

# CANADA'S PENSION SYSTEM AND AGING POPULATION: 2021 CENSUS INSIGHTS

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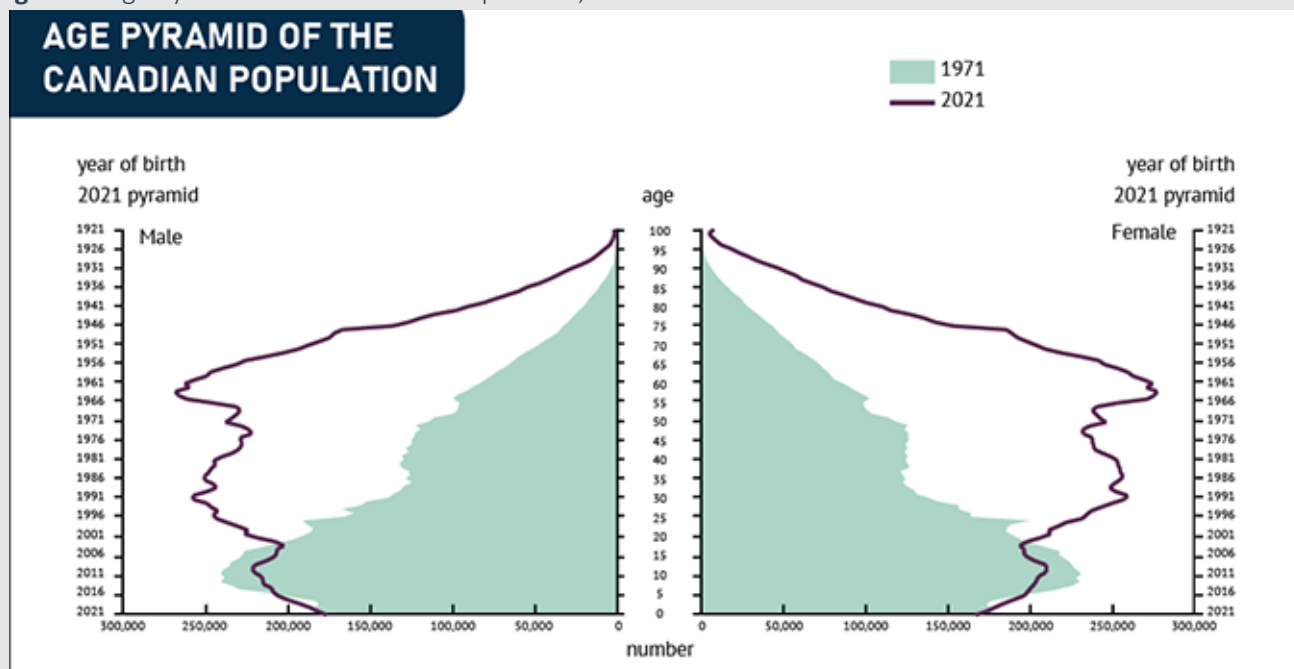


The 2021 Census of Population study on Canada's shifting demographic profile was released by Statistics Canada in April 2022<sup>1</sup>. It clearly shows the demographic trend towards an aging population with a record seven million people 65 years old or older (19% of the total population). Secondly, the ratio of old-age social security<sup>i</sup> beneficiaries (65 years or older) to potential workers (15-64 age group) has risen to a historic high of 30%. In other words, every retiree is supported by three potential workers. This compares to 1970's demographic data, where every retiree was supported by closer to eight workers. Thirdly, the potential worker segment has increased in average

age with over 20% of potential workers aged 55-64. These factors put the sustainability of existing pension arrangements under pressure.

This paper discusses risk mitigation and reforms for consideration in Canada's multi-pillar pension system as it faces this challenge of a fast-aging workforce. The pillars include (a) Pay-as-you-go Programs, (b) Canada and Quebec Pension Plans, and (c) Voluntary Retirement Saving Programs. Each pillar presents different challenges and opportunities to adapt.

**Figure 1:** Age Pyramid of the Canadian Population, 1971 vs 2021



**Source:** *Census of Population, 1971 and 2021 (3901).*

<sup>i</sup> Social security: Any government system that provides monetary assistance to people with inadequate income, be that from sickness, unemployment, retirement, death of a partner, disability or carers, maternity/paternity/adoptive, bringing up children, etc. A public social safety net.

