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Frames, Incentives, and Education: Effectiveness of Interventions to Delay Public Pension Claiming *

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Abstract

Many near-retirees forgo a higher stream of public pension income by claiming early. We provide both quasi-experimental and survey-experimental evidence that the timing of public pension claiming is relatively inelastic to changes in financial incentives in Canada. Using the survey experiment, we evaluate the effect of two different educational interventions and different ways of framing the incentive to delay claiming. While all three types of interventions induce delays, these interventions have heterogeneous financial consequences for participants who react.

JEL Classification: D91, H55, J14, J26

Keywords: Pension Claiming, Annuities, Retirement, Financial Education, Framing.

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1 Introduction

Public pensions are an important building block of most retirees' income in retirement. The age at which an individual claims their public pension directly impacts the level of pension payments (annuity income). In Canada, the degree of actuarial fairness in pension adjustments for early and late claiming has improved over the years (Milligan and Schirle, 2021) and the implicit return from delaying claiming can be well above any most investment product with similar risk. The possibility of increasing annuitization in the current environment by encouraging delays is often discussed in policy circles.[1]

Income security has been eroding in North America due to a number of distinct trends. According the Statistics Canada projected cohort life tables, a 65 years old today can expect to live 23.6 years compared to 18 years 40 years ago. This should climb to 28 years in less than 40 years according to demographic projections. The direct consequence of this trend is that retirees need to finance consumption for a longer period and have increased exposure to longevity risk. At the same time, traditional defined benefit (DB) pension coverage, which protects against longevity risk, is loosing ground, now covering two thirds of those with private pension coverage compared to 85% at the turn of the century.[2]

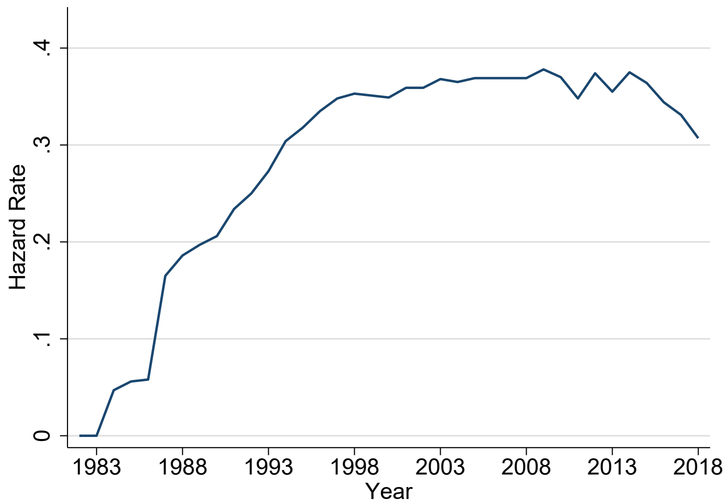
Yet, many workers claim their CPP (and QPP) benefits at the earliest age possible, age 60, therefore forego higher pension payments in the future. Figure 2 plots the evolution of the fraction claiming their pension at the earliest age possible in Canada. Historically, the earliest age to claim a pension in Canada was 65, until Québec allowed for early claiming at age 60 (before age 65) in 1984. The rest of Canada followed in 1987. Since then, the fraction claiming at the earliest age increased steadily to reach around 35% in the early

[1] The Canadian Institute of Actuaries proposed increasing the earliest age at which benefits can be claimed from age 60 to 62 for this reason `https://www.cia-ica.ca/docs/default-source/Public-Statement/219042e.pdf`. Several experts often note that a 10% penalty in claiming early means that the return to delaying claiming by one year is 11% (1/0.9-1), a real-indexed safe return which is higher than what most investors can get on similar investments. See for example, `https://www.wsj.com/articles/BL-258B-6976` or `https://financialpost.com/personal-finance/retirement/why-you-should-wait-until-you-are-70-to-collect-cpp-benefits`.

[2] DB pension coverage statistics from Table 11-10-0016-01 of Statistics Canada.

2000s. There has been a slow decline in recent years to about 30%.

Figure 1: Fraction claiming CPP (QPP) at Age 60



Notes: Data from the Longitudinal Administrative Database (LAD), 1982-2018.

Similar behavior is observed in other countries, in particular the United States (Shoven and Slavov, 2014). Because delaying claiming is akin to purchasing a deferred annuity, one sacrifies current benefit (the price) for an increase in future benefit (the annuity), the same reasons that explain the low take-up of life annuities can be invoked to explain early claiming (Benartzi et al., 2011). While some general results hold that full annuitization should be preferred to self-managing longevity risk in retirement (Davidoff et al., 2005), there are perfectly rational reasons to claim early once a host of other factors are taken into account.

One of the key factors is longevity. Actuarial penalties set by CPP reflect mortality prospects of the average retiree. However, remaining life expectancy at retirement is distributed very unequally across socio-economic groups. Milligan and Schirle (2021) document that men in the top ventile of the income distribution live on average 8 more years (4 more years for women). Lacroix et al. (2021) estimate that college education increases life expectancy by more than 4 years. The shorter the retirement years, the lower is the present value of (discounted) benefit payoffs. Those in poor health, or expecting to not to live to a very old age could be better off by claiming early.

The optimal claiming age will depend on, *inter alia*, current and future income, taxes, financial wealth, and preferences, in particular when liquidity constraints are present (Maurer et al., 2018). It could be optimal for those who are liquidity constrained, or face tax incentives that lower the benefit of delaying, to claim as early as possible.

Another set of reasons why retirees claim early has to do with the difficulty of evaluating deferred annuities implied by delayed claiming. Research has shown that individuals who focus on the investment aspect rather than consumption value of annuities are less willing to buy annuities(Brown et al., 2008), lack financial literacy (Kaiser et al., 2022), are sensitive to framing of such choices (Brown et al., 2017) and potentially misperceive longevity risk (Hurd et al., 2004).

Depending on the mix of underlying reasons for early claiming, the effectiveness and desirability of various interventions may vary. The evidence however points to sticky behavior. Even when the reward for delayed claiming is increased, early claiming appears to be somewhat insensitive. For example, Lalive et al. (2023) show in the context of of a Swiss reform that workers react little to strong penalties for early claiming. Similar evidence is reported by Gorry et al. (2022). Manoli and Weber (2016) present evidence for Austria that the elasticity of labor market participation to financial incentives ranges between 0.1 and 0.3. Others find larger responsiveness. For example, Liebman et al. (2009) reports larger effects on retirement and hours worked in the United States.[3] There is limited evidence that education or information works to incentivize delays in claiming. Mastrobuoni (2011) finds positive effect of the introduction of the Social Security statement in the U.S. on pension benefit knowledge but no effect on retirement (and claiming) behavior. The introduction

[3]An extensive literature exist estimating the effect of financial incentives in retirement using cross-sectional variation in incentives. See Lumsdaine and Mitchell (1999) for a review of this work. Different forms of financial incentives may impact claiming decisions. Maurer et al. (2021) explore the possibility of offering lump-sums when participants delay and find evidence of increased delays.

of the statement also does not seem to impact how individuals react to financial incentives. However, Liebman and Luttmer (2015) find evidence that workers are willing to work longer (in terms of expectations) once they learn more about how the earnings test, a measure that penalizes work while receiving benefits, works. There is some evidence that framing can incentivize delays. Lalive et al. (2023) and Gruber et al. (2022) show that a change in the full retirement age, without changing penalties or keeping low ones for early claiming generates a substantial amount of delays in claiming. Similarly, Mastrobuoni (2009) and Behaghel and Blau (2012) report that the claiming hazard peak at the normal retirement age moved in lockstep with the increases in the normal retirement age witnessed in recent decades in the United States. Consistent with the evidence from the U.S., Seibold (2021) exploits reference dependence in the German pension system and finds evidence that individuals are sensitive to reference points. While effectiveness of a policy intervention is certainly important, the reward from delaying claiming may be quite heterogeneous across individuals and interventions. An intervention could for instance incentive delays for individuals for whom it was optimal to claim early. While such an intervention might be effective, it may not be desirable, when for example evaluated against what economic theory prescribes.

In this paper, we aim to understand the response of Canadians to various interventions that can be used to delay claiming. We start in Section 2 by investigating how sensitive Canadians nearing retirement are to the financial incentives embedded in the Canada Pension Plan (and Québec Pension Plan). These financial incentives changed in the early 2010s, therefore providing a natural experiment for estimating how claiming responds to these incentives.

To investigate other policy tools that can incentivize delays, in particular education (information) and framing, we designed and fielded a survey with a large sample of Canadians nearing retirement. We describe the experiment in Section 3. We also assessed in the same experiment the sensitivity of claiming to financial incentives with the objective of understanding the effects estimated from the natural experiment. Since we randomize these interventions and have extensive control over the choice set faced by these respondents, we are able to investigate heterogeneity in responses. We discuss results in Section 4.

In Section 5, we re-interpret these effects in terms of whether or not they improve the financial loss respondents make from not picking the claiming age with the highest present discounted value of pension benefits given their longevity. We use a detailed microsimulation model of health to create individual-specific survival rates as a benchmark for the optimal claiming age. Finally, we conclude in Section 6.

2 Changes in Financial Incentives: Quasi-Experimental Evidence

Until 2011, individuals could claim a Canada and Québec Pension Plan (CPP and QPP, respectively) retirement pension at any age between 60 and 70, subject to a penalty and a bonus of 6% per year of claiming before and after age 65.[4] For example, a person claiming at age 60 would receive a pension that was 30% lower than at age 65. In contrast, a person claiming at age 70 would receive a pension that was 30% higher than at age 65. In an attempt to strengthen incentives for claiming and retiring later, a CPP lead pension reform in 2010 increased the penalty and the bonus for early and late claiming. Notably, the changes were implemented gradually and differently in the CPP and the QPP, creating independent variation in pension adjustment factors (PAFs) across time

[4]The Canadian retirement income system has three pillars. The first pillar offers a fixed benefit starting at 65 (based on the number of years in Canada), which is means-tested against other pension income. A supplement is also paid to those with low pension income, but it is means-tested at a high rate. The second pillar is the CPP and QPP (in Québec), a scheme similar to Social Security in the United States. At age 65, the program replaces 25% of a measure of lifetime earnings up to a maximum, set closely to average earnings. The replacement rate from this program therefore declines rapidly with earnings. Contributions are split equally between employers and workers. Workers can claim as early as 60 and as late as 70. There is a malus for claiming early and a bonus for claiming after age 65. In 2016, the CPP introduced a new top-up, increasing the replacement to 33% and the maximum earnings admissible for contributions in the coming decades. The last pillar comprises defined benefit and defined contribution employer-provided pensions. Several voluntary savings programs, often with tax-preferred treatment, complete the system.

and pension plans.

Table 1 illustrates the variation in PAFs. Between 2012 and 2016, the CPP increased the early claiming penalty in five steps from 6 to 7.2% per year of claiming before age 65. The QPP increased the early claiming penalty by the same amount but did so in only three increments starting in 2014. Moreover, the new penalties were lower for people with a pension below the maximum pension. For example, after being fully phased in, a person with a pension half the maximum pension would incur an early claiming penalty of 6.6% per year instead of 7.2%. Moreover, the reform increased the bonus of delaying claiming after age 65 from 6 to 8.4% per year, equivalent to a 12% benefit increase for someone who claims at age 70. The timing of the increase again differed across the two plans. The CPP increased the bonus in three steps between 2011 and 2013, while the QPP increased it in a single step in 2013.

Table 1: Pension Adjustment Factors per Year of Claiming Before/After Age 65 (%)

Year	Penalty Pre-65		Bonus Post-65	
	CPP	QPP	CPP	QPP
< 2011	6	6	6	6
2011	6	6	6.84	6
2012	6.24	6	7.68	6
2013	6.48	6	8.4	8.4
2014	6.72	$6 + 0.36 \cdot (b/b^{\max})^{*}$	8.4	8.4
2015	6.96	$6 + 0.72 \cdot (b/b^{\max})^{*}$	8.4	8.4
≥ 2016	7.20	$6 + 1.2 \cdot (b/b^{\max})^{*}$	8.4	8.4

Notes: * Individuals born before 1954 are exempt from these changes; b is the potential QPP pension at age 65 and b^{max} is the maximal QPP pension at age 65.

The CPP reform implemented one additional change that could matter for our analysis. Before 2012 individuals who claimed a CPP pension before age 65 had to earn less than the maximum monthly benefit ($960 in 2011) in the month before and the month of the first benefit payment. The CPP abolished this work cessation test on January 1, 2012, which could affect older workers' retirement and pension claiming decisions. The QPP abolished the work cessation test only two years later in 2014.

Data and Sample. Our empirical analysis relies on the Longitudinal Administrative Database (LAD), a representative panel of 20% of Canadian tax filers from 1982 to 2018. The LAD is ideal for our analysis for two reasons. First, it contains detailed information on all the variables we need for our analysis: demographics, earnings, and transfers, including public pensions. Second, an individual's potential pension benefits, an essential variable in our analysis, depend on lifetime earnings. Since the LAD follows individuals for 35 years, we observe earnings for almost their entire working life, enabling us to calculate an individual's potential pension with great precision.[5]

Our main analysis sample covers all individuals born between 1935 and 1958, ensuring that we can observe them at least until age 60 when most claim their pension. We do not consider individuals born before 1935 because earlier cohorts could benefit from a reduction in the early claiming age from age 65 to age 60 (Staubli and Zhao, 2022). We extract the entire labor market histories for the individuals in our sample from the first age they are observed in the data until age 70—the last age somebody can claim a CPP or QPP pension. The only restriction we impose is to drop individuals who never earn more than \$3,500 per year before age 60. Each year in which an individual earns \$3,500 or more counts as a contribution year. Only individuals with at least one contribution year are eligible for a CPP/QPP pension.[6]

Appendix A.1 describes the steps for the calculation of an individual's potential pension at each age. The level of the pension increases with the total lifetime earnings and the number of contribution years between age 18 and the pension claiming age. We can use the earnings information in the LAD to calculate total lifetime earnings and the number of

[5]Tax data does not distinguish the type of benefit claimed while we focus our analysis on the retiree benefit. Hence, some of those we identify as claiming a retiree benefit may in fact be receiving other benefits. One that is relevant in this age range is the survivor benefit. However, the incidence of those type of benefits is relatively low, even at these ages.

[6]Appendix Table A.1 provides summary statistics of our analysis sample, separately for Québec and the rest of Canada before and after the 2011 reform.

contribution years. We then calculate potential pension benefits using the pension formula. To verify the accuracy of our calculation, Appendix Figure A.1 plots the mean matched pension benefits against mean predicted pension benefits. The figure shows that actual pension benefits track the predicted pension benefits very closely.

2.1 Empirical Strategy

Our empirical strategy exploits the exogenous variation in PAF induced by the 2010 reform to estimate the causal effect of pension benefit generosity on pension claiming. Our baseline regression is as follows:

$$Y_{i,a,p,t} = \beta_0 + \beta_1 PDV_{i,a,p,t} + \beta_2 ACC_{i,a,p,t} + \theta_t + \pi_p + \lambda_a + \mathbf{X}'_{i,a,p,t}\gamma + \varepsilon_{i,a,p,t} \tag{1}$$

where i is individual, a is age in years, p is province, t is year, and PDV is the expected present discounted value of pension benefits. It is defined as

$$PDV_{i,a,p,t} = \sum_{k=60}^{T=110} \beta^{k-60} s_{k,p} B_{i,a,p,t} \mathbf{1}(k \geq a)$$

where $\beta = 0.97$ is the discount factor, $s_{k,p,t}$ is the probability of being alive at age k conditional on being alive at age 60, and B_a is the annual pension at claiming age a (which we calculate following the steps described in Appendix A.1). ACC is the pension accrual, which captures the change in the PDV from delaying claiming by one year, i.e. $ACC_a = PDV_{a+1} - PDV_a$.[7] In the baseline specification, we control for year fixed effects (θ_t), province fixed effects (π_p), and age fixed effects (λ_a) to capture the spikes in the claiming hazard at the early and normal retirement age. In additional specifications, we also include background characteristics (X_{iapt}).[8]. Specification (1) is similar to those in previous studies (e.g., Gruber and Wise, 1998, Coile and Gruber, 2007), but we use plausibly exogenous

[7]Appendix Figure A.2 illustrates the ACC distribution by age for Québec Pension Plan and the rest of Canada before and after the 2011 reform.

[8]Dummies for marital status and gender, tax-deductible medical expenditures as a proxy for health, a fourth-order in last earnings, and a fourth-order polynomial in lifetime earnings

variation in benefit levels while previous studies mostly relied on cross-sectional variation which could be correlated with unobserved factors.

Our main outcome variable y is a dummy for whether an individual claims a CPP or QPP pension at age a, in province p, and year t. Our main parameter of interest is β_2, which captures the effect of financial incentives to delay (accrual). By delaying claiming one year, individuals forgo one year of benefits, but they also buy an option to get higher pension benefits in all future years. The higher the PAF, the larger the financial gains from delaying claiming by one year. Thus, we expect that $\beta_2 < 0$: the higher the accrual, the less likely an individual is to claim a pension. In contrast, β_1 captures the wealth effects of pensions: higher pension wealth will likely induce individuals to claim their pension earlier. For better comparability, we convert the β_2-estimate into an elasticity $\varepsilon = \beta_2 \frac{\overline{ACC}}{\overline{y}}$ where $\overline{ACC}$ and $\overline{y}$ are sample means.

The identifying assumption is that, absent the reform-induced change in the PAFs, trends in $Y_{i,a,p,t}$ would have been the same in Québec and the Rest of Canada. We explore the validity of this assumption by testing whether key outcomes follow the same trends in the pre-reform period. One concern is that the CPP and QPP abolished the work cessation test in 2012 and 2014, respectively, which could impact benefit claiming independent of the change in $PAFs$. To account for these changes, we run one specification with two additional interaction terms: a dummy for the Rest of Canada times a dummy for the year being greater than 2012 and a dummy for Québec times a dummy for the year being greater than 2014.

As another robustness check, we run a specification that includes the pre-reform ACC and PDV as additional controls. Variation in the ACC and the PDV stem from both exogenous changes induced by the 2010 reform and individual characteristics. Specifically, the ACC and PDV are nonlinear functions of past earnings and the claiming decision could be correlated with past earnings, leading to biased estimates even after controlling for past earnings. As Nielsen et al. (2010), Mullen and Staubli (2016), and Fevang et al.

