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Get the Most from the Canada & Quebec Pension Plans by Delaying Benefits

The Substantial (and Unrecognized) Value of Waiting to Claim CPP/QPP Benefits

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About the National Institute on Ageing & FP Canada Research Foundation™/MC

The **National Institute on Ageing** (NIA) is a public policy and research centre based at Ryerson University in Toronto. The NIA is dedicated to enhancing successful ageing across the life course. It is unique in its mandate to consider ageing issues from a broad range of perspectives, including those of financial, physical, psychological, and social well-being.

The NIA is focused on leading cross-disciplinary, evidence-based, and actionable research to provide a blueprint for better public policy and practices needed to address the multiple challenges and opportunities presented by Canada's ageing population. The NIA is committed to providing national leadership and public education to productively and collaboratively work with all levels of government, private and public sector partners, academic institutions, ageing-related organizations, and Canadians.

The NIA further serves as the academic home for the National Seniors Strategy (NSS), an evolving evidence-based policy document co-authored by a group of leading researchers, policy experts and stakeholder organizations from across Canada and first published in 2014. The NSS outlines four pillars that guide the NIA's work to advance knowledge and inform policies through evidence-based research around ageing in Canada: Independent, Productive and Engaged Citizens; Healthy and Active Lives; Care Closer to Home; and Support for Caregivers.

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The Foundation is committed to technical research that examines and challenges current practices in financial planning decision-making, behavioural research that examines the impact of human behaviour on effective financial planning and societal research that examines the benefits of financial planning on society as a whole.

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Executive Summary

When to claim benefits from the Canada Pension Plan (CPP) – or its Quebec counterpart, the Quebec Pension Plan (QPP) – is an important financial decision for retiring Canadians. With an ageing population and widespread concern that Canadians are inadequately prepared for retirement, it is critical that retiring workers understand how to get the most from the CPP/QPP program. For Canadians in reasonable health who can afford to wait, that often means delaying the start of their CPP/QPP benefits for as long as possible.

Canadians are not required to begin receiving CPP/QPP benefits as soon as they retire. Benefits can be taken as early as age 60 or as late as age 70, and the benefit amounts are adjusted according to the age of the individual when they start receiving payments. Indeed, delaying CPP/QPP benefits comes with a sizeable financial advantage, which is conventionally explained as follows:

- If CPP/QPP benefits start before age 65, then payments decrease by 0.6% each month (or 7.2% per year), up to a maximum reduction of 36% at age 60.
- If benefits start after age 65, then payments increase by 0.7% each month (or 8.4% per year), up to a maximum increase of 42% at age 70. (There is no additional advantage to starting benefits after age 70.)

In addition to the conventionally reported statutory figures, average national wage growth affects the CPP/QPP benefit calculation in such a way that often increases the delay incentive and also heightens the penalty for taking benefits early. This piece of the financial incentive structure is not featured in the official public-facing descriptions of the CPP/QPP claiming mechanics. When delaying benefits, however, it often results in even greater financial advantages.

These incentives – combined with the strength of these programs – have made delaying CPP/QPP benefits for as long as possible is the safest, most inexpensive approach to get secure, worry-free retirement income that lasts for life and keeps up with inflation.

Waiting to claim CPP/QPP is even more attractive today than in the past, due to historically low interest rates, longer life expectancies and adjustments to CPP/QPP delay rules in 2012. In addition, the CPP/QPP enhancements being phased in between 2019 and 2023 will ultimately make the CPP/QPP an even larger source of retirement income, therefore making the CPP/QPP claiming decision even more important.

Yet fewer than 1% of Canadians choose to delay benefits to age 70. In fact, over the past decade, Canadians have most commonly taken their CPP/QPP benefits as soon as they are eligible – at age 60 – likely without considering the far-reaching financial effects of this decision. In doing so, they are unknowingly giving up substantial lifetime income – as well as protection against financial market risks, the possibility of high inflation, living longer than anticipated and the anxiety of potentially running out of money in retirement.

The purpose of paper is to show the value of delaying CPP/QPP benefits, to understand why more people are not doing it, and to propose how to best help retiring Canadians make more informed decisions about when to start their CPP/QPP benefits. Bringing together the insights of leading thinkers and cross-disciplinary academic literature, supported by original analytical evidence and solutions, this paper investigates the following questions:

- At what age are Canadians currently taking CPP/QPP benefits?
- Why are not more Canadians delaying their CPP/QPP benefits?
- How much more will they get if they delay?
- How can Canadians move from the existing paradigm of taking CPP/QPP benefits as soon as possible toward greater awareness and appreciation of the excellent return and risk-mitigating aspects of delaying these benefits?

A major theme underlying this paper's findings is the need for the Canadian financial services industry to fundamentally rethink its approach to advising Canadians who are nearing retirement, including a major change in how to address the CPP/QPP uptake decision.

Financial planning for retirement has evolved over time, and the advice on how to manage savings in retirement should adapt more closely to the current environment – one in which Canadians are facing longer periods of time in retirement, scarcer sources of secure pension income, low interest rates, and fewer adult children available to provide care to ageing parents as their health declines.

This paper reviews the limited circumstances in which taking CPP/QPP early is a sensible choice. For the rest, having adequate secure lifetime income is more important now than ever before. Not only does it provide predictable financial stability in later years, but it also facilitates retirement budgeting, reducing concerns about outliving one's savings and covering expensive health care costs (such as long-term care) later in life.

The economic shocks of COVID-19 have provided a grim reminder of the value of secure retirement income and the stress that comes from unpredictable financial markets. Increased CPP/QPP benefits help take the major post-retirement financial risks off the table, enabling Canadian seniors to spend their savings more confidently and joyfully in retirement.

Improving CPP/QPP claiming age decisions is the single most effective tool to directly augment the long-term financial security of Canada's ageing population without major reforms to its retirement system. There are more than 20 million Canadians participating in the CPP and QPP and, every day in 2019, an average of over 1,000 Canadians made the decision to start their CPP/QPP benefits. With each coming year, as baby boomers reach the age of eligibility at age 60, more and more will be struggling with this financial decision that will affect them for the rest of their lives.

Key Findings

- **Most Canadians take their CPP/QPP benefits early.**

Despite the advantages of delaying, more than 95% of Canadians have consistently taken CPP at normal retirement age (age 65) or earlier. Today, fewer than 1% of Canadians choose to delay for as long as possible, to age 70. Over the past decade, the most popular uptake age has been age 60 - the earliest possible age.

- **Taking CPP/QPP benefits early typically means forfeiting significant levels of secure income.**

From the actuarial age-adjustment factors and the non-enhanced CPP benefits alone, an average Canadian receiving the median CPP income who chooses to take benefits at age 60 rather than age 70 is forfeiting over $100,000 (in current dollars) worth of secure lifetime income. From a lifetime perspective, the total amount of CPP/QPP income that an average Canadian will receive over the course of their retirement is over 50% more by delaying CPP from age 60 to age 70.

- **The value of delaying – and the penalty for early claiming – are greater than most Canadians understand.**

Official government communications (which the financial service industry also relies on) describe the benefit adjustments as a straightforward 0.6% reduction in benefits for each month of uptake prior to the individual's 65th birthday (a 36% reduction for starting benefits the full five years earlier), and a 0.7% increase for each month of uptake after age 65 (a 42% increase for the full five-year deferral). However, the actual financial incentives of delaying benefits are often higher due to the role of national wage growth in determining CPP/QPP benefit levels, which generally exceeds inflation. Between 2012 and 2019, for example, the average financial penalty for taking the CPP/QPP at age 60 versus age 65 grew from 36.0% to 38.8%, and the incentive to delay to age 70 increased from 42.0% to 45.4%. Going forward, national wage growth is expected to increase the incentives even further, based on the CPP's Chief Actuary's assumptions for the future.

- **Delaying benefits by even a single year (from age 60 to 61) delivers very high value.**

Based on the official age-adjustment factors alone, a one-year delay is equivalent to investing a single year's CPP/QPP benefit at age 60 and getting a lifetime pension income of 11.25% of that initial investment, indexed by inflation year after year. For example, examining the statutory age-adjustments alone (that is, maintaining the same average pensionable earnings during

the delay), a $1,000 monthly benefit at age 60 increases to $1,112.50 per month if the person waits until age 61, and to $2,218.75 if the person waits until age 70 (indexed by inflation, for life).

- **While the actual benefit adjustments can be higher (or lower), depending on personal circumstances, the advantages of delaying are still significant**.

In addition to the age-adjustment factors, CPP/QPP benefits can be impacted by contributions after age 60, depending on a person's earnings history. But even with personal circumstances that are conventionally understood to favour taking benefits early – such as having zero earnings after age 60 and no remaining dropout room – the advantages of delaying are still substantial on account of the large financial incentives underlying the age-adjustment factors.

- **Delaying CPP/QPP is essentially the purchase of an inexpensive, inflation-indexed and very secure defined benefit (DB) pension.**

It is the equivalent of "purchasing" additional CPP/QPP pension benefits at the "cost" of forfeited CPP/QPP payments during the deferral period. If Canadians were to use the equivalent of those forfeited CPP/QPP payments to buy such a pension in the retail marketplace, the resulting annuity payments would be 40% lower for a man and 50% lower for a woman (due to their generally greater longevity, which is incorporated into the purchase price). Put differently, buying the same level of secure pension income in the retail market costs nearly twice as much!

- **For most Canadians, the cheapest and safest way to maintain secure income over their retirement is to delay CPP/QPP benefits past age 60.**

This can be accomplished either by working longer or by using their savings – including registered retirement savings plans (RRSPs), registered retirement income funds (RRIFs) and tax-free savings accounts (TFSAs) – to bridge the gap. Holding onto savings instead of using them to finance a CPP/QPP delay carries much more risk and much less reward. Even earning a 4% rate of return (after fees), nearly 4 out of 5 Canadians with RRSPs/RRIFs would get more income from using a portion of their savings in early retirement as a bridge to a higher delayed CPP/QPP benefit, rather than stretching out their RRSP/RRIF withdrawals over the span of their full retirement. Forfeiting the CPP/QPP delay option likely means less return despite taking on a significant level of financial risk and worry. It may seem counterintuitive, but taking CPP/QPP early is the riskier option when it comes to retirement income security.

- **Most Canadians can afford to delay CPP/QPP.**

In 2009 for example, more than half of Canadians who took CPP benefits early could have delayed by at least a year, and over a quarter could have delayed for more than 10 years, using only their RRSP/RRIF savings to bridge the income gap.

- **Retirement financial planning practices are currently encouraging Canadians – whether directly or indirectly – to take their CPP/QPP benefits early**.

Here are three reasons this is occurring:

1. Lack of advice: As detailed in this paper, a recent Government of Canada poll by Employment and Social Development Canada found that more than two thirds of Canadians nearing or in retirement do not understand that waiting to claim CPP benefits will increase their monthly pension payments.

2. Bad "good" advice: Canadians who do seek retirement financial planning advice are being encouraged to take CPP/QPP benefits early. Mainstream practices use a concept known as the "breakeven age" to explain CPP/QPP claiming decisions, with statements like, "You'll be ahead financially if you take CPP/QPP at age 60 and don't live past age 80". New research and evidence clearly show the "breakeven" approach is misleading and has been proven to powerfully influence earlier benefit uptake, as it pushes people to mentally gamble their subjective life expectancy against the "breakeven" age. The psychological effect of how the decision is framed distorts the actual risk/return proposition, perpetuating the short-sighted thinking that encourages retiring Canadians to take their CPP/QPP benefits as early as possible.

3. Bad "bad" advice: Retirement financial planning paradigms continue to be encumbered by insufficient information and poor advice that obstructs good decision-making instead of improving clarity of choice. Whether they hear them from a paid professional or informally from friends and family, statements like, "Why leave this money for the government when you could have it right now?" – or the adage that "a bird in the hand is worth two in the bush" – feed into retiring Canadians' concerns about drawing on their savings, lack of understanding of CPP/QPP rules and its financial sustainability, desire for immediate gratification and general inability to imagine (and, therefore, plan for) their future selves.

Bad "bad" advice also includes the dangerous advice influenced by potential conflicts of interest. For example, the longer Canadians keep their assets under the management of advisers/managers, the greater the trailing fees paid to those professionals, who are therefore indirectly compensated to advise taking CPP/QPP benefits as soon as possible. Heirs may also act opportunistically to preserve their expected inheritance by advising early uptake.

- **The financial services industry needs to fundamentally rethink its approach to advising Canadians who are nearing retirement.**

Advisors and experts are susceptible to the same problematic ideas and approaches as the general public, and many continue to follow industry practices anchored in outdated default assumptions. As Canada faces the challenges of an ageing population with potentially greater financial insecurity, the financial services industry will better serve its clients by understanding the negative impact of the breakeven age approach and moving away from this paradigm. Even it if means giving up wealth management fees in the short term, helping Canadians make better claiming decisions will create wealthier clients over the long-term.

- **The "*Lifetime Loss*" concept, outlined in this paper, offers a framework that advisors can use to better understand – and help Canadians understand – the lifelong financial consequences of the CPP/QPP uptake decision.**

Lifetime Loss is a straightforward calculation that demonstrates the expected financial loss of taking CPP/QPP at an earlier rather than a later age. The primary benefit of the *Lifetime Loss* metric is that it encourages people to look beyond the short term and consider their entire financial future, by directing their attention to the larger context of retirement financial planning with its long-term implications.

For example, examining the statutory age-adjustments alone with expected real national wage increases, an average female Canadian retiring in 2020 with the maximum CPP benefit can expect to lose $155,000 in lifetime income by taking CPP at age 60 in 2020, rather than at age 70 in 2030 (in current dollars). If she falls into the category of better longevity, owing to her higher socioeconomic status, there is a 25% risk that she will be giving up nearly $300,000 of secure lifetime income (in current dollars) by taking CPP/QPP benefits at age 60 versus age 70. This translates to 84% more lifetime income in total by claiming at age 70 instead of age 60 – she would nearly double the total amount of CPP income that she would receive over her retirement. Furthermore, while this analysis looks only at the base CPP/QPP pension system, the *Lifetime Loss* would be even greater when considering the CPP/QPP pension enhancements.

The message of this paper is clear: most Canadians in reasonable health who can afford to defer their CPP/QPP benefits should do so. The financial advantages are material.

However, the CPP/QPP uptake choice is strongly influenced by the psychology of those making the decision, as well as how the information is framed by those advising them. Those in a position to give retirement planning advice – including human resource leaders, policymakers, and financial advisors – are the ones best positioned to shift this paradigm. My upcoming paper will offer further approaches that policymakers, human resource leaders, and financial advisors can use to encourage people to overcome short-term thinking and financially support their future selves by not claiming CPP/QPP benefits earlier than they should.