## TOP FIVE PENSION RISK MANAGEMENT HIGHLIGHTS OF THE 2021 CENSUS

**1. Seven million seniors (aged 65 and older) represent nearly one-fifth of Canadians.** In 1971, there were eight people aged 65 and older (seniors) for every 100 Canadians i.e., 8%. In contrast, the proportion of this age group has now more than doubled, to 20 in every 100 Canadians. According to population projections, in 2051 one-quarter of the population (24.9%) will be seniors, reaching a total seniors' population of 12 million.<sup>2</sup>

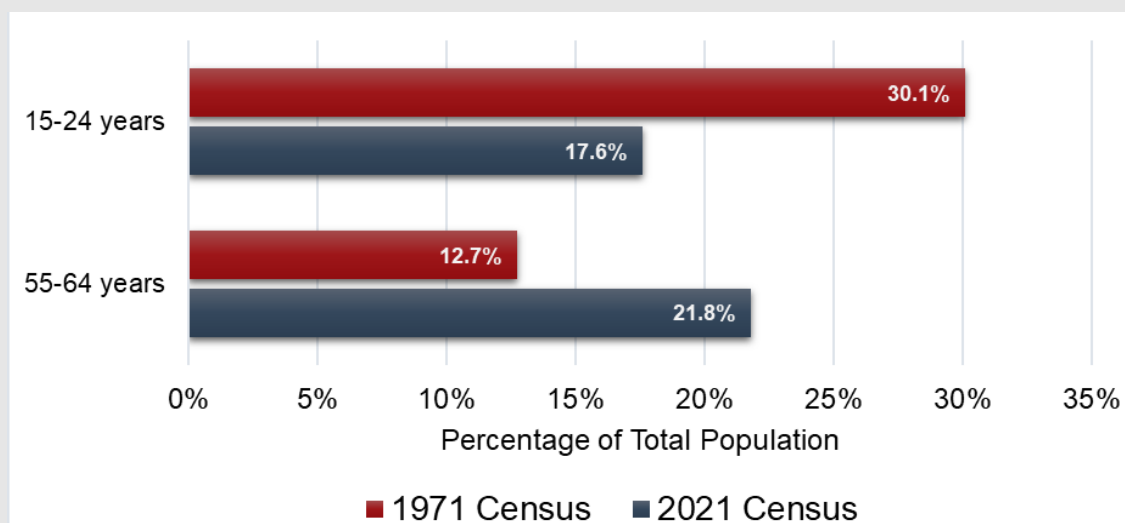
**2. Longer lifespans continue to shape the population pyramid.**<sup>3</sup> (Figure 1) While COVID-19 claimed many lives among the oldest Canadians, one of the fast-growing segments was those aged 85 or over (12% increase since the 2016 census). Over the next 25 years, it is projected that the population over 85 years of age could triple to over 2.5 million. As more seniors are living to 85 and beyond, they will face increasing later life support/expense challenges<sup>4</sup>.

**3. Less workers will support our retirees.** The old-age dependency ratio, i.e., the ratio of social security beneficiaries (65 and above age group) to covered workers (the 15-64 age group), has more than doubled over the past half-century, having risen from 13 percent in 1971 to 30 percent in 2021. In the 1970s, eight (potential) Canadian workers supported one (retired) senior; now, a little more than three workers support each retiree.

**4. Working-age population reaches a historic aging level.** (Figure 2) Within the working-age population (15-64 age group), the 55-64 subgroup has reached a record high proportion of 21.8%, or just over one in five Canadians (Figure 3). The census also reports that these oldest potential workers (aged 55 to 64) surpass the youngest potential workers (aged 15-24) in number. By comparison, in the 1970s, the youngest workers represented about three times the population of the oldest workers.