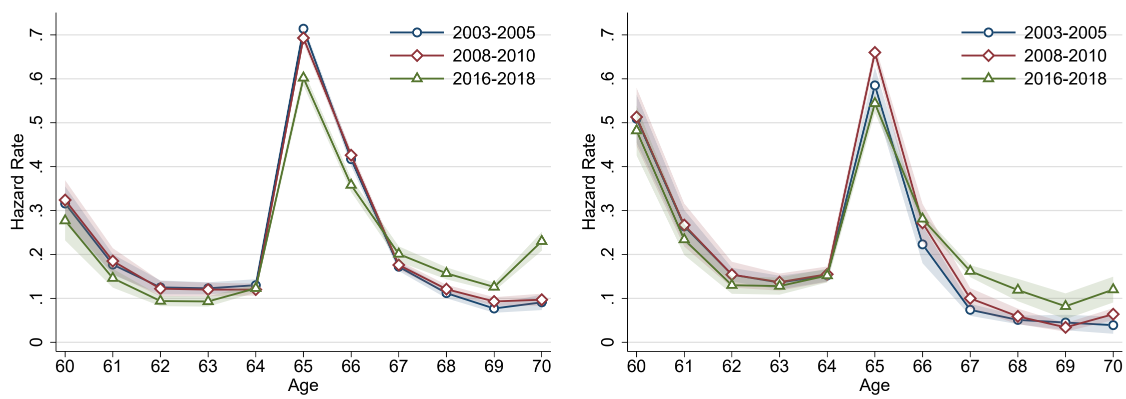
(2017) show in other contexts, conditioning on the pre-reform ACC and PDV guarantees that the actual ACC and PDV isolate the exogenous variation from the reform.

2.2 Results

We start our analysis by comparing the age profile of the claiming hazard in the rest of Canada and Québec across different years. This descriptive analysis illustrates distributional changes in claiming. Our regression analysis compresses these changes into a single claiming hazard estimate. Figure 2 shows that the claiming hazard age profiles are very similar in the pre-reform years (2003-2005 and 2008-2010). As in other countries, the claiming hazard shows large peaks at the early retirement age of 60 and the full retirement age of 65. About 30 percent of people in the rest of Canada claim their pension at the early retirement age. The share of people claiming at age 60 is even higher in Québec, about 50 percent.

Figure 2: Claiming Hazard by Age and Year for ROC and Québec

(a) Rest of Canada (b) Québec



The claiming hazard for post-reform years shows that the change in PAF induced individuals to delay pension claiming. The post-reform claiming hazard drops at each age between 60 and 64, consistent with the reform raising the penalty for claiming a pension before age 65. The claiming hazard at age 65 also drops, suggesting that some people who would have claimed at age 65 before the reform now take advantage of the higher bonus for claiming after age 65. Consistent with more people delaying claiming, we see that the post-reform claiming hazard is higher after age 65, both in the rest of Canada and Québec.

Table 2: Main Estimates for Pension Claiming Hazard

	(1)	(2)	(3)	(4)	(5)	(6)
ACC	-0.331***	-0.829***	-0.826***	-0.818***	-0.746***	-0.902***
	(0.097)	(0.083)	(0.08)	(0.083)	(0.074)	(0.106)
PDV	0.066***	0.116***	0.116***	0.116***	0.113***	0.121***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.038)
ACC elasticity	-0.045***	-0.114***	-0.113***	-0.112***	-0.102***	-0.123***
	(0.013)	(0.011)	(0.011)	(0.011)	(0.01)	(0.015)
SES controls	NO	YES	YES	YES	YES	YES
Age×QUE FE	NO	NO	YES	YES	YES	YES
ROC×2012	NO	NO	NO	YES	YES	YES
QUE×2014	NO	NO	NO	NO	YES	YES
Pre-2011 incentives	NO	NO	NO	NO	NO	YES
No. Obs.	4,551,390	4,551,390	4,551,390	4,551,390	4,551,390	4,551,390
R^2	0.136	0.148	0.155	0.155	0.155	0.155

Notes: The table reports estimates from linear regression models where the dependent variable is the hazard of claiming (=1 if claims at age a and zero if not). The variables ACC and PDV are reported in hundred thousand dollars. The elasticity is computed at the mean of the claiming hazard and ACC. Specification 1 includes year, province, and age fixed effects. Specification 2 adds controls for health, gender, marital status, number of kids, lifetime earnings, and last earnings. Specification 3 adds Québec times age fixed effects. Specification 4 adds a Post 2012 times ROC dummy. Specification 5 adds a Post 2014 times Québec dummy. Finally, specification 7 adds controls for the pre-2011 ACC and PDV. Standard errors are clustered at census division level. *** p<0.01, ** p<0.05, * p<0.1

Table 2 presents the estimates from equation (1) for different specifications. The outcome variable is always a dummy for pension claiming. Since we drop individuals from the sample after they claim, the coefficient estimates capture the impact on the claiming hazard. Across all specifications, we find robust evidence that financial incentives influence the timing of pension claiming. The estimates are statistically significant and quantitatively similar, except for the baseline specification in column 1 where they are about half as large. Our preferred specification is column 5 which flexibly controls for background characteristics and for abolishing the work cessation test in 2012 in ROC and 2014 in Québec. It suggests that a $100,000 increase in the ACC reduces the claiming hazard by 0.746%, while a $100,000 increase in the PDV raises the claiming hazard by 0.113%. Multiplying the ACC estimate with the average ACC and dividing by the average claiming hazard implies an elasticity of -0.102. This estimate is also robust to including the pre-reform ACC and PDV as additional controls, as column 6 shows.

While not the focus of our analysis, Appendix Figure A.3 shows the age profile of the retirement hazard in the rest of Canada and Québec across different years. Appendix Table A.2 present the corresponding retirement hazard estimates from equation (1). Retirement is a dummy for the last age an individual has positive earnings. The figure illustrates that retirement hazards change little across year, suggesting that the impact of public pensions on the timing of retirement is small. Consistent with this view, Appendix Table A.2 shows that the elasticity of the retirement hazard with respect to the ACC is about half as large as the corresponding elasticity for the claiming hazard. Moreover, the elasticity becomes insignificant once we control for the pre-reform ACC and PDV.

The identifying assumption of our empirical strategy is that, absent the policy reform, trends in the outcome variables would have evolved in parallel in Québec and the rest of Canada. To shed light on its validity, we estimate a variant of equation 1 that replaces ACC and PDV with interaction terms of a Québec dummy times a year dummy, spanning the years 2005 to 2018 (the reference period are the years before 2005). Appendix Figure A.4 plots the estimated interaction term coefficients for the ACC, the pension claiming hazard, and the retirement hazard.

For all outcomes, the coefficient estimates for the pre-reform years (2005-2010) are close to zero and statistically insignificant, providing strong support for the validity of the identifying assumption. Panel a shows that the ACC differs significantly between Québec and the rest of Canada during the post-reform years. The sign and magnitude of the estimates align with the reform-induced differences in PAFs. Panel b shows that the claiming hazard also starts to diverge between Québec and the rest of Canada during the post-reform years. The estimates are almost the mirror image of the *ACC* estimates: the claiming hazard estimates are negative and large when the *ACC* estimates are positive and large, and vice versa. In contrast, panel c shows that retirement hazard differs little during the post-reform years between Québec and the rest of Canada, consistent with the small elasticities of the retirement hazard with respect to the *ACC* (Appendix Table A.2).

We also explore the heterogeneity in the responsiveness across different subgroups of the population. Table 3 reports the corresponding ACC elasticity estimates. We find that individuals with above median average lifetime earnings are significantly more responsive than those with below lifetime earnings. Similarly, individuals with above-median pension benefits respond more strongly to financial incentives than those with below-median pensions. One explanation is that liquidity constraints force individuals with below-median earnings and pensions to claim the pension as early as possible, independent of financial penalties. We also find that men and single individuals are more responsive than women and married individuals but the differences are small. Finally, we find that healthy individuals (those with below-median tax-deductible medical expenditures) and individuals without a DB pension plan are significantly more responsive than unhealthy individuals and those with a DB pension plan.

3 The Stated-Choice Experiment

We fielded a survey experiment on pension claiming in November 2019 using the online survey panel *Asking Canadians*. We targeted participants from all Canadian provinces aged 55 to 59. Overall, 3,055 respondents completed the survey.[9] We first provide an overview of the survey structure before presenting each component in more detail.

[9]Each respondent is compensated for his/her participation in the survey. Compensation is paid by the survey organization using loyalty points at major Canadian outlets for participating in the panel.

Table 3: Heterogeneity Estimates for Pension Claiming Hazard

	No		Yes		Equality
	ACC elasticity	SE	*ACC* elasticity	SE	p-value
	(1)	(2)	(3)	(4)	(5)
High Avg. Earnings	-0.036***	(0.006)	-0.126***	(0.013)	0.000
High Pension	-0.064***	(0.009)	-0.123***	(0.012)	0.000
Female	-0.087***	(0.009)	-0.114***	(0.012)	0.000
Married	-0.121***	(0.014)	-0.096***	(0.010)	0.001
Health Problems	-0.131***	(0.011)	-0.048***	(0.012)	0.000
Has a DB Plan	-0.138***	(0.011)	-0.073***	(0.011)	0.000

Notes: The table reports estimates from a linear regression model, corresponding to specification 5 in table 2. The dependent variable is the hazard of claiming (=1 if claims at age a and zero if not). The elasticity is computed at the mean of the claiming hazard and ACC. The p-value for the test statistic testing the equality of the elasticities is also reported. Standard errors are clustered at census division level. *** p<0.01, ** p<0.05, * p<0.1

Our survey consists of two parts. In the first part, we elicit individuals' socioeconomic characteristics, preferences, and expectations about longevity, health status, etc. Health status in important because we latter make use of such data to construct *personalized* survival risk using a microsimulation model. We also elicit the age at which respondents plan to claim their pension and reasons that could have helped shape this decision (e.g., advice received, claiming behavior of friends or family, etc.). In the second part, we elicit choices in hypothetical choice scenarios where the respondent has to decide on a claiming age. Table 4 summarizes the different parts of the survey and their purpose.[10]

3.1 Description of Scenarios

We design seven hypothetical choice scenarios that introduce variation in financial incentives andframing of the pension claiming decision. This within design also allows us to implement an education intervention with a difference-in-difference design, i.e. we observe choices before and after the intervention for those treated and for those in the control

[10]We reproduce the questionnaire in Appendix C).

Table 4: Different Elements of Survey and Experimental Design

Steps	Content	Purpose
1	General demographic and financial questions	Gather information on personal circumstances and expected claiming age
2	Baseline claiming scenario	Elicit claiming age in a scenario with current incentive structure
3	Education Treatment	Provide a heuristic to help with decision making
4	Five scenarios varying incentive structure (see Table 5)	Estimate sensitivity to financial incentives
5	One scenario with framing	Estimate framing effects

group.

Each scenario presents participants with information about their expected retirement benefits at different ages under a set of personalized assumptions. Respondents then decide on a claiming age between 60 to 70, the current choices available under CPP and QPP. We reproduce below the specific wording used in the survey (terms in square brackets are respondent-specific):

> "When you turn 60, you will have to decide whether to claim your CPP [11] benefits. Assume your current plan is to retire completely at age [RETAGE], and that until that age, your yearly earnings will be [EARN] if you work.[12] Assume you have [WLTH] in retirement savings, which earn an annual return of [R], and which are not taxed if you choose to withdraw them.
>
> At age 60, you will receive a statement from Services Canada[13] regarding your CPP benefits if you claim at different ages between 60 and 70. These benefits are net of taxes and have no effect on your other pension benefits. Importantly, these benefits protect you against inflation and will be paid no matter

[11] CPP stands for Canada Pension Plan and was replaced by QPP (Québec Pension Plan) if the respondent resided in Québec

[12] This phrase is omitted for respondents that are already retired.

[13] "Retraite Québec" if the respondent resided in Québec

what. Suppose the statement includes the following information regarding the monthly benefit you can get if you claim at different ages: "

The statement is followed by a table that shows the pension benefits that would be paid at different claiming ages between 60 and 70.

[RETAGE] is a respondent's expected retirement age, as indicated earlier in the survey. The retirement age is the age at which he or she intends to stop working completely. [EARN] is a respondent's yearly labour earnings.[14] We use the CPP replacement rate of 25% from current earnings to approximate CPP benefits. The benefit amount does not necessarily represent what respondents will receive in real life but provides scenarios closer to personal circumstances of respondents. Financial wealth [WLTH] is computed as the sum of individual retirement savings, consisting of individual retirement accounts and savings in a defined contribution pension plan. Lastly, [R] is the rate of return on financial wealth that was shown to respondents. This rate is randomized for each scenario and is either 5% or 2% with equal probability. The higher the rate, the less likely respondents should be willing to delay claiming since the opportunity cost of funds used to finance consumption in the year when benefits are not paid is higher. We specify that benefits are net of taxes to avoid that respondents think about complicated tax implications.

Scenario 1: Baseline. Scenario 1 is our baseline scenario and uses claiming penalties and bonuses that individuals face currently with CPP and QPP. Specifically, claiming before age 65 reduces the pension by 7.2% per year and delaying after age 65 increases the pension by 8.4% per year, up to a maximum of 42% for claiming at 70.

Education Treatments: Break-Even Age and Longevity Risk. After participants answer the baseline scenario, we randomize them, with equal probabilities, into one of two education treatments or a control group with no treatment. The first treatment informs

[14] We use $12,000 for respondents who do not provide an exact number nor respond to the bracketing questions, and for respondents who report earnings below $12,000—the minimum earnings for receiving a pension.

respondents about the break-even age, a decision tool private sector financial advisors and public pension representatives often use to help people think about the claiming decision. Suppose a 65 year-old earns $1,000 more annually by delaying claiming by one year and forgoes $10,000 in benefits this year by delaying. The break-even age in this case is 75, because it will take 10 years to recoup the lost benefits. The break-even age does not take into account discounting. Using this rule, people who think they will live past 75, should delay claiming and vice versa.

Previous studies find that presenting individuals with a break-even age induces earlier claiming, because it makes delayed claiming seem risky: delaying claiming appears to be a bet on a long life. Brown et al. (2016), for example, contrast the average claiming age under a symmetric frame and a break-even frame. They find that the break-even frame induces people to claim about 15 months earlier than the symmetric frame. We differ from Brown et al. (2016) in presenting an education treatment rather than expressing scenarios in terms of a break-even age. The education treatment graphically shows the cumulative pension benefit at different claiming ages for a few hypothetical persons. The cumulative pension benefits are simply linear functions with different slopes and intercept. The education treatment then proceed to explain that the age at which these lines cross defines the break-even age (see Appendix C), and reports the average life expectancy of a 60 year-old Canadian according to projections by Statistics Canada. Another important difference with Brown et al. (2016) is that we do not report the break-even age for the scenarios we present to respondents. Rather, we inform them about this rule they could use.

The second treatment primes respondents to think about longevity risk in terms of consumption. To test whether emphasizing the insurance benefit of delaying pension claiming, we design a treatment that informs individuals about the risks of outliving their savings. Moreover, the treatment informs respondents that those who expect to live long might benefit from delaying claiming. We also provide respondents with a gender-specific table with likelihoods to live to ages 65 to 90 (in 5 year increments). While the break-even age should induce earlier claiming as the salient risk is "Will I live to the break-even age?", emphasizing the insurance aspect should induce *later* claiming as the salient risk is "Will I have enough income to finance consumption in old age?". Thinking about the claiming decision in terms of consumption insurance is related to the consequence messaging in the annuity context by Brown et al. (2021). They find that people are better at valuing an annuity if they think about the impact of the annuity on future consumption streams.

Scenario 2-6: Varying Financial Incentives. Following the education intervention (the baseline scenario for respondents in the control group), we present five financial scenarios. The order in which we show those scenarios is randomized. They are identical to the baseline scenario except that we vary the pension adjustment factors (PAF) to elicit the elasticity of the claiming age with respect to financial incentives. Table 5 shows the adjustment rates for each scenario, including those in the baseline scenario which are the PAFs currently in use.

Table 5: Pension Adjustment Factors (PAF)

Scenario	Bonus (in %)	Malus (in %)
1 (Baseline)	7.2	8.4
2	2.2	3.4
3	5.2	6.4
4	8.2	9.4
5	11.2	12.4
6	14.2	15.4

Notes: The table reports pension adjustment factors we use in hypothetical scenarios 1 to 6. The order of scenarios 2-6 is randomized.

Scenario 7: Varying Framing. In the last scenario, we use the adjustment factors from the baseline scenario but add a sentence that frames the claiming decision in a specific way. For each respondent, we randomly draw one of five frames that vary along three dimensions: Frequency of pension payments (monthly versus annually), gain frame versus loss frame, and the reference age (65 or 67). We only use a handful of possible combinations of the three dimensions to make sure we have sufficient statistical power. Table 12 summarizes the frames we use in the survey.

We vary the payment frequency to analyze if salience plays a role, as the difference in pension amounts is more pronounced when reported annually. We include the gain and loss frames because of the well-documented phenomenon of loss aversion, though Brown et al. (2016) find in the context of pension claiming that reporting gains instead of losses actually delays claiming. In frame 1, we add the following text to the baseline scenario to frame claiming as a loss: "For example, claiming at age 60 instead of age 65 will result in a $[X] reduction in your monthly benefit for your remaining lifetime." We use similar wording for the other loss frames but replace age 65 with age 67 (frame 2) and monthly with annual (frame 4). In contrast, for frame 3 we add the following text to frame claiming as a gain: "For example, claiming at age 65 instead of age 60 will result in a $[X] increase in your monthly benefit for your remaining lifetime." We use the same text in frame 6 but replace monthly with annual.

Finally, we vary the reference age. Recent evidence suggests that individuals have a strong tendency to claim at focal ages like the full retirement age, which cannot be explained by financial incentives (Seibold, 2021; Gruber et al., 2022; Lalive et al., 2023). Individuals could see this reference age as an "endorsement" by the pension administration or as a social norm. Frames 1 and 3-5 anchor the reference age at 65, while frame 2 anchors the reference age at 67.

3.2 Calculating Financial Incentive Measures

To measure the financial incentives at different claiming ages, we first need to compute a respondent's pension amount at each hypothetical claiming age. The amount of pension payments depends on the pensionable earnings, which we specify in the scenario description, and the pension adjustment factors, which vary across scenarios. The formula for the

Table 6: Frames

Frame	Frequency	Gain or Loss	Reference point
1	Monthly	Loss	65
2	Monthly	Loss	67
3	Monthly	Gain	65
4	Annual	Loss	65
5	Annual	Gain	65

Notes: The table shows the dimensions across which we vary the framing of the pension claiming decision. Each participant is randomly assigned to one of these frames.

annual pension in the context of our experiment is as follows:

$$B_{i,j,a} = 0.25W_i \cdot [1 + (a - 65) \cdot PAF_{j,a}], \tag{2}$$

where $B_{i,j,a}$ is the pension payment for an individual in scenario j claiming at age a; W_i are the earnings of individual i (subject to the CPP and QPP cap) and $PAF_{j,a}$ is the pension adjustment factor that depends on the hypothetical scenario j and the claiming age a.