1. Background

Canadians can claim their benefits from the Canada Pension Plan (CPP) – or its Quebec counterpart, the Quebec Pension Plan (QPP) – anytime between ages 60 and 70.[1] Benefit levels are adjusted according to the age that payments start, and those adjustments are relatively large:

- If benefits start before age 65, then payments decrease by 0.6% each month (or 7.2% per year), up to a maximum reduction of 36% at age 60.[2]
- If benefits start after age 65, then payments increase by 0.7% each month (or 8.4% per year), up to a maximum increase of 42% at age 70 (There is no further advantage to starting benefits after age 70.)

A person's CPP/QPP benefits can also be affected by the person's earnings and contributions during the deferral period, relative to their earnings history. This individual component can have a positive, neutral, or negative impact on the benefit adjustments.

CPP/QPP benefits last for the rest of a person's life and keep up with inflation. These adjustment factors are designed to be actuarially appropriate for the aggregate CPP/QPP system – meaning that the sustainability of the CPP/QPP funds on the whole should not be affected by when Canadians decide to take their benefits.[3]

Waiting to claim benefits from age 60 until age 70 will therefore increase constant-dollar benefits by 122%. That is, from the age-adjustments alone, a $100 monthly benefit at age 60 will increase to $222 a month if the person waits until age 70 (in current dollars):

$$222\% = \frac{100\% \text{ of age 65 CPP/QPP benefit} + 42\% \text{ adjustment factor increase for delaying to age 70}}{(100\% - 36\% \text{ adjustment factor loss for claiming at age 60})}$$

Moreover, the calculated benefits are wage-indexed to age 70, so that, depending on national wage growth, the 222% could be closer to 240% (in current dollars).

However, for individual Canadians, the time of uptake has important implications for the level, security, and predictability of their retirement income, particularly at older ages. In combination with Old Age Security (OAS) – including the Guaranteed Income Supplement (GIS) – CPP/QPP makes up the first pillar of the Canadian retirement income system. This first pillar is the single largest source of retirement income for Canada's older population – and, for many, their only meaningful source of secure, inflation-indexed income. (See Appendix A for an overview of Canada's retirement income system.)

As presented in this paper, more than 95% of Canadians have consistently taken CPP at age 65 or earlier since the CPP introduced flexible retirement in the 1980s. Today, fewer than 1% of Canadians choose to delay taking their CPP benefits for as long as possible, to age 70.

Over the last decade, Canadians have most often claimed their CPP/QPP benefits as soon as they are eligible (at age 60), likely without fully considering the far-reaching financial effects of this decision. At age 60, life expectancy for a man and woman is approximately 25.9 years and 28.5 years, respectively (Table 42, OCA, 2019) meaning that, on average, a man aged 60 is expected to live until age 85.9 and a woman until age 88.5. This is a significant amount of time during which older Canadians will be subject to the negative financial risks of unpredictable investment returns, potentially high inflation and living longer than expectations, leading to concerns about running out of money.

Deciding when to take CPP/QPP benefits is one of the most important financial decisions that retiring Canadians have to make. Higher CPP/QPP benefit payments would enable more older Canadians to sustain their living standards and maintain secure income to cover the ongoing expenses associated with declining health – especially the expensive long-term care services many will need, whether in senior homes or through home care. During later years, chronic health conditions and widowhood are more likely, financial savings may already be depleted, inflation may have eroded any fixed retirement income by one third (assuming a traditional 2% rate of inflation compounded over 20 years) and declining cognitive abilities may make it more difficult for seniors to manage their own financial affairs. The CPP/QPP's reliable income stream simplifies and stabilizes year-to-year finances throughout retirement.

This paper discusses the significance of the CPP/QPP uptake decision, and the disconnect between what Canadians are doing now and what would benefit many of them the most. It explains the financial incentives of delaying CPP/QPP benefits and investigates the financial capacity of Canadians to fund a delay. The final section proposes a simple solution to help address the disconnect.

2. Setting the Scene: The Perfect Retirement Storm

Financial planning is critically important in helping many Canadians maintain an income that will last throughout their retirement. But the current narrative often includes outdated assumptions – such as the notions that dying in one's 70s is relatively common, saving more should be the sole priority, mitigating financial risk means allocating the majority of savings to high-quality bonds at older ages, and Canadians generally will need less income as they age (because they often own their home, will reduce voluntary spending as their health declines and will have adult children to take care of them). Even experts are susceptible to, and influenced by, this narrative.

The reality is that Canadians are increasingly, and often unknowingly, facing a perfect storm as they enter retirement. The trend away from collective workplace pension plans – along with a historically low interest rate environment – will result in reduced retirement income for many.[4] Yet the overall costs of retirement are rising: life expectancy has increased to a historical peak, while family size has decreased to a historical low. Without the support of adult children – who have traditionally provided that support for free – retiring Canadians must prepare to finance a longer time horizon with health care-related expenses (such as long-term care) that will otherwise need to be paid out of pocket.

The societal value that family has historically played in supporting the needs of elders cannot be overemphasized. Family essentially acts as a form of insurance for older Canadians, providing financial support and much-needed care when health deteriorates. In fact, family members currently provide about three quarters of home care – unpaid – for older Canadians (Macdonald et al., 2019).

However, continuing to provide that level of unpaid care will be a major challenge. Canadian fertility rates declined significantly after the mid-1960s. Retiring Canadians now have fewer adult children, and those children are more likely to be geographically separated from their families than past generations. Without adequate family support, work that has traditionally been done for free (e.g., transportation, daily care, preparing meals, etc.) will come at a cost, and those services are expensive to replace.[5]

Without major reforms, Canada's ageing population will only amplify the longstanding systemic challenges and gaps in the Canadian long-term care system (MacDonald et al., 2019). If these services cannot be covered privately or met by public programs, seniors' unmet needs will

have serious consequences that can spiral into social isolation, health deterioration and, ultimately, death (Sinha, 2019). What is more, the full impact will not be felt for a decade, when baby boomers enter their 80s – the stage of life when health is more likely to start deteriorating.

Public policymakers, academics, and industry practitioners have been strongly advocating for Canadians to overcome their retirement security hurdles by saving more. Indeed, it has been an overarching theme for the past four decades that Canadians should be saving more for retirement. As Gordon Pape said, "If there is one theme that dominates the whole retirement discussion, it is that we are not saving enough. People hear the message so often from so many sources that there is a danger it is becoming a background noise" (Pape, 2012, p. 114). Despite – or maybe even because of – this constant messaging, savings behaviour has not changed much over the past three decades.[6] Voluntary private savings is clearly not the panacea it was once thought to be.

Retirement financial planning paradigms and practices – combined with the repeated refrain that Canadians should save more – have crowded out other options that could make retirement cheaper and more financially secure, particularly at older ages. Delaying CPP/QPP benefits offers higher returns and better financial protection in the new retirement environment of longer lives, lower interest rates and less family support.

3. Why Delay CPP/QPP?

CPP/QPP benefits can be taken as early as age 60, and as late as age 70. The uptake age affects benefit levels in two ways:

1. Individual work histories: CPP/QPP benefits are calculated based on lifetime earnings and can be impacted by earnings after age 60, depending on how a person's earnings during the deferral period compare to their earlier earnings history. For example, working Canadians continue to contribute to CPP/QPP through payroll tax, so each month of contributions can further increase their CPP/QPP benefits beyond the age adjustments if the month's earnings exceed those of a previous month in their work history, thereby improving their earnings history. On the other hand, lower (or zero) earnings could reduce their earnings history during the deferral period. This individualized calculation is done on a case-by-case basis, so the individual financial factors cannot be generalized, other than to say they can have a positive, neutral, or negative impact on the age-related advantages to delay CPP/QPP benefits. Section 5 discusses these and other considerations, and Section 8 investigates their financial implications.

2. Universal statutory delay incentives (i.e., CPP/QPP's actuarial adjustment factors for age): More relevant to this discussion, CPP legislation prescribes a "universal" actuarial adjustment factor applied identically to the benefit calculation for all recipients, according to their uptake age. This adjustment factor is conventionally described as follows: between ages 60 and 70, a 0.6% reduction for each month benefits are taken prior to age 65, and a 0.7% increase for each month after age 65. (The same applies to the QPP, except that the early adjustment factors are between 0.5% and 0.6% per month, depending on the individual's earning history.)

This section focuses on the actuarial adjustment factors, in that it does not incorporate the individual-specific implications of earnings and contributions during the delay period on the overall financial reward for delaying, which are discussed in Section 5. To capture the age-adjustment factors alone, therefore, the calculations in this section implicitly assume the work earnings history is unaffected by the delay – such as when an individual continues to contribute at a level that maintains their career average earnings or, in the case of lower (or no) earnings, has sufficient dropout room left to cover the delay period.

3.1 The financial incentives are higher than we think

Delaying CPP/QPP benefits is financially attractive, due to the high returns underlying the stated actuarial adjustment factors. Moreover, these adjustments are even greater than what is communicated to the public.

In addition to the conventionally reported statutory figures (a 0.6% reduction for each month of uptake prior to age 65, and 0.7% for each month after age 65), an additional incentive for delaying CPP/QPP is often overlooked. The universal actuarial adjustment factor is applied to benefits calculated using the Maximum Pensionable Earnings Average[7] (MPEA) in the year of pension take-up, which increases with the compounding of average national wage growth year over year. Therefore, the "effective" actuarial adjustment factors are generally higher than the stated figures.

For example, assuming average wages increase by 1% beyond inflation (following the long-term assumptions of the CPP/QPP actuarial valuation report (OCA, 2019)),[8] the 42% increase in benefits from a deferral from age 65 to 70 would grow by an additional 1% annually in excess of inflation over those five years.

Therefore, choosing to delay CPP/QPP from age 65 to age 70 would result in a 49.2% increase in the annual real (inflation-adjusted) benefit payout value rather than 42%, while taking CPP/QPP at age 60 would reduce benefits by 39.1% rather than 36%.[9]

Note that while the financial adjustment associated with the real wage growth component most often augments the incentive to delay, real wage growth can be (and has been) negative. Over the decade ending in 2019, real wage growth has averaged less than 1% overall; therefore, the adjustments are less than these projected levels.

Table 1 summarizes the historical adjustment generated by this overlooked component. It shows that the role of average national wage growth underlying the CPP/QPP benefit calculation increases the delay incentive and also heightens the penalty for taking benefits early (averaging delay periods ending between 2012 and 2019, and applying the current actuarial adjustment factors).

The first column lists the conventionally cited figures: relative to age 65, benefits are reduced by 36% for uptake at age 60 (0.6% per month for five years) and increased by 42% for uptake at age 70 (0.7% per month for five years).

The second column shows the further adjustment in the benefit calculation from the real wage adjustments derived from the MPEA baseline. The third column lists the total adjustment to the initial pension (in constant dollars, after accounting for the effects of inflation), showing the incentives to delay CPP have historically been greater than the public-facing statutory description. In the fourth column, the incentives will be even greater going forward (according to the projection assumptions of Canada's chief actuary).

Table 2 presents the same information as Table 1, except from the perspective of a 60-year-old looking to delay one,

Table 1: Statutory, historical (averaged across period ending 2012 to 2019), and projected CPP/QPP benefit delay incentive relative to age 65 benefit.

	Statutory CPP Actuarial Adjustment (inflation adjusted)	Historical additional increase on account of average national real wage growth (inflation adjusted)	Historical total increase to initial pension (inflation adjusted)	Long-term projected total adjustment to initial pension (inflation adjusted)
Age 60 Uptake	-36%	-2.8%	-38.8%	-39.1%
Age 65 Uptake	0.0%	0.0%	0.0%	0.0%
Age 70 Uptake	42%	3.4%	45.4%	49.2%

Table 2: Statutory, historical (averaged across period ending 2012 to 2019), and projected delay incentive relative to age 60 benefit level

	Statutory CPP Actuarial Adjustment (% increase inflation adjusted)	Historical additional % increase on account of average national real wage growth (inflation adjusted)	Historical total % increase to initial pension (inflation adjusted)	Long-term projected total % increase to initial pension (inflation adjusted)
1-year Delay	11.3%	0.7%	11.9%	12.4%
5-year Delay	56.3%	7.0%	63.3%	64.2%
10-year Delay	121.9%	15.5%	137.4%	145.1%

five, or 10 years. The first column shows the increases to CPP/QPP benefits from the standard reported actuarial age adjustment. A 60-year-old will receive a benefit increase of 11.25% by delaying to age 61, 56.3% by delaying to age 65 and 118.75% by delaying to age 70.

The math behind these numbers is as follows:

- Delaying CPP/QPP to **age 61** increases the benefit to 111.25% of what it would be at age 60 [111.25% = (100%-28.8% four-year loss of claiming at age 61)/ (100%-36% five-year loss of claiming at age 60)].

- Delaying CPP/QPP to **age 65** increases the benefit to 156.3% of what it would be at age 60 [156.3% = 100%/(100%-36%)].

- Delaying CPP/QPP to **age 70** increases the benefit to 218.75% of what it would be at age 60 [218.75% = (100% + 42% increase)/(100% - 36%)].

Using a round number for illustration purposes (although it exceeds the current maximum CPP pension at age 60), a monthly benefit of $1,000 at age 60 would increase due to the statutory actuarial adjustment alone to $1,112.50 by waiting one year, $1,563.00 by waiting five years, and $2,218.75 by waiting ten years – all in constant (inflation-adjusted) dollars. The second column captures the added increase from the real wage adjustments. The actual gain in column 3 (from having delayed CPP/QPP to 2012-2019) is effectively an additional 11.9% increase for one year, 63.3% for five years and 137.4% for 10 years[10] (adjusted for inflation). Consider that a one-year delay is essentially the equivalent of investing a single year's CPP benefit at age 60 and getting a pension income of 11.9% of that initial investment, indexed by inflation, year over year, for life.[11] For people who value secure lifetime retirement income, this level of risk-free return is unparalleled in today's market, where government bond rates are not even meeting expected inflation.

While Tables 1 and 2 calculate the real (net of inflation) increases to the initial pension, the nominal increase to the initial pension – that is, the benefit increase that the person will actually see – is much more substantial. From a nominal perspective, the pension starting at age 70 is nearly triple that payable at age 60 – a 183.2% increase – based on the historical period examined. The nominal change is more directly comparable to the reported investment return statistics that the public often considers, although it does not capture the drop in purchasing power of the income flows.

How can delaying CPP/QPP deliver such large secure increases? Unlike the retail pension or annuity market, the expected investment rate of return underlying the CPP/QPP actuarial adjustment factors is not dynamically linked to current market yields and is instead based on long-term averages that are hardwired into the factors.

That means, it does not necessarily change – even in today's rock-bottom interest rate environment. The necessity to adjust the factors is based on their actuarial justification, as determined by the Office of the Chief Actuary.[12]

In summary, the additional adjustment for average national real wage growth generally increases the incentive for claiming CPP/QPP benefits later and heightens the penalty for taking them earlier. On average, between 2012 and 2019, the financial penalty for taking CPP/QPP at age 60 rather than age 65 grew from 36% to 38.8%, and the incentive to delay from age 65 to age 70 increased from 42% to 45.4%.

