOC approach. They cite rates of 12% for India and Pakistan, and 15% for the Philippines. But a recent paper by Moore, Boardman and Vining (2020, p. 61) estimates SDR for 17 Latin American countries using the SRTP approach and states "our value for the average SDR is 3.77 percent, ranging from 2.14 percent for Paraguay to 5.83 percent for Chile."

respect to consumption (μ) and expected growth rate of future per-capita consumption (g). The equation combining these factors is given by Slomka et al. as $r = \delta + L + \mu g$. For projects with a longer horizon than 30 years, a term structure is introduced. Zhuang et al. (2007) state that hyperbolic discounting has been suggested as an approach to give appropriate weight to future generations, i.e., the discount rate would decline like a section in a hyperbola; however, they state that this approach may lead to problems of time inconsistency in planning and consumption. For simplicity and perhaps to avoid such problems, in the U.K. the SRTP declines in steps to 1.0% beyond 300 years.

Slomka et al. (2020) review factors affecting the parameters that may have changed since adoption of the current values. They suggest that an alternative of 2.45% to the current value of 3.5%. In a subsequent article, Slomka and Shepherd (2020) suggest that adjusting for inequality could reduce the rate further to 1.95%. They also discuss why the step rate function might be modified to decline more gradually than currently.

Drupp et al. (2018) conducted a survey and found a surprising consensus among experts, with more than three-quarters finding the median risk-free SDR of 2% acceptable. Our point here is not to determine the SDR, but to identify that some experts think it may be lower than is commonly used.

IMPACT OF POPULATION AGING AND POPULATION STRUCTURE ON ASSET RETURNS

In a technical paper, Eden (2021) argues that even small deviations of the SDR from the market rates can provide welfare outcomes, with morally challenging implications. A discussion of her paper is beyond our scope here, but her final paragraph does provide a potential direction for future research. Her analysis is based on the balanced growth path (BGP). She acknowledges that the desirability of age-related redistribution changes as we move away from the BGP.

With an aging population, and the likelihood of the total global population beginning in this century to decline, a move away from the BGP may be warranted. This subsection describes recent research that suggests that with an aging population market rates may also decline.

Andrews et al. (2021) report the findings of a multiyear project that investigated the impact of population structure on various asset class returns and express the results in the context of the implications for pension plans in Canada, the U.S. and the U.K. They conclude that the finances of Canadian pension plans are more exposed to the demographic effect on investment returns (older populations are associated with lower investment returns) than plans in the U.K. or the U.S.

Significant analyses have been conducted on the relationship between demographic structure and investment returns in specific investment markets: equities, bonds and housing. Seminal examples from this literature include Bakshi and Chen (1994) for equities and bonds and Mankiw and Weil (1989) for housing.

Although results vary, the general conclusion is that aging populations will dampen the future returns on equities, bonds and housing. The effects identified in the literature can be summarized as follows. An increase of 1% in the proportion of the population that is working age increases equity returns in the range of 1.5% to 5% per year. An increase of 1% in the proportion of the population that is over age 65 reduces equity returns by roughly 0.5% per year. An increase of 1% in the proportion of the population that is working age reduces bond yields in the range of 1% to 1.5%. An increase of 1% in the old age dependency ratio reduces house prices in the range of 0.5% to 1.5%.

Andrews et al. (2022) analyze and quantify the impact of demographics on the returns from infrastructure investments and conclude that there is a significant relationship between demographic structure and infrastructure returns.

Table 2 from Andrews et al. (2022) summarizes the results for the various asset classes.

Table 2
IMPACT OF INCREASE IN DEMOGRAPHIC FACTORS ON ASSET CLASS RETURNS

Demographic Factor	Equities	Bond Yields	Housing	Infrastructure
Working age proportion	↑	↓	n/a	↑
Proportion over 65	↓	n/a	n/a	↑
Old age dependency	n/a	n/a	↓	n/a
Average age	n/a	n/a	n/a	↓

Source: Andrews et al. (2022).

Given that evidence suggests that population aging and population structure are expected to have an impact on the expected returns on real asset classes, it is worth considering whether they might have an impact on the discounted value of projects that involve real assets.

POTENTIAL IMPLICATIONS AS WE MOVE PAST COVID-19

Given that the U.K. government has maintained the same SDR since 2003, it supports the concept that the SDR is used for a wide range of projects, at least some of which are directed toward subgroups of the population. In other words, the SDR does not change based on the subgroup most impacted. This suggests that the SDR is an aggregate rate, arguably comprising (some) weighting of the subgroups, their discount rates and the portfolio of subgroup projects. To explore further this line of thought, let us consider the four COVID-19 initiatives listed in part 1 and their implications for subgroups. For simplicity of discussion let us consider three subgroups by age: under 16, 16–64 and 65 and older, typically thought of as too young to work, working age and retired. Other considerations are the time horizon of the project and how the project balances considerations of investment and expenditure over its useful life.

Vaccinations have an immediate impact on the prevention of disease within the vaccinated population and on the prevention of disease for the whole population as overall immunization rates increase. The older the age subgroup, the greater the immediate benefits to the vaccinated, in terms of health impact and potential for morbidity and mortality. Beyond the immediate benefits in protecting the vaccinated, vaccinating a high percentage of the population, regardless of age, provides a societal investment in general safety from disease prevention. So the benefits of immediate vaccination rise sharply with age, but the whole population, regardless of age, benefits when high numbers of the population are vaccinated. In this regard vaccinating a large proportion of the population has strong investment characteristics that are beneficial for all ages.