In a second step, we compute a respondent's expected presented discounted value (PDV) of pension payments and the pension accrual (ACC) for each hypothetical claiming age in each scenario. Specifically, the present value of discounted pension payments at age 60 of respondent i in scenario j who claims at age a is

$$PDV_{i,j,a} = \sum_{k=60}^{110} \beta^{-(k-60)} s_{i,k} B_{i,j,a} \mathbf{1}(k \geq a), \tag{3}$$

where $s_{i,k}$ denotes individual i's probability of surviving to age k. We use the discount rate that is presented in the scenario description: 2% or 5% with equal probability so that $\beta = 1.02$ or $\beta = 1.05$.

Because we are concerned with how respondents perceive financial incentives, we use subjective probabilities to compute the present discounted values. Later, we compute alternative present discount values using *objective* survival risk produced by a microsimulation model of health dynamics. The survey asks each respondent about subjective probabilities of surviving to age 70, age 80, and age 90. We use a minimim distance estimator to find (subjective) Gompertz hazard parameters for each respondents. We then use those parameters to generate survival probabilities at each age. [15]. Hence, beyond variation across scenarios in PAFs, discount rates and earnings, the PDV estimates vary across respondents because of heterogeneous beliefs about survival.

The corresponding one-year accrual for scenario j and claiming age a is $ACC_{i,j,a} = PDV_{i,j,a+1} - PDV_{i,j,a}$. We use the one-year accrual in our econometric model to capture the financial incentives for delaying claiming. Since the incentives in Canada's public pension plans are monotonic, using one-year accruals or option value calculations (e.g., Coile and Gruber, 2007) would yield similar results in terms of the value of postponing claiming.

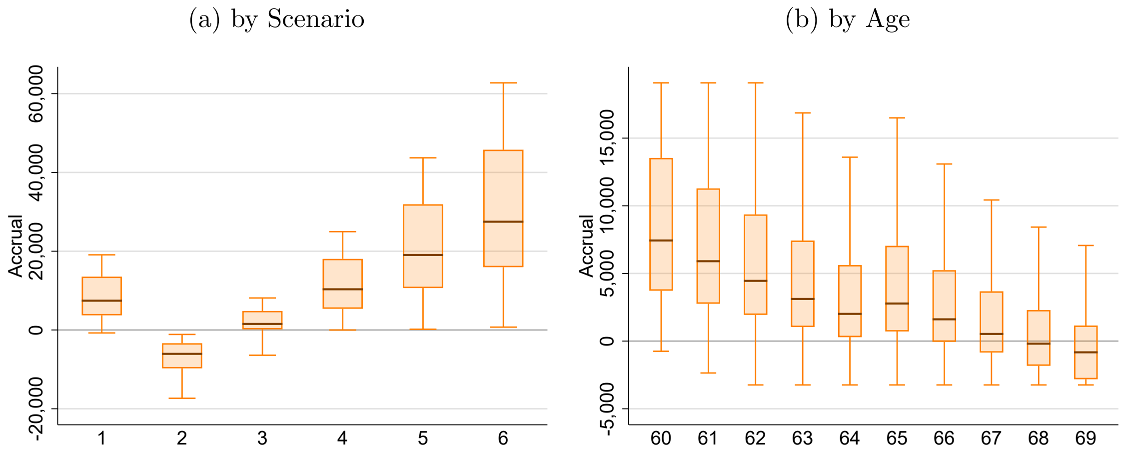
Figure 4 reports the accrual distribution at age 60 by scenario (panel a) and by age for scenario 1 (panel b). Three findings emerge. First, accruals at a given age in a given scenario vary considerably across respondents because of heterogeneity in survival risk and discount rates. Second, accruals vary significantly across scenarios because of the variation in pension adjustment factors. We use this variation to identify the impact of financial incentives on pension claiming. Third, pension accruals are generally positive at younger ages but decline with age. Most respondents in scenario 1 start experiencing negative accruals at around 68, but some do as early as age 60.

3.3 Representativeness of Survey and Descriptive Evidence

This section provides descriptive evidence that our survey is representative for the Canadian population, the assignment of respondents into treatment and control groups is random, and the scenarios impact respondents' claiming age.

[15]See Appendix B.1 for details on how we estimate subjective survival probabilities

Figure 3: Pension Accruals by Scenario and Age.



Notes: Panel a reports the pension accrual distribution by scenarios at age 60. Panel b shows the distribution of pension accruals by age for scenario 1. Pension accruals are computed using subjective mortality risk. The top and bottom whiskers of the box plots are 5th and 95th percentiles.

Representativeness and Validity of Experiment. Table 7 reports the mean and standard deviation for 55-59 year-olds in the 2016 Canadian census (column "Population") and our survey sample (column "Sample"). We also present the difference in means in each treatment arm relative to the control group (columns "Insurance arm" and "Break-Even arm"). Our survey data is weighed by gender, education, and region using census data.

The first two columns show that the survey is representative of the overall population in terms of gender and education, the variables we use for weighting. [16] Panel B shows that survey respondents tend to have higher incomes, savings in an RRSP (a tax deferred individual account similar to Keogh IRAs), and savings in a TFSA (a pre-tax savings account similar to Roth IRA) than the overall population but the standard deviation of these variables is also high.

The last two columns show that respondents in the two treatment arms do not differ sig-

[16] We do not report summary statistics for age in the population, because the public-use census only reports the age group (e.g., 55-59).

Table 7: Summary Statistics

	Mean (Std. Dev.)		Diff. Control (Std. Err.)	
	Population	Sample	Insurance	Break-Even
A. Demographics				
Age		57.10	0.05	0.01
		(1.39)	(0.06)	(0.06)
Female (%)	51.06	51.09	1.72	0.99
			(2.20)	(2.22)
Married/Common-Law (%)	71.92	67.13	1.13	2.14
			(2.06)	(2.08)
Widowed/Separated/Divorced (%)	17.08	17.81	0.68	0.18
			(1.65)	(1.65)
Never Married (%)	11.01	15.06	-1.81	-2.32
			(1.60)	(1.61)
HS and less	43.43	43.86	1.18	0.64
			(1.83)	(1.84)
HS but no Univ.	35.83	36.17	1.80	-0.54
			(2.19)	(2.20)
University	19.77	19.97	-2.97	-0.10
			(2.10)	(2.15)
B. Income and Savings				
Income ($1,000)	61.89	75.05	-4.31	-0.01
	(77.21)	(96.11)	(5.16)	(6.94)
Has RRSP (%)		69.73	-2.29	-0.18
			(1.94)	(1.94)
RRSP Amount ($1,000)	107.71	184.53	-13.83	-3.89
	(170.37)	(295.00)	(16.59)	(16.01)
Has TFSA (%)		55.63	-3.98*	-2.51
			(2.15)	(2.17)
TFSA Amount ($1,000)	19.47	58.20	-6.57	-7.23
	(29.25)	(113.45)	(7.79)	(7.96)

Note: The first two columns report the mean and standard deviation for socio-economic characteristics in the 2016 Canadian census (column "Population") and our survey (column "Sample"). The last two columns report the difference in means between the insurance and break-even treatment group, respectively, relative to the control group. Standard errors are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent level, respectively. Note that we cannot calculate the mean age for the census because we only observe the age group (i.e., 55-59) and not the exact age.

nificantly from respondents in the control group, except for a slightly smaller share of TFSA ownership in the insurance arm. To test more formally for random assignment, we estimate a multinomial logit model for treatment arm assignment on observable characteristics (age, gender, marital status, education, income, wealth, whether the individual has a defined-benefit pension plan, and financial and retirement literacy). A χ^2-test cannot reject the null hypothesis that the characteristics jointly cannot explain assignment to treatment (p-value: 0.7524), providing further evidence that the randomization is adequate.

Correlates with the Expected Claiming Ages. Table 8 presents summary statistics for respondents' socio-economic characteristics, financial and retirement literacy, and preferences. To examine which characteristics correlate with the expected claiming age, we split respondents in three groups: those who plan to claim before age 62, those who plan to claim between age 62 and 64, and those who plan to claim after age 64.

Panel A shows that early claiming before age 62 is a bit higher among females, those with lower education, and those who have already retired (and consequently early claimers have a lower retirement age). In contrast, current age, marital status, and health appear unrelated with the expected claiming age. Moreover, Panel B shows that respondents with lower incomes and those with less savings are also more likely to claim early.

Panel C shows how financial and retirement literacy correlates with the expected claiming age. We measure financial literacy using the number of correct answers to three questions commonly used in the literature: interest, diversification, and inflation (Lusardi and Mitchell, 2014). The results show that individuals with more correct answers are more likely to delay claiming and vice versa. To measure literacy regarding the retirement income system, we use five questions tailored to elicit knowledge of key features of the program. The sum of correct answers, which we label the retirement literacy index, is negatively correlated with the expected claiming age. Moreover, we ask one question that checks if the respondent recognizes that annuitization is optimal in a simple vignette of a fictitious person with an uncertain life time.[17] We do not find evidence that the expected claiming age is associated with a lower or higher level of understanding of annuitization. Overall, the evidence that knowledge explains why some claim early is mixed. While lower financial literacy is associated with early claiming, higher retirement literacy is also associated with earlier claiming.

Finally, we ask respondents a number of questions regarding their preferences. We measure these preferences using their assessment of several statements as indicated on a 4-point Likert scale ("Strongly disagree", "Disagree", "Agree", and "Strongly Agree"). The variable "Live well" refers to the statement "I prefer to live well for fewer years than to live long and have to sacrifice my quality of life". The variable "Spend quick" refers to the statement "I would rather spend down my wealth quickly because I might not be healthy enough to enjoy the money later in life." This questions aims at assessing the degree to which patience and the fear of worsening health induces early claiming. To elicit risk preference, we ask respondents to rate their willingness to take financial risks on a 5-point scale, ranging from "I am willing to take substantial financial risks expecting to earn substantial returns" to "I am not willing to take any risk, knowing I will earn a small but certain return". Risk aversion is one reason individuals might want to claim early if they think of claiming late as a risky bet on a long life.

We report for the variables "Live well" and "Spend quick" a score that ranges from 1 to 4 where higher numbers indicate stronger agreement. For "Risk aversion", we report a score than ranges from 1 to 5 where a higher number indicates higher risk aversion. Those who claim earlier (before 62) tend to be more likely to prefer living well for fewer years than live young. For the other two variables, there is no clear detectable pattern.

Descriptive Evidence on Impact of Financial Incentives, Education, and Framing. Figure 4 provides descriptive evidence on the impact of the stated-choice experi-

[17] See questions Q29 to 33 in the questionnaire in Appendix

Table 8: Expected Claiming Age and Characteristics of Respondents

	Expected Claiming Age		
	Before 62	Between 62 and 64	After 64
A. Demographics			
Age	57.26	57.37	57.08
	(1.37)	(1.34)	(1.42)
Female dummy	0.54	0.52	0.48
HS and less (%)	50.37	42.59	36.37
HS but no Univ. (%)	37.17	39.94	38.02
University (%)	12.47	17.47	25.61
Married/Common-Law (%)	68.71	67.28	67.89
Widowed/Separated/Divorced (%)	17.62	20.55	17.54
Never Married (%)	13.67	12.17	14.56
Number of Health Problems	0.60	0.52	0.62
	(0.85)	(0.77)	(0.89)
Working (%)	64.46	89.65	74.53
Retired (%)	27.60	7.92	14.21
Not working (%)	6.70	2.43	9.91
Planned Retirement Age	62.35	63.17	65.48
	(4.43)	(3.13)	(5.26)
B. Income and Savings ($)			
Income	67,810	66,203	80,646
	(63,497)	(38,643)	(82,710)
Sum of RRSP, TFSA and DC savings	208,014	231,373	252,291
	(363,931)	(274,494)	(414,323)
Has occup. pension (%)	58.03	81.15	53.52
C. Literacy			
Financial literacy			
1 correct answer (%)	10.80	5.21	8.33
2 correct answers (%)	32.93	25.51	28.24
3 correct answers (%)	51.91	67.43	60.41
Retirement Literacy (0-5)	3.89	3.71	3.54
	(0.99)	(1.14)	(1.18)
Annuity Question Correct	0.22	0.21	0.19
D. Preferences			
Live Well	2.80	2.57	2.60
	(0.89)	(0.84)	(0.83)
Spend quick	2.17	2.023	2.15
	(0.69)	(0.72)	(0.77)
Risk Aversion	3.04	3.03	3.36
	(0.82)	(0.98)	(1.14)

Notes: The table shows summary statistics on several socio-economic characteristics, financial and retirement literacy, and preferences. We report means as well as the standard deviation (in brackets). We split the sample into three groups, defined by the age at which a respondent intends to claim the pension: before 62, between 62 and 64, and after 64.

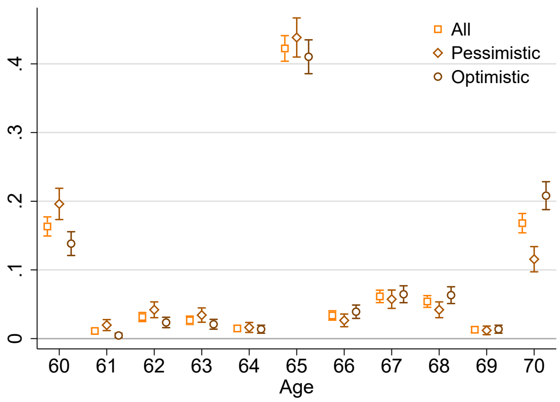
ments. Panel a shows the baseline claiming age distribution for all respondents, pessimistic respondents (who overestimate mortality risk relative to the life table), and optimistic respondents. Distinguishing pessimistic and optimistic respondents becomes important when analyzing the education intervention. Although optimism or pessimism may be perfectly rational given differences in health and other characteristics, we use this terminology to reflect higher (lower) than average survival risks. Teaching respondents about longevity likely increases early claiming among optimistic respondents but reduces early claiming among pessimistic respondents. Indeed, panel a shows that the age-60 claiming spike is higher among pessimistic and lower among optimistic respondents compared to the overall population. In contrast, pessimistic respondents are less and optimistic respondents more likely to delay claiming until age 70.

Panel b shows that the stated claiming age responds to financial incentives in line with economic theory: The smaller the penalty and bonus for early and late claiming, the larger the share of respondents who claim at the earliest age. For example, a 5 percentage points smaller penalty and bonus than in the baseline, i.e., -2.2% and +3.4% per year of claiming before and after age 65, increases the claiming rate at age 60 by about 12 percentage points. Conversely, larger penalties and bonuses are associated with more people delaying claiming beyond age 65. For example, a 7 percentage point larger bonus than in the baseline increases the claiming rate at age 70 by about 6 percentage points.

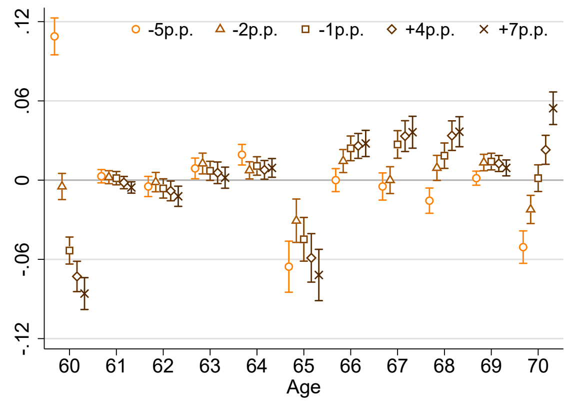
Panel c documents changes in the claiming profile from the education intervention, separately for the break-even and insurance treatment and for pessimistic and optimistic respondents. The patterns suggest that the treatments induce pessimistic respondents to delay claiming, particularly for the insurance intervention, while optimistic respondents' early claiming rates are more stable. Finally, panel d suggests that shifting the reference age from age 65 to age 67 is an effective tool to change people's claiming decision. The spike in claiming moves from 65 to 67 when the reference age is 67. In contrast, framing the decision in terms of losses versus gains and showing benefits in annual versus monthly amounts have minor impacts on claiming profiles.

Figure 4: Baseline and Change in Claiming from Incentives, Education, and Framing

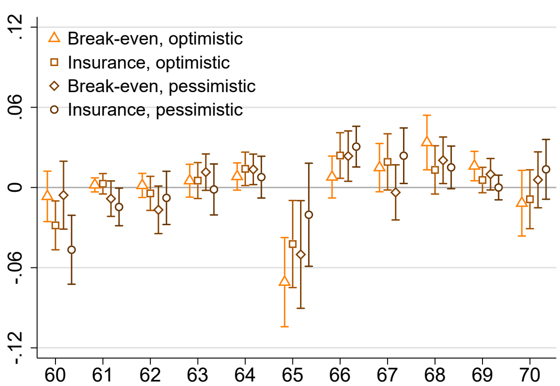
(a) Baseline Claiming Distribution



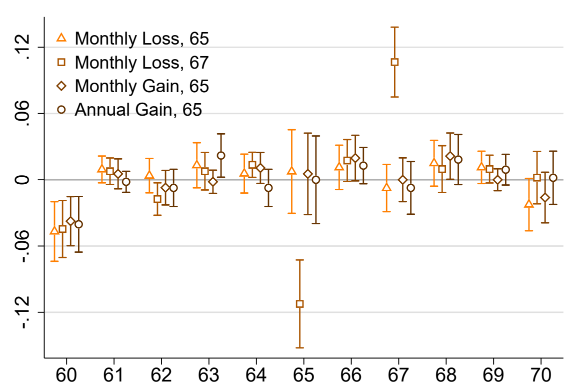
(b) Change Claiming from Incentives



(c) Change Claiming from Education



(d) Change Claiming from Framing



Notes: The figure shows the distribution of stated claiming ages for the baseline (panel a) and the change in the claiming rates from financial incentives (panel b), the education interventions (panel c), and the framing interventions (panel d). Pessimistic respondents underestimate and optimistic respondents overestimate the mortality risk. Bars denote a 95% confidence interval.

4 Stated-Choice Experimental Evidence

4.1 Financial Incentives

We first describe the empirical specification for estimating the impact of financial incentives and then present the results. A participant i responds to each scenario j with an expected claiming age, denoted by $c_{i,j}$. Let $y_{i,a,j}$ be equal to one if the respondent claims at age a in scenario j, and zero otherwise. When a respondent has claimed, she is dropped from the sample. Hence, $y_{i,a,j}$ measures a hazard in discrete time. Respondents have characteristics X_i, an expected retirement age r_i, and an expected claiming age of a defined benefit pension db_i. Let $db_{i,a} = 1$ if respondent i has claimed his defined benefit pension by age a and zero otherwise. Similarly, let $r_{i,a} = 1$ if the respondent has retired from the labor force and zero otherwise. These triggers help capture potential jumps in the claiming hazard at retirement and defined benefit pension claiming age.