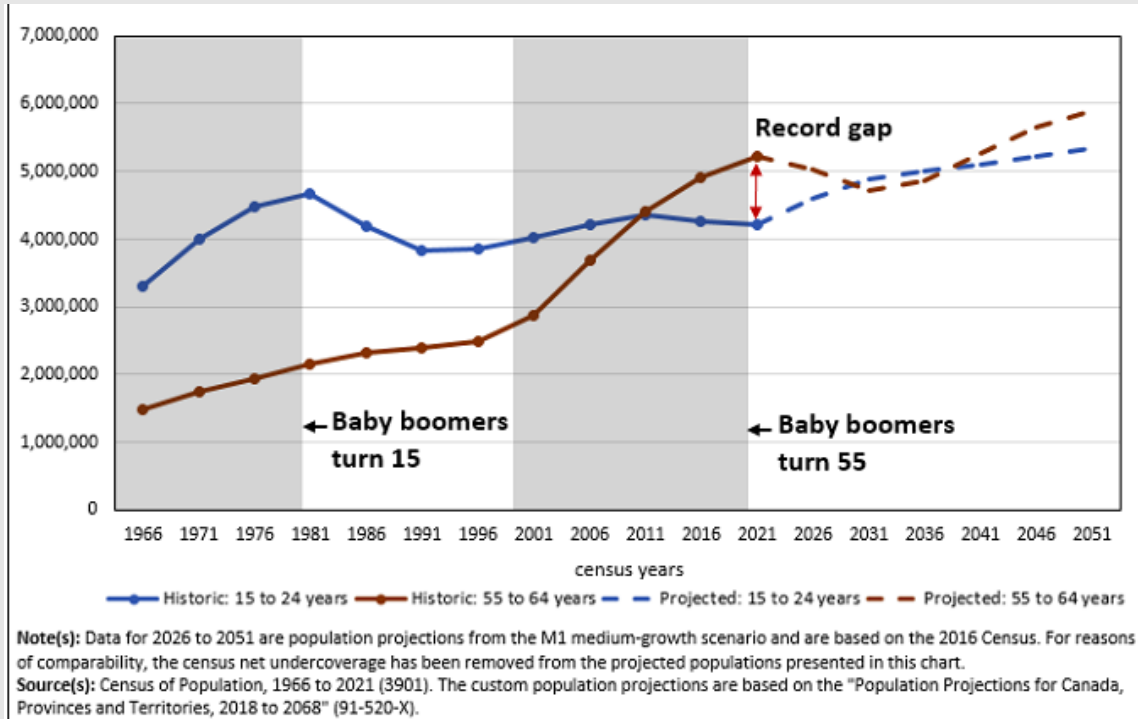
**5. There are fewer children under 15 than seniors aged 65 years and older.** (Figure 4) Apart from people living longer, this has been influenced by declining fertility rates. From 2016 to 2021, the number of children under 15 grew at a rate six times slower than the number of people aged 65 and older<sup>5</sup>. The fertility rate in Canada decreased from 1.69 children per woman in 2008 to a record low of 1.40 children per woman in 2020. This fertility decline was associated with many factors, including a transition to greater urbanization, a growing dependency on wages earned outside the home, and the rising cost of child-rearing. Moreover, studies show that the COVID-19 pandemic<sup>6</sup> and climate risks (Barreca et al. 2018) may have also jeopardized fertility plans.