3.2 Market-price comparison

Joe Tomlinson – an expert on the nuances of Social Security in the United States – explained that delaying Social Security is "like buying an annuity, but at a much better price" (Miller, 2017). The same is true in Canada with the CPP/QPP.

The conventional approach to explain the advantageous pricing underlying the CPP/QPP actuarial adjustments tends to be very technical.[13] Mr. Tomlinson's approach is powerful because it is a "real-world" view that the general public can understand, directly comparing the social security option to the price of purchasing income security in the retail market.

One challenge of the annuity price comparison is that individual Canadians currently cannot purchase inflation-indexed annuities in the retail market – despite their value in sustaining an individual's standard of living throughout retirement. The closest substitute is a life annuity with payouts that increase by a fixed percentage, which could be made to match *anticipated* inflation (2% annually).

Using annuity price quotes as of October 6, 2020 (provided by CANNEX Financial Exchanges Limited), a 70-year-old with registered savings of $100,000 could purchase an annuity with 2%-indexed (for inflation) payments of approximately $5,299/year for males and $4,688/year for females. Note that the price ($100,000) is identical for both, but they receive differing payouts because of the different longevity expectations for males and females.

Delaying CPP/QPP for five years (from age 65 to age 70) is the equivalent of "purchasing" additional future CPP/QPP benefits at the "cost" of five years of forfeited CPP/QPP payments. In other words, the premium being paid is the five years of forfeited CPP/QPP payments, and the product being purchased is an inflation-indexed annuity with payouts matching the increase in CPP/QPP benefits. Presenting this transaction as a retail annuity product, a 70-year-old who has delayed CPP/QPP since age 65 will get $9,080 in annual inflation-indexed payouts for every $100,000 of premium (see Appendix B for the mathematical description).

Putting this all together, a 70-year-old man purchasing a private annuity would get only $5,299 in annual payouts, versus the $9,080 that the CPP/QPP delay would deliver for every $100,000 of premium – making it 71% more expensive to purchase a retail annuity that matches the additional payout stream that delaying CPP/QPP benefits provide. For a woman, this payout drops to $4,688, making it 94% more expensive than the price implied in the CPP/QPP adjustment factors.

In other words, buying the same level of secure pension income in the retail market nearly doubles the price. In addition, CPP/QPP payments are fully indexed to inflation (which can go above 2%). This risk-reduction feature further increases the value of the CPP/QPP income stream, making its implicit pricing even more attractive.

The key takeaway is that delaying CPP/QPP benefits is essentially the purchase of a very secure pension at an excellent price. Overall, the risk/reward trade-offs underlying the adjustment factors are far better than those currently available in the retail annuity market.

3.3 The risk (and lack of reward) of holding on to RRSP/RRIF savings

The most basic approach to evaluating alternative financial strategies is to quantify the trade-offs between reward (how much money can be expected) and risk (the likelihood that the future will not work out as expected). Generally, more reward also carries more risk.

Canadians who have RRSPs, RRIFs and TFSAs savings often try to stretch out their savings over the course of their retirement. For many Canadians comparing the financial risks and rewards of this decision, however, the better approach is to deliberately use a portion of those savings in early retirement to put off the start of CPP/QPP benefits.

A recent report published by the Canadian Institute of Actuaries and Society of Actuaries examined the costs and risks of this choice (MacDonald et al., 2020). The purpose of the study was to better inform the decisions of Canadians for whom delaying CPP benefits might provide improved financial outcomes and greater retirement income security. It provided a quantitative basis for understanding the CPP delay option, including a comprehensive view of the risk/return trade-offs, and the dynamics of the Canadian tax and social transfer system (Box A).

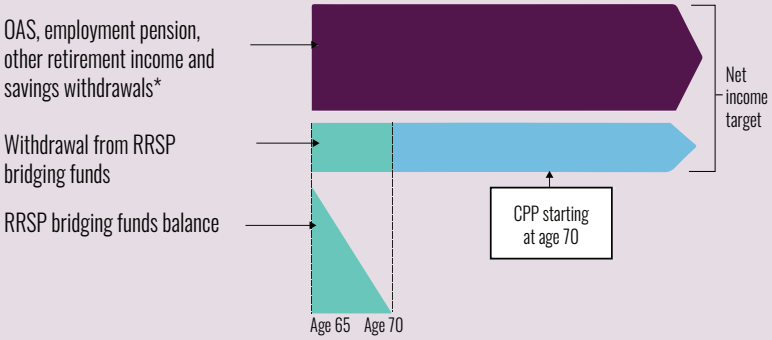
Box A: Excerpt from the July 29, 2020 Globe and Mail Opinion: *Here's a way Canadians with RRSP savings can get the most out of their CPP benefits*

A MATTER OF RISK

Two options aim to generate the same income each year, and start with the same level of savings and retirement income resources. The only difference is the age that CPP payments begin...and the risks involved.

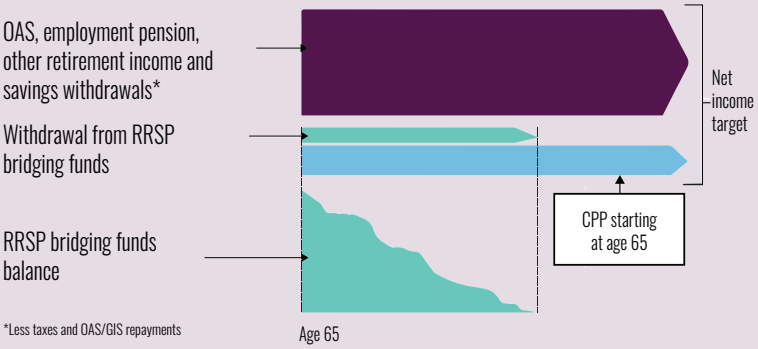
Option 1:

Delay payments from age 65 to 70, using a portion of RRSP/RRIF savings to provide an income bridge during that five-year period.



Option 2:

Claim CPP payments at age 65 and invest the RRSP/RRIF funds (which could otherwise be used as a bridge) in a portfolio subject to market risks, making annual withdrawals that generate the same net income as Option 1 (until death or the end of the bridging funds).



*Less taxes and OAS/GIS repayments

Source: MacDonald et al., 2020

"Using the example of a 65-year-old retiring Canadian, the goal of the research was to make a straightforward comparison of two otherwise identical financial strategies, where the only difference is the age that CPP payments start (see graphic).

In our study, we quickly realized the ramifications on personal income taxes and OAS/GIS eligibility are the same in both options as well. (Note that CPP death and survivor benefits are unaffected by the age of CPP uptake, and the same applies to employer pension plan benefits).

So, what's the difference between these two options? The simple answer is the risks involved."

The study found that if the goal is to securely increase lifelong income in retirement, then most Canadians with RRSP/RRIF savings are much better off using a portion of those savings in early retirement as a bridge to a higher delayed CPP benefit, rather than stretching out their RRSP/RRIF withdrawals over retirement. The two strategies generate the same tax and GIS/OAS eligibility implications, and survivor benefits are unaffected. However, delaying CPP offers greater reward and minimal risk.

Even looking at a scenario that favours the self-managed option – for example, where investments yield a mean long-term annual net (after fees) nominal return of 6% – a male with low longevity still faces a 51% probability of not achieving the same income as with delaying CPP. Overall, he is likely to get less return and will also be taking on a significant level of financial risk. It may seem counterintuitive, but taking CPP early was found to be the riskier option.

For retiring Canadians who intend to use their RRSP/RRIF savings to increase their retirement income, delaying CPP/QPP is a financially advantageous investment strategy in terms of risk and rewards, with less worry about sustaining a secure income throughout retirement.

3.4 How much are Canadians losing out?

But how much are Canadians really giving up when they take CPP/QPP benefits early? This question can be answered with the concept of ***Lifetime Loss***, a concept that is explained more fully in Section 8.

According to the stylized calculations below, the Lifetime Loss for the average Canadian with the median CPP income who chooses to take CPP at age 60 rather than age 70 is over $100,000 of secure lifetime income in current dollars (from the statutory actuarial age-adjustments and non-enhanced CPP benefits alone, before taxes and OAS/GIS repayments). That is significant income they could be spending in retirement.

Several factors influence these results:

- Life expectancy for a 60-year-old is 25.9 years for men and 28.5 years for women (Table 42, OCA, 2019).
- The median CPP income for 60-year-olds is 75% of the maximum benefit (Table 48, OCA, 2015). In 2020, this equals $6,773 per year at age 60 (75% of $14,110 less 36%), indexed to inflation.

- The projected maximum 2030 CPP benefit will be $18,957 per year, or $15,705 in 2020 dollars, based on the 2020 maximum CPP benefits of $14,110, the newly announced 2021 YMPE, and the chief actuary's long-term projection assumptions for inflation and real wage growth beyond 2021 (OCA, 2019). This amounts to $16,726 per year for an age 70 uptake (75% of $15,705 plus 42%).

Here is how the math works out:

- A 60-year-old who takes CPP immediately can expect to receive annual payments of $6,773 starting at age 60 for their life expectancy – 25.9 years for males or 28.5 years for females – or a total of $175,400 in current dollars (males) and $193,000 (females).
- The same 60-year-old who, at age 60, decides to delay CPP benefits to age 70 can expect to receive annual payments of $16,726 for their life expectancy – 15.9 years (males) and 18.5 years (females) – or a total of $265,900 in current dollars (males) and $309,400 (females).

Therefore, the *Lifetime Loss* from taking CPP at age 60 is as follows:

- For men: $265,900 (CPP at age 70) - $175,400 (CPP at age 60) = $90,500
- For women: $309,400 (CPP at age 70) - $193,000 (CPP at age 60) = $116,400
- Average Lifetime Loss: $103,500

Put another way, delaying benefits can provide over 50% more lifetime income over the course of retirement (52% = $90,500/$175,400 for men, and 60% = $116,400/$193,000 for women).

Note that this analysis examines the effect of actuarial adjustments alone with assumed average real wage growth, which essentially fixes the average pensionable earnings so that they stay the same during the deferral period. Changes in earnings history and work patterns after age 60 could, however, adjust benefits further up or down, as shown in Section 5. In addition, while this analysis looks only at the base CPP pension system, the *Lifetime Loss* would be even greater when considering the CPP pension enhancements.

This calculation finds that, from the actuarial adjustment factors alone, a Canadian with the median CPP income and average life expectancy is losing out on over $100,000 worth of secure lifetime income, in current dollars, by taking CPP benefits earlier.

4. Many Canadians Can Afford to Delay

Canadians who choose to delay taking CPP/QPP can do so without affecting their living standards by continuing to work and/or drawing on their savings to bridge the gap. If they have the interest, ability, and opportunity, there are advantages for older Canadians to keep working for longer – including financial benefits from the additional years of employment earnings, and psychosocial benefits for their health and wellbeing (Waddell and Burton, 2006). Working longer also enables them to delay their CPP/QPP benefits, which can also further increase their CPP/QPP benefits beyond the already-cited amounts if their monthly earnings exceed those of a previous month in their work history, thereby improving their earnings history.

Canadians can also fund the delay by drawing on their savings. The concern, however, is that many Canadians are not saving enough. This raises the question of how to get the most out of minimal savings, to help ensure their financial well-being in retirement. It also raises the question of whether it is worthwhile for those in a position to influence the CPP/QPP uptake decision – including human resource leaders, policymakers, and advisors – to encourage Canadians to draw on their savings, if only a minority of older Canadians can afford to delay.

According to Statistics Canada's 2016 *Survey of Financial Security*, 70% of Canadian families nearing retirement have RRSP/RRIF savings, with a median balance of about $90,000. While $90,000 likely will not generate enough income to cover 10 to 40 years of retirement, it is enough to bridge the financial gap created by delaying CPP/QPP benefits. For example, the median CPP/QPP benefit for Canadians ages 60 to 70 is approximately 75% of the maximum benefit ($6,773) (OCA, 2015). Combining these two high-level statistics, the median RRSP/RRIF savings could finance the median CPP/QPP benefit for more than 10 years, suggesting that many Canadians could afford to delay their CPP/QPP benefits by using their RRSP/RRIF savings as income to bridge the gap to a higher pension.

It is possible to get more precise, individualized picture of the situation by building on Statistics Canada's *LifePaths* Model – a longstanding, large-scale, policy-oriented micro-simulation modeling system of the Canadian population[14] that was developed over 25 years at Statistics Canada. *LifePaths* generates the necessary pieces of granular data to connect a person's accumulated CPP/QPP benefits with their RRSP/RRIF savings throughout their working life and in retirement.

With the help of Dr. Kevin Moore, principal researcher at Statistics Canada, we were able to extend Statistics Canada's *LifePaths* Model to answer the question:

How many Canadians can afford to delay their CPP/QPP retirement benefits from RRSP/RRIF savings alone, and for how long?

We started by looking back at Canadians who took their CPP/QPP benefits in 2009. Assuming a risk-free return on investments that meets inflation over the deferral period, Table 3 shows the proportion of all Canadians who took CPP/QPP at a particular age (column) in 2009 who could have delayed their CPP/QPP income for a specified number of years (row) by drawing income from their RRSP/RRIFs to match their CPP/QPP benefits.

Table 3: Proportion of all Canadians who took CPP/QPP between ages 60 and 65 in 2009 with sufficient RRSP/RRIF savings to delay taking those benefits

	Age of CPP /QPP benefit uptake in 2009						
Delay by (years)	**60**	**61**	**62**	**63**	**64**	**65**	**Average**
1	53%	47%	51%	51%	51%	54%	**51%**
2	48%	44%	47%	47%	47%	50%	**47%**
3	45%	41%	43%	43%	43%	46%	**43%**
4	41%	38%	40%	40%	39%	42%	**40%**
5	38%	35%	36%	37%	36%	39%	**37%**
6	35%	34%	34%	34%	33%		**34%**
7	33%	31%	31%	32%			**32%**
8	31%	29%	30%				**30%**
9	29%	28%					**28%**
10	27%						**27%**

Source: Author's calculations with Kevin Moore, building on Statistics Canada's Lifepaths Population Microsimulation model

For example, to delay uptake to age 68, a 62-year-old would have needed enough RRSP/RRIF savings to fund the equivalent of six CPP/QPP benefit payments that would otherwise have been claimed at age 62 (adjusted for inflation).

Using only their RRSP/RRIF savings to replace the income, more than half (53%) of 60-year-old Canadians could have delayed their accumulated CPP/QPP benefits by one year, 38% could have delayed by at least five years (to age 65) and 27% could have delayed all the way to age 70 without exhausting those savings.

It is important to keep in mind that Canadians can also delay CPP/QPP benefits by drawing on other savings outside of RRSPs/RRIFs and/or working longer. Indeed, as Section 6 discusses, the past seven years have shown longer delays in aggregate CPP/QPP uptake, which are likely attributable to significantly longer labour participation among older workers over that period.

In summary, when considering the question of affordability, the majority of Canadians can afford to fund a delay of at least one year to higher CPP/QPP benefits with their registered retirement savings alone.