For each respondent and scenario, we compute the present discounted value of claiming at age a, $PDV_{i,a,j}$, and the one-year accrual (gain) from delaying claiming at age a by one year to $a+1$, $ACC_{i,a,j}$. We have variation in the ACC and PDV in terms of pension adjustment factors (randomized), pensionable earnings, survival risk, and discount rates (randomized). Finally, let $o_{i,j}$ be the order in which scenario j was presented to the respondent. Respondents could be sensitive to the order by which scenarios are presented if there is fatigue or learning.

We specify the hazard of claiming at age a as

$$y_{i,a,j} = \beta_1 PDV_{i,a,j} + \beta_2 ACC_{i,a,j} + \mathbf{X}_i'\gamma + \lambda_R r_{i,a} + \lambda_D db_{i,a} + \lambda_a + \lambda_{oj} + \epsilon_{i,a,j}, \qquad (4)$$

where λ_R, λ_D, λ_a, and λ_{oj} capture the impact of the retirement age trigger, the defined benefit claiming age trigger, age-in-year fixed effects, and scenario-order fixed effects. We estimate equation (4) by OLS using scenarios 1 to 6, which vary the pension adjustment factors.[18] We cluster standard errors at the respondent level and estimate different specifications with varying controls: SES, preferences, the age triggers $(db_{i,a}, r_{i,a})$, and controls for knowledge, retirement, and financial literacy. As for natural experiment analysis, we compute an elasticity of claiming with respect to the ACC at the mean, $\eta = \beta_2 \frac{\overline{ACC}}{\bar{y}}$.

[18]We use a linear probability model to be consistent with the analysis in Section 2. We also estimate a logit regression and calculate the marginal effectsand resulting elasticities. The elasticities are very similar to those from linear probability models and are available upon request.

Table 9 reports the coefficient estimates (Table B.3 in the Appendix reports full estimation results). We find that respondents are sensitive to financial incentives, summarized by the ACC, but the effects are small. As column 1 shows, a \$100,000 increase in the accrual reduces the probability of claiming by 15.7 percentage points. Since the mean of the ACC variable is \$8,650, the effect of increasing the accrual by that amount is to reduce the probability of claiming by 1.36 percentage points. The hazard of claiming is on average 13.3%. Therefore, this represents a decrease of 10.2% in the hazard, equivalent to an elasticity of -0.102. This estimate is robust to the presence of various controls, as columns 2 to 5 illustrate. Hence, financial incentives are costly as a mechanism to encourage delays. Results on price sensitivity from the experiment are remarkably similar to the evidence shown using quasi-experimental variation. Hence, we replicate the lack of sensitivity to financial incentives estimated from actual behavior.

The full results presented in Table B.3 show that respondents with lower educational attainment tend to claim earlier. We also find that respondents with a preference for spending wealth quickly and those with a high-risk aversion claim earlier. The age at which respondents aim to exit the labor force, or claim their DB pensions, increases significantly the hazard of claiming their CPP or QPP benefits. Higher retirement literacy tends to be associated with earlier, rather than delayed claiming. Similarly, respondents who value annuities correctly are also to claim earlier. However, we find suggestive evidence that respondents with higher financial literacy are more likely to delay.

We can explore the richness of the characteristics of respondents to elicit whether the sensitivity to financial incentives is larger among particular subgroups. Specifically, we split respondents into two groups for each characteristic. For continuous characteristics, we split the sample at the median. Table 10 reports the ACC elasticity estimates for a selected set of characteristics. Overall, we find significant differences in the effect of financial incentives across groups. Respondents with high earnings or wealth are more sensitive to financial incentives compared to those with low earnings or wealth, which is

Table 9: Effects of Financial Incentives on the Claiming Hazard

	(1)	(2)	(3)	(4)	(5)
ACC	-0.157***	-0.161***	-0.157***	-0.170***	-0.171***
	(0.0098)	(0.0100)	(0.0101)	(0.0099)	(0.0098)
PDV	0.0013	0.0009	0.0009	0.0014	0.0015
	(0.0011)	(0.0010)	(0.0010)	(0.0010)	(0.0009)
ACC elasticity	-0.102***	-0.104***	-0.102***	-0.111***	-0.111***
	(0.0063)	(0.0065)	(0.0066)	(0.0064)	(0.0063)
Order effects (p)	0.0118	0.0135	0.0140	0.0103	0.0084
SES controls	NO	YES	YES	YES	YES
Preferences	NO	NO	YES	YES	YES
Age Triggers	NO	NO	NO	YES	YES
Knowledge	NO	NO	NO	NO	YES
Observations	100,974	100,974	100,974	100,974	100,974
R-squared	0.204	0.206	0.209	0.224	0.225

Notes: The table reports estimates from linear regression models where the dependent variable is the hazard of claiming (=1 if claims at age a and zero if not). Controls include age dummies and dummies for the order in which scenarios 2 to 6 were presented. The variables ACC and PDV are reported in hundred thousand dollars. The elasticity is computed at the mean of the claiming hazard and ACC. Specification 1 has only controls for age and order effects. Specification 2 adds controls for SES which include age at the time of doing the survey, gender, marital status, education dummies, the presence of health problems, the log of financial wealth, and earnings. Specification 3 adds dummies capturing a preference for living a shorter life but well, spending quickly, and a low tolerance for risk. Specification 4 adds dummies for whether the respondent has reached the age at which he plans to retire and to claim his or her defined benefit (DB) pension. We call these variables age triggers. Finally, specification 5 adds controls for retirement literacy, knowledge of annuities, and financial literacy using dummies for the number of correct answers. Standard errors are clustered at the respondent level. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Heterogeneity in the Elasticity of Claiming with respect to Financial Incentives

	No		Yes		Equality
	ACC elasticity	SE	*ACC* elasticity	SE	p-value
	(1)	(2)	(3)	(4)	(5)
High Earnings	-0.0891***	(0.0076)	-0.1296***	(0.0075)	0.000
High Wealth	-0.0695***	(0.0072)	-0.1181***	(0.0070)	0.000
High Fin. Lit.	-0.0535***	(0.0084)	-0.1166***	(0.0061)	0.000
College Edu.	-0.0364***	(0.0087)	-0.1201***	(0.0061)	0.000
Prefer Spend Quickly	-0.1104***	(0.0057)	-0.0449***	(0.0098)	0.000
Risk Averse	-0.1104***	(0.0056)	-0.0334***	(0.0108)	0.000
Has DB Plan	-0.1140***	(0.0059)	-0.0654***	(0.0083)	0.000
Female	-0.1039***	(0.0064)	-0.0834***	(0.0076)	0.039
Married	-0.0887***	(0.0090)	-0.0974***	(0.0057)	0.413
Health Problems	-0.0939***	(0.0066)	-0.1028***	(0.0085)	0.403

Notes: The table reports estimates from linear regression models where the dependent variable is the hazard of claiming (=1 if claims at age a and zero if not) and a separate effect of ACC is permitted for each variable. Controls only include the PDV, age dummies, and dummies for order effects. The estimate (and standard error) reported is the elasticity of the pension claiming hazard with respect to the accrual ACC. The p-value for the test statistic testing the equality of the elasticities is also reported. Standard errors are clustered at the respondent level. *** p<0.01, ** p<0.05, * p<0.1

consistent with liquidity constraints. Respondents with high financial literacy and college education are more price elastic. In contrast, respondents who want to spend quickly, those who are more risk-averse, and those with a DB plan are less price sensitive. Other characteristics exhibit small elasticity differences and are not statistically significant at the 5%-level. Overall, financial incentives are not very effective in getting respondents to claim later. They are therefore also unlikely to increase the level of annuitization (level of pension income) of respondents.

4.2 Education

This section discusses the impacts of educating respondents about the break-even age (break-even treatment) and remaining life expectancy as well as the value of annuities (insurance treatment). We expect these treatments to induce more delays if respondents are claiming early because they do not understand annuities. But the effects are likely heterogeneous because of differences in remaining life expectancy. For respondents optimistic about the prospects of living longer, the information on life expectancy may lead them to claim earlier. For pessimistic respondents, the treatments may lead to more delays.

We specify the hazard of claiming as a fixed effect difference-in-differences model:

$$y_{i,a,j} = \alpha Post_j + \sum_k \gamma d_{i,k} Post_j + \beta_{0,i} + \beta_1 PDV_{i,a,j} + \beta_2 ACC_{i,a,j} + \lambda_t + \lambda_{oj} + \epsilon_{i,a,j}. \quad (5)$$

where $d_{i,k}$ is one if respondent i was assigned to treatment k and zero if not. The dummy $Post_j$ is one if scenario $j > 1$ and zero if not. We estimate this specification for the full sample and also tease out heterogeneity by baseline survival expectations. To this end, we compute the percent deviation between the subjective estimate of life expectancy and the life-table life expectancy for each respondent. We call this deviation the optimism index. We split the sample at zero with one group being optimistic (subjective life expectancy higher than life table) and one group being pessimistic. We also run a specification that interacts the post-treatment effects with the optimism index.

Table 11 reports the results. The treatments do not appear to have any effect in the full sample (column 1), but this effect masks considerable effect heterogeneity. Once we split the sample (columns 2 and 3), we find a statistically significant negative effect of the insurance treatment for those who are pessimistic (inducing delays). Observing the life-table survival probabilities probably leads pessimistic respondents to re-assess their evaluation of the claiming age towards claiming later as they now expect to live longer than they thought. We do not find statistically significant opposite effects for those who are optimistic although the effects are in the right direction (induces early claiming). The effect of the break-even treatment appears to lead to earlier claiming for those who revise their survival expectations downwards.

Table 11: Effect of Education Treatments on the Claiming Hazard

	All (1)	Optimistic (2)	Pessimistic (3)	Interaction (4)
Break-even × Post	0.0046	0.0074	0.00034	
	(0.0044)	(0.0055)	(0.0074)	
Insurance × Post	-0.0065	0.0015	-0.0183**	
	(0.0043)	(0.0052)	(0.0074)	
Post	-0.0059**	-0.0056*	-0.0058	-0.0088***
	(0.0028)	(0.0034)	(0.0050)	(0.0019)
Break-even × Post × Optimism				0.0676**
				(0.0285)
Insurance × Post × Optimism				0.113***
				(0.0306)
Observations	100,974	60,567	40,407	100,974
R-squared	0.289	0.266	0.325	0.289

Notes: The table reports estimates from fixed effects linear regression models where the dependent variable is the hazard of claiming (=1 if claims at age a and zero if not). Controls for order effects and age effects are included. The first column reports results for the full sample where the treatment groups are compared to the control group before and after (Post) scenario 1. The second and third columns split the sample according to whether or not the respondent has a subjective remaining life expectancy larger than what the life table would predict. Those who are optimistic (column 2) have higher subjective life expectancy than the life table would predict and those in column 3 (pessimistic) have lower life expectancy than the life table would predict. Finally, column 4 reports results where we interact the Post and treatment dummies with the deviation (percent) between subjective and life-table life expectancy (optimism). Standard errors are clustered at the respondent level. *** p<0.01, ** p<0.05, * p<0.1

We can exploit the variation in the optimism index further by interacting it with the treatment effects (column 4). Doing so shows that both interventions induce the most optimistic respondents to claim earlier while pessimistic respondents tend to delay claiming. The effects are relatively strong and imply strong revisions in survival expectations. The results suggest that one of the education levers to have an effect on claiming is to inform respondents about their survival prospects. Hence, one should not expect education treatments of the type we used to induce delays in aggregate. But to the extent that beliefs about longevity are biased relative to the life-table, the induced changes in delays from this type of intervention may be beneficial to respondents. This interpretation relies crucially on life-table survival probabilities reflecting the objective survival risk respondents face. We will explore this further in the section 5.

4.3 Framing

The frames presented to respondents in scenario 7 have three dimensions. First, we randomize the reference age for expressing the gain of claiming at that age to be either 65 (as in other scenarios) or 67. Second, we randomize the gain vs. loss dimension. Finally, we randomize whether the gain (or loss) is expressed in annual or monthly benefits. We have a total of five treatment frames and a control frame. We want to understand how each dimension of the frames impacts the expected claiming age.

We focus on responses to scenarios 1 and 7, since the scenarios are identical in terms of the financial incentive parameters. Absent framing effects, we should see no change in claiming ages. It is however possible that between scenarios 1 and 7, respondents learn about aspects of this decision task and revise their choice made in scenario 1. Since we have a control group who got the exact same frame as in scenario 1, we can use a difference-in-difference strategy to tease out the effect of each dimensions of the frames on expected claiming ages.

Since changing the full retirement age, the reference point, is likely to impact claiming at these ages disproportionately, we use a kinked age function,

$$g(nra_j, a) = \gamma_- \max(nra_j - a, 0) + \gamma_+ \max(a - nra_j)$$

to capture reference age effects. There is no bunching at the reference point if $\gamma_- = \gamma_+$. Similarly, a change in the reference point does not have an effect on claiming if this is the case.

We look at both the effect of other dimensions (annual vs. monthly) and loss vs. gain both on the hazard of claiming (first order effect) as well as on the kinked age function for the reference point. For example, one could think that a loss or gain frame would have a different effect on the reference age effect.

We specify the following fixed effect difference-in-difference model for the claiming hazard:

$$y_{i,a,j} = \alpha Post_j + g(nra_j, a) + \sum_k d_{i,k} Post_j(\gamma_k + g_k(nra_j, a)) + \beta_{0,i} + \lambda_a + \lambda_{oj} + \epsilon_{i,a,j}, \quad (6)$$

where $g_k(nra_j, a) = \gamma_{-,k} \max(nra_j - a, 0) + \gamma_{+,k} \max(a - nra_j)$. The parameter α captures the pre-post difference absent any changes in framing. Let k be the two dimensions of the frame, loss vs. gain, annual vs. monthly. Also let $d_{i,k} = 1$ if respondent had dimension k changed (relative to the control group) in scenario 7. The parameters γ_k captures the change in expected claiming age for those with a frame manipulation in dimension k. We also allow the function g_k to be specific to each dimension. Since we have fixed effects, $\beta_{0,i}$, there is no term for $d_{i,k}$ in the specification. The specification is otherwise the same as previous fixed effect specifications. We estimate by OLS using clustered standard errors.

Table 12 reports the estimates. First, we see that absent any changes in the frame, respondents tend to claim later ($Post$) in scenario 7 compared to scenario 1. The kinked age term reveals very strong reference age effect. This is identified from the variation in the normal retirement age between scenario 1 and 7. For each year prior to the nra, respondents are less likely to claim (more likely to postpone). For each age after the nra they are also less likely to claim. This induces a strong kink. Suppose someone is 65 and the nra is also 65. Then the value of $g(nra_j, a)$ at 65 is 0. Now consider a change in the nra from 65 to 67. The function now takes the value -0.0171 * 2 = -0.0342. The respondent is now more likely to delay. Similarly, take someone 67 when the nra is 65. The value of $g(nra_j, a)$ is

-0.0438*2 = -0.0876. He has an incentive to delay. Consider a change of the nra from 65 to 67. The new value is $g(nra_j, a) = 0$. Compared to before, he is more likely to claim at 67. Figure 4 shows very strong effects of changing the NRA specifically at the ages of 65 and 67. This kind of pattern is captured by the kinked function we estimate. Turning to the first order effects of the other dimensions of the frame: loss vs. gain and annual vs. monthly, we see that the estimates of γ_k are close to zero and statistically insignificant. These dimensions of the frame do not seem to impact the reference age effect either, with one exception. When the scenario is framed as a loss, the effect of being above the nra is weaker (a positive coefficient which lowers the negative effect of being away from the reference age). Overall, these other dimensions of the frame have little impact on claiming. The dominant effect comes from the reference age used as the normal retirement age. Hence, we conclude that changing the reference age when reporting the gain from delaying has a large impact on delays in the experiment.

5 Do Respondents Gain from these Interventions?

We find substantial effects of frames and education on behavior and some effects of financial incentives. Are these effects desirable for those impacted? This question is difficult to answer. It requires a benchmark for what the optimal claiming age is. In a very general setting, the optimal claiming age will depend on a number of unobservables, including preferences.

Delaying claiming is akin to purchasing a deferred annuity. The pension income sacrificed today is the price paid for an increase in the pension annuity once benefits are claimed. If the return on this purchase is larger than the risk-adjusted return on current financial wealth, delaying claiming increases lifetime resources. Hence, at first glance, this optimality problem does not seem to involve preferences. But the problem is more intricate. While in many situations the path of consumption is independent of the timing of claiming, in other situations it is not. One situation is when the current wealth is too low and the

Table 12: Effect of Framing Treatments on the Claiming Hazard

	(1)	(2)	(3)
Post	-0.0106***	-0.0105**	-0.0105***
	(0.0024)	(0.0041)	(0.0041)
$\max(nra - a, 0)$	-0.0171***	-0.0197***	-0.0219***
	(0.0032)	(0.0037)	(0.0046)
$\max(a - nra, 0)$	-0.0438***	-0.0413***	-0.0475***
	(0.0106)	(0.0107)	(0.0112)
Loss × Post		0.0049	-0.0070
		(0.0049)	(0.0076)
Annual × Post		-0.0051	-0.0040
		(0.0049)	(0.0085)
Loss × Post × $\max(nra - a, 0)$			0.0034
			(0.0023)
Annual × Post × $\max(nra - a, 0)$			-0.0014
			(0.0027)
Loss × Post × $\max(a - nra, 0)$			0.0116**
			(0.0055)
Annual × Post × $\max(a - nra, 0)$			0.0049
			(0.0057)
Observations	33,230	33,230	33,230
R-squared	0.359	0.359	0.360

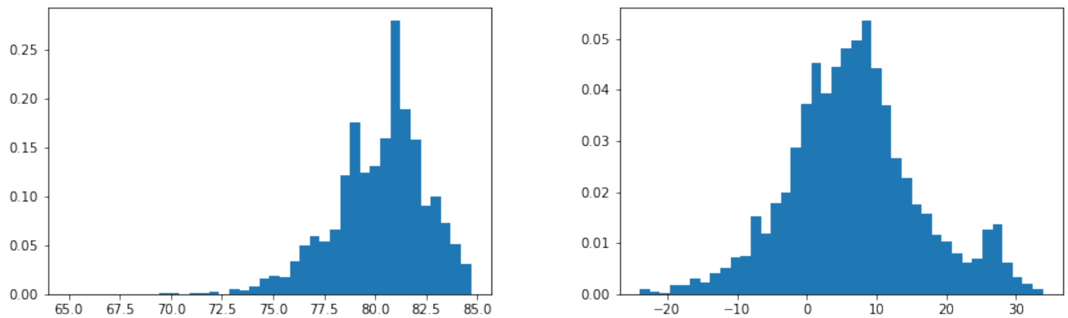
Notes: The table reports estimates from fixed effects linear regression models where the dependent variable is the hazard of claiming (=1 if claims at age a and zero if not). Controls for age dummies and age triggers are included. Standard errors are clustered at the respondent level. *** p<0.01, ** p<0.05, * p<0.1

individual is constrained (liquidity constraint). The other occurs when the annuity income in the future is larger than the desired consumption (Hurd, 1989). In this case, the Euler equation of consumption does not bind at older ages and preferences will play a role. Introducing bequests complicates matters further. If liquidity constraints do not bind and bequest motives are negligible, one can show that the optimal claiming age is the age that maximizes the present discounted value of pension benefits, where the discount rate is the rate of return on the competing investment (financial wealth). The optimal choice is then independent of the trajectory of consumption.