**Figure 2: Old vs. Young Working-Age Population**



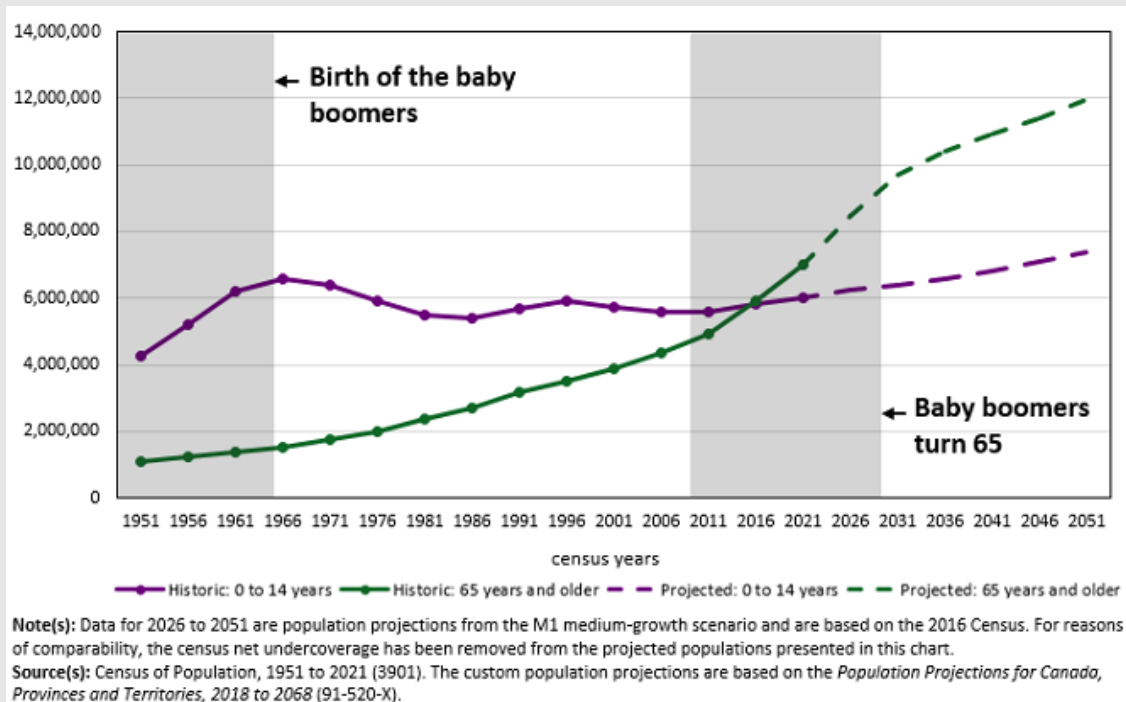
Source: Census of population, 1971 and 2021.

**Figure 3:** People close to retirement (55-64) exceed people about to enter the labour force (15-24).



Source: Statistics Canada  
<https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>

**Figure 4:** Fewer children under the age of 15 than people 65 years and older.



Source: Statistics Canada  
<https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>

## PENSION SYSTEM SUSTAINABILITY AND THE AGING POPULATION

It has long been recognized that an aging population makes it more challenging to finance social security benefits in a pay-as-you-go system (e.g., Harper 2010). The primary purpose of old-age benefits programs is to protect the elderly from poverty and a decline in living standards. But population aging and falling fertility rates have catalyzed a rapid increase in current and projected program costs and prompted a growing urgency to reform public pension programs.

Further exacerbating the risk, it has been demonstrated that social security old-age benefits programs have a sizable negative effect on fertility (Boldrin et al. 2015). Oshio and Yasuoka (2009) present a model demonstrating that social security reduces the demand for children because there is less need for children to provide family support in old age.

The following discusses how to prepare each of the three pillars of Canada's pension system (Pay-as-you-go Programs, Canada and Quebec Pension Plans, and Voluntary Retirement Saving Programs) for the looming pension sustainability crisis.

### Pillar I: Pay-as-you-go Program

**An aging population makes it challenging to finance social security benefits in a pay-as-you-go system** (Harper, 2010). The first pillar of the Canadian pension system is Old Age Security (OAS), which is a pay-as-you-go public pension scheme. The key strengths of this first-pillar are that benefits are protected from price and wage changes and have a relatively low sensitivity to shocks in interest rates and stock prices.

**Pro-natalist policies could be used to support pay-as-you-go social security programs.** Pro-natalist policies have long been connected with the support of social security systems (e.g. Demeny 1987, Adams 1990, Thompson 1996).

Properly structured, pro-natal policies can successfully increase fertility (Malak et al. 2019). These policies advocate compensating parents for the costs of raising children, fostering parents' employment, supporting early childhood development, and reducing gender inequalities. According to a United Nations report, the share of countries with explicit pro-natalist policies has risen from 10 percent in 1976 to 15 percent in 2001 and 28 percent in 2015 (Stone 2020). In 1988, the Quebec government introduced the Allowance for Newborn Children, which paid a family up to \$8,000 after the birth of a child. Milligan (2005) finds the policy had a strong effect on fertility. Raute (2019) shows that earnings-dependent maternity leave benefits, which compensate women according to their opportunity cost of childbearing, could successfully increase the fertility of tertiary-educated women.