5. When (Potentially) Not to Delay CPP/QPP

The CPP/QPP actuarial adjustment factors depend only on a person's age; otherwise, they are the same for everyone. There are, however, some important individual components that can differentially affect, positively or negatively, the advantages of delaying CPP/QPP benefits. These can arise from a person's general characteristics (e.g., life-limiting illness), their work history and contributions as they relate to the CPP/QPP calculations (e.g., pensionable earnings) and/or how their CPP/QPP benefits operate within the dynamics of the Canadian retirement income system on the whole (e.g., taxes and income-tested social transfers). The next section focuses on complicating factors and considerations that can negatively impact the financial advantages of delaying CPP/QPP benefits for certain Canadians.

1. Those who already have sufficient lifetime secure retirement income

Conventional financial planning wisdom advises retiring Canadians to ensure that their level of secure lifetime income (from CPP/QPP, GIS/OAS, workplace DB pension plans and annuities) is high enough to cover essential expenses that last for life – such as housing, food, utilities and other routine costs.

This assessment is typically done at a household level, usually including a spouse (if there is one) and their sources of retirement income. Where older Canadians live with their adult children, the evaluation can also include the pooling of intergenerational resources within extended family. It should also account for changes in spending over the course of one's life. For example, a person may want to ensure that their secure income stream is sufficient to cover the cost of their preferred assisted living residence.

Secure income enables Canadians to sustain their living standards into later life, despite the ups and downs of the financial market. If a retiring Canadian finds that their secure lifetime income is insufficient to cover these ongoing expenses, then they should use their savings to purchase any necessary additional pension income to fill the gap (for example, by purchasing an additional life annuity or delaying the start of CPP/QPP). On the other hand, those who already have adequate secure retirement income may be able to take their CPP/QPP benefits early without compromising their living standards, leaving more liquid savings as accessible wealth to cover uncertain costs, greater spending when needed (or desired), gifts to family and friends, or bequests.

2. Those who cannot afford to delay

Even when higher CPP/QPP benefits are needed for long-term financial security, individual circumstances and financial pressures may oblige a person to take CPP/QPP benefits earlier than they otherwise would. Some examples include the inability to work longer due to poor health, the need to care for a sick family member, forced unemployment, or difficulty keeping up with job demands. Without other income streams or savings to cover the necessary living expenses, delaying CPP/QPP may not be a viable option.

3. Those with shortened life expectancy

Out of one hundred 60-year-old Canadians, it is expected that seven will die by age 70 (OCA, 2015), thereby losing any potential CPP/QPP income from delaying benefits. On the other hand, 93 people will live past age 70, more than half will live well past age 86 – and, increasingly, more Canadians are living well into their 100s (ibid).

As Section 7 explains, concerns about shortened life expectancy are central to the fear that drives Canadians to take CPP/QPP benefits earlier. Anchoring this decision on a single unlikely consideration encourages people to mentally decide between each uptake age in terms of which will deliver more income *before* a particular age, rather than clearly thinking through the range of risks and outcomes associated with dying (and living) across the age spectrum. People generally tend to underestimate how long they will live (Perlman and Fauquier, 2020), moreover, meaning their mental "gambling" is based on inaccurate odds.

Fear of early death also encourages early CPP/QPP uptake by focusing on the peace of mind of having greater savings to leave to a spouse or other beneficiary, such as a disabled adult child. Box B suggests more appropriate bequest strategies than forfeiting the financially advantageous risk/reward opportunity that delaying CPP/QPP benefits offers

For Canadians who rationally and strongly believe their benefit period will be short (due to life-limiting illness, for example), taking CPP/QPP early is likely a prudent decision. But for most Canadians, early death is unlikely, so they are best advised to take a long-term perspective.

Box B: Considering legacies and taxes

One argument for taking CPP/QPP benefits early is to leave more savings as a legacy (e.g., to a spouse and children). However, insights from academic literature challenge this reasoning.

It is important to first note that the age of CPP/QPP uptake does not affect the survivor benefit. This is a common misconception. If a person dies, and they have not yet taken their CPP/QPP benefits, then the legislation assumes they "asked" for their pension just before death, and the survivor benefit is calculated based on the age 65 benefit regardless of the age it was claimed.

If the desire is to have more savings available to a surviving spouse and children, then a better solution is to purchase life insurance, or to purposefully set aside a portion of the remaining wealth as a bequest. The amount of savings is known – and, with the second option, the timing can also be predetermined (i.e., it can be given before death). Further, the recipients would benefit from knowing the amount (and, possibly, the timing) for their own financial planning and budgeting. On the other hand, in a self-managed strategy, both the timing and size are uncertain (Davidoff et al., 2005).

For these reasons, Brown (2009) reasoned that if an individual is risk-averse, then using savings to purchase more fixed income (through purchasing an annuity or deferring social security benefits like the CPP/QPP) is important so as to meet annual basic expenses while helping to ensure that the desired amount is available upon their death.

A further compelling advantage of these approaches is that they protect the retiree as well as their intended heirs. Like all retirement financial planning, it is critical to take a long-term view when it comes to legacies and bequests. Without the protection of secure income in later life, intended heirs may ultimately need to support their benefactor if investment returns are poor, the retiree lives longer than budgeted for, and/or the wealth is inadequately managed. When retirees outlive their savings, they can become dependent on their spouse and children – especially for helping with care needs and paying for those services – and that is the opposite of a bequest.

The CPP/QPP benefit delay incentives are financially very advantageous and, as Section 3.3 demonstrates, it is more likely that seniors will find themselves having run out of the savings that *could* have been used to bridge income to a higher CPP/QPP benefit.

4. Those eligible for the GIS and other income-tested benefits

Lower-income Canadians who expect to receive the GIS are less likely to be able to afford delaying CPP/QPP benefits. Without the necessary savings to make ends meet, delaying CPP/QPP income is not a viable option. However, since there may be individual instances of GIS recipients who may be in a position to delay their CPP/QPP benefits, such as by working longer, this section investigates this premise in greater depth.

The conventional advice is that low-income workers should take CPP/QPP as soon as possible (supported by Laurin, Milligan and Schirle (2008)). It is important to highlight, however, that the underlying cause of this insight is not the CPP/QPP program itself, nor its deferral incentives, but the way the Canadian tax and transfer system treats taxable income.

Canada's tax and transfer system features strong financial disincentives for low-income seniors to increase any taxable income past age 65 – including CPP/QPP benefits, employment earnings, RRSP/RRIF withdrawals and workplace pension benefits. In fact, when provincial GIS top-ups and income-tested subsidies for seniors are included for the one-third of seniors who receive GIS, the effective marginal tax rate can be well over 50% for every dollar of taxable income.[15] Since it is a taxable income source, receiving CPP/QPP reduces GIS and other income-tested social benefits.

For these reasons, low-income workers are best advised to save in TFSAs – not RRSPs – and to take their CPP/QPP benefits as soon as they turn age 60. This is also why Canada should strongly consider introducing a tax-free alternative to workplace pension plans to improve pension coverage, as discussed in a 2019 NIA white paper (MacDonald, 2019).

If a worker has the prospect of receiving GIS and has some RRSP/RRIF savings, then drawing both CPP/QPP *and* RRSP/RRIF savings at age 60 could make sense. For example, one financial strategy is to hold a sufficient amount to produce $2,000 or less of annual RRIF income, which would be eligible for the pension tax credit, and transfer RRSP savings above this amount to a TFSA before age 65. Note that this strategy depends on whether there is other pension income and does not reflect the tax that may result from moving too much money from RRSPs to TFSAs at once, which may push the worker into a higher tax bracket.

For GIS recipients age 65 and older who have larger amounts of RRSP/RRIF savings they intend to use as retirement income, however, using some of those savings to defer claiming CPP/QPP remains an attractive option – especially if they are in good health. That is because if a person wants to increase their annual income in retirement and attempts to do so by either drawing on RRSP/RRIF wealth or delaying CPP/QPP benefits, then the GIS implications are the same with both options (MacDonald et al., 2020).

5. Those who are on the threshold of the GIS phase-out, the start and end of OAS clawbacks, or other tax-reducing financial strategies

OAS benefits are income-tested like the GIS – except the income thresholds are much higher, and they are income-tested based on individual rather than family income. In 2020, for example, OAS benefits are reduced by 15 cents for every dollar of individual net income that exceeds $79,054, until the OAS is reduced to zero for net income of $128,137 or more (if OAS was postponed). For the top 7% of Canadian seniors affected (OCA, 2015), these individuals may consider targeting their CPP/QPP income so that it – along with the minimum RRIF withdrawal and other fixed taxable income sources – keeps them within the eligibility range of receiving GIS/OAS for as many years as possible. They could then "bounce" their RRIF income up and down, collecting GIS/OAS in some years and not others. Splitting RRIF and RPP income and C/QPP pension sharing can also be used to manage OAS reductions.

6. Those who continue working

A CPP member who is still working after age 60 has three choices:

1. Do not apply for CPP, thereby improving their earnings record and taking advantage of the adjustment factors.
2. Apply to start CPP but continue to make contributions, thereby gaining post-retirement benefits (in the CPP) or retirement pension supplement (in the QPP).
3. Apply to start CPP and suspend their contributions after age 65.

(Note that a QPP member does not have the third option, as suspension of contributions is not permitted at any age. Therefore, unlike the CPP, the inclusion of zero contributory earnings between ages 65 and 70 may decrease average pensionable earnings.)

In the first option, a complicating situation affects Canadians who have reached their maximum CPP benefit level. The extra years of contributions essentially go unrewarded[16] and therefore tend to encourage earlier benefit uptake.

For example, a person who has reached their maximum benefit would receive the same level of CPP benefits at age 70 whether he/she stopped making contributions at age 65 by ceasing to work, or continued to work until age 70 and made contributions during those five years.[17]

In the second above option (a person who decides to start their CPP/QPP benefits while still working and making contributions), the employee contributions are used to buy additional CPP/QPP pension (CPP post-retirement benefits and QPP retirement pension

supplement), which will automatically pay out the following year.[18]

Overall, the decision between the above options should be based on the overall package, accounting for both the additional contributions and the changes in benefit levels, when considering the lifetime trade-offs of delaying CPP/QPP benefits. Section 8 examines a scenario that is generally understood to favour early CPP claiming: when a person has maximized their CPP benefits at age 60 and continues to work. Even in this severe example, however, substantial lifetime income is forfeited by not deferring uptake of CPP benefits, on account of the highly profitable age-adjustment factor that are applied to the entire CPP pension when delaying.

7. Those receiving a CPP/QPP survivor's benefit

CPP/QPP calculations are complicated when a person begins to receive, or is already receiving, a CPP/QPP survivor's benefit – in which case, the two benefits are subject to special rules for combined benefits. The calculation has various components, including a combined retirement/survivor benefits maximum and a special adjustment based on the age when the pension started, and uses two different survivor's benefit formulas, depending whether or not the survivor is age 65. (For more details, see Runchey (2020). These components come together based on a combination of factors and are often misunderstood (see Box C for a description).

Box C: CPP combined retirement/survivor benefits

by Doug Runchey, Personal CPP Benefits Computation Expert

Financial advisors and many Service Canada agents often believe that the combination of the CPP retirement and survivor pensions into a single benefit is as simple as adding the two amounts together, subject to the maximum of a single CPP retirement pension. For that reason, they will tell you to take your own CPP retirement pension whenever it reaches an amount that when added to your CPP survivor's pension equals the maximum. That is bad advice, because their understanding of the combined formula is totally WRONG.

Let me tell you these truths about the CPP combined retirement/survivor's benefit formulas:

- You NEVER get to keep all of both pensions, even if they do not total the maximum.
- The CPP survivor's pension is ALWAYS reduced when it is combined with a CPP retirement pension.
- It will get recalculated (usually reduced) when the survivor's pension formula changes at age 65.

The CPP combined benefit rules are not simple.

8. Those who would face a reduction in average pensionable earnings for delaying CPP/QPP

Canadians who are age 65 or older and cease employment can delay taking CPP to age 70 without impacting their base benefits – that is, the pension benefit calculation does not include any years of zero salary after age 65. On the other hand, non-contributory years between age 60 and 65 *could* impact the CPP earnings base calculation if the retiree has insufficient dropout room.

"Dropout" refers to the general provision that allows an individual to exclude the lowest 17% of their lifetime earnings from the CPP benefit calculation (or 15% for the QPP). At age 65, for example, a person has a contribution period of 47 years (from age 18 to 65) with at least eight years of low earnings that can be excluded. The CPP benefit is therefore based on the best 39 years of earnings. (Note that there is an additional dropout provision for child-rearing and periods of receiving a CPP disability pension.) Delaying QPP operates in a similar way, except that the non-contributory years between ages 65 and 70 could also affect the base benefit if there is insufficient dropout room.

According to Doug Runchey, an expert on personalized CPP benefit calculations, this situation is not uncommon, and the calculation is not straightforward from one person to the next. Section 8 describes the situation where a person has run out of dropout room, and months of zero earnings are being added to an otherwise maximum CPP pension.

Even in this severe example, which illustrates the consequences of a scenario that is conventionally understood to favour early CPP claiming, substantial lifetime income is forfeited by taking benefits early.

Another common argument to support earlier CPP/QPP benefit uptake is the "political risk" that income tax rates will increase in the future, thereby triggering a heavier tax burden on any taxable income. If this is a concern, then it could be optimal to drain taxable income sources more quickly than if tax rates were assumed to be constant (in current dollars). Relative to holding on to RRSP/RRIF savings, it is still safer to drain those savings more rapidly and delay CPP/QPP benefits, since this strategy delivers higher returns with lower risk from both a pre-tax and an after-tax perspective.