Hence, one proxy for sub-optimal choices is to study the financial loss respondents incur when they expect to claim at an age, which does not maximize the PDV of pension payments. Let $PDV_{i,j}$ be the PDV at the age they expect to claim and $PDV^*_{i,j}$ be the PDV at the age that maximizes the PDV. Then the financial loss measure is

$$M_{i,j} = PDV^*_{i,j} - PDV_{i,j}, \tag{7}$$

where $M_{i,j} \geq 0$ by definition. This optimal PDV calculation requires a good estimate of the objective survival prospect of each respondent. We follow the approach by (Boyer et al., 2020) and compute objective survival probabilities using a microsimulation model of health developed by Boisclair et al. (2019). This model takes a number of individual characteristics as inputs to parameterize a Markovian transition model between health states and death such that it matches transition models estimated from the National Population Health Survey (1994-2010). Based on these transition matrices, we can simulate for each respondent a number of paths, each with a path-specific life span. Then, we can average over these paths to find survival probabilities to different ages, as well as the expected life span. In our survey, we designed the first part of the questionnaire to contain questions that we could then use in the microsimulation model. For example, we asked a battery of health-related questions, such as the prevalence of six major health conditions as well as smoking habits. In addition, we asked about sex, education, and other characteristics pre-



(a) Objective life expectancy (b) Subjective less objective life expectancy

Figure 5: Objective life expectancy and deviation of subjective from objective life expectancy

Notes: These histograms show the dispersion of objective life expectancy (panel a) and of the difference between subjective and objective life expectancy panel b) for survey respondents. Positive values of this difference indicate individuals with a subjective life expectancy that is higher than their objective one. Subjective life expectancy is calculated based on reported survival probabilities to ages 70, 80, and 90. Objective life expectancy is calculated based on respondents' gender, their reported health status and other variables using a microsimulation model.

dictive of their survival. Feeding that information into the microsimulation model provided us with individualized objective survival probabilities for each respondent.

We show a histogram of the objective life expectancy for our sample in panel a of Figure 5a, and a histogram of the difference between the objective and subjective life expectancy in panel b.

In Figure B.5, we observe that subjective life expectancy is on average higher than objective life expectancy. When looking at the survival probabilities to each age we surveyed respondents about (70, 80, and 90), we observe that while individuals underestimate the probability of living to 70 (0.8590 versus 0.9023), they overestimate the probability of living to age 80 (0.6988 versus 0.5495), and the probability to living to age 90 by a lot more (0.4109 versus 0.0331), which explains the resulting higher subjective life expectancy. Second, we observe that subjective life expectancy is considerably more dispersed than

Table 13: Effect of Education Treatments on the Financial Loss M

	Control (1)	Break-Even (2)	Insurance (3)
$E(\Delta M_{i,j})$	-278	-402	-896*
P-value diff		[0.701]	[0.054]
$\Pr(\Delta M_{i,j} < 0)$	0.172	0.198	0.223***
P-value diff		[0.160]	[0.007]

Notes: The table reports statistics on the change in the financial loss between scenario 1 and 7. The first line reports the average change in the financial loss. The second line reports the p-value on the t-test for a difference in a given treatment arm relative to the control group. The third line reports the fraction of respondents with a decrease in their financial loss. The fourth line reports the p-value on a t-test for a difference relative to the control group. *** p<0.01, ** p<0.05, * p<0.1

objective life expectancy.

The optimal claiming age in our analysis varies between participants mainly because of their varying survival risk. As such, our resulting loss measure rests on the assumption that the objective survival probability estimates approximate the actual risk faced by respondents well.

We first focus on the education interventions. Table 13 reports statistics on the change in the financial loss $M_{i,j}$ for each education treatment arm. We look at the change from scenario 1 to 7. We only consider respondents who changed their expected age between these two scenarios. We find that the fraction with an improvement in their financial loss is larger for those in the insurance treatment compared to the control group. 22.3% of respondents in that arm make a choice which brings them closer to their optimal age compared to 17.2% in the control group. The difference is statistically significant. The Break-even group also experiences a higher fraction with improvements but the difference is not statistically significant at the 10% level. In terms of average gains (reduction in financial loss), both treatment arm see an improvement on average, with the improvement larger in the Insurance treatment arm (statistically significant at the 10% level). Overall, education appears to reduce financial losses.

Table 14: Effect of Framing on the Financial Loss

	Control (1)	Monthly Loss Age 67 (2)	Monthly Gain Age 65 (3)	Annual Loss Age 65 (4)	Annual Gain Age 65 (5)
$E(\Delta M_{i,j})$	-350	-303	-929	-582	-452
P-value diff		[0.911]	[0.161]	[0.577]	[0.807]
$\Pr(\Delta M_{i,j} < 0)$	0.216	0.209	0.188	0.174*	0.203
P-value diff		[0.780]	[0.244]	[0.081]	[0.585]

Notes: The table reports statistics on the change in the financial loss from scenario 1 to 7. The first line reports the average change in the financial loss. The second line reports the p-value on the t-test for a difference in a given each framing arm relative to the control group. The third line reports the fraction of respondents with a decrease in their financial loss. The fourth line reports the p-value on a t-test for a difference relative to the control group. *** p<0.01, ** p<0.05, * p<0.1

We produce similar statistics for the framing intervention. This time, we consider each different frame as potential treatments relative to the control. Table 14 reports the results for the different frames we consider. Overall, there is an imprecise reduction in the average loss for each frame. But the fraction who see a reduction in the loss is *lower* in all treatments compared to control. Hence, the treatments lead to more participants making a worse decision as compared to the control group. Overall, there is no clear pattern which suggests that the important changes due to framing do not appear to lead to substantially better outcomes for respondents, at least in terms of the present discounted value of benefits.

Consider the effect of financial incentives. We focus on scenarios 1 and 4. In scenario 4, the malus (and bonus) are increased by one percentage point. As we found earlier, this leads to more delays. For those who change their claiming age, does this lead to a reduction in the financial loss? We compute the change in the PDV loss from scenario 1 to 4. A negative number means a reduction in the financial loss. We find an average change of -1150.56 (p-value < 0.001). More than 60% of respondents who changed their claiming age had a reduction in the financial loss while 38.1% had an increase in the loss. Overall, we find that increasing the malus (and bonus) improves on average the financial loss from picking a non-optimal claiming age.

6 Conclusion

For various reasons, policymakers are advocating for policies aimed at increasing delays in pension claiming. In Canada, the motivation appears to be focused on increasing annuitization in the light of various trends exposing retirees to greater longevity risk. But what is the most effective way of increasing annuitization through delayed claiming? And are those who change behavior impacted positively, at least in financial terms? This paper combines quasi-experimental and experimental evidence to answer those questions.

First, we find that financial incentives are likely to be an ineffective policy option to incentive delays in claiming given an elasticity of the claiming hazard to financial accrual between -0.1 and -0.15. We obtain similar estimates whether we estimate behavioral responses using administrative data on actual changes in Canada, or a survey experiment which features randomized variation in incentives. Our result that near retirees are relatively inelastic are in line with several recent studies leveraging exogeneous changes in the financial reward to delay claiming (Lalive et al., 2023; Gorry et al., 2022; Manoli and Weber, 2016). We further measure the financial impact of choosing a certain claiming age as the financial loss survey respondents incur from picking an age which does not maximize the present discounted value of their pension benefits. Interestingly, we find that while the response to incentives is small overall, the impact of changing the claiming age for those who react to incentives is on average positive.

Second, we find that education, especially information treatments aimed at emphasizing the consumption value of delaying as well as informing on longevity risk from life tables, can help respondents either delay or claim earlier depending on how optimistic they are about their survival prospects. There is some evidence that this leads to better financial outcomes in terms of the present discounted value of pension benefits. However, there is little evidence that the type of education intervention we consider increases delays in a way that has a tractable impact overall.

Third, we find sizeable effects of simply reporting the financial gain of delaying relative to an older reference age. Currently, the full retirement age in CPP and QPP is 65. If this full retirement age was changed to be 67, our estimates imply strong effects on the modal claiming age even absent any changes to the pension adjustment factors. This is consistent with strong responses to changes in the normal retirement age found in Mastrobuoni (2009), Behaghel and Blau (2012), Seibold (2021), and Lalive et al. (2023). The cost of such an intervention is null, making it very attractive from a cost-effectiveness perspective. However, we do not find that those impacted by such framing improve their financial outcomes in terms of the present discounted value of pension benefits. Combining a change in the reference age with education may produce better outcomes.

Behind the motivation to incentive delays is the belief that such delays are in the interest of participants. This paper shows that this is not necessarily the case. The price paid for higher annuitization is that current consumption, or the financial return on financial wealth, needs be sacrificed to obtain higher future benefits. For some, in particular those with poor longevity prospects, claiming early may be perfectly sound from a financial perspective. Consequently, the financial impact of delaying is negative for these individuals. Interventions that incentive delays, whether through financial incentives or framing, may push them to delay, but thereby lead to a financial loss measured as the present discounted value of future benefits.

We argue that policy should focus on interventions which help individuals reach better financial outcomes rather than declaring delays in claiming as such the primary goal. In that respect, we show that education, in particular informing about longevity risk, is likely most promising in terms of inducing better financial outcomes.

References

Behaghel, L. and Blau, D. M. (2012). Framing social security reform: Behavioral responses to changes in the full retirement age. *American Economic Journal: Economic Policy*, 4(4):41–67.

Benartzi, S., Previtero, A., and Thaler, R. H. (2011). Annuitization puzzles. *Journal of Economic Perspectives*, 25(4):143–64.

Boisclair, D., Décarie, Y., Laliberté-Auger, F., and Michaud, P.-C. (2019). Compas: A health microsimulation model for quebec and canada. *Technical document, Chaire de recherche sur les enjeux économiques intergénérationnels, Montréal.*

Boyer, M. M., De Donder, P., Fluet, C., Leroux, M.-L., and Michaud, P.-C. (2020). Long-term care insurance: Information frictions and selection. *American Economic Journal: Economic Policy*, 12(3):134–69.

Brown, J. R., Kapteyn, A., Luttmer, E. F., and Mitchell, O. S. (2017). Cognitive constraints on valuing annuities. *Journal of the European Economic Association*, 15(2):429–462.

Brown, J. R., Kapteyn, A., Luttmer, E. F., Mitchell, O. S., Samek, A., et al. (2021). Behavioral impediments to valuing annuities: Complexity and choice bracketing. *Review of Economics and Statistics*, 3(103):533–546.

Brown, J. R., Kapteyn, A., and Mitchell, O. S. (2016). Framing and claiming: How information- framing affects expected social security claiming behavior. *Journal of Risk and Insurance*, 83(1):139–162.

Brown, J. R., Kling, J. R., Mullainathan, S., and Wrobel, M. V. (2008). Why don't people insure late-life consumption? a framing explanation of the under-annuitization puzzle. *American Economic Review*, 98(2):304–09.

Coile, C. and Gruber, J. (2007). Future social security entitlements and the retirement decision. *The Review of Economics and Statistics*, 89(2):234–246.

Davidoff, T., Brown, J. R., and Diamond, P. A. (2005). Annuities and individual welfare. *American Economic Review*, 95(5):1573–1590.

Fevang, E., Hardoy, I., and Roed, K. (2017). Temporary disability and economic incentives. *Economic Journal*, 127:1410–1432.

Gorry, D., Lee, K. M., and Slavov, S. N. (2022). Does the actuarial adjustment for pension delay affect retirement and claiming decisions? *Journal of Pension Economics and Finance*, page 1–14.

Gruber, J., Kanninen, O., and Ravaska, T. (2022). Relabeling, retirement and regret. *Journal of Public Economics*, 211:104677.

Gruber, J. and Wise, D. (1998). Social security and retirement: An international comparison. *American Economic Review: Papers and Proceedings*, 88(2):158–163.

Hurd, M. D. (1989). Mortality risk and bequests. *Econometrica*, 57(4):779–813.

Hurd, M. D., Smith, J. P., and Zissimopoulos, J. M. (2004). The effects of subjective survival on retirement and social security claiming. *Journal of Applied Econometrics*, 19(6):761–775.

Kaiser, T., Lusardi, A., Menkhoff, L., and Urban, C. (2022). Financial education affects financial knowledge and downstream behaviors. *Journal of Financial Economics*, 145(2, Part A):255–272.

Lacroix, G., Laliberté-Auger, F., Michaud, P.-C., and Parent, D. (2021). The effect of college education on health and mortality: Evidence from canada. *Health Economics*, 30(S1):105–118.

Lalive, R., Magesan, A., and Staubli, S. (2023). How social security reform affects retirement and pension claiming. *American Economic Journal: Economic Policy*.

Liebman, J., Luttmer, E. F., and Seif, D. G. (2009). Labor supply responses to marginal social security benefits: Evidence from discontinuities. *Journal of Public Economics*, 93(11-12):1208–1223.

Liebman, J. B. and Luttmer, E. F. P. (2015). Would people behave differently if they better understood social security? evidence from a field experiment. *American Economic Journal: Economic Policy*, 7(1):275–99.

Lumsdaine, R. L. and Mitchell, O. (1999). New developments in the economic analysis of retirement. In Ashenfelter, O. and Card, D., editors, *Handbook of Labor Economics*, volume 3, Part C, chapter 49, pages 3261–3307. Elsevier, 1 edition.

Lusardi, A. and Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1):5–44.

Manoli, D. and Weber, A. (2016). Nonparametric evidence on the effects of financial incentives on retirement decisions. *American Economic Journal: Economic Policy*, 8(4):160–82.

Mastrobuoni, G. (2009). Labor supply effects of the recent social security benefit cuts: Empirical estimates using cohort discontinuities. *Journal of public Economics*, 93(11-12):1224–1233.

Mastrobuoni, G. (2011). The role of information for retirement behavior: Evidence based on the stepwise introduction of the social security statement. *Journal of Public Economics*, 95(7):913–925.

Maurer, R., Mitchell, O. S., Rogalla, R., and Schimetschek, T. (2018). Will they take the money and work? People's willingness to delay claiming social security benefits for a lump sum. *Journal of Risk and Insurance*, 85(4):877–909.

Maurer, R., Mitchell, O. S., Rogalla, R., and Schimetschek, T. (2021). Optimal social security claiming behavior under lump sum incentives: Theory and evidence. *Journal of Risk and Insurance*, 88(1):5–27.

Milligan, K. and Schirle, T. (2020). Retirement decisions and retirement incentives: New evidence from canada. Technical report.

Milligan, K. and Schirle, T. (2021). The Evolution of Longevity: Evidence from Canada. *Canadian Journal of Economics*, 54(1):164–192.

Mullen, K. J. and Staubli, S. (2016). Disability benefit generosity and labor force withdrawal. *Journal of Public Economics*, 143:49–63.

Nielsen, H. J., Sorensen, T., and Taber, C. (2010). Estimating the effect of student aid on college enrollment: Evidence from a government grant policy reform. *American Economic Journal: Economic Policy*, 2:185–215.

Seibold, A. (2021). Reference points for retirement behavior: Evidence from german pension discontinuities. *American Economic Review*, 111(4):1126–65.

Shoven, J. B. and Slavov, S. N. (2014). Does it pay to delay social security? *Journal of Pension Economics and Finance*, 13(2):121–144.

Staubli, S. and Zhao, Q. (2022). The long-run and distributional impacts of public pensions. *Working Paper*.

A Additional Details and Results for Natural Experiment

A.1 Calculation of Potential CPP/QPP Pensions

CPP and QPP pensions are calculated using the same formula, but the parameters differ in some of the years because of the 2010 pension reform. An individual who claims a pension at age a receives an annual pension B_a that is calculated as follows:

$$B_a = 0.25\cdot(1+(a-65)\cdot PAF_a)\cdot \underbrace{\left(\frac{\sum_{k=18}^{a-1}\min\left(\frac{W_k}{YMPE_k},1\right)}{NCY_a}\right)}_{=\text{total adjusted pensionable earnings}} \cdot \underbrace{\left(\frac{\sum_{s=a-4}^{a} YMPE_s}{5}\right)}_{=\text{average}YMPE}, \quad \text{(A.1)}$$

where PAF_a is the pension adjustment factor which depends on the claiming age, W_k are the annual earnings at age k, NCY_a is the total number of contribution years, and $YMPE_s$ is the year's maximum pensionable earnings.

The contribution period begins in the year an individual turns 18 or in January 1966, whichever is later. It ends in the year an individual turns 70, or the year before the individual starts receiving a CPP/QPP pension.[19] The contribution period excludes any year that an individual receives a disability pension. Since we observe the year of birth and whether individuals receive a disability pension, we can calculate each individual's NCY_a at each potential claiming age.

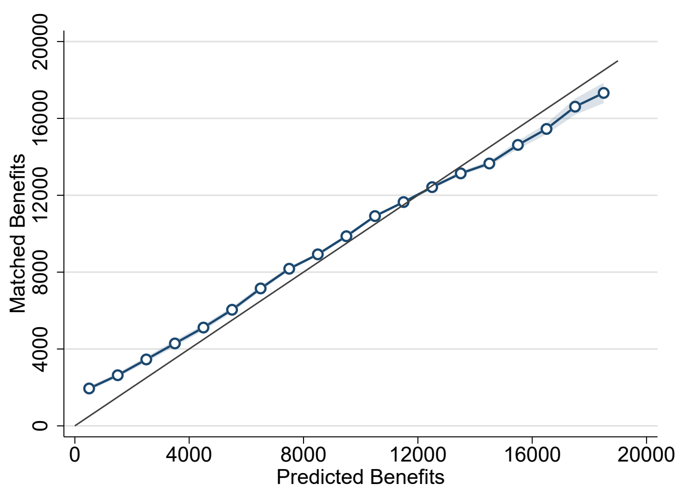
Individuals are eligible for a general dropout, which removes the years with the lowest 15% of earnings from the total NCY_a. The dropout percentage in the CPP was increased to 16% in 2012 and to 17% in 2014. For example, a 65-year old individual who applies for a pension in 2016 can remove the lowest 8 years of earnings from the 47 NCY_a. Additionally, individuals who have been the primary caregiver for their children qualify for child rearing dropout periods, on top of the general dropout periods. Since in the data we cannot observe

[19]The over-65-dropout provision allows people to drop all periods after age 65 from the NCY_a if the earnings after age 65 are less than any of the under-age 65 earnings.

who of the parents is the primary caregiver, we ignore the child rearing dropout provision when calculating the CPP/QPP pension amount, but instead we control for the number of children directly.