Income is important for all ages. In recognition that workers may need support if they have families, Canada has a history of providing child support benefits, which may be adjusted based on need. Canada also has recognized that retirees may need income support, which it provides through Old Age Security and Guaranteed Income Supplement. The underlying premise deducible from current program design appears to be that there is value to provide income support in respect of children and in respect of retirees, but very limited value[25] in providing support in respect of the working age population. Experimental evidence to question this assumption is limited, although Forget (2018) and Segal (2019) both claim to find societal benefits from a universal basic income, compared to targeted income support programs.

Projects to improve LTC benefit the older subgroup, in the immediate term, but have potential benefits for other age groups, who may require care at some point or who may benefit indirectly if family members receive quality

[25] Or perhaps limited public support for providing income to those of working age, except in exceptional circumstances.

care. Given that care is delivered mainly to those who will likely make limited societal contribution in the remainder of their lives, these expenditures tend to be more a consumption good or service rather than an investment, although potential investment aspects arise from paying wages to the workers in LTC.

Child care presents another different weighting of benefits by age subgroup. For the working age subgroup, a consumption benefit is received in having child care in place, but more importantly longer term investment and economic benefits arise through being able to work for wages. One might argue that the child subgroup receives investment benefits through quality child care because it provides a sounder basis for a future productive life. It is difficult to find benefits for the older subgroup, with the possible exception of loss of satisfaction in providing child care for their children and to their grandchildren.

These four programs illustrate the types of trade-offs in evaluating programs that have different implications for different ages, and that have both expenditure and investment benefits. Eden (2021, p. 28) makes this point with respect to the pandemic response, stating "Containment measures disproportionately benefitted the elderly, who were at higher risk from the virus. However, some of the costs were born by children and working-age adults, who suffered serious disruptions. This raised the question of how to trade-off benefits to the elderly with costs to younger people."

The decisions are made even more complicated by additional programs, such as health care, education and defense spending. Notwithstanding the complexity, the basic model is that the SDR reflects the appropriately weighted average of net costs and benefits, where the cost and benefits have been adjusted for immediate versus longer term and to distinguish expenditure, consumption and investment considerations. Should the future (projected) structure of the population change from the past (projected) structure of the population, and should this change be considered permanent and significant, then one would expect the SDR to be changed.

If a lower SDR is used in cost-benefit analysis, future costs and benefits both have a higher net present value. Also, projects with high front-end expenditures but longer-term benefits may be considered viable, whereas they were not considered viable using a higher SDR. On the one hand, this may make infrastructure investment and the related job creation, in response to the pandemic, more viable as noted by Slomka and Shepherd (2020). On the other hand, the evaluation of projects under consideration for outsourcing to the private sector or the privatization of public entities may change, if future cash flows have a greater weight in the present value analysis.

Conclusions and Areas for Future Research

In part 1 we have described significant spending initiatives taken by the federal government of Canada in response to the global pandemic. Four main spending priorities are described: vaccines, income support, LTC and child care. Before the pandemic was declared, these massive expenditures were not budgeted. It is remarkable that governments, at all levels, complied in undertaking such expenditures, with little discussion of future ramifications for debt and the economy in future years.

Although the increased expenditures during the pandemic for LTC were the least of the four spending priorities, the magnitude of the sickness and deaths among those in LTC facilities has heightened public awareness regarding the social costs of operating LTC in the current manner. Part 2 lists many of the issues that need attention. A part of the challenge is to address cumulative neglect and underfunding. A compounding part of the challenge is to address the continuing pressures on the system that an aging population will bring. An underlying premise of the current system is that informal unpaid caregivers will be able to manage sufficiently the care burden, without requiring ILTC, so that quality institutionalized care will be accessible, if necessary, and will remain affordable. The aging demographics, which indicate that the numbers requiring care will increase and the capacity of informal caregivers who are aging

will decline, will challenge this premise. The expectations that women will provide care, on an unpaid basis or at low wages, are unfair, and perhaps unsustainable. These are areas for future research.

As the pandemic passes, governments and the public are likely to review their priorities, compared to prepandemic years. In making assessments to choose among spending proposals, cost-benefit analyses using a SDR will be performed. In part 3 we have discussed approaches to determining the SDR and suggested that the SDR may be lower than used in the past. Based on our research of the impact of population aging on asset returns, we suggest that population aging may exert continuing downward pressure on the SDR. A lower SDR may change both the absolute and the relative viability of projects and may introduce trade-offs among programs, along intergenerational lines. The SDR is a critical analytic tool in determining future project spending. More research is warranted about its level and the impact that population aging has on it. In this century, the global population may begin to decline. Spending and social priorities, as well as the traditional assumptions underpinning economic models, will be challenged. All these areas warrant further research.

COVID-19 has provided a one-time shock to our economy. Population aging is a relentless force driving change. How society responds to these two forces will require trade-offs among generations and reconsideration of assumptions regarding traditional gender roles and may lead to a reevaluation of what we consider important. COVID-19 may provide the catalyst to change our social contract and provide the opportunity to incorporate notions of fairness for an aging population.

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