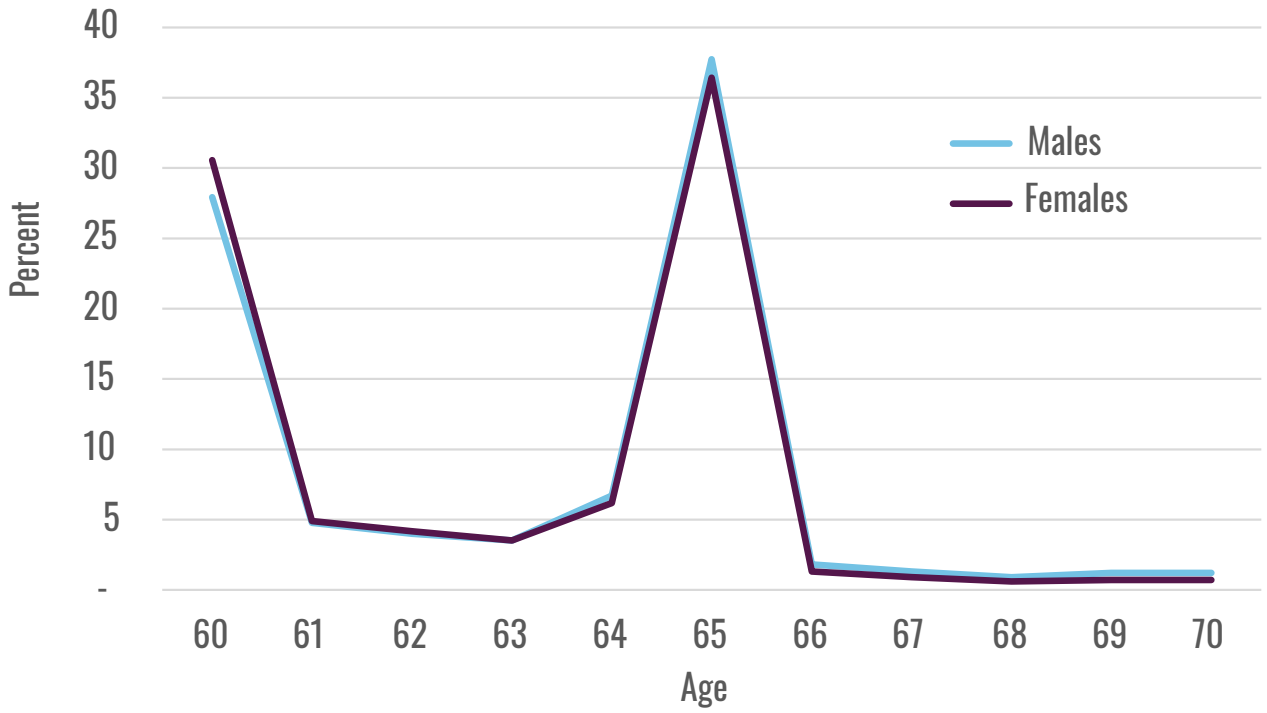
The math behind working longer, survivor benefit maximums, dropout earning adjustments, additional years of contributions, and the nuances of the Canadian tax and transfers system is not straightforward. Financial planning decisions should be done on an individual basis to fully understand the implications of any alternative strategies. It is also crucial that financial planning decisions better incorporate the expansive considerations that are critical to retirement financial well-being but often ignored – including the significant advantages of greater CPP/QPP benefits when it comes to long-term protection and greater retirement income security later in life.

6. When Are Canadians Claiming CPP/QPP Benefits?

The vast majority of Canadians (7 out of 10) start their CPP benefits at either age 60 or age 65. Less than five in 100 claim their CPP benefits after age 65, and approximately one in 100 at age 70.

Figure 1 shows the proportion of eligible Canadian females and males by age who first claimed their CPP benefits in 2019.[19] The behaviour is similar across both sexes, with spikes at ages 60 and 65 that dominate all other ages.

Figure 1: 2019 CPP Benefit Uptake for Eligible Females/Males

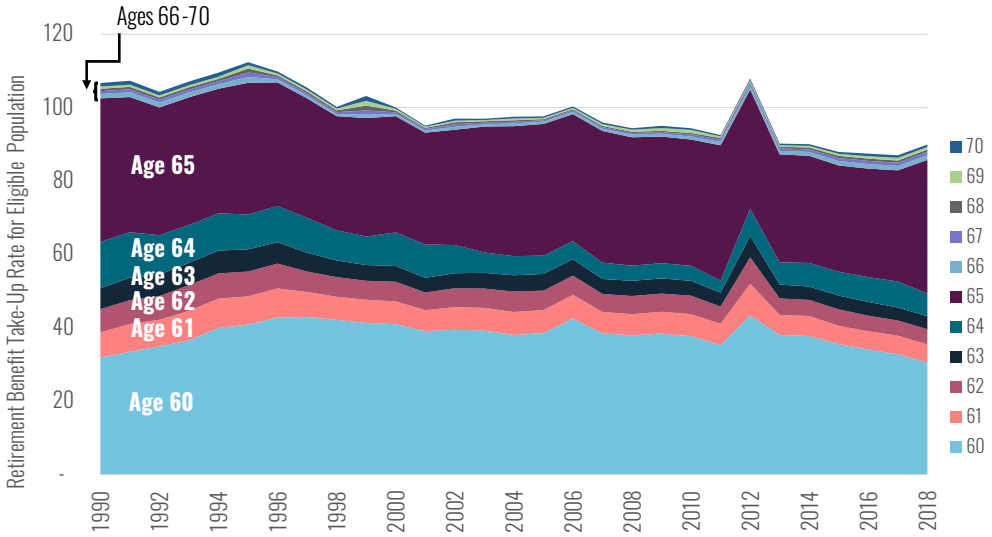


Source: Office of the Chief Actuary, personal communication, March 20, 2020. Based on the most recent actuarial report (OCA, 2019)

Figures 2a (females) and 3a (males) show the stacked CPP benefit uptake rates for eligible females and males by age over the past three decades, highlighting how few people have been starting CPP after age 65 since 1990. The uptake rates for ages 66 to 70 are a thin sliver of the proportion relative to ages 60 to 65.

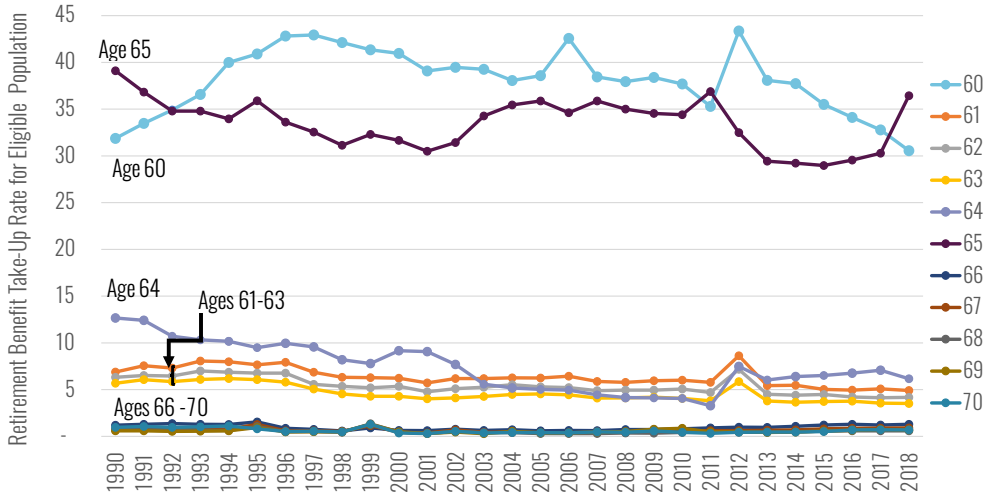
Figures 2b (females) and 3b (males) track the age trends over the past three decades. Between 2012 and 2016, the most popular uptake age for both males and females was age 60 – the earliest age of eligibility. Note that the spike in 2012 was due to provisions in the *Economic Recovery Act* (stimulus) of 2009.[20]

Figure 2a: Historical CPP Benefit Uptake Rates for Eligible Females



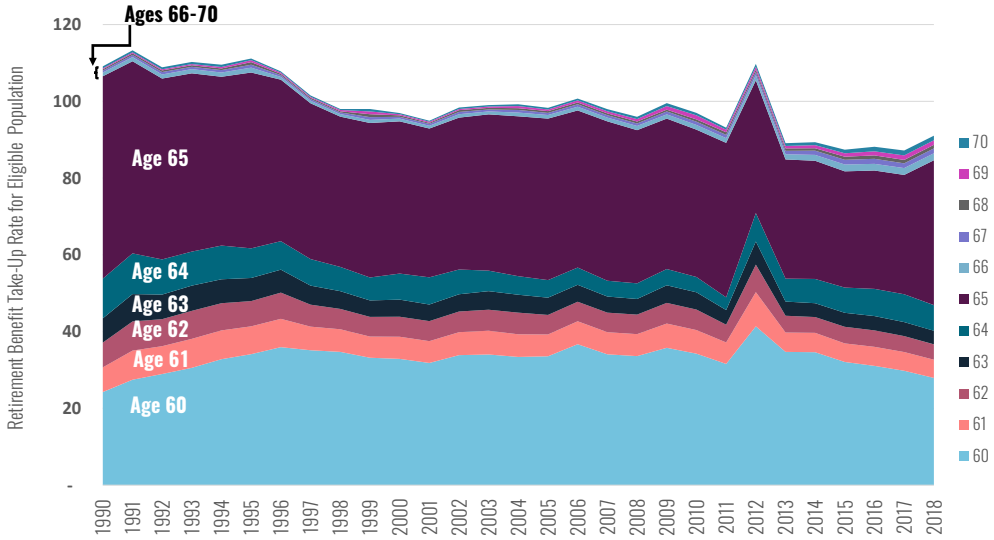
Source: Office of the Chief Actuary, personal communication, March 20, 2020. Based on the most recent actuarial report (OCA, 2019)

Figure 2b: Historical CPP Benefit Uptake Rates for Eligible Females



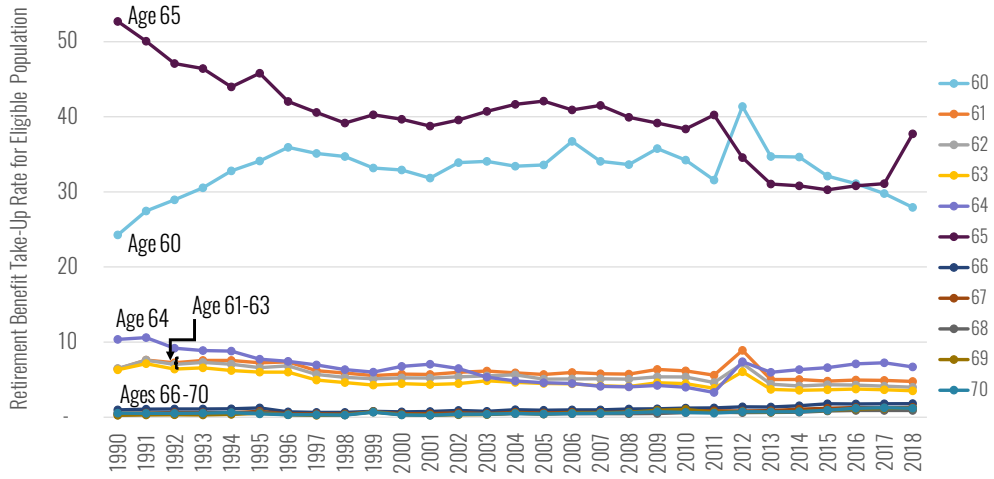
Source: Office of the Chief Actuary, personal communication, March 20, 2020. Based on the most recent actuarial report (OCA, 2019)

Figure 3a: Historical CPP Benefit Uptake Rates for Eligible Males



Source: Office of the Chief Actuary, personal communication, March 20, 2020. Based on the most recent actuarial report (OCA, 2019)

Figure 3b: Historical CPP Benefit Uptake Rates for Eligible Males



Source: Office of the Chief Actuary, personal communication, March 20, 2020. Based on the most recent actuarial report (OCA, 2019)

Over the past decade, more Canadians have claimed their CPP benefits as soon as they are eligible (at age 60) than at any other age – although, more recently, Canadians are showing some movement away from that behaviour. Since 2012, the uptake rates at age 60 have declined and are now below their 1992 values. In Quebec, however, more than half continue to claim QPP benefits at age 60 (Michaud et al., 2020).

As of 2018, age 65 has become the most popular age to claim CPP benefits. Uptake rates between ages 61 and 63 have been stable, and rates at ages 64 and 65 show

some growth. Uptake rates above age 65 have also increased, although the relative popularity of this option remains very low. However, these small increases are more likely attributable to the significantly growing labour force participation of older workers than to better financial planning practices. The proportion of Canadians retiring after age 70 has nearly doubled over the past dozen years alone (Statistics Canada, 2020a), and the average retirement age has risen from age 61 to nearly age 65 within a single decade (Statistics Canada, 2020b). Among older workers over age 60, half say they are working out of financial necessity, while the other half are continuing to work by choice (Hazel, 2018). Projections suggest that working longer is an ongoing trend (OCA, 2019), and government initiatives are underway across Canada to support the labour force participation of older workers (ESDC, 2018). It is likely that later retirement ages will continue to affect CPP/QPP benefit uptake.

Despite these shifts, the proportion of Canadians who take advantage of delaying CPP/QPP benefits past age 65 has been, and continues to be, minuscule. Less than 1% of Canadians choose to delay to age 70, suggesting a fundamental lack of understanding of the value that delaying offers.

7. What Is Driving this Early Uptake Behaviour?

Hundreds of biases affect human decision-making. Behavioural economics tells us people often cannot explain *why* they make the decisions they do, and this is certainly true when it comes to retirement savings decumulation decisions.

When asked, seniors express significant concerns over having financial security in later life. In fact, survey evidence finds that Canadians rank having secure income for life as the most important feature of any retirement plan (Baldwin, 2017), and 15 years of surveys and focus group studies by the Society of Actuaries (SOA) have found that having sufficient income at later ages (and not outliving their savings) is a primary financial concern (SOA 2016). In all these surveys, the desire for income security outweighs the desire for accessible wealth.

Yet despite this reported preference, when given the choice, most retirees do not use their wealth to purchase additional secure lifetime income. This is clear in the private annuity market, where relatively few Canadians voluntarily purchase annuities, opting instead to self-manage their retirement savings. Purchasing an annuity in retirement is nearly always ranked by experts as the optimal financial strategy, which has made the unpopularity of this choice a significant focus of research. (For a summary of the annuity literature, see MacDonald et al. (2013).)

However, many of the explanations suggested by experts – such as expensive pricing, distrust of providers, and obstacles in access – do not apply to the CPP/QPP decision. As discussed, delaying CPP/QPP by working longer or bridging the gap with savings is the most inexpensive and safest approach to obtain secure income in retirement. The cost savings differential of delaying CPP/QPP to purchasing a retail annuity (measured in Section 3.2) shows that a 70-year-old female currently pays nearly double in the retail market for equivalent income security.

Canadians report wanting greater income security in retirement, even at the expense of accessible savings. Along with this expressed preference is an army of economists and a vast body of research that consistently finds retirees should annuitize a large portion of their savings, if they want to maximize them with the least amount of risk. Delaying CPP/QPP benefits is the cheapest and safest annuity

that money can buy – yet 99% of Canadians are not taking full advantage of the option to increase their CPP/QPP benefits.

Given this disconnect between intention and action, do people *really* understand and appreciate the protection offered by delaying CPP/QPP payments? New research finds they do not – and those who seek advice are (perhaps inadvertently) being persuaded to take CPP/QPP early. The next section explores some possible drivers of this behaviour.

7.1 Lack of advice

A 2018 poll carried out on the Government of Canada website found that approximately two thirds of Canadians nearing and beyond the age of CPP/QPP eligibility did not know or understand they have the option to delay taking CPP/QPP benefits (ESDC, 2020). The survey asked Canadian residents between ages 40 and 64: *Do you think it's possible to delay the start of your Canada Pension Plan retirement pension?*

Of nearly 4,000 participants, only slightly more than one third answered correctly. Even more alarming, 40% of respondents had *already* started taking their CPP benefits. These are startling results. If the basic principles of the CPP are so poorly understood, then it is not surprising that people are not convinced to take their CPP benefits later.