In the next step, we use a person's earnings history to calculate the adjusted pensionable earnings for each age from 18 to $a-1$, $W_k/YMPE_k$, which are capped from above at one. We exclude the lowest adjusted pensionable earnings that fall under the general dropout provision. We ignore contribution years and adjusted pensionable earnings after age 59 because they are likely affected by how people respond to the reform.[20] A challenge when calculating the adjusted pensionable earnings is that we do not observe earnings all the way back to age 18 because our data starts in 1982 when individuals in our sample are between 24 and 47 years old. To address this problem, we follow Milligan and Schirle (2020) and estimate gender-birth-cohort-specific growth rates in median earnings. We then use these growth rates to backcast earnings to age 18.

Figure A.1: Comparison of predicted and matched pension benefits



Notes: The figure compares predicted benefits (horizontal axis) with matched benefits (vertical axis). Solid grey line is the 45-degree line.

In the final step, we calculate the average annual pensionable earnings by multiplying the

[20]Our retirement hazard estimates in Appendix Table A.2 suggest that people who face higher PAFs retire later, affecting contribution years and pensionable earnings after age 60.

total adjusted pensionable earnings without dropout years with the average *YMPE* for the five-year period ending in the year a person claims a pension. The annual pension an individual gets corresponds to 25% of the average annual pensionable earnings multiplied by the pension adjustment factor, PAF_a. Our empirical analysis exploits exogenous variation in PAF_a induced by the 2010 pension reform, as discussed in paper section 2.1.

We verify the accuracy of our calculation by comparing our potential pension benefits with the actual pension payments for individuals who claim their CPP/QPP pension between 2005 and 2018. Figure A.1 plots the mean matched pension benefits against mean predicted pension benefits (in $1,000-bins) for all years together. We see that actual pension benefits track our predicted pension benefits very closely.

A.2 Additional Tables and Figures

Table A.1: Summary Statistics

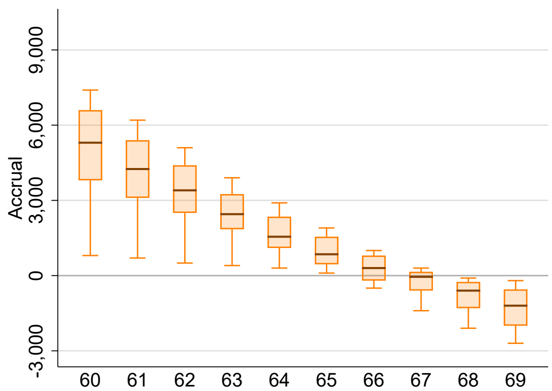
	Rest of Canada		Québec	
	Pre-2011	Post-2011	Pre-2011	Post-2011
Claiming age	63.9	63.8	63.1	62.8
	(2.2)	(2.3)	(2.4)	(2.4)
Claiming hazard	0.245	0.232	0.338	0.329
	(0.43)	(0.422)	(0.473)	(0.47)
ACC	0.018	0.025	0.017	0.023
	(0.03)	(0.04)	(0.03)	(0.041)
PDV	1.125	1.139	1.112	1.132
	(0.429)	(0.473)	(0.473)	(0.493)
Age	61.9	62.3	61.7	62
	(2)	(2.2)	(2.1)	(2.3)
Annual earnings	41546.5	46209.2	32435.8	39166.9
	(159237)	(138075)	(114914)	(97540)
Avg. annual earnings	29280.1	30018.8	26609.1	28022.4
	(41324)	(45190)	(32611)	(36594)
% Female	53.6	52	55.1	54.2
	(49.9)	(50)	(49.7)	(49.8)
% Married	77.5	73.3	74.1	70.1
	(41.7)	(44.2)	(43.8)	(45.8)

Notes: The table reports summary statistics for ROC and Québec before and after 2011.

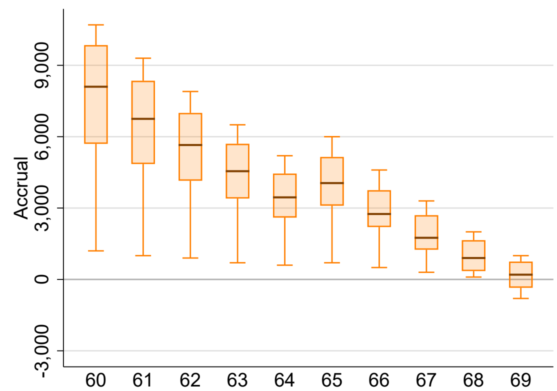
Figure A.2: Accrual Rate by Age and Period for Rest of Canada and Québec

Rest of Canada

(a) Pre-2011

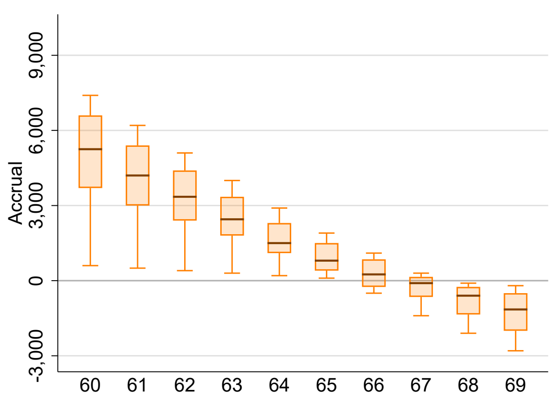


(b) Post-2011

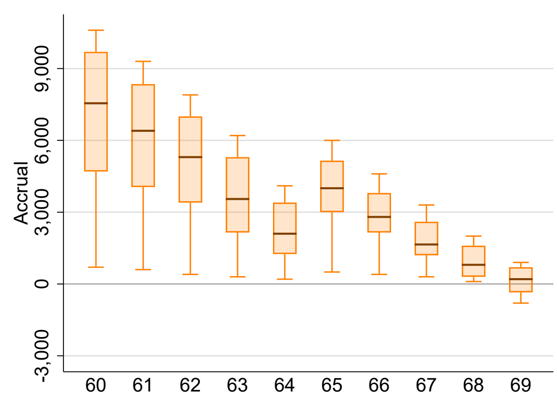


Québec

(c) Pre-2011



(d) Post-2011



Notes: The figure shows the pension accrual distribution in ROC and Québec before and after 2011. The top and bottom whiskers of the box plots are 5th and 95th percentiles reports summary statistics for ROC and Québec before and after 2011.

Figure A.3: Retirement Hazard by Age and Year for Rest of Canada and Québec

(a) Rest of Canada (b) Québec

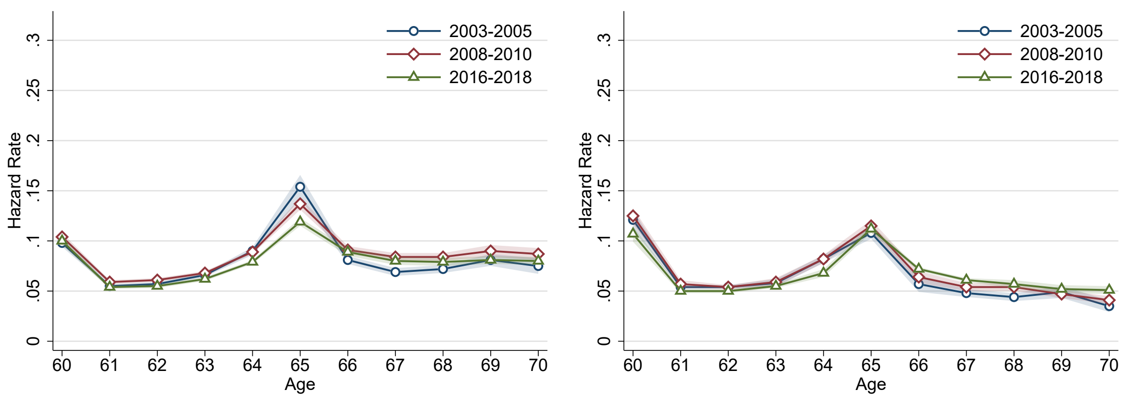


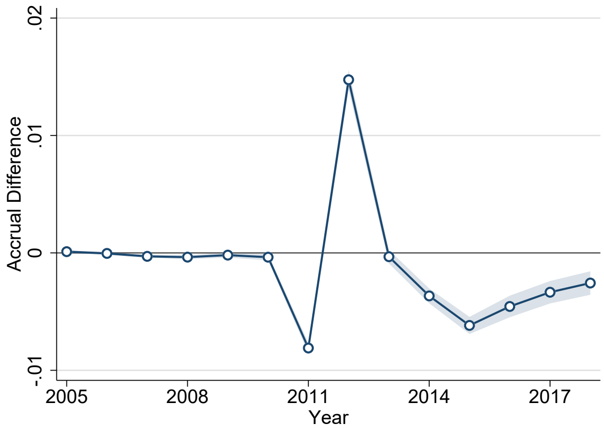
Table A.2: Main Estimates for Retirement Hazard

	(1)	(2)	(3)	(4)	(5)	(6)
ACC	-0.202***	-0.242***	-0.225***	-0.224***	-0.229***	-0.019
	(0.039)	(0.036)	(0.037)	(0.037)	(0.036)	(0.023)
PDV	0.038***	0.043***	0.042***	0.042***	0.042***	0.078***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)
Elasticity ACC	-0.062***	-0.074***	-0.069***	-0.069***	-0.070***	-0.006
	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.007)
Earnings controls	NO	YES	YES	YES	YES	YES
Age×QUE FE	NO	NO	YES	YES	YES	YES
ROC×2012	NO	NO	NO	YES	YES	YES
QUE×2014	NO	NO	NO	NO	YES	YES
Pre-2010 incentives	NO	NO	NO	NO	NO	YES
No. Obs.	8,005,470	8,005,470	8,005,470	8,005,470	8,005,470	8,005,470
R^2	0.012	0.015	0.015	0.015	0.015	0.016

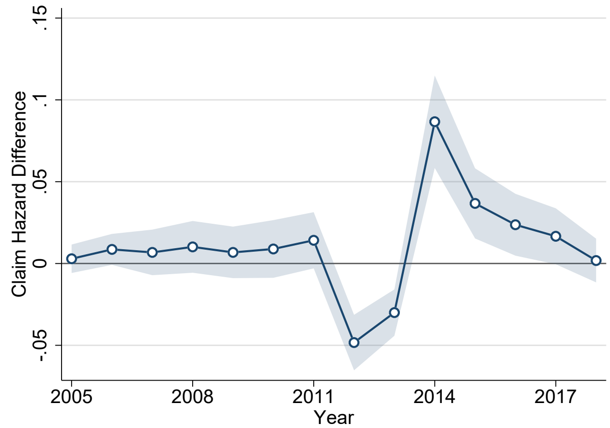
Notes: The table reports estimates from linear regression models where the dependent variable is the hazard of retirement (=1 if retires at age a and zero if not). The variables ACC and PDV are reported in hundred thousand dollars. The elasticity is computed at the mean of the claiming hazard and ACC. Specification 1 includes year, province, and age fixed effects. Specification 2 adds controls for health, gender, marital status, number of kids, lifetime earnings, and last earnings. Specification 3 adds Québec times age fixed effects. Specification 4 adds a Post 2012 times ROC dummy. Specification 5 adds a Post 2014 times Québec dummy. Finally, specification 7 adds controls for the pre-2011 ACC and PDV. Standard errors are clustered at census division level. *** p<0.01, ** p<0.05, * p<0.1

Figure A.4: Difference in Key Outcomes Between Rest of Canada and Québec by Year

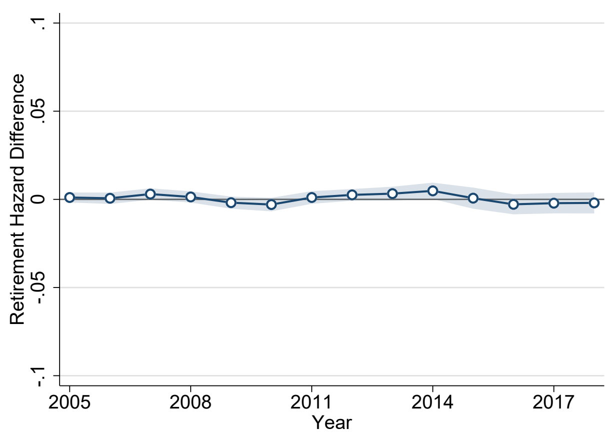
(a) Accrual (in 100,000)



(b) Claiming hazard



(c) Retirement hazard



Notes: The figure plots coefficient estimates of Québec times Year interaction terms from a linear probability model where the dependent variable is the accrual (panel a), the hazard of claiming (panel b), and the hazard of retirement. The reference period is pre-2005. The specification includes year, province, and age fixed effects. The shaded area denotes a 95-percent confidence interval.

B Additional Details and Results for Survey Experiment

B.1 Estimating Subjective Survival Probabilities

We derive age-specific survival probabilities for each respondent from three point-estimates that respondents report in the first part of the survey: Their subjective probability of surviving to age 70, age 80, and age 90. To obtain estimates for subjective survival probabilities all ages, we fit a Gompertz form of the subjective survival curve:

$$s_x(a_i, \theta_i) = \exp(-\tfrac{\alpha_i}{\beta_i} \exp(\beta_i(x - a_i))),$$

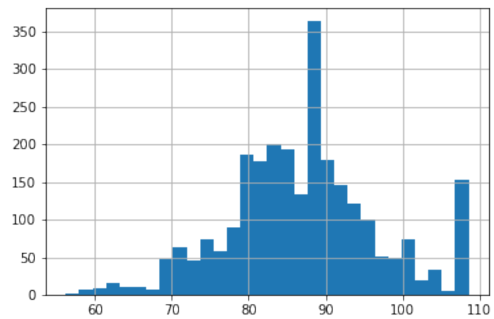
where $\theta_i = (\alpha_i, \beta_i)$ are the subjective parameters for respondent i. To estimate those parameters we use a minimum distance estimator where we minimize the distance between each reported subjective probability and the one predicted from the Gompertz formulation. This yields 3 distances and two unknowns. We solve for each respondent:

$$\hat{\theta}_{i,MD} = \min_{\theta_i} \sum_x \left(p_x(a_i) - s_x(a_i, \theta)\right)^2, \tag{B.2}$$

where the sum is taken over the non-missing reported probabilities. Since there are two parameters, one needs at least two reports in order to estimate these parameters. For those respondents with two reported subjective probabilities, the distance at the estimates is zero. After having calculated the parameters of the Gompertz distribution for each respondent, we then impute these parameters for respondents who did not provide at least two survival probabilities, based on age, gender, education, health conditions and on whether the respondent smoked. The final predicted survival probabilities to ages 70, 80 and 90 are very close to the answers provided in the questionnaire. A simple regression of the predicted probability on the stated probability gives R^2s of 93.56%, 94.28% and 98.74% respectively.

To illustrate the expected life expectancy that results from the fitted survival curves, we show in Figure B.5 the histogram of life expectancy at the individual level.

Figure B.5: Histogram of subjective life expectancy.



Notes: This figure depicts the distribution of life expectancy at the individual level. Life expectancy is calculated using the parameters of the Gompertz distribution, which are estimated to fit the subjective probabilities of living to ages 70, 80, and 90 as reported in the survey by respondents.

B.2 Additional Results

Table B.3: Full Results for the Effect of Incentives in the Claiming Hazard

	(1)	(2)	(3)	(4)	(5)
ACC	-0.0785***	-0.0778***	-0.0765***	-0.0804***	-0.0802***
	(0.0135)	(0.0136)	(0.0132)	(0.0143)	(0.0146)
PDV	0.000680	0.000326	0.000474	0.000816	0.000978
	(0.000752)	(0.000759)	(0.000791)	(0.000825)	(0.000890)
Age at survey		0.00247*	0.00244*	0.00104	-3.53e-05
		(0.00146)	(0.00146)	(0.00143)	(0.00145)
Female		0.00661	0.00375	-0.00292	-0.00244
		(0.00432)	(0.00438)	(0.00439)	(0.00439)
Married		0.00489	0.00370	0.00102	-0.000223
		(0.00462)	(0.00460)	(0.00453)	(0.00452)
HS		0.0282***	0.0252***	0.0279***	0.0272***
		(0.00491)	(0.00494)	(0.00483)	(0.00484)
Less than HS		0.0533***	0.0509***	0.0515***	0.0515***
		(0.0176)	(0.0175)	(0.0170)	(0.0168)
Health problems		0.00281	0.00187	0.000428	0.000439
		(0.00263)	(0.00266)	(0.00261)	(0.00258)
log wealth		0.000203	0.000588	0.000182	3.52e-05
		(0.000499)	(0.000509)	(0.000511)	(0.000513)
Log earnings		0.00709*	0.00891**	0.00694*	0.00527
		(0.00394)	(0.00389)	(0.00419)	(0.00428)
Livewell, disagree			0.00439	0.00472	0.00404
			(0.00475)	(0.00469)	(0.00469)
Livewell, strongly agree			0.0140**	0.0128*	0.0116*
			(0.00710)	(0.00688)	(0.00691)
Livewell, strongly disagree			0.0111	0.0117*	0.0118*
			(0.00692)	(0.00696)	(0.00696)
Spend quickly, disagree			-0.0197***	-0.0192***	-0.0196***
			(0.00584)	(0.00573)	(0.00569)
Spend quickly, strongly agree			0.00748	0.00219	0.00275
			(0.0135)	(0.0137)	(0.0140)
Spend quickly, strongly disagree			-0.0347***	-0.0341***	-0.0343***
			(0.00683)	(0.00678)	(0.00679)
Risk aversion, average risk			0.0193***	0.0165***	0.0173***
			(0.00486)	(0.00477)	(0.00477)
Risk aversion, below average risk			0.0309***	0.0223***	0.0221***
			(0.00780)	(0.00774)	(0.00775)
Risk aversion, no risk			0.0258***	0.0188**	0.0201**
			(0.00861)	(0.00852)	(0.00874)
Risk aversion, substantial fin risk			-0.0223**	-0.0160	-0.0154
			(0.0106)	(0.0110)	(0.0112)
DB trigger				0.0509***	0.0467***
				(0.00606)	(0.00611)
Ret. trigger				0.0685***	0.0687***
				(0.00419)	(0.00420)
Ret. lit., 1 correct					-8.46e-05
					(0.0168)
2 correct					0.00870
					(0.0156)
3 correct					0.0227
					(0.0153)
4 correct					0.0323**
					(0.0153)
5 correct					0.0402**
					(0.0156)
Correct annuity					0.0122**
					(0.00525)
Fin. lit., 1 correct					-0.0154
					(0.0139)
2 correct					-0.0207*
					(0.0124)
3 correct					-0.0185
					(0.0124)
Constant	0.157***	-0.0790	-0.0990	-0.0360	0.0352
	(0.00577)	(0.0924)	(0.0922)	(0.0926)	(0.0952)
Observations	100,974	100,974	100,974	100,974	100,974
R-squared	0.203	0.205	0.207	0.222	0.223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: The table reports estimates from linear regression models where the dependent variable is the hazard of claiming. Controls include age dummies and dummies for the order in which the scenarios 2 to 6 where presented (not shown). Standard errors are clustered at the respondent level. Refer to the main text for the definition of variables. *** p<0.01, ** p<0.05, * p<0.1

C Questionnaire

INSTRUCTIONS INCLUDED WITH AN ANONYMOUS QUESTIONNAIRE

CLAIMING PENSIONS

The following pages contain an anonymous questionnaire, which we invite you to complete. This questionnaire was developed as part of a research project at HEC Montréal.