### Pillar II: Canada and Quebec Pension Plans (C/QPP)

**An aging population makes Canada and Quebec Pension Plans (C/QPP) more vulnerable to shocks in interest rates and stock prices.** The second pillar in the Canadian retirement income system comprises Canada and Quebec Pension Plans (C/QPP), and compulsory earnings-related Defined Benefit (DB) pensions on a partially funded basis.<sup>i</sup> The strengths of Pillar II pensions are their low sensitivity to fertility risk and political risk; however, Pillar II pensions are relatively more sensitive to shocks in interest rates and stock prices. The sensitivity of the second pillar to inflation depends on the availability of inflation-linked financial instruments (Sørensen et al. 2016). Demographic aging, together with the 2016 CPP expansion, will lead to contribution hikes for future workers and more aggressive assumed investment returns (e.g. Robson and Laurin 2017) to meet the promised benefits. As defined benefit plans continue to mature in the decades ahead, contract completeness and

<sup>i</sup> These plans currently replace 25% of career-average income, but only on annual earnings up to a year's maximum pensionable earnings (YMPE). In June 2016, federal and provincial finance ministers reached an agreement on the CPP expansion. The CPP expansion consists of two parts. First, the income replacement rate is increased from 25% of adjusted career earnings to 33%. Second, the pension earnings cap is increased from 100% of the Yearly Maximum Pensionable Earnings (YMPE) to 114% of the YMPE (see OSFI 2019).

transparency become increasingly significant (e.g. Baldwin and FitzGerald 2010).

**There will be a delicate balance on risk-reward with the critical focus on asset-liability management.** Discount rates and asset mix should reflect the timing and riskiness of future cash flows. Modern risk management theory believes that a maturing DB pension plan should shift to a more conservative and more diversified liquid asset mix (Black 1989, Bodie et al. 1992, Lucas and Zeldes 2009, and Rauh 2008). Thus, a maturing pension fund should take a lower going-concern discount rate than the given interest rate that would be applied by younger funds due to their shorter duration of liabilities. However, investment strategies with lower risk appetites may not generate sufficient returns to close the solvency gaps (Mayers and Smith Jr 1987 and Froot et al. 1993), which can lead to bankruptcy or funding failures (Smith and Stulz 1985). In addition, maturing DB plans become increasingly unsustainable if they maintain asset mix policies that embody material mismatch risk between plan assets and liabilities (Kocken 2011).

**Index payments should become conditional on the financial performance of the fund.** Although still hovering around 100% funded status in nominal terms, the recent inflation hike will challenge the stability of Canada's second pillar dramatically, especially given its claim to be "fully indexed to prices". By April 2022, Canada's inflation rate jumped to a 31-year high of 6.7% , making the current inflation-linked assets and liabilities a mismatch. An interest rate increase can help to decrease liabilities, but this remedy will likely be offset by wage increases expected in the future. Unfortunately, real guaranteed benefits cannot be hedged, with the supply of inflation-linked bonds limited in Canada and becoming more expensive. If inflation stays high, it will become necessary to weaken the defined part of Pillar II pension benefits by shifting from being fully inflation-indexed to more conditional promises. System survival must be prioritized over benefits to a specific cohort. In addition, the conditional indexation features can mitigate unfair risk absorption by younger generations (Bovenberg et al. 2016 and Kocken 2011). As Baldwin (2020) argues, regulation needs to be complemented by enabling more flexibility to adapt to changing circumstances.

**While raising the Early Eligibility Age (EEA) helps reduce the burden on public pensions, policies should be put in place to ensure the employment prospects of older workers.** Raising the EEA can boost employment by reducing spending on public pensions while increasing tax revenue. In addition, a higher EEA can reduce overall welfare if income protection during retirement declines and old-age poverty increases. The 2011 CPP reform increased the benefit penalties for opting to receive CPP before age 65 and provided greater rewards for delaying CPP take-up until after age 65. In line with life expectancy increasing, delaying CPP take-up aims to encourage workers to work longer. While this policy can benefit Pillar II pensions, low-income workers face substantial financial disincentives to working longer (Milligan 2005, Milligan and Schirle 2008, and Laurin et al. 2012). Such policies will, in particular, negatively impact non-knowledge workers where physical prowess erodes during later working years regardless of any form of public policy. To ensure the employment prospects of older workers, employment support programs for those workers must be implemented.