7.2 Bad "good" advice

Mainstream advice in the private sector revolves around a "breakeven" analysis, which emphasizes that people would not break even (or come out ahead) unless they live to at least a particular age – the age that the cumulative CPP/QPP payouts after delaying payments equals the cumulative CPP/QPP payouts from having taken them at the earlier age. People then mentally gamble the breakeven age against their subjective longevity expectations (i.e., how long they think they will live), which they usually underestimate (Perlman and Fauquier, 2020).

The problem is that the breakeven analysis explicitly undervalues the risk protection of lifetime income security that delaying CPP/QPP benefits offers. It ignores the associated retirement income protection against financial and mortality risks that a person would achieve by using their savings in early retirement as a bridge to a higher delayed CPP/QPP benefit, rather than stretching out their withdrawals over retirement.

By only considering a target date, this comparison implies that the financial guarantee of the CPP/QPP has no value compared to the income stream their savings will ultimately deliver. The reality is, risk must be rewarded, and lifetime financial guarantees are highly valuable (as implied by the cost of such protection in the retail market demonstrated in Section 3.2).

Another issue is that the breakeven approach confuses the fact that the CPP/QPP benefit delay choice carries inconsistent risk/reward consequences across stakeholders. Consider a person who decides to take CPP/QPP early so they can hold on to more savings and still maintain their spending budget. If this person dies before their breakeven age, then their beneficiaries are rewarded with greater untouched savings. If they die after the breakeven age, then they themselves lose. In other words, the only people who can *really* be rewarded by the risk of not delaying CPP/QPP are the beneficiaries of their legacies and those rewards will not come to fruition if the beneficiaries are financially responsible for the retiree in the event that they outlive their savings.

The consequences of the breakeven approach are even more dangerous due to the psychological effects of how the options are explained. Behavioural economics finds that people's decisions are impacted by the way the information is presented, not just by the facts themselves. Known as "framing bias", the same facts presented in two different ways can lead to people making different judgments or decisions.

Recent research finds this is particularly true when advice is delivered using the breakeven age approach. In a U.S. study of Social Security claiming, Brown et al. (2016) found that breakeven framing led Americans to choose the earliest age to claim Social Security out of all the 10 approaches tested. "Breakeven" was identified as an extreme form of a "wealth framing" – one that frames delaying as the risky choice when, in fact, the risk to lifelong consumption is *reduced* with this option. By emphasizing the minimum number of years one would need to live to make up the amount forfeited by delaying benefits, "(t)his approach implicitly frames the decision as a risky bet on one's length of life, while downplaying the longevity insurance aspects of the choice"(ibid, 3).

The breakeven approach is so pervasive that, prior to 2008, even U.S. Social Security Administration (SSA) representatives would show claimants their breakeven age when informing them of their options. Brown et al. (2016, 16) concluded their paper by describing the potential damage of this routine practice: "Our research suggests that Social Security's historical emphasis on 'breakeven analysis' may have inadvertently encouraged several generations of American workers to claim benefits earlier than they would have if the information had been presented in a different frame."

Equally concerning is the finding that the financially vulnerable are most susceptible to the way the advice is presented:

> "The fact that it appears relatively easy to influence the claiming decision by a change in framing is a concern, since it implies that many individuals may be insufficiently equipped to make a decision that affects their financial well-being in their later lives. We have found that less financially literate individuals with credit card debt, and those with lower earnings, are more influenced by framing than others. These are also the groups that are most financially vulnerable at older ages." (ibid)

Ultimately, the advice given by experts in Canada is an extreme form of framing that portrays delaying CPP/QPP as the risky choice. Whether it is deliberate or not, this approach powerfully pushes Canadians toward early claiming decisions.

Box D: Why the CPP is one of the most sustainable pension plans in the world

by International Pension Plan Management and Investment Expert, Keith Ambachtsheer

At this point, readers may ask: "If I delay starting my CPP pension until age 70 for the reasons set out in this paper, how do I know the Plan will still be there for me if I reach age 90……or even 100?"

The short answer is: "because the CPP will exist as long as Canada exists". There are two reasons for making this assertion: one is political, and the other is financial:

1. The political reason for CPP sustainability is because it is a joint venture between the federal and provincial governments agreed to in 1965 to support Canadians in their retirement years. Part of the 'deal' at that time was that the CPP can only be changed by agreement of the Federal Government and at least 2/3rds of the provinces with 2/3rds of the population. When Canada's Chief Actuary warned in the 1990s that the original financial structure of the CPP would become increasingly unsustainable in the 21st century, Federal-Provincial agreement was reached to almost double the CPP contribution rate to its current 9.9% of pay up to the Yearly Maximum Pension Earnings (YMPE) amount. Projections made at that time suggested that the 9.9% rate would be the 'steady state' rate that could be maintained to support promised CPP benefits into the indefinite future. Actuarial projections over the subsequent 25 years have confirmed that to be the case.

   A new Federal-Provincial agreement was reached in 2016 to enhance CPP benefits from a maximum of 25% of the YMPE to 33% of a higher YMPE. Higher contributions (from 9.9% to 11.9%) are being phased in over six years to pay for these benefit enhancements. The higher benefits and contributions were in response to inadequacies in private savings, not due to any fault in the original benefits, which continue to be sustainable with 9.9% contributions. The point is that a sustainable CPP has been firmly embedded in Canada's political fabric since 1965. To obtain federal-provincial agreement to discontinue this CPP prudence after 55 years of success would be a political impossibility.

2. The financial reason for CPP sustainability is that the Plan is backed by a combination of the Canadian economy through the dedicated stream of employer and employee CPP contributions noted above, and a globally diversified investment fund. This fund, created through the noted doubling of the contribution rate in the 1990s, is currently valued at about $400 billion and is projected to continue growing steadily in the decades ahead. Its well-regarded manager, the CPP Investment Board (CPPIB), has the sole mandate to maximize the long-term return on the CPP asset pool without taking 'undue' risk. Over the course of the last 10 years, the CPPIB has generated a net real investment return of about 8%/yr., well ahead of its long term 4%/yr. net return target. In the continuing role of assessing CPP's long-term sustainability, Canada's Chief Actuary gave the CPP a clean bill of financial health in its most recent 2019 assessment.

These prudent 'made in Canada' political and financial arrangements to safeguard the long-term sustainability of its national pension plan are as strong as any in the world.

Note: Quebec chose to go its own way in 1965 with the Quebec Pension Plan. However, the design and operation of the QPP closely matches that of the CPP. Benefits are portable between the two Plans. For a colourful account of the creation and evolution of the CPP and QPP, see Bruce Little's (2008) "Fixing the Future", UofT Press.

7.3 Bad "bad" advice

Finally, there is negative advice that preys on people's fears of lost income, ignorance of CPP/QPP rules and its sustainability, desire for immediate gratification and inability to adequately imagine – and, therefore, plan for – their future selves. This includes phrases like the following:

"Why leave this money for the government, when you could have it right now?"

"You can't pass it on after you die, so take it now."

"A bird in the hand, is worth two in the bush."

"You'll be ahead financially if you take CPP/QPP at age 60 and don't live past age 80."

Unfortunately, this advice amplifies the human tendency to shortchange the future for more immediate rewards, distorting the rational risk/return trade-offs required when making prudent financial decisions with long-term implications. Whether intentional or not, this advice favours the interests of the advisors and family members who give it over the interests of the retiree. Investment advisors are compensated for managing RRSP/RRIF assets or recommending a high-cost retail annuity that earns them a commission. Family members and possible heirs are the beneficiaries of leftover assets after the retiree's death.

The irony is, the "bird in hand" expression is essentially saying that having some CPP/QPP income now is safer than taking the chance of having more CPP/QPP income later. But from a retirement income security perspective, delaying CPP/QPP provides higher expected return with lower risk. The person is securing at least double the lifetime CPP/QPP income by using their savings to delay benefits from age 60 to 70, and there is no guarantee on the future financial performance of the savings they would otherwise be holding on to. From this perspective of long-term retirement income security, CPP is the bird in the hand and future investment returns are the birds in the bush.

Another line of bad "bad" advice includes statements such as, "Take your CPP before the money runs out", which stems from lingering fears that the CPP/QPP programs are not sustainable. This fear may have been fueled by a campaign in the early 1990s whose aim was to convince the public that the CPP was unsustainable and the 1996 reforms were necessary. People may remember the "unsustainable" message while forgetting the problem was fixed. It may also be fueled by the challenges facing the U.S.'s Social Security, which is under substantial financial pressure and scrutiny, and is often featured in American media.

In Canada, however, experts confirm that the CPP is sustainable for at least the next 75 years (OCA, 2019). Box D discusses the misconceptions and confusion around CPP sustainability.[21]

8. Better Advice: Introducing the *Lifetime Loss*

8.1 Breaking away from the breakeven

Research in judgment, decision-making, and behavioural economics continues to find that humans are myopic when it comes to retirement financial planning, forfeiting larger future benefits for short-term gratification (Knoll, 2011). That is why it is the responsibility of experts, advisors, and government sources of public information to work in the best interests of the people who depend on them – including protecting their financial interests in their older years, and providing them with the best possible information to make informed decisions.

Helping Canadians make the most of their CPP/QPP benefits means moving away from short-term, fear-based thinking toward more effective communication that encourages a fuller understanding and appreciation of the long-term implications of the CPP/QPP uptake decision.

As an alternative to the conventional breakeven approach, a better strategy is to view the decision in terms of *Lifetime Loss*. As explained earlier in this paper, the *Lifetime Loss* is simply the expected loss of having taken CPP/QPP at an earlier age rather than at a later age.

For a person age Z (where Z lies between ages 60 and 70) who is contemplating deferring CPP/QPP benefits to age Y, the *Lifetime Loss* is defined as follows:

***Lifetime Loss* =**

CPP/QPP Benefit Payment at Age Y x (Life Expectancy at Age Z – (Y-Z))

- CPP/QPP Benefit Payment at Age Z x Life Expectancy at Age Z

Lifetime Loss assigns equal weight to all expected future payments in constant, inflation-adjusted dollars. In technical terms, it is the "present value" of the difference between the expected future income flows under two CPP/QPP uptake ages.

Simplifying the present value formula is made possible by the fact that CPP/QPP payments are indexed by inflation, removing the need to capture the decline of purchasing power for income streams that lack this feature, and by the implicit assumption of a 0% real rate of return, net of inflation and investment fees and taxes. This is reasonable, as CPP/QPP benefit payments are as close to risk-free as Government of Canada real return bonds, which are currently delivering negative yields (before any fees and taxes are deducted for retail investors).

It is important to note that if risk-free real rates of return were to increase in the future, then the *Lifetime Loss* calculation would be adjusted so that each income flow is discounted by that rate of return.

Financial advisors may be tempted to assume higher rates of returns when comparing the options. For example, one common notion is that taking CPP/QPP earlier generates income that could be then invested in the financial markets and produce more income over the long run.

However, it is misleading to use higher rates of returns without also communicating the financial market and mortality risks involved.[22] Analysis described in Section 3.3 found, moreover, that such strategies generated less return and more risk.

Behavioural science research finds that, once the decision frame is established, losses tend to get weighted twice as heavily as gains (Tversky and Kahneman, 1981). An attractive feature of the *Lifetime Loss* metric is that it taps into this heuristic by highlighting the potential income loss trade-off that Canadians face when taking their CPP/QPP benefits earlier.

The advantages of using this type of metric in the CPP/QPP uptake decision was demonstrated in a recent study by Fellowes et al. (2019), which reported the amount of potential income lost by sub-optimal Social Security claiming decisions among U.S. households. The study provided a compelling demonstration of the importance of delaying these benefits, including the finding that U.S. senior poverty could be reduced by 50% if retirees were to claim their Social Security benefits at the financially optimal time.

No metric is comprehensive; however, *Lifetime Loss* can act as a straightforward replacement for the breakeven approach – which is demonstrably misleading and potentially harmful. In addition to its simplicity, the primary benefit of the *Lifetime Loss* metric is that it encourages people to look beyond the short-term and consider their entire financial futures, by directing their attention to the larger context of retirement financial planning and its long-term implications.

8.2 How to calculate Lifetime Loss

The first step to compute the *Lifetime Loss* is to determine the CPP/QPP benefit payments at the two alternative ages, in constant dollars (that is, after inflation, to adequately capture the purchasing power of the income streams). With personalized information, a financial advisor would also incorporate adjustments to their client's other financial income flows, including taxes and social transfers, when evaluating the alternative claiming ages in order to comprehensively capture the lifelong financial trade-offs on the net take-home income. The second step is to estimate life expectancy, which can be done by using online tools that personalize these statistics. This section reviews some examples of computing *Lifetime Loss*.

Example #1: Base case with maximum CPP benefits

Consider a woman retiring at age 60 in 2020, who contributed the maximum CPP throughout her entire career and has sufficient dropout room to delay CPP benefits to age 70 without affecting her earnings history. Based on the 2020 maximum CPP benefits, the newly announced 2021 YMPE, and the chief actuary's long-term projection assumptions for inflation and real wage growth (OCA, 2019):

- At age 60, she is eligible for the maximum 2020 CPP benefit of $14,110 per year, less the age-adjustment factor of 36%: $9,030 per year in 2020 dollars.
- At age 65, she is eligible for the maximum 2025 CPP pension of $16,352 per year: $14,957 in 2020 dollars.
- At age 70, she is eligible for the maximum 2030 CPP pension of $18,957 per year, plus the age-adjustment factor of 42%: $26,918 per year, or $22,301 in 2020 dollars.

The maximum CPP benefits in 2025 and 2030 are higher, due in part to the projection assumption for real wage growth. The importance of accounting for inflation – and leveling the income flows so they are represented in constant 2020 dollars – is highlighted here as well. The nominal 2030 CPP payment is projected to be $26,918, but it would be inappropriate to compare that against the original age 60 pension of $9,030 in 2020, as a dollar in 2020 has greater purchasing power than a dollar in 2030.

Maintaining the comparison in 2020 dollars, her pension will increase by 66% by delaying to age 65, and it will increase by 147% by delaying to age 70, relative to the age 60 value. Assuming her longevity matches that of the "typical" Canadian, the *Lifetime Loss* from taking CPP at age 60 rather than at age 70 is as follows:

Lifetime Loss
= $412,600 ($22,301 for 18.5 years from ages 70 to 88.5)
- $257,400 ($9,030 for 28.5 years from ages 60 to 88.5)
= $155,200

The same calculation for a male, with a life expectancy of 25.9 years, produces a *Lifetime Loss* of $120,700.

Note: Although this example projects past 2019, the analysis examines only the pre-enhanced (original) component of the CPP/QPP. It does not include the effects of the CPP/QPP enhancement, which would create even more incentive to delay – at least among those who are still working and making contributions – as it would allow them to accrue larger enhancement benefits, which would also be actuarially adjusted. The *Lifetime Loss* dollar amounts would also be correspondingly higher with the larger CPP/QPP dollar amounts.