Since your first impressions best reflect your true opinions, we would ask that you please answer the questions without any hesitation. We ask, however, that you take the time needed to consider certain questions on knowledge, which might involve concepts you are less familiar with. There is no time limit for completing the questionnaire, although we have estimated that it should take approximately 20 minutes.

The information collected will be anonymous and will remain strictly confidential. It will be used solely for the advancement of knowledge and the dissemination of the overall results in academic or professional forums. It is possible that the collected data will be shared with other researchers, solely for non-commercial research purposes, but for projects other than the one for which the data was originally collected. The anonymized dataset resulting from the survey may, at a later date, be made publicly available for academic research purposes.

The online data collection provider agrees to refrain from disclosing any personal information (or any other information concerning participants in this study) to any other users or to any third party, unless the respondent expressly agrees to such disclosure or unless such disclosure is required by law.

You are free to refuse to participate in this project and you may decide to stop answering the questions at any time. By completing this questionnaire, you will be considered as having given your consent to participate in our research project and to the potential use of data collected from this questionnaire in future research. Since the questionnaire is anonymous, you will no longer be able to withdraw from the research project once you have completed the questionnaire, because it will be impossible to determine which of the answers are yours.

If you have any questions about this research, please contact the principal investigator, Pierre-Carl Michaud, at the telephone number or email address indicated below.

HEC Montréal's Research Ethics Board has determined that the data collection related to this study meets the ethics standards for research involving humans. If you have any questions related to ethics, please contact the REB secretariat at (514) 340-6051 or by email at cer@hec.ca.

Thank you for your valuable cooperation!

Pierre-Carl Michaud
Professor
Department of Applied Economics
HEC Montréal
514-340-6466
pierre-carl.michaud@hec.ca

[PN: RESPONDENTS SHOULD NEVER BE ALLOWED TO GO BACK EXCEPT WITHIN THE BREAKEVEN TREATMENT]

Section 1: Background

QA Are you…?
1 Male
2 Female

QB How old are you? *Please Enter.* [PN: MUST ENTER THE 2 CHARACTERS.] [RANGE 55-59]
Numeric
[PN: TERMINATE IF NOT 55-59 INCLUSIVELY]

QC Which province or territory do you live in?
1. British Columbia
2. Alberta
3. Saskatchewan
4. Manitoba
5. Ontario
6. Quebec
7. New Brunswick
8. Nova Scotia
9. Prince Edward Island
10. Newfoundland and Labrador
11. Northwest Territories
12. Nunavut
13. Yukon
14. None of the above

[PN: TERMINATE IF QC==14]

*****

Q1 What is the highest degree, certificate or diploma you have obtained?
1 Less than high school diploma or its equivalent
2 High school diploma or a high school equivalency certificate
3 Trade certificate or diploma
4 College, CEGEP or other non-university certificate or diploma (other than trade certificates or diplomas)
5 University certificate or diploma below the bachelor's level
6 Bachelor's degree (e.g. B.A., B.Sc., LL.B.)
7 University certificate, diploma, degree above the bachelor's level

Q2 What is your marital status?
1 married
2 living common-law
3 widowed

4 separated
5 divorced
6 single, never married

Q2a How old is your partner (spouse)? [Ask if Q2==1 or 2][RANGE 18 - 100]

Q3 At the present time, do you smoke cigarettes daily, occasionally or not at all?
1 Daily
2 Occasionally
3 Not at all

[Ask if Q3==2 or 3][SHOW ON SAME PAGE AS Q3]
Q3a Have you ever smoked cigarettes daily? 1 Yes 2 No

[Multiple select]
Q4 Looking at the following list of health conditions, has a doctor ever told you that you had:
1 Heart disease
2 Stroke
3 Lung disease
4 Diabetes
5 Hypertension
6 Depression or other mental health problems
7 Cancer

For the remainder of this survey, it could be useful to have the following documents in front of you, if they are available: your [PN: IF RESPONSE TO QC==6, ADD "federal" HERE] income tax return for 2018 and that of your spouse, as the case may be; your notice of assessment for 2018 from the Canada Revenue Agency; and your most recent investment and pay statements, if applicable.

Section 2: Financial situation

[PN: THE VARIABLES “EARN” AND “WLTH” ARE DEFINED THROUGH THIS SERIES OF QUESTIONS AND WILL BE USED IN THE EXPERIMENT IN SECTION 6.]

Q5 Which of the following statements best describes your work situation for 2018? Note that by being “retired”, we mean that you have stopped working entirely.

1 Employed (full time, part time, seasonal work)
2 Self-employed or business owner
3 Not in the labor force (retired)
4 Not in the labor force (for reasons other than retired)
7777777 Don’t know
8888888 Prefer not to say

[Ask if Q5==1 or 2]

Q6 For 2018, what is your best estimate of your earnings (salary) before taxes and deductions?

Numeric (0-$5,000,000)
9999999 Don’t know or prefer not to say

IF Q6==Numeric: EARN = Q6
[Ask if Q6== 9999999]

Q6a Is it more than $50,000? 1 Yes 2 No 7777777 Don’t know 8888888 Prefer not to say

If Q6a==1: EARN = 50,000$
If Q6a==7777777 or 8888888: EARN = 25,000$
[Ask if Q6a==2]

Q6b Is it more than 25,000$? 1 Yes 2 No 7777777 Don’t know 8888888 Prefer not to say

If Q6b==1: EARN = 37,500$
If Q6b==2: EARN = 12,500$
If Q6b==7777777 or 8888888: EARN = 25,000$

[Ask if Q5==3]

Q7 Before you retired, what were your average annual earnings in the last couple of years you worked?

Numeric (0-$5,000,000)
9999999 Don’t know or prefer not to say

If Q7==Numeric: EARN = Q7

[Ask if Q7== 9999999]

Q7a Was it more than $50,000? 1 Yes 2 No 7777777 Don’t know 8888888 Prefer not to say

If Q7a==1: EARN = 50,000$
If Q7a==7777777 or 8888888: EARN = 25,000$
[Ask if Q7a==2]

Q7b Was it more than $25,000? 1 Yes 2 No 7777777 Don't know 8888888 Prefer not to say

If Q7b==1: EARN = 37,500$
If Q7b==2: EARN = 12,500$
If Q7b==7777777 or 8888888: EARN = 25,000$

[Ask if Q5==4]

Q8 Since you turned 18, have you worked in at least one calendar year during which you earned an income of at least $3,500?

1 Yes
2 No
9999999 Don't know or prefer not to say

[Ask if Q8==1]

Q9 How many such years have you worked?

Numeric (1-[RESPONSE TO QB - 18])
9999999 Don't know or prefer not to say
IF Q9==NUMERIC: EXP = [min(Q9,40)]/40
IF Q9==9999999: EXP = 20/40

[Ask if Q9== Numeric and Q9>=2]

Q10 What were your average annual earnings in the last couple of years you worked?

Numeric (0-$5,000,000)
9999999 Don't know or prefer not to say
If Q10==Numeric: EARN = Q10*EXP

[Ask if Q10== 9999999]

Q10a Was it more than $50,000? 1 Yes 2 No 7777777 Don't know 8888888 Prefer not to say

If Q10a = 1: EARN = 50,000$ * EXP
If Q10a = 7777777 or 8888888: EARN = 25,000$ * EXP

[Ask if Q10a==2]

Q10b Was it more than $25,000? 1 Yes 2 No 7777777 Don't know 8888888 Prefer not to say

If Q10b==1: EARN = 37,500$*EXP
If Q10b==2: EARN = 12,500$*EXP
If Q10b==7777777 or 8888888: EARN = 25,000$*EXP

[PN: Because of skip logic it is possible that EARN is blank at this point. If EARN is less than 12,000 now, set it to 12,000]

[PN: DEFINE "WLTH" = 0 BEFORE THIS SERIES OF QUESTIONS.]

[Range 0 - $5,000,000]

Q11 What is your best estimate of how much <u>your household</u> has accumulated in individual Registered Retirement Savings Plans (RRSPs) as of today? (Exclude savings in accounts linked to an employer.)

Numeric
9999999 Don't know or prefer not to say

If Q11==Numeric: WLTH = WLTH + Q11

[Ask if Q11==9999999]

Q11a Is it more than $50,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

[Ask if Q11a==1]

Q11b Is it less than $200,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

If Q11b==1: WLTH = WLTH + 125,000$
If Q11b==2: WLTH = WLTH + 275,000$
If Q11b ==777777 or 888888 = WLTH + $100,000

[Ask if Q11a==2]

Q11c Is it more than $10,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

If Q11c==1: WLTH = WLTH + 30,000$
If Q11c==2: WLTH = WLTH + 5,000$
If Q11c==777777 or 888888: WLTH = WLTH + $25,000

[Range 0 - $5,000,000]

Q12 What is your best estimate of how much <u>your household</u> has accumulated in individual Tax-Free Savings Accounts (TFSAs) and individual non-registered savings accounts as of today? (Exclude savings in accounts linked to an employer.)

Numeric
9999999 Don't know or prefer not to say

If Q12==Numeric: WLTH = WLTH + Q12

[Ask if Q12==9999999]

Q12a Is it more than $50,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

[Ask if Q12a==1]

Q12b Is it less than $200,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

If Q12b==1: WLTH = WLTH + 125,000$
If Q12b==2: WLTH = WLTH + 275,000$
If Q12b ==777777 or 888888 = WLTH + $100,000

[Ask if Q12a==2]

Q12c Is it more than $10,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know

If Q12c==1: WLTH = WLTH + 30,000$
If Q12c==2: WLTH = WLTH + 5,000$
If Q12c==777777 or 888888: WLTH = WLTH + $25,000

Q13 Which annual rate of return do you expect to earn on these savings (RRSP and TFSA)?
[PN: Display box with %-sign next to it. Allow participant to enter one decimal.]
Numeric (0-100)
7777777 Don't know
8888888 Prefer not to say

Q14 Defined-contribution pension plans are plans sponsored by employers, where you choose how much to contribute and where the balance of your account fluctuates with the financial markets. Upon retiring, you are allowed to withdraw as much as you want from the account. Do you [if Q2==1,2 add "or your spouse"] have such a plan? Also include "group TFSAs" and "group RRSPs", which are employer provided.
1 Yes
2 No
9999999 Don't know or prefer not to say

[Ask if Q14==1] [Range 0 - $5,000,000]
Q15 What is your best estimate of how much <u>your household</u> has accumulated in defined-contribution employer pension plans (and which has not been taken out to date)?
Numeric
9999999 Don't know or prefer not to say

If Q15==Numeric: WLTH = WLTH + Q15

[Ask if Q15==9999999]
Q15a Is it more than $50,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know
[Ask if Q15a==1]
Q15b Is it less than $200,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know
If Q15b==1: WLTH = WLTH + 125,000$
If Q15b==2: WLTH = WLTH + 275,000$
If Q15b==777777 or 888888: WLTH = WLTH + $100,000

[Ask if Q15a==2]
Q15c Is it more than $10,000? 1 Yes 2 No 8888888 Prefer not to say 7777777 Don't know
If Q15c==1: WLTH = WLTH + 30,000$
If Q15c==2: WLTH = WLTH + 5,000$

If Q15c==777777 or 888888: WLTH = WLTH + $25,000

[Ask if (Q5==1 or 2 or 3) or if (Q5==4 AND Q8==1)]

Q16 A defined-benefit pension plan pays pre-determined benefits during retirement. The benefits depend on the number of years worked and income, but not on the pension plan's returns. [IF Q5==1 (employed), insert "Do you have a defined-benefit pension plan with your current employer?", if Q5==2 or 3 or 4 (self-employed or retired or not in the labor force), insert "Did you have a defined-benefit pension plan with a previous employer?"]

1 Yes
2 No
7777777 Don't know
8888888 Prefer not to say

[Ask if Q16==1]

Q16a Have you already begun receiving the pension from your defined-benefit plan?

1 Yes 2 No 8888888 Prefer not to say

[Ask if Q16a==1]

Q16b At what age did you claim your pension?

Numeric (<= RESPONSE TO QB (AGE))
8888888 Prefer not to say

[Ask if Q16a==1][Range: 0-100]

Q16c What is your best estimate of how much pension income you receive as a fraction of your [if Q5==1 or 2 insert "current", if Q5== 3 or 4 insert "last"] earnings through this defined-benefit pension plan?

Numeric [PN: Show box with % sign next to it]
7777777 Don't know
8888888 Prefer not to say

[Ask if Q16a==2] [RESPONSE TO QB (Age)-100]

Q16d At what age do you plan on claiming the pension from your defined-benefit pension plan?

Numeric
7777777 Don't know
8888888 Prefer not to say

[Ask if Q16a is Numeric]

Q16e Have you inquired what would be the benefits from your defined-benefit pension plan if you claimed at ages other than [RESPONSE TO Q16d]?

1 Yes
2 No
8888888 Prefer not to say

[Ask if Q16a==2]

Q16f What is your best estimate of how much pension income you will receive as a fraction of your [if Q5==1 or 2 insert "current", if Q5== 3 or 4 insert "last"] earnings through this defined benefit pension plan?

Numeric (0-100%)

7777777 Don't know

8888888 Prefer not to say

Section 3: Plans for Retirement

In this section, we will ask about your plans for retirement. By being "retired", we mean that you have stopped working completely.

[PN: DEFINE RETAGE = 60]

[Ask if Q5==1 or 2][DISPLAY Q17 ON SAME SCREEN AS THE INTRODUCTORY TEXT]

Q17 At what age do you plan on retiring?
Numeric (>=RESPONSE TO QB)
7777777 Don't know
8888888 Prefer not to say

If Q17 == Numeric: RETAGE = Q17

Q18 Do you have a financial plan for your retirement, in the sense that you have thought about how much money you will need in retirement, and how much income you will have from different sources (public programs and private sources)?

1 Yes
2 No
7777777 Don't know
8888888 Prefer not to say

[PN: For the remainder of this questionnaire, define REG = "Quebec Pension Plan" if QC==6 (Quebec), and REG = "Canada Pension Plan" otherwise. Similarly, define ORG = "Retraite Québec" if QC==6 (Quebec), and ORG = "Service Canada" otherwise.]

Q19 The [REG] is a retirement income program administered by the government. At what age do you plan on claiming your [REG] pension?

Numeric (>=RESPONSE TO QB)
7777777 Don't know
8888888 Prefer not to say

[Ask if Q19 is Numeric]

Q20 How did you gather information to decide when to claim your [REG] benefits? Please choose at least one and up to three responses.

1 I was advised by a pension representative at my workplace.
2 I was advised by my financial advisor.
3 I was advised by friends and/or family members.
4 I used an online tool offered by [ORG].
5 I used the pension statement and documents mailed to me by [ORG].
6 Other – Please specify: [PN: HAVE TO ENTER A RESPONSE]
7 Until now I had not really thought about it. [PN: Make this an exclusive option]
8888888 Prefer not to say

[Ask if Q20==1]

Q20a Did the pension representative recommend you claim as early as possible?

1 Yes
2 No
7777777 Don't know
8888888 Prefer not to say

[Ask if Q20==2]

Q20b Did your financial advisor recommend you claim as early as possible?
1 Yes
2 No
7777777 Don't know
8888888 Prefer not to say

PN: Q20a and Q20b can be displayed on one screen for respondents with Q20==1 and 2

[Ask if Q20<7]

Q20c What are the main reasons you plan to claim at age [RESPONSE TO Q19]? Please choose at least one and up to three reasons.
1 I did not know I could claim at other ages.
2 I have to claim at that age in order to maintain my standard of living.
3 Claiming my pension at a different age is not financially attractive.
4 I am afraid to be in poor health later in life, which would prevent me from enjoying pension benefits later in life.
5 I have sufficient income from other sources and do not need the pension earlier.
6 I think I will live long enough to still enjoy my pension benefits later in life.
7 I think I can invest the money and come out ahead.
8 I want to claim at the same age I retire.
9 I am unsure of whether the [REG] will be able to pay the pension later on.
10 Other – Please specify: [PN: HAVE TO ENTER A RESPONSE]
8888888 Prefer not to say

Section 4: Risk Perception

Next we would like to ask your opinion about how likely you think various events might be. When we ask a question, we'd like you to give us a number from 0 to 100, where "0" means that you think there is absolutely no chance, and "100" means that you think the event is absolutely certain to happen. For example, no one can ever be sure about tomorrow's weather, but if you think that rain is very unlikely tomorrow, you might say that there is a 10 percent chance of rain. If you think there is a very good chance that it will rain tomorrow, you might say that there is an 80 percent chance of rain.

[PN: Show Q21-Q23 on the same screen]

Q21 What do you think is the likelihood you will live to age 70? Please enter a number between 0 and 100, 0 meaning you expect there is no chance you will live to 70, and 100 meaning that you will live to 70 with certainty.

[PN: Provide box for numerical answer] [Range: 0 – 100]

Numeric (0-100)
7777777 Don't know
8888888 Prefer not to say

[Ask if Q21>0 and is Numeric]

Q22 What do you think is the likelihood you will live to age 80? Please enter a number between 0 and 100, 0 meaning you expect there is no chance you will live to 80, and 100 meaning that you will live to 80 with certainty.

[PN: CAP THE MAX ALLOWED RESPONSE HERE TO THE VALUE OF RESPONSE TO Q21]
[PN: Provide box for numerical answer] [Range: 0 – [RESPONSE TO Q21]]

Numeric
7777777 Don't know
8888888 Prefer not to say

[Ask if Q22>0 and is Numeric]

Q23 What do you think is the likelihood you will live to age 90? Please enter a number between 0 and 100, 0 meaning you expect there is no chance you will live to 90, and 100 meaning that you will live to 90 with certainty.

[PN: CAP THE MAX ALLOWED RESPONSE HERE TO THE VALUE OF RESPONSE TO Q22]
[PN: Provide box for numerical answer] [Range: 0 – [RESPONSE TO Q22]]

Numeric
7777777 Don't know
8888888 Prefer not to say

Q24 What do you think is the likelihood that at some point after you retire you will face a very large expense due to a health problem that requires that you draw down your savings? Please enter a number between 0 and 100, 0 meaning you expect that there is no chance this will occur and 100 meaning that you are certain this will occur.