### **Pillar III: Voluntary Retirement Saving Programs**

**Voluntary, fully-funded occupational pension schemes (registered pension plans) and individual, tax-assisted savings plans will need to innovate with demographic aging.** These plans are an essential part of retirement income for middle- to high-income earners in Canada, designed to allow people to maintain their standard of living after they retire.

Baldwin (2020) argues the DB versus defined contribution (DC) debate is meaningless as the high diversity in plan designs makes direct comparison between the two categories impossible. Literature on the middle-ground option that incorporates positive attributes of both DB and DC plans is growing (MacDonald et al. 2013 and Fuentes et al. 2022). For example, Wang et al. (2018) and Brown and McInnes (2014) discuss the optimal design of targeted benefit plans (TBP), while implementation of the TBP is challenged by unmatured regulatory standards (Gros 2022). MacDonald et al. (2021) introduce Dynamic Pension (DP) pools to potentially address the decumulation disconnect issue. While DC plans can offer Dynamic Pensions, these plans cover only a small portion

of Canadians and, hence, are insufficient to make DPs work.

Building on Kocken (2011), we recommend the following six criteria to ensure the equity of any future Pillar III pension redesign:

**1. Contract Completeness** - Contracts should be defined as the extent to which entitlements to beneficiaries - under all situations of asset growth, interest rate development, and longevity development - are allocated explicitly to individuals. A complete contract will contribute to an increase in investment discipline with the support of an empowered risk management function.

**2. Transparency** - The level of pension entitlement security and implications for participants' retirement income must be made clear to participants when the risks are borne by the employer or the pension provider. Plan sponsors should identify what happens when things go wrong, what cross-subsidies are embedded in the plans, and what financial risks are embedded. A sufficient level of transparency will improve decision making, pension communication, as well as the relationship and interactions across a broad spectrum of stakeholders, including beneficiaries, plan sponsors, regulators, suppliers, and concerned citizens.<sup>i</sup>

**3. Short- and long-term fairness of contributions** - Ex-ante fair contracts imply that all contributions have expected pay-outs equal to the amount of contributions plus the expected return. Leaving an excessive pension burden to the next generation could quickly lead to a collapse of the pension system as participants lose faith in receiving any return. Many DB plans fail the fairness test today as young workers pay full contributions while, in an underfunded situation, retirees receive full benefits. Furthermore, life expectancy is strongly socially stratified. The "risk" of longevity is not distributed equally in society and differs across occupational groups. The future pension reform must address the need for a fairer

mechanism to avoid age and sector discrimination. Enhancing actuarial fairness should play a key role in pension reform.

**4. Risk-sharing** - The trend towards declining DB plans and growth in DC plans (in Canada and elsewhere) suggests the need for new risk-sharing arrangements (Turner and Center 2014). Risk-sharing arrangements can be established (1) between participants and employers, (2) among participants, (3) between active participants and retirees, or (4) between participants and plan sponsors. Risk sharing, in the design of retirement-income arrangements, offers benefits in terms of risk mitigation and higher levels of expected income in retirement as compared to individual retirement arrangements (e.g. OECD 2020).

**5. Inflation-indexed pensions during retirement** - Pension funds typically communicate nominal pension rights to participants, but they are relatively silent on future indexation prospects and the possibilities of future cuts in nominal pension rights. In recent years, most pension funds have been unable to provide (full) indexation. Pension redesign should disclose a clear risk profile taken by participants. Many sizeable Canadian DB plans, such as CAAT<sup>ii</sup> and UPP<sup>iii</sup>, have implemented some form of conditional indexation to maintain the sustainability of collective pension schemes.

**6. Pension communication** - Pension reforms will reduce the generosity of collective pensions and shift the responsibility for an adequate standard of living after retirement to individuals and their households. Therefore, governments and the pension industry should provide strategic guidance through pension communication to assist individuals in making the right decisions.

<sup>i</sup> <https://www.top1000funds.com/2020/11/pension-transparency-needs-a-benchmark/>

<sup>ii</sup> <https://www.caatpension.ca/pension-solutions/what-employees-get/inflation-adjustments>

<sup>iii</sup> <https://www.universitypension.ca/Content/pdfs>

## CONCLUSION

Canada's working-age population has never been older. The demographic shifts are attributed to low fertility, the gradual increase in life expectancy, and the large baby boom generation that started turning 65 in 2011. As a result of these shifts, the rising old-age dependency ratio puts increasing pressure on our pension systems and, thereby, may jeopardize the future standard of living for all.

Canada has a multi-pillar retirement income system, which will require innovative actions to adapt to an aging population. Politically-acceptable, periodic reforms on the factors that are used to determine benefits will be necessary to ensure a sustainable retirement system.

### *Endnotes*

- 1 Source: <https://www12.statcan.gc.ca/census-recensement/2021/as-sa/fogs-spg/>
- 2 Source: <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>
- 3 Source: <https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-X/2021003/98-200-X2021003-eng.cfm>
- 4 Source: <https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-X/2021004/98-200-X2021004-eng.cfm>
- 5 Source: <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>
- 6 Source: <https://www150.statcan.gc.ca/n1/pub/45-28-0001/2021001/article/00041-eng.htm>

## REFERENCES

- Adams, Paul. 1990. "Children as Contributions In Kind: Social Security and Family Policy." *Social Work* 35(6): 492-498. <https://academic.oup.com/sw/article-abstract/35/6/492/1891776>
- Baldwin, R.D., 2020. The Shifting Ground of Pension Design: Reflections on Risks and Reporting. CD Howe Institute Commentary, 571.
- Baldwin, R.D. and FitzGerald, B., 2010. Seeking certainty in uncertain times: A review of recent government-sponsored studies on the regulation of Canadian Pension Plans. CD Howe Institute Commentary, (310).
- Barreca, Alan, Olivier Deschenes, and Melanie Guldi. "Maybe next month? Temperature shocks and dynamic adjustments in birth rates." *Demography* 55, no. 4 (2018): 1269-1293.
- Black, F., 1989. Should you use stocks to hedge your pension liability? *Financial Analysts Journal*, 10.
- Bodie, Z., Light, J. O., Morck, R., Taggart Jr, R. A., 1985. Corporate pension policy: an empirical investigation. *Financial Analysts Journal* 41 (5), 10-16.
- Boldrin, Michelle, Mariacristina De Nardi, and Larry E. Jones. 2015. "Fertility and Social Security." *Journal of Demographic Economics* 29(2): 261-299.
- Bovenberg, A.L., Mehlkopf, R., Nijman, T., Mitchell, O. and Shea, R., 2016. The promise of defined ambition plans: lessons for the United States. *Reimagining Pensions: The Next 40 Years*, p.215.
- Brown, R.L. and McInnes, C., 2014. Shifting Public Sector DB Plans to DC. The experience so far and implications for Canada: Canadian Public Pension Leadership Council.
- Demeny, Paul. 1987. "Re-linking Fertility Behavior and Economic Security in Old Age: A Pronatalist Reform." *Population and Development Review* 13(1): 128-132. <https://www.jstor.org/stable/1972124>
- Froot, K. A., Scharfstein, D. S., Stein, J. C., 1993. Risk management: Coordinating corporate investment and financing policies. *the Journal of Finance* 48 (5), 1629-1658.
- Fuentes, O., Fullmer, R.K. and Garcia Huitron, M.E., 2022. A Sustainable, Variable Lifetime Retirement Income Solution for the Chilean Pension System. *Variable Lifetime Retirement Income Solution for the Chilean Pension System* (March 1, 2022).
- Gros, B., 2022. The Challenges Facing Target-Benefit Plans: Changes Are Needed to Provincial Pension Standards. *Commentary-CD Howe Institute*, (618), pp.0\_1-15.
- Harper, Sarah. 2010. "The Capacity of Social Security and Health Care Institutions to Adapt to an Aging World." *Special Issue: Social Security and the Challenge of Demographic Change. International Social Security Review* 63(3-4): 177-196. <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-246X.2010.01374.x>
- Kocken, T.P., 2011. Why the Design of Maturing Defined Benefit Plans Needs Rethinking. *Rotman International Journal of Pension Management*, 4(1), pp.44-50.

Laurin, A., Milligan, K.S. and Schirle, T., 2012. Comparing Nest Eggs: How CPP Reform Affects Retirement Choices. CD Howe Institute, 352.

Lucas, D. J., Zeldes, S. P., 2009. How should public pension plans invest? *American Economic Review* 99 (2), 527-32.

MacDonald, B.J., Jones, B., Morrison, R.J., Brown, R.L. and Hardy, M., 2013. Research and reality: A literature review on drawing down retirement financial savings. *North American Actuarial Journal*, 17(3), pp.181-215.

MacDonald, B.J., Sanders, B., Strachan, L. Frazer, M., 2021 Affordable Lifetime Pension Income for a Better Tomorrow. Global Risk Institute.

Malak, N., Rahman, M.M. and Yip, T.A., 2019. "Baby bonus, anyone? Examining heterogeneous responses to a pronatalist policy." *Journal of Population Economics*, 32(4), pp.1205-1246.

Mayers, D., Smith Jr, C. W., 1987. Corporate insurance and the underinvestment problem. *Journal of Risk and Insurance*, 45-54.

Milligan, K., 2005. Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and statistics*, 87(3), pp.539-555.

Milligan, Kevin. 2005. Making It Pay to Work: Improving the Work Incentives in Canada's Public Pension System. Commentary 218. Toronto: C.D. Howe Institute. October.

Milligan, Kevin, and Tammy Schirle. 2008. "Improving the Labour Market Incentives in Canada's Public Pension System." *Canadian Public Policy*, 34:3 (September), pp. 281-304.

OECD, 2020 OECD Pensions Outlook 2020 [https://www.oecd-ilibrary.org/finance-and-investment/oecd-pensions-outlook-2020\\_67ede41b-en](https://www.oecd-ilibrary.org/finance-and-investment/oecd-pensions-outlook-2020_67ede41b-en)

Oshio, Takashi and Masaya Yasuoka. 2009. "Maximum Size of Social Security in a Model of Endogenous Fertility." *Economic Bulletin* 29(2): 644-64. <http://hermes-ir.lib.hit-u.ac.jp/rs>

OSFI, 2019 Multi-Pillar Pension Systems: Lessons from Canada and Internationally. <https://www.osfi-bsif.gc.ca/Eng/Docs/ab20190206.pdf>

Raute, A., 2019. Can financial incentives reduce the baby gap? Evidence from a reform in maternity leave benefits. *Journal of Public Economics*, 169, pp.203-222.

Rauh, J. D., 2008. Risk shifting versus risk management: Investment policy in corporate pension plans. *The Review of Financial Studies* 22 (7), 2687-2733.

Robson, W.B. and Laurin, A., 2017. Bigger CPP, Bigger Risks: What 'Fully Funded' Expansion Means and Doesn't Mean. CD Howe Institute ebrief, 256.

Kleinow, T. and Schumacher, J.M., 2017. Financial fairness and conditional indexation. *Scandinavian Actuarial Journal*, 2017(8), pp.651-669.

Stone, Lyman. 2020. "Pro-Natal Policies Work, But They Come with a Hefty Price Tag." Institute for Family Studies, March 5. <https://ifstudies.org/blog/pro-natal-policies-work-but-they-come-with-a-hefty-price-tag>

Sørensen, O. B.; Billig, A.; Lever, M.; Ménard, J-C. and Settregren, O. 2016. The interaction of pillars in multi-pillar pension systems: A comparison of Canada, Denmark, Netherlands and Sweden. *International Social Security Review*, 69: 53–84. doi: 10.1111/issr.12101

Thompson, Lawrence H. 1996. "Principles of Financing Social Security Pensions." *International Social Security Review* 49(3): 45-63. <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-246X.1996.tb01109.x>

Turner, J.A. and Center, P.P., 2014. Hybrid pensions: risk sharing arrangements for pension plan sponsors and participants. *Society of Actuaries*.

Turner, J.A., Hadass, Y., Labouré, M., and Shen, S., 2020 New Approaches to Communicating to Workers About Pensions. Products, Tools, and Strategies that Address Retirement Risks – Essay Collection. Society of Actuaries, 2020. <https://www.soa.org/globalassets/assets/files/resources/research-report/2020/products-tools-strategies-retirement-essays.pdf>

Wang, S., Lu, Y. and Sanders, B., 2018. Optimal investment strategies and intergenerational risk sharing for target benefit pension plans. *Insurance: Mathematics and Economics*, 80, pp.1-14.