Example #2: *Lifetime Loss* complicated by a reduction in average pensionable earnings during deferral

To demonstrate a more complicated *Lifetime Loss* calculation, this section reviews a scenario where there is a reduction in pensionable earnings on account of years of zero earnings while delaying CPP benefits (again, examining the base CPP benefits alone). To illustrate the consequences, this section examines the severe situation that conventionally is understood to favor taking CPP early, where a person is eligible for the maximum CPP benefit and each month of zero earnings adds a zero month to an otherwise maximum pension.

Consider the same woman age 60 in 2020 who contributed the maximum CPP amount throughout her career up to age 52, when she stopped working (leading to 86 months – or 7.14 years – of zero earnings, which exactly meets the maximum general dropout provision of 17% for someone age 60):

- At age 60, she is eligible for the maximum 2020 CPP pension or $14,110 per year, less the age-adjustment factor of 36%: $9,030 per year in 2020 dollars.

Table 4 lists the incremental changes to the contribution period, and the consequential effect on benefit levels, due to accumulating zero months of earnings after age 60 for someone who would otherwise have been entitled to the maximum CPP benefit.

Table 4: Benefit adjustment impact of zero years of earnings to the maximum CPP pension entitlement

CPP Start Age	Contribution Period (months)	Drop-Out Period (months)	Net Contribution Period (months)	Accumulated Zero Earnings Months	Reduction on Account of Insufficient Drop-Out Room
60	504	86	418	0	0.0%
61	516	88	428	10	2.3%
62	528	90	438	20	4.5%
63	540	92	448	30	6.7%
64	552	94	458	40	8.7%
65	564	96	468	50	10.6%
66	564	96	468	50	10.6%
67	564	96	468	50	10.6%
68	564	96	468	50	10.6%
69	564	96	468	50	10.6%
70	564	96	468	50	10.6%

Note: Net effect of adding months of zero earnings to the maximum CPP entitlement from ages 60 to 70 for an individual with no dropout room other than the (17%) general dropout provision.

Using Table 4 as a reference, if she waits to take CPP until age 61 (in 2021), she will add a year of zero earnings to her CPP calculation, but she will have also increased the duration of her contribution period, therefore lengthening out her dropout period by two months (from 86 months to 88 months). The net effect is 10 months (one year less two months) of zero earnings, which is now a part of her CPP base benefit calculation:

- At age 61, she is eligible for the maximum 2021 CPP pension of $14,302 in 2020 dollars, less the reduction due to 10 months of no contributions (10 months divided by 428 months, or 2.3%), less the age-adjustment factor of 28.8%: $9,946 per year in 2020 dollars.

If she waits until age 65 to collect her pension (in 2025), she will add five years of zero earnings to her CPP calculation. Together with the longer contribution period – which now allows 10 additional months of dropout room (from 86 months at age 60, to 96 months at age 65) – the net effect is that she has accumulated 50 months of zero earnings (five years less 10 months), which is now a part of her CPP base benefit calculation:

- At age 65, she is eligible for the maximum 2025 CPP pension of $14,957 in 2020 dollars, less the 10.6% reduction due to 50 months of no contributions (50 months divided by 468 months), less the age-adjustment factor of 0%: $13,366 per year in 2020 dollars.

Looking ahead further, if she waits until age 70 to collect her pension (in 2030), there are no further reductions based on zero earnings after age 65. Therefore:

- At age 70, she is eligible for the maximum 2030 CPP pension of $15,705 per year in 2020 dollars, less the 10.6% reduction due to 50 months of no contributions (50 months divided by 468 months), plus the age-adjustment factor of 42%: $19,929 per year in 2020 dollars.

Keeping the income flows in constant 2020 dollars, her pension will increase by 48% by delaying to age 65, and it will increase by 121% by delaying to age 70. Assuming her longevity matches average life expectancy, her total *Lifetime Loss* from taking CPP at age 60 rather than at age 70 is as follows:

Lifetime Loss

= $368,700 ($19,929 for 18.5 years from ages 70 to 88.5)
- $257,400 ($9,030 for 28.5 years from ages 60 to 88.5)
= $111,300

Table 5: Benefit adjustment impact of zero years of earnings to the maximum QPP pension entitlement

CPP Start Age	Contribution Period (months)	Drop-Out Period (months)	Net Contribution Period (months)	Accumulated Zero Earnings Months	Reduction on Account of Insufficient Drop-Out Room
60	504	76	428	0	0.0%
61	516	77	439	10	2.3%
62	528	79	449	20	4.5%
63	540	81	459	31	6.7%
64	552	83	469	41	8.7%
65	564	85	479	51	10.6%
66	576	86	490	61	12.5%
67	588	88	500	71	14.3%
68	600	90	510	82	16.0%
69	612	92	520	92	17.6%
70	624	94	530	102	19.2%

Note: Net effect of adding months of zero earnings to the maximum QPP pension entitlement from ages 60 to 70 for an individual with no dropout room other than the (15%) general dropout provision.

Table 5 provides the same information as Table 4 except applied to the QPP, where the dropout period is 15% (not 17%), and the years of zero earnings between ages 65 and 70 are not excluded – amounting to a 19.2% reduction by age 70. The details of the previous CPP example remain the same, except that at age 70, she would be eligible for the maximum 2030 QPP pension of $15,705 per year in 2020 dollars, less 19.2% reduction due to 102 months of no contributions (102 months divided by 530 months), plus the age-adjustment factor of 42%: $18,012 per year in 2020 dollars.

Lifetime Loss

= $333,200 ($18,012 for 18.5 years from ages 70 to 88.5)
- $257,400 ($9,030 for 28.5 years from ages 60 to 88.5)
= $75,800

Overall, the advantages of delaying CPP/QPP continue to be significant, despite the additional years of zero earnings during the deferral period.

Example #3: *Lifetime Loss* complicated by potential accrual of post-retirement benefits (PRBs)

This section reviews a scenario where a person continues to work and make contributions past age 60, and therefore has a choice between delaying CPP uptake or taking it earlier and accumulating post-retirement benefits (PRBs).

The general formula for the PRB is 1/40th of a retirement pension (2.5%), which is then adjusted actuarially on the individual's age on January 1st when it starts. Note that the actuarial adjustment applies only to the PRB benefits, rather than the whole pension, as would be the case when choosing to defer CPP payments.

In general, the PRB is considered particularly valuable for individuals who are at or near the maximum CPP benefits, since the PRB allows them to accrue benefit above the maximum, thereby rewarding the additional contributions through increased benefits.[23]. To illustrate the consequences of the timing of CPP uptake for Canadians who continue working past age 60, therefore, this section examines the case of a higher earner at the maximum CPP benefit level who continues to work and make CPP contributions. By claiming CPP benefits, they could accumulate the maximum PRB and augment their maximum CPP level. On the other hand, having reached the maximum CPP benefit level, they would not improve their earnings record by delaying, despite the continuing maximum contributions. As Section 5 notes, such a situation is conventionally regarded as favouring earlier benefit uptake, since the extra years of contributions essentially go otherwise unrewarded if CPP benefits have not been claimed.

Consider the same woman age 60 in 2020 who is entitled to the maximum CPP but decides to continue working. As before, she is eligible for the maximum 2020 CPP benefit of $14,110 per year, less the age-adjustment factor of 36%: $9,030 per year in 2020 dollars. By continuing to contribute, she will accumulate PRBs: at age 61, she will have accumulated 1/40th (or 2.5%) of the maximum CPP benefit in the year of payout, adjusted downward by the age-adjustment factor: 1.8% of $14,302 in 2020 dollars at age 61, an additional 2% of $14,420 in 2020 dollars at age 62, and so on up to 3.6% of $15,705 in 2020 dollars at age 70. Table 6 tracks the additional projected maximum PRBs benefits in 2020 dollars.

Table 6: Additional maximum PRBs accumulated on a maximum CPP pension entitlement claimed at age 60 versus delaying CPP benefits to age 70.

Age	Age 60 CPP Benefit Claim		Age 70 CPP Benefit Claiming
	Cumulative Total PRB (2020 dollar)	Total Annual CPP Payment (2020 dollar)	Total Annual CPP Payment (2020 dollar)
60		$9,030	$0
61	$255	9,285	0
62	537	9,568	0
63	849	9,880	0
64	1,192	10,222	0
65	1,566	10,596	0
66	1,975	11,005	0
67	2,420	11,451	0
68	2,902	11,933	0
69	3,422	12,452	0
70+	3,979	13,010	22,301

Keeping the income flows in constant 2020 dollars, her annual CPP pension income is $9,030 at age 60, $9,285 at age 61, and so on until $13,010 at age 70 and thereafter (in 2020 dollars). Assuming her longevity matches average life expectancy, her total *Lifetime Loss* from taking CPP at age 60 rather than at age 70 is as follows:

Lifetime Loss

= $412,600 ($22,301 for 18.5 years from ages 70 to 88.5)
- $346,100 ($9,030 at age 60, $9,285 at age 61, ..., $13,010 for 18.5 years from ages 70 to 88.5)
= $66,500

The *Lifetime Loss* is over $66,000. In other words, she could expect 20% more lifetime income by delaying benefit claiming (20% = $66,500/$346,000). *Lifetime Loss* is also substantial for a male, at over $42,000.

A third alternative option after age 65 is to claim CPP benefits, stop contributing and cease accumulating PRBs (see Section 5). The *Lifetime Loss* can again be used to help put the extra contributions into broader perspective, as it provides a reference point against which a worker can compare whether the extra years of additional contributions are worth the expected lifetime income associated with delaying CPP benefits.

Example #4: *Lifetime Loss* with mortality risk protection

Lifetime Loss is an "expected" value and, therefore, does not adequately capture the degree to which an augmented CPP benefit will reduce post-retirement financial risk for Canadians.

The *Lifetime Loss* employ percentiles to capture the dispersion that emerges from the existence of mortality risk. For example, according to the longevity statistics of Club Vita[24] – an analytics centre with the largest and most up-to-date longevity dataset for Canadian pensioners with workplace pensions – a 60-year-old with higher socioeconomic conditions (who is therefore more likely to be able to afford to delay CPP/QPP) has a 25% chance of living to age 97 (for men) or age 99 (for women). Returning to the base case example:

***Lifetime Loss* from taking CPP at age 60 (at the 75th percentile):**

- **For men: $602,100 ($22,301 for 27 years) - $334,100 ($9,030 for 37 years) = $268,000**
- **For women: $646,700 ($22,301 for 29 years) - $352,200 ($9,030 for 39 years) = $294,500**

In this case, there is a 25% probability of losing more than $260,000 of secure lifetime income by taking CPP/QPP at age 60 instead of at age 70 examining the mortality risk alone. In other words, from just the original CPP benefits, there is a 25% risk that the *Lifetime Loss* will be over a quarter of a million dollars.

9. Conclusion: Moving Forward

In Canada and around the world, stakeholders are concerned about how to create more secure retirement income for advanced-age seniors. Delaying retirement benefits is proving to be a politically palatable option, and financial experts and academics are calling for changes to public policies that would allow Canadians to delay CPP/QPP even beyond age 70 to keep up with the longer lives they will likely lead (Genest-Gregoire et al. (2018); CIA (2019)). But changing public policy on the maximum deferral age will not accomplish much if Canadians do not take advantage of the reforms.

It is time to take a step back and start by better communicating to Canadians how they can maximize the deferral options that are already available. Despite wanting and needing greater income security, Canadians are clearly choosing *not* to delay CPP/QPP benefits, thereby forfeiting the safest, most inexpensive approach to get more secure retirement income.

A major culprit is the "breakeven" approach underlying mainstream advice on the CPP/QPP uptake decision, which perpetuates short-sighted thinking and pushes retiring Canadians to take CPP/QPP as early as possible. It does a major disservice to the industry, and to society at large. Well-intentioned advisors and experts are also susceptible to, and influenced by, the same narrative as the general public.

Fundamentally, the financial service industry should rethink its approach to advising Canadians on the CPP/QPP benefit uptake decision, as well as retirement financial planning in a broader context. For this to happen, experts and industry practitioners need to move away from the breakeven approach toward metrics that better encourage Canadians to consider and appreciate the full financial implications of this decision on their lifetime retirement financial security.

The *Lifetime Loss* – a simple calculation that measures the expected lifetime income loss of taking CPP/QPP earlier rather than later – can help to achieve that. This measure does not trigger fears that place greater value on getting the money sooner and, therefore, supports a longer-term perspective on retirement financial planning.

My upcoming paper presents further approaches that those in a position to influence the CPP/QPP uptake decision – policymakers, human resource professionals, and advisors – can use to help shift the paradigm away from taking CPP/QPP benefits early. Its goal is to offer insights to help replace bad practices with more balanced information that will support retiring Canadians in making more informed financial decisions that will affect them for the rest of their lives.

Appendix A: Overview of The Structure of Canada's Retirement Income System (RIS)

(Adapted from Ambachtsheer and Nicin (2019)

Canada's RIS structure roughly fits the World Bank's 3-pillar model of government programs, employment-based retirement and pension plans, and personal retirement savings.

Pillar 1: Public Programs and Plans Administered by the Government:

Old Age Security: The universal OAS program provides an inflation-indexed base pension. The monthly benefit commencing at age 65 for an individual who resided in Canada for 40 years after age 18 and before benefits commenced is approximately $613 per month, or $7,300 year. (SDC, 2020a). At the high end of the income spectrum, the OAS pension is gradually clawed back starting at about C$78,000 income level and reaching 100% claw back at about $128,000 (or more when the benefit is increased for postponed commencement and less when the benefit is reduced due to shorter residency). The OAS program is funded out of general tax revenue, meaning that Canadians do not pay into it directly.

Guaranteed Income Supplement: The GIS provides supplementary monthly income to OAS recipients who reside in Canada and have low income, which for single seniors is defined as having annual income (excluding OAS and GIS) below about $18,600 (SDC, 2020a). The GIS provides a single senior a maximum monthly benefit of $916, for a maximum annual benefit of $10,992. Amounts vary based on income levels and marital status (ibid).

Canada/Quebec Pension Plans: The CPP/QPP provide nearly all working Canadians a partial earnings replacement upon retirements as early as age 60. They are workplace-based pension arrangements requiring compulsory participation via contributions paid by employers and working Canadians. The original target income replacement rate was 25% of average earnings up to a maximum earnings level (about $59,000 today). Originally a pay-go system, it was moved to a partially pre-funded target benefit basis in the 1990s, permitting a stabilized contribution rate of 9.9% of pay, split 50-50 between employers and employees (FCAC, 2020).

In 2016, recognizing that the majority of private sector workers were not members of employer-sponsored pension plans, Canada's federal and provincial

governments agreed to increase the target CPP/QPP benefit to 33.33% of average earnings, and to increase the ceiling on maximum earnings covered by 14%. By 2023, total employer/employee contributions will increase to 11.9%, split 50-50 between employers and employees. These enhancements are to be fully prefunded with the additional contributions required phased in over a number of years, starting in 2019. The full increase in CPP/QPP will be achieved by 2065 (SDC, 2020b). Overall, the enhancements will on average increase CPP/QPP benefits by 44 per cent across Canadian seniors (MacDonald, 2019)

Pillar 2: Collective workplace-based program including registered pension plans (RPPs), Group Registered Retirement Savings Plans (GRRSPs), and Deferred Profit-Sharing Plans (DPSPs).

RPPs: Registered pension plans are established by employers or unions, registered under federal or provincial regulators in accordance with their Pension Benefits Acts (FSCO, 2017). The two main types of employer-established plans are defined benefit (DB) and defined contribution (DC). In a DB plan, ultimate retirement benefits are defined by a formula that typically includes years of service, earnings, etc. Benefits within a DC plan, by contrast, are defined by the amount of contributions that are made and the investment returns that are generated over time. Out of a total of approximately 19 million employed Canadians in 2019, about one-third belonged to an RPPs, for a total RPP membership of 6.3 million Canadians (Statistics Canada, 2019). Of the 6.3 million total members of RPPs, 3.3 million belong to public sector plans and 3 million to private sector plans. Out of the 6.3 million total RPP members, about 4.2 million belong to a DB plan, 1.2 million belong to a DC plan. About 925,000 people belong to RPP plans other than DB or DC, namely hybrid plans, composite, and combination plans (ibid). While the number of people who are members of and RPP increased by 62,100 in 2017, the pension coverage rate declined, from 37.5% in 2016 to 37.1% in 2017.

Group RRSPs/DPSPs: Employers also play a role in creating retirement savings arrangement for their workers. Two main types are Group RRSPs and Deferred Profit-Sharing Plans (DPSPs). Group RRSPs are similar to individual RRSPs but administered by an employer for a group of employees (FSCO, 2017). Employers select a financial services provider to manage the group RRSP, and may also match employee contributions into their RRSPs up to some maximum amount. DPSPs are arrangements that allow employees to share in employer profits. Approximately 1.6 million workers are members of these group arrangements (OSFI, 2017).

Pillar 3: Personal Retirement Savings Vehicles, including RRSPs and Tax-Free Savings Accounts (TFSAs).

Individual RRSPs/TFSAs: Canadians can also save for retirement on their own through RRSPs or TFSAs. RRSPs are personal retirement savings accounts offered by financial institutions and facilitated by the Income Tax Act (FSCO, 2017). Contributions to RRSPs are tax deferable until withdrawal. They must be converted into Registered Retirement Income Funds (RRIFs) by age 71. RRIF holders must withdraw at least a mandated minimum annual amount from their account as taxable pension income (ibid). TFSAs are also personal savings accounts, but rather than allow tax on contributions to be deferred until withdrawal, contributions and investment returns are permitted to accumulate tax-free. Both accounts have annual and lifetime contribution limits. About 14 million Canadians had TFSAs as of the 2017 contribution year (CRA, 2017), 8.1 million contributed to their TFSA in that year, and 1.4 million maxed out their $5,500 contribution limit for 2017 (ibid). For the same year, 5.9 million Canadians contributed to their RRSP accounts. Median RRSP contributions for that same year were $3,000 (Statistics Canada, 2020c).

Appendix B: The market value of delaying CPP/QPP benefits from age 65 to 70

What is the implicit price of delaying CPP/QPP in the retail annuity market?[25]

The cost of delaying from age 65 to 70 is five years worth of forfeited CPP/QPP benefit payments, and the benefit of the delay is an inflation indexed annuity with a 42% increase in the age 65 CPP/QPP benefit payments.

Assuming that (1) the five forfeited payments are invested in cash that earns inflation that is fixed at "p", (2) the YMPE underlying CPP/QPP benefit calculation grows at a real wage growth rate of "w", and (3) the person lives from age 65 to 70[26], then:

- The cost is: $CPP_{65}(1+p)^5 + CPP_{66}(1+p)^4 + CPP_{67}(1+p)^3 + CPP_{68}(1+p)^2 + CPP_{69}(1+p)^1$
- And the benefit is: $1.42CPP_{65} \times [(1+w)\times(1+p)]^5 \ddot{a}_{70} - CPP_{70}\ddot{a}_{70}$

where $\ddot{a}^{p}_{70}$ is the annuity factor at age 70 with a payout that is indexed by inflation. In other words, the actuarial present value of annual payments of $1 (adjusted for inflation) for life beginning at age 70.

Given that CPP/QPP payments are inflation adjusted:

$$CPP_x = CPP_{65}(1+p)^{(x-65)}, \text{ for x>=65}$$

Setting the cost and the benefit equal, therefore:

$$5CPP_{65}(1+p)^5 = CPP_{65} \times (1+p)^5 \ddot{a}^{i}_{70}[1.42 \times (1+w)^5 - 1]$$

Letting p=0.02 (inflation to 2%) and w=0.01 (real wage growth to 1%), then the underlying cost of annuitization in the CPP/QPP adjustment factors are:

$$\ddot{a}^{i}_{70} = \frac{5}{1.42 \times 1.01^5 - 1} = 10.15$$

An annuity factor of 10.15 signifies that a person would receive $9,849 in annual inflation-indexed payouts for every $100,000 of premium (this is calculated by dividing the premium by the annuity factor: $100,000/ $\ddot{a}^{p}_{70}$).

Using the historical average actuarial adjustment factors between ages 65 and 70 since 2012 from Table 1, there has been a 45.4% real increase at age 70 relative to the benefit at age 65. This results in an annuity factor of 11.01, delivering $9,080 in annual inflation-indexed payouts for every $100,000 of premium.

Endnotes

[1] The advantages of delaying the QPP are very similar to the CPP, and in most cases the term CPP/QPP encompasses both. Relevant differences are noted when this is not the case.

[2] The QPP's early adjustment factor is slightly different than that of the CPP – the latter being 0.6% per month, and the former being up to 0.6% per month, and at least 0.5%, depending on the individual's earning history.

[3] The underlying principle of the methodology employed by the Chief Actuary, who is responsible for determining the CPP actuarial adjustment factors (or simply adjustment factors), is that the CPP's funding status would not be affected by the retirement decisions of multiple generations of Canadians, based on particular assumptions about the future, including the relationship between benefit uptake behaviour and labour markets (OCA, 2017). With these actuarial adjustment factors, the retirement pension is permanently adjusted downward or upward for each month between age 65 and the age when the pension commences. Prior to 2011, the adjustment factor for both pre-65 and post-65 pension take-up was 0.5% per month. Starting in 2011, the statutory actuarial adjustment factors were changed. For contributors who take their retirement benefit early (before age 65), the adjustment factor gradually increased to 0.6% per month over the five-year period 2012 to 2016. For those who take their benefit after age 65, the factor gradually increased to 0.7% per month over the three-year period 2011 to 2013. The downward pension adjustment factor of 0.6% per month, applicable for the year 2016 and thereafter, results in a pension that is reduced by 36% for pension take-up at age 60. The upward factor of 0.7% per month, applicable for 2013 and thereafter, results in a pension increased by 42% for pension take-up at age 70.

[4] For supporting evidence, see MacDonald (2018).

[5] Many Canadians have the mistaken belief that their long-term care needs will be met through programs and services funded by governments. While government programs aimed at assisting Canadians with long-term care needs currently exist, these programs vary by jurisdiction and are at least partly dependent on the income and/or assets of individuals. According to a 2019 NIA white paper, projections showed that publicly funded long-term care costs could exceed OAS expenditures by 2050, representing over a quarter of federal and provincial income tax revenue (MacDonald et al., 2019). Canadians will become responsible for an increasing portion of the overall costs, either directly out of pocket, through increased taxes, or both. If family members try to keep up with the care needs of the seniors they will be supporting, they will need to increase

their efforts by 40 per cent, some much more than others (ibid). The prospects for meeting this challenge do not look good – particularly when taking into account factors such as smaller families, more separated and divorced seniors, greater participation of women in the work force, fewer elderly parents living with their children, and reduced expectations and/or willingness to provide care services within families. This is not to mention the emotional, physical and financial stress already reported by family members providing unpaid care to seniors in Canada. According to projections, the price tag to pay for the unpaid hours of family care will increase year after year as the elderly population grows, reaching $27-billion dollars per year in three decades. These projections may in fact be underestimates. The bulk of paid long-term care is currently provided by personal support workers (PSWs), about 90 per cent of whom are women, and about 30 per cent are immigrants (ibid). COVID-19 has, moreover, exposed the inadequate pay and working conditions of PSWs to the general public. With already a shortage of long-term care workers, calls for employment conditions reforms for PSWs and an increase in staffing for institutions providing care will push up projected costs even further.

[6] See recent NIA report by Ambachtsheer and Nicin (2020) for discussion.

[7] The Maximum Pensionable Earnings Average (MPEA), which is the basis for determining the contributor's average pensionable earnings and therefore the value of their CPP/QPP pension, equals the average YMPE in the year of retirement and the four previous years. The MPEA used for determining a benefit is the one for the year in which the benefit is first paid.

[8] As described in OCA (2019), the nominal average wage is determined by the ratio of the total nominal earnings to total civilian employment in the Canadian economy as a whole. The real wage increase is the difference between the increase in the nominal average wage and the consumer price index.

[9] The background calculations are as follows:

- An increase of 42%, taken together with real wage growth of 1% each year for five years, yields nearly a 50% increase in real terms:
    - $142\% \times (1.01)^5 = 149.2\%$ (or a 49.2% increase)
- A reduction of 36%, taken together with real wage growth of 1% each year for five years, yields more than a 39% decrease in real terms:
    - $(100\%-36\%) \times (1.01)^{-5} = 60.9\%$ (or a 39.1% reduction).

[10] To explain further, 137.4% is the average of ten-year delay incentive over an eight-year period between 2012 and 2019 (e.g., delaying CPP/QPP benefits from 2003 to 2012, 2004 to 2013, …., and 2010 to 2019).

[11] The observation that the value of delaying CPP benefits is most effectively communicated by looking at the single year return on benefit was contributed by Jean-Claude Menard, Canada's former long-standing Chief Actuary, and was further identified and articulated by Doug Chandler, Canadian pension plan expert and researcher, and Steve Vernon, U.S. retirement income planning expert and researcher. My upcoming paper examines their insightful approaches more deeply.

[12] In accordance with subsection 115(1.11) of the Canada Pension Plan, the Chief Actuary shall calculate the CPP's pension adjustment factors and specify them in every third triennial CPP/QPP actuarial report prepared, starting with the Actuarial Report on the Canada Pension Plan as at 31 December 2015. The Chief Actuary may also, if deems it necessary, specify the factors in any supplemental CPP actuarial report after 2015. In accordance with the legislation, the first CPP actuarial report to specify the pension adjustment factors was the 27th CPP Actuarial Report as at 31 December 2015, which was tabled in the House of Commons on 27 September 2016. The methodology used to calculate the factors is described in the study: "Canada Pension Plan Actuarial Adjustment Factors as specified in the 27th Actuarial Report on the Canada Pension as at 31 December 2015 – Actuarial Study No. 18", which was published by the OCA in April 2017 (OCA, 2017).

[13] Approaches include computing the underlying internal rate of return for Canadians with varying characteristics and comparing them to bond yields. Or capturing the value of alternative income streams associated with various uptake ages according to a mathematical formula that is intended to capture individual preferences and the ingredients of an optimal decision (the economist's utility maximization approach).

[14] There is no single data source that combines CPP/QPP benefits levels and retirement savings for a representative sample of individual Canadians. For example, Statistics Canada's Survey of Financial security provides a detailed summary of income and wealth data, but it is missing many pieces necessary to answer this question – namely, a person's accumulated CPP/QPP benefit entitlements. LifePaths was developed to integrate and build on the wide range of data available at Statistics Canada. Using a micro-analytic approach, LifePaths simulates the past, present, and future Canadian population by modeling one person at a time and tracking all relevant information as they make their way through life. Millions of individuals have their complete life paths or biographies synthesized via simulation. These synthetic individuals, by construction, collectively form a representative sample of the Canadian population. Statistics Canada discontinued funding for LifePaths in the budget climate after 2010 and the model was archived, though it is still available to interested parties. An overview of LifePaths can be

found at the Statistics Canada Modelling Division (Spielauer, 2013), which is publicly available to the interested reader and can be found on the Statistics Canada website. The assumptions and calculations underlying the simulation results were prepared by the authors, and the responsibility for the use and interpretation of these data is entirely that of the author.

[15] See, for example, Stapleton (2016) and Chisholm and Brown (2007). Note that these disincentives are typically leveled on family, rather than individual income.

[16] With the introduction of the CPP enhancements, continuing to contribute will produce modest benefit increases. Putting the enhanced CPP benefits aside, however, the there is no gain to the base CPP benefits for the additional associated contribution.

[17] A person could in fact reach this threshold as early as age 60, either because they have unused dropout years or because their future earnings will be less than the lowest ratio so far. Many thanks to Doug Chandler, Doug Runchey and Neal LeBlanc for their substantial assistance in this section.

[18] This is also a place where the QPP and CPP are different. The QPP version of the post-retirement benefit is the retirement pension supplement, and individuals who work while receiving a retirement pension continue contributing to QPP, without an option to opt to cease or an age limit. So, while the CPP can provide a maximum of 11 post-retirement benefits (as earnings are determined based on calendar years), in Quebec, working to one's 80s could mean 20 plus supplements.

[19] The reporting of the data is described in OCA (2019): "The retirement benefit take-up rates are determined on a cohort basis. The sex-distinct retirement benefit take-up rate for any given age and year from age 60 and above corresponds to the number of emerging (new) retirement beneficiaries divided by the total number of people eligible for retirement benefits for the given sex, age, and year." (p.24)

[20] First, the work cessation test was removed, so individuals could claim early CPP benefits while continuing to work. Second, an increase in the penalty for early uptake from 0.5% per month to 0.6% per month was announced, with a five-year phase-in period that temporarily tipped the balance in favour of earlier uptake. In addition, the introduction of the post-retirement benefit in 2012 made early uptake more accessible for individuals who were still employed.

[21] In addition to the explanations given in Box D, a further important feature of the CPP is that it is a target benefit pension plan, in that if the contributions prove insufficient and the provinces cannot agree on raising the rates, there is a mechanism to make modest adjustments to pension indexing that will ensure long-term sustainability.

[22] A client's risk tolerance should govern the asset mix and potential volatility of the client's total portfolio, including pensions as well as investments. Therefore, a reduction in guaranteed CPP/QPP lifetime income as a proportion of the total portfolio should be accompanied by a proportional reduction in the allocation to risky investments, in order to maintain the same overall volatility of future income.

[23] It is also considered valuable for low-earners on account of the yearly basic exemption feature of the CPP contribution of $3,500 - see Runchey (2019) for discussion.

[24] Obtained through personal correspondence on August 29, 2020.

[25] Many thanks to Joseph Tomlinson who suggested this approach (with respect to U.S. Social Security benefit delay) via personal correspondence (August, 2018).

[26] Survival carries a 96% probability (OCA, 2015), and would be generally higher for such Canadians with the financial ability to bridge the gap so as to put off taking CPP/QPP.

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