[PN: Provide box for numerical answer] [Range: 0 – 100]

Numeric
7777777 Don't know

8888888 Prefer not to say

Section 5: Financial literacy and preferences

We would now like to ask you a few questions concerning your familiarity and ease with certain financial concepts, as well as your knowledge of certain pension and retirement programs. Please answer the questions to the best of your knowledge, without any outside assistance.

Q25 Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow during these 5 years?

1 More than $102
2 Exactly $102
3 Less than $102
7777777 Don't know
8888888 Prefer not to say

Q26 Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy…

1 More than today
2 Exactly the same as today
3 Less than today
7777777 Don't know
8888888 Prefer not to say

Q27 Do you think the following statement is true or false? "Buying a single company's stock usually provides a safer return than a stock mutual fund."

1 True
2 False
7777777 Don't know
8888888 Prefer not to say

[PN: FOR THIS QUESTION, DEFINE AND RECORD THE VARIABLE "GIVEUP" = [, give up $12,000] WITH A PROBABILITY OF 0.5, AND "GIVEUP" = [], I.E. EMPTY, WITH A PROBABILITY OF 0.5.]

Q28 John learns on first of January that he has at most 3 years to live and he has no heirs. He has a 100% chance of living another year, a 50% chance of living 2 years only and a 25% chance of living 3 years. He has $12,000 in the bank (which pays no interest) and wants to make the best use of it. He has three options:

1) spend $4,000 each year
2) spend $6,000 this year, $4,000 next year and $2,000 in the third year
3) use the money to buy an annuity [GIVEUP] and receive a check of $6,000 each year for as long as he lives.

Which one should he pick?
1 Option 1

2 Option 2
3 Option 3
7777777 Don’t know
8888888 Prefer not to say

[PN: FOR Q29, RANDOMIZE ORDER OF CHOICES (SINGLE SELECT).]

Q29 Retirement benefits from the [REG]:
1 Are generally a fixed amount per person
2 Depend entirely on the recipient’s income in the previous year
3 Are based on a recipient’s career earnings
4 Are based on the value of contributions made to the plan by the recipient, plus a fixed return
5 Are based on the value of contributions made to the plan by the recipient, plus a variable return that depends on financial markets returns
7777777 Don’t know
8888888 Prefer not to say

[PN: AFTER QUESTION Q29, SHOW CORRECT ANSWER TO RESPONDENTS (ANSWER #3 IN THE ORDER SHOWN ABOVE). PLEASE USE THE FOLLOWING FORMAT: “Your response is [IF Q29==3, INSERT “correct”, ELSE INSERT “not correct”]. Retirement benefits are based on a recipient’s career earnings.”]. SAME FOR Q30-Q33]

[PN: IN THE FIRST PROGRAMMED VERSION, SOME PARTICIPANTS DO NOT SEE THE CORRECT ANSWER HAVING RESPONDEDN, WHILE OTHERS DO. MAYBE IT DEPENDS ON THE BROWSER (IN SAFARI I DON’T SEE CORRECT RESPONSE E.G.), BUT IT’S IMPORTANT THAT EVERYONE SEES THE CORRECT ANSWER!]

Q30 When is the earliest age at which you can claim retirement benefits from the [REG]?
Numeric (30-100)
7777777 Don’t know
8888888 Prefer not to say

[PN: AFTER QUESTION Q30, PROVIDE CORRECT ANSWER (60) TO RESPONDENTS BY SHOWING THIS SENTENCE UNDER THE QUESTION: “Your response is [IF Q30==60, INSERT “correct”, ELSE INSERT “not correct”]. The earliest age at which you can claim retirement beenfits from the [REG] is 60 years old”.]

Q31 If someone begins to draw [REG] retirement benefits earlier than some “normal age”, is there a penalty (a reduction in the amount of the monthly benefit received)?
1 Yes
2 No
7777777 Don’t know
8888888 Prefer not to say

[PN: AFTER QUESTION Q31, SHOW CORRECT ANSWER TO RESPONDENTS (ANSWER #1) BY SHOWING THIS SENTENCE UNDER THE QUESTION: “Your response is [IF Q31==1 (Yes), INSERT "correct", ELSE INSERT "not correct"]. If someone begins to receive retirement benefits before some "normal age", monthly benefits are reduced."]

Q32 If someone begins to draw [REG] retirement benefits later than some "normal age", is there a bonus (an increase in the amount of the monthly benefit received)?

1 Yes
2 No
7777777 Don't know
8888888 Prefer not to say

[PN: AFTER QUESTION Q32, SHOW CORRECT ANSWER TO RESPONDENTS (ANSWER #1), BY SHOWING THIS SENTENCE UNDER THE QUESTION: "Your response is [IF Q32==1 (Yes), INSERT "correct", ELSE INSERT "not correct"]. If someone begins to receive retirement benefits later than some "normal age", monthly benefits increase.".]

Q33 At what age can you claim your full [REG] pension without any penalty?

Numeric (30-100)
7777777 Don't know
8888888 Prefer not to say

[PN: AFTER QUESTION Q33, PROVIDE CORRECT ANSWER TO RESPONDENTS BY SHOWING THIS SENTENCE UNDER THE QUESTION: "Your response is [IF Q33==65, INSERT "correct", ELSE INSERT "not correct"]. You can claim your full [REG] pension at 65 years old".]

Q34 Do you agree with the following statements? (Answers: 5 Strongly Agree; 4 Agree; 3 Disagree; 2 Strongly Disagree; 1 Don't know)

Q34a Parents should set aside money to leave to their children or heirs once they die, even when it means somewhat sacrificing their own comfort in retirement
Q34b I prefer to live well but for fewer years than to live long and have to sacrifice my quality of life
Q34c I would rather spend down my wealth quickly because I might not be healthy enough to enjoy the money later in life

Q35 Would you say you are a patient person when it comes to financial decisions?

1 Strongly Agree
2 Agree
3 Disagree
4 Strongly Disagree
5 Don't know

Q36 Which of the following statements comes closest to describing the amount of financial risk that you are willing to take when you wish to save or make investments?

1 I am willing to take substantial financial risks expecting to earn substantial returns
2 I am willing to take above average financial risks expecting to earn above-average returns
3 I am willing to take average financial risks expecting to earn average returns

4 I am willing to take below average financial risks expecting to earn below-average returns
5 I am not willing to take any risk, knowing I will earn a small but certain return

Section 6: Making choices

PN: In this section, we first show an intro screen providing information on the task. We then ask question Q37, a "reference choice" scenario with no framing. Follows an "intervention" with three treatment arms. Then, there is a sequence of 5 randomized choices also without a frame (Q38 to Q42), and finally one last choice at Q43 that includes a frame which is itself randomized.

All calculated dollar values in this section are to be rounded to the nearest dollar and formatted as $X,XXX in English and X XXX $ in French

INTRO SCREEN (show only once per respondent)
The following questions present scenarios that relate to the decision to claim benefits from the [REG]. We ask that you answer the questions as best you can. The scenarios may slightly depart from your actual, personal situation, but they approximate the choices you likely face when you reach the age at which you need to make a claiming decision.

Note that while these questions may appear to be similar, relevant details of the scenarios will differ. We therefore ask that you read the scenarios carefully and make your decision based on the information provided on each screen.

*****

PN: Define the following variables:

- *EARN will come from section 2.*
- *WLTH will come from section 2.*
- *RETAGE is defined in section 3, near Q17.*
- *MBEN = 0.25*min(EARN,50000)/12*
- *ABEN = 0.25*min(EARN,50000)*
- *R = 2% with probability 0.5, or R = 5% with probability 0.5*

*****

There are 6 scenarios, each defined by a MALUS and a BONUS. These are given by:

SCENARIO	**MALUS**	**BONUS**
1 (baseline)	7.2%	8.4%
2	2.2%	3.4%
3	5.2%	6.4%
4	8.2%	9.4%
5	11.2%	12.4%
6	14.2%	15.4%

TABLE 1: BONUS and MALUS values.

And here is the matrix of factors FX for each of the 6 scenarios (where X=60,61…70):

	F60	*F61*	*F62*	*F63*	*F64*	*F65*	*F66*	*F67*	*F68*	*F69*	*F70*
Scenario 1	*0.64*	*0.712*	*0.784*	*0.856*	*0.928*	*1*	*1.084*	*1.168*	*1.252*	*1.336*	*1.42*
Scenario 2	*0.89*	*0.912*	*0.934*	*0.956*	*0.978*	*1*	*1.034*	*1.068*	*1.102*	*1.136*	*1.17*
Scenario 3	*0.74*	*0.792*	*0.844*	*0.896*	*0.948*	*1*	*1.064*	*1.128*	*1.192*	*1.256*	*1.32*
Scenario 4	*0.59*	*0.672*	*0.754*	*0.836*	*0.918*	*1*	*1.094*	*1.188*	*1.282*	*1.376*	*1.47*
Scenario 5	*0.44*	*0.552*	*0.664*	*0.776*	*0.888*	*1*	*1.124*	*1.248*	*1.372*	*1.496*	*1.62*
Scenario 6	*0.29*	*0.432*	*0.574*	*0.716*	*0.858*	*1*	*1.154*	*1.308*	*1.462*	*1.616*	*1.77*

TABLE 2: Values of factors "FX" depending on the scenario, where X=60,61…70.

Finally, define the following frames [FRAME] which is a sentence that will be shown in Q43:

Frames	***Frequency***	***Gain or Loss***	***Reference point***	***FRAME text (factors all taken from Scenario 1 in TABLE 2. Note that the statements should be printed in bold and underlined)***
0				*None*
1	*M*	*Loss*	*65*	**For example, claiming at age 60 instead of age 65 will result in a [(F65-F60)*MBEN] reduction in your monthly benefit for your remaining lifetime.**
2	*M*	*Loss*	*67*	**For example, claiming at age 60 instead of age 67 will result in a [(F67-F60)*MBEN] reduction in your monthly benefit for your remaining lifetime.**
3	*M*	*Gain*	*65*	**For example, claiming at age 65 instead of age 60 will result in a [(F65-F60)*MBEN] increase in your monthly benefit for your remaining lifetime.**
4	*A*	*Loss*	*65*	**For example, claiming at age 60 instead of age 65 will result in a [(F65-F60)*ABEN] reduction in your annual benefit for your remaining lifetime.**
5	*A*	*Gain*	*65*	**For example, claiming at age 65 instead of age 60 will result in a [(F65-F60)*ABEN] increase in your annual benefit for your remaining lifetime.**

TABLE 3: "FRAME" texts.

The scenarios in Q37 to Q42 are done with FRAME=0. The last scenario (in Q43) picks one frame at random per respondent among frame texts 1 to 5 in Table 3 (each with probability 1/5).

SCENARIO SCREENS for each of Q37 to Q43
(with the "treatment" defined below shown between Q37 and Q38)

*[PN: FOR Q38-Q43 ONLY, INSERT THE FOLLOWING HERE: "*Now also consider the following scenario, which differs somewhat from the previous one(s) you have seen.*"]*
[PN: NOTE THAT WE ADDED BOLD FORMATTING TO SOME STATEMENTS]

When you turn 60, you will have to decide whether to claim your [REG] benefits. [If Q5 is not 3 (retired), insert "Assume your current plan is to retire completely at age [RETAGE], and that until that age, your yearly earnings will be [EARN] if you work."] Assume you have [WLTH] in retirement savings, which earn an annual return of [R], and which are not taxed if you choose to withdraw them.

At age 60, you will receive a statement from [ORG] regarding your [REG] benefits if you claim at different ages between 60 and 70. These benefits are *net of taxes* and have no effect on your other pension benefits. Importantly, these benefits *protect you against inflation* and will be paid no matter what. Suppose the statement includes the following information regarding the **monthly** [substitute "monthly" by "**annual**" in Q43 if Frame 4 or Frame 5 is shown] **benefit** you can get if you claim at different ages:

60	61	62	63	64	65	66	67	68	69	70
F60*MBEN	F61*MBEN	F62*MBEN	F63*MBEN	F64*MBEN	F65*MBEN	F66*MBEN	F67*MBEN	F68*MBEN	F69*MBEN	F70*MBEN

TABLE 4: Potential pension payouts depending on claiming age. (Where MBEN is as defined above, and F60 refers to column 1 of Table 2; the row to use to pick the correct cell in Table 2 will depend on the scenario. Format numbers as $X,XXX in English and as X XXX $ in French. Also note that in Q43, Frames 4 and 5 show annual benefits (ABEN) instead of monthly benefits (MBEN).)

[PN: TABLE FORMAT: CENTER TABLE HORIZONTALLY ON SCREEN. DON'T USE VERTICAL BORDERS, ONLY HOROZONTAL. PRINT AGE BOLD. INCREASE HEIGHT OF THE ROWS AND CENTER THE NUMBERS (VERTICALLY AND HORIZONTALLY). MAKE TOP AND BOTTOM BORDER THICKER THAN THE MIDDLE ONE. SHOULD LOOK LIKE THIS (NUMBERS JUST AN EXAMPLE):

60	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
$667	$742	$817	$892	$967	$1,042	$1,130	$1,217	$1,305	$1,392	$1,480

]

[For Q37 – Q42 only: "This corresponds to a **penalty of [MALUS]** for each year prior to age 65 and a **reward of [BONUS]** for each year after age 65. This penalty or reward will apply *for the rest of your life*."]

[FRAME] *for Q43*

[SCENARIO=1, FRAME=0]
[Range: 60-70]

Q37 Faced with this situation, at what age would you plan to claim your pension?

TREATMENTS (to show once between Q37 and Q38)

There are 2 interventions to randomize (a third arm is the control and does not get an intervention), for a total of 3 treatments. Each respondent gets one and only one treatment. The treatment drawn for a respondent is to be administered to him/her only once, immediately prior to Q38.

Treatment Arms	***Probability for each respondent to get a given treatment***
1. Control	*1/3*
2. Break-Even	*1/3*
3. Insurance	*1/3*

TABLE 5: Treatment probabilities.

The specification of the treatments are given hereafter.

1. CONTROL TREATMENT

Respondents getting this treatment are not shown anything between questions Q37 and Q38. For these respondents, the questionnaire thus goes directly from Q37 to Q38 ("Scenario screens" above).

2. BREAK-EVEN TREATMENT

Respondents getting this treatment are shown the following once between questions Q37 and Q38. Respondents should be allowed to back and forth between the two screens on which this treatment is described.

[PN: Note that names are different in French and in English version]

IF QA=1(Male):
NAME1 = JOHN, NAME2 = ERIC, NAME3=ROB
PRON1 = HE
PRON2 = HIS
IF QA=2(Female):
NAME1 = MEREDITH, NAME2 = BEVERLY, NAME3 = ERIN
PRON1 = SHE
PRON2 = HER

One way of choosing when to claim pension benefits is by comparing the total pension income you receive in retirement depending on what age you claim your pension. As a simple example, suppose that [NAME1] and [NAME2] can both claim a monthly pension of $500 at age 65. [NAME1] decides to claim at age 60 already for a reduced monthly pension of $320. [NAME2] decides to wait with claiming [PRON2] pension until [PRON1] is 65 years old.

For five years, [NAME1] receives [PRON2] pension of $320. When [NAME2] starts [PRON2] pension, [NAME1] has collected 60 monthly pensions of $320, or $19,200. When [NAME2] starts [PRON2] pension, [PRON1] receives a higher monthly benefit than [NAME1] and thus [PRON2] total pension income slowly catches up to [NAME1]'s. Starting at age 74, [NAME2] has collected a higher total pension income than [NAME1], and the difference becomes larger every year.

[NEW SCREEN]

Now consider a third person, [NAME3]. [NAME3] could have also claimed a monthly pension of $500 at age 65, but decided to wait with claiming until [PRON1] is 68 years old for a monthly pension of $625. When adding up [PRON2] monthly pension benefits, we see that starting at age 76, [PRON2] total pension is larger than that of [NAME1] (who claimed at age 60) and starting at age 80, it is also larger than that of [NAME2] (who claimed at age 65).

Below is a graph illustrating the total pension income for different claiming ages.
[PN: Note that graph is different in English and in French version]

Hence, the total expected pension income for different claiming ages depends on **how long one expects to live**. A [male/female] Canadian aged 60 today can expect to live on average [IF QA=1(Male): INSERT “25”; OTHERWISE INSERT “28”] years according to projections by Statistics Canada.

It is important to note that this is just a numerical example. The actual breakeven age will depend on the pension benefits you would receive at different claiming ages.
3. INSURANCE TREATMENT

Respondents getting this treatment are shown the following <u>once</u> between questions Q37 and Q38.

Deciding when to claim one's pension affects income for the rest of your life. Claiming a pension early means one can enjoy a pension income early on. However, the pension can be considerably smaller than if claiming had been delayed by a few years. This is especially relevant because some people run out of savings later in retirement if they live longer than they thought.
Claiming early can be beneficial for individuals who expect to die relatively young, for example due to poor health or known family conditions. Claiming later, on the other hand, can be beneficial for individuals who expect to live relatively long, because they will benefit most from a higher pension, which provides some **insurance against financial risk** at later ages. Furthermore, [REG] benefits provide an **insurance against inflation** since they are adjusted for inflation.

For a [IF QA=1(Male): INSERT "male"; OTHERWISE INSERT "female"] Canadian aged 60 today, the average likelihoods of reaching different ages are as follows according to projections by Statistics Canada. Note that a likelihood of 0 indicates that an event is impossible, and a likelihood of 100 indicates that it is certain that an event will occur.

Age	Average likelihood of reaching that age
65	
70	
75	
80	
85	
90	

TABLE 6: Survival likelihoods to be shown to respondents.

To fill Table 6 above, use the appropriate column in Table 7 below depending on response to QA (sex)

Age	***Average likelihood of reaching that age for individual age 60***	
	IF QA=1(male)	*IF QA=2(female)*
65	*96.2*	*97.2*
70	*90.9*	*93.3*
75	*83.5*	*87.9*
80	*72.7*	*79.9*
85	*56.4*	*67.2*
90	*32.3*	*46.2*

TABLE 7: Survival likelihoods by sex as projected by Statistics Canada.

Q38-Q42 *After treatment has been shown, randomize order of scenarios 2 to 6 (5 questions in total) with FRAME=0 and show "Scenario screens" above accordingly.* [Range: 60-70]

Q43 Present scenario 1 again to respondents as in Q37, but this time including a FRAME text randomly drawn from rows 1 to 5 in Table 3, each with probability 1/5. Note that while in questions Q37-Q42, monthly benefits were shown (MBEN), frames 4 and 5 present annual benefits (ABEN) (see Table 3). That means that Table 4 that is shown to respondents has to be changed to show annual benefits.
[Range: 60-70]