Institute for Fiscal Studies

Grant Miller
Nieves Valdés
Marcos Vera-Hernández

Working paper

25/31

More to live for: health investment responses to expected retirement wealth in Chile

Economic and Social Research Council

More to Live for: Health Investment Responses to Expected Retirement Wealth in Chile

Grant Miller Nieves Valdés Marcos Vera-Hernández*

September 6, 2025

Abstract

An important but poorly understood way that economic development may influence health is through the private incentives that it creates for individuals to invest in their own health. In this paper, we study how individuals' forward-looking health investments respond to changes in expected future (but not current) wealth. Focusing on institutional features of Chile's public pension overhaul in 1981, we link administrative microdata to a detailed household panel survey, and we then exploit discrete breaks in the resulting cohort pension wealth profile using a fuzzy regression kink design (RKD). Although theoretically ambiguous, empirically we find that greater expected pension wealth increases the use of important preventive medical care (and to a lesser extent, promotes more costly healthy lifestyle behaviors) – leading to measurable increases in chronic disease diagnosis (a requisite for appropriate disease management), reductions in disease prevalence, and measurably lower mortality in old age (particularly due to chronic diseases). In general, these results provide new evidence that economic development can have a meaningful incentive effect on health.

*Grant Miller, Stanford Medical School and NBER. Email: ngmiller@stanford.edu. Nieves Valdés, Escuela de Negocios, Universidad Adolfo Ibáñez. Email: nieves.valdes@uai.cl. Marcos Vera-Hernández, University College London, IFS, and CEPR. Email: m.vera@ucl.ac.uk. The authors gratefully acknowledge financial support from CAF-Banco de Desarrollo de América Latina. Nieves Valdés acknowledges support from ANID-Chile (FONDECYT) through grant 11130058, and Marcos Vera-Hernández from financial support from the Ministerio de Ciencia, Innovación y Universidades (Spain) under the project PID2022-137352NB-C44. We thank numerous seminar participants from the RFBerlin Workshop on the Economics of Aging, American-European Health Economics Study Group - IX Edition, CEDA Workshop, Global Health Economics Working Group Seminar, IHEA and ASHEcon Annual Meetings, LACEA/LAMES Annual Meeting, SECHI Annual Meeting, Universidad Adolfo Ibáñez, Universidad de Montevideo, Universidad ORT, Universidad Diego Portales, Universidad de Chile, Universidad de La Plata, Ministerio de Desarrollo Social y Familia de Chile and Superintendencia de Pensiones de Chile, University College London, as well as James Banks, Pedro Carneiro, Mariacristina De Nardi, Christian Dustmann, Eric French, Jonas Hjort, Joseph Hotz, Attila Lindner, Cormac O'Dea, Cristóbal Otero, and Michela Tincani for helpful comments and suggestions. We are also grateful to the staff of the Research Division at Chile's Superintendence of Pensions for providing access to data and for assistance in interpreting recognition bond records. All errors are our own.

1 Introduction

A large body of research links long-term economic growth to improvements in population health (Pritchett and Summers, 1996). However, the precise ways that economic growth improves health are complex.[1] Considerable past research has focused on the contemporaneous role of income and consumption (nutrition and use of medical care, for example) in health production and on how child nutrition fosters economic productivity in adulthood (Rodgers, 1975; Bliss and Stern, 1978; Basta et al., 1979; Immink and Viteri, 1981; Strauss, 1986; Deolalikar, 1988; Fogel, 1994; Dasgupta, 1997; Thomas and Strauss, 1997; Strauss and Thomas, 1998; Hoddinott et al., 2013; Vogl, 2014). More poorly understood, however, is the possibility that economic growth strengthens forward-looking incentives for individuals to invest in their own health.

Consistent with canonical models of human capital accumulation by forward-looking individuals (Becker, 1964, 1967; Grossman, 1972a,b), expectations of greater future wealth may create incentives for longevity because, all else equal, individuals have "more to live for."[2] Put differently, the utility derived from an extra year of life is greater because additional material resources allow higher consumption.[3] Although we are unaware of studies that have empirically examined how health investments respond to changes in future economic circumstances, such behavioral responses may be meaningful.[4]

This paper provides new empirical evidence on forward-looking incentives for health investments by studying how current health behaviors respond to changes in expected future (but not current) wealth. To study this issue empirically, we take advantage of policy details governing the transition of Chile's public pension program from a Defined Benefit (DB) system

[1]There is ongoing debate about the primary causes of mortality decline; economic gains may not be most important but undoubtedly matter (Preston, 1975; McKeown, 1976; Fogel, 1994; Cutler and Miller, 2005; Cutler et al., 2006).

[2]A growing literature in behavioral economics also provides alternative models of forward-looking individual decision-making (Laibson, 1997; O'Donoghue and Rabin, 1999; Angeletos et al., 2001; Harris and Laibson, 2001; Pistaferri, 2001). In general, changing one's health investments in response to a shock to future wealth does not require fully rational behavior.

[3]Attanasio and Hoynes (2000) observe that accounting for the wealth-health relationship is required for appropriately estimating wealth-age profiles.

[4]Studying self-protective behavior in response to HIV/AIDS in Sub-Saharan Africa, Oster (2012) shows evidence that the degree of self-protection is related to material well-being.

to a Defined Contribution (DC) system in 1981.[5] Our approach does not compare DC enrollees with those choosing to remain in the DB system. Instead, we use age-related variation in the way that participants in the DB system were compensated for their previous contributions – variation creating a kink in the cohort pension wealth profile. To do so, we use a fuzzy regression kink design (FRKD) to estimate how individuals' private investments in their own health respond to variation in expected future pension wealth (Card et al., 2012, 2015).

There are two forward-looking channels through which greater expected pension wealth can affect health investments before retirement. One is that, given concavity of the utility function, individuals have an incentive to spend additional wealth on extra years of life rather than simply keeping the same lifespan but consuming more in each year (Hall and Jones, 2007). The other is ambiguous *a priori* and depends on whether consumption and health are complements or substitutes in the utility function. To make these ideas clear, we develop a simple model that incorporates these mechanisms by allowing the marginal utility of consumption to depend on health (see Section A.1 in the Appendix). If consumption and health are complements (and hence the marginal utility of consumption increases with health), greater future consumption increases the incentive to invest in health. Existing empirical evidence on complementarity or substitution is somewhat thin, and mixed: Lillard and Weiss (1997) and Low and Pistaferri (2015) find evidence of substitution; Viscusi and Evans (1990), Finkelstein et al. (2013), and Blundell et al. (2020) find evidence of complementarity; and Evans and Viscusi (1991) and De Nardi et al. (2010) find no significant evidence of either. However, the degree of substitution required to completely offset the "more to live for" effect would need to be quite sizeable.

To estimate empirically how health behaviors respond to changes in future pension wealth, we first link two rich data sources at the individual level, joining four waves of Chile's nationally-representative Social Protection Survey (or *Encuesta de Protección Social* (EPS)) with monthly administrative records from Chile's public pension system (from the *Historia Previsional de Afiliados* (HPA) database). This linked EPS-HPA data enables us to

[5]The Chilean Pension reform has been studied by Diamond (1994), Edwards (1998), Diamond (2002), Arenas de Mesa et al. (2008), Stephen and Kay (2008), Attanasio et al. (2011), Quintanilla (2011b), Quintanilla (2011a), and Attanasio et al. (2014), among others.

calculate expected pension wealth (EPW) at retirement for every individual in our nationally representative sample. It also allows us to observe their health lifestyle behavior (physical activity, alcohol consumption, and smoking), use of screening tests (specifically for diabetes, cholesterol, and hypertension), and chronic disease diagnoses (for cardiovascular disease, diabetes, hypertension, and kidney failure). We focus on Chilean men given substantially lower labor force participation rates (and greater variability in ages of labor force entry) among women.[6]

Doing so, we find that greater expected pension wealth increases use of key chronic disease screening tests (for high cholesterol, hypertension, and diabetes) which contribute to healthy aging and longevity. These preventive screenings are critical for early detection and subsequent management of chronic diseases, and they can reduce hospitalizations (Guirguis-Blake et al., 2021; Kaczorowski et al., 2011) as well as risk of major morbidity and premature mortality (Cheung et al., 2004; ADVANCE Collaborative Group, 2008; Holman et al., 2008; The Action to Control Cardiovascular Risk in Diabetes Study Group, 2008; Law et al., 2009). We also note that these health investments are relatively less costly (both in time and in utility loss) than others because they require relatively little behavior change (only a single medical visit, for example) and because health conditions identified through them can often be managed with simple pharmaceutical interventions. To a lesser extent, we also find increases in physical activity and exercise, a more costly lifestyle change in health behavior.

In interpreting these results as forward-looking health investments, we also investigate if they could alternatively be due to higher current (pre-retirement) disposable income, which could make health investments more affordable. Individuals expecting greater future wealth in retirement might wish to borrow against their future wealth (although for all years prior to the COVID-19 pandemic, individuals were not allowed to borrow against their pension wealth), or to implicitly do so by reducing their private savings. Empirically, however, we find little evidence that they play a meaningful role – and in particular, we find no effect of greater expected pension wealth on household expenditures. Moreover, the health investments that

[6]As we show in Figure A.4, we do not observe a discernible kink in women's expected pension wealth profile, presumably because they have historically participated less in the formal labor market in Chile (Contreras et al., 2005).

we study are inexpensive, and screening tests for chronic diseases (including high cholesterol, hypertension, and diabetes) are covered by Chile's national health insurance program (other than for very small copayments).[7]

Importantly, these health investments then translate directly into higher diagnosis rates of major chronic diseases sensitive to them – specifically, hypertension, diabetes and heart disease (which increase by 0.43%, 0.43%, and 0.7%, respectively). Using a similar estimation framework together with data from the Chilean National Health Survey (ENS), a nationally-representative epidemiological surveillance survey, we present evidence that these increases in diagnosis reflect greater detection of chronic diseases rather than increases in disease prevalence. Specifically, exploiting the same birth cohort kink, we find suggestive evidence that, if anything, greater EPW *reduced* chronic disease prevalence rates.

Finally, an important question is if these health investments actually led to measurable declines in mortality. To test for this, we use Chile's administrative death records to estimate discrete-time survival models (following Jenkins (1995)). By allowing heterogeneity by individual year of age, we are able to capture changes in the slope of age-specific mortality rates at the birth cohort kink. We find that the reform measurably increased longevity, reducing age-specific mortality rates in old age, and in particular, among the key chronic conditions for which we find greater health investments.

In addition to providing new evidence on how economic development can improve health through an incentive effect, our paper is also related to several other broad areas of research. First, it contributes to a large literature on the effects of pension reforms on consumption and savings (Feldstein, 1974; Attanasio and Rohwedder, 2003; Attanasio and Brugiavini, 2003; Aguila, 2011; Chetty et al., 2014; Lachowska and Myck, 2018). We also complement previous empirical evidence on changes in health-related outcomes produced by increases in income due to non-contributory pension reforms. For example, Bando et al. (2022) (using data from Paraguay) and Galiani et al. (2016) (using data from Mexico) show that beneficiaries of new non-contributory pensions enjoy gains in psychological well-being and mental health.

Second, our paper contributes to a substantial empirical literature demonstrating important

[7]Copayments for each test performed by a public provider cost less than 2017 USD $0.50, and copayments for tests performed by private providers cost less than 2017 USD $1.50 – see Appendix Table A.5.

forward-looking economic behavior (studying a horizon of a decade or more) (Modigliani et al., 1954; Friedman, 1957). Ashenfelter (1978) prominently observes an anticipatory earnings response to job training programs, an idea reinforced by others, including Heckman and Smith (1999). Research in public finance documents 'fiscal foresight,' or behavioral adjustments to the announcement of fiscal policy changes before they occur (Hall, 1971; Auerbach, 1989; Yang, 2005; Lemos, 2006; House and Shapiro, 2006). More generally, anticipatory forward-looking behavior has been shown in a wide range of other areas, including the supply response of physicians to tort reforms (Malani and Reif, 2015), health care use in response to dynamic incentives embedded in non-linear health insurance contracts (Aron-Dine et al., 2015), pharmaceutical consumption responses to anticipation of the creation of Medicare Part D (Alpert, 2016), the development of privately-held forest land in anticipation of the Endangered Species Act (Lueck and Michael, 2003), human capital investments in children in response to reductions in future mortality risk (Jayachandran and Lleras-Muney, 2009), and labor supply responses to pension reforms at ages far below retirement age (French et al., 2022).

Finally, our paper contributes to literature on what share of overall resources should be devoted to health, and how the optimal share varies with income per capita (Chernew and Newhouse, 2011). Hall and Jones (2007) suggest that if the marginal utility of consumption declines sufficiently, it may be optimal for individuals with increasing income to allocate resources largely towards longevity (rather than increasing consumption within a single period). Relatedly, Costa and Kahn (2004) and Kniesner et al. (2010) estimate income elasticities for the value of a statistical life to be greater than one, and several studies find that advances in medical technology – even very expensive ones – are generally worth their expense (Cutler and McClellan, 2001; Cutler, 2007; Cutler et al., 2007).[8] Our findings that individual health investments increase with expected future wealth are consistent with, and extend, this literature.

The rest of this paper is organized as follows. Section 2 provides an overview of the Chilean pension system and its 1981 reform. Section 3 describes our data and Section 4 presents our econometric frameworks. In Section 5, we report our primary results for health investments, disease diagnoses, disease prevalence, and mortality. Section 6 shows evidence on the validity

[8]This does not of course mean that all health care spending is efficient (see Weisbrod (1991), Garber et al. (2007), and Newhouse (2004), for example).

of our identifying assumptions and the robustness of our results. Finally, Section 7 concludes.

2 The Chilean Pension System Reform

2.1 Pension Reform Overview

In May 1981, Chile converted its Defined Benefit (DB) public pension program for formal sector workers into a Defined Contribution (DC) program (Congreso Nacional de Chile, 1980). This was a landmark reform, and it was widely publicized and heavily advertised across the country. In the DC system, participating workers are required to contribute 10% of their monthly income to an individual account, which is privately managed by regulated Pension Fund Administrators (PFAs).[9,10] Individual accounts earn a market-based rate of return based on the investment choices made by PFAs. Women are eligible to retire at age 60, and men at age 65. Retirement at these ages is not mandatory – pensioners can continue working, and additional contributions past retirement age are not required.

During this transition, all new formal sector workers (joining the workforce for the first time, commonly at age 18) were mandated to enroll in the DC system, while existing formal sector workers had the option of either remaining in the DB program until retirement or switching to the DC system.[11] Given that the minimum legal age for employment in Chile is 18, all individuals born in May 1963 or later (who turned 18 at or after the time of the reform) were mandated to enroll in the DC system. Alternatively, those born before May 1963 (who legally could have entered the labor force before the reform) had the option to remain in the DB system. In other words, individuals born in May 1963 or later were "fully-exposed" to the DC pension system for all of their adult working years, while those born before May 1963 were only "partially-exposed" (because they either opted into the DC system for a fraction of their adult working years, as most Chileans did, or chose to remain in the DB system altogether).

Beneficiaries in the DB system who switched to the DC system also received a compensatory payment, known as a recognition bond, to transfer past contributions to their

[9] In the DC system employers do not make pension contributions.
[10] The contribution rate has remained unchanged since the introduction of the DC system up to August 2025.
[11] Until 2017, participation was optional for the self-employed.

individual DC system accounts. The amount of these recognition bonds depended on how long workers had already contributed to the DB system. Workers making all contributions necessary to be fully vested in the DB system received a recognition bond calculated to be the equivalent of a lifetime annuity providing 80% of their average earnings.[12] The size of the bond is otherwise scaled to match the share of contributions made towards full vesting. Recognition bonds yield a 4% annual return (paid by the Chilean government once the recognition bond has been adjusted for inflation) from the time a beneficiary moves to the DC system to the time of retirement.

Public knowledge of the reform was widespread, and one year after it was implemented, about 70% of contributors to Chile's DB system had chosen to move to the DC system (Arellano, 1985). Among men in the cohorts relevant to our analysis, this figure rises to 86.6%.[13] Both the Chilean government and PFAs made substantial efforts to publicize the reform and to promote the DC system, enlisting the help of prominent public figures and using marketing slogans such as "a secure future."[14] During the year prior to reform implementation, news headlines aimed to publicize to Chileans that the new system would safeguard pensions from inflation, a major concern in Latin American countries at the time. For example, a newspaper (La última Noticias, 11/7/1980) front page proclaimed, "The Minister assures: [The DC system is the] End of the drama of the retirees!" and "Pensions will have an automatic adjustment [100% Consumer Price Index (CPI)]" (see Appendix Figure A.1). Other newspaper articles emphasized the reform's positive impact on pension income, promising that "Minimum pension amounts were guaranteed" and that "Contributing 10% of their remuneration...will allow workers to obtain a pension close to their last remuneration" (see Appendix Figure A.2). This publicity continued over time as well; in 2000, the COO of the PFA Association advertised that affiliates retiring by 2020 would enjoy a 100% replacement rate if DC return rates continued to exceed 6% (see Appendix Figure A.3).[15]

[12]This value corresponds to the average of the last 12 salaries received between June 1979 and November 1975.

[13]The *Encuesta de Protección Social* (EPS) includes self-reported information on pension system affiliation. Using survey waves from 2004 to 2015 and restricting the sample to male respondents not affiliated with the armed forces or police pension systems, 86.6% of those with non-missing responses reported being enrolled in the DC system.

[14]For an example, see `https://www.youtube.com/watch?v=OdSUlclz19E`

[15]We are grateful to Mariano Bosch (Inter-American Development Bank) for kindly providing these newspaper clips.

Pension Fund Administrators (AFPs) also send their affiliates account statements (*cartolas*) every four months. These statements detail the individual account's activity, including contributions made, fund transfers, investment returns, and fees charged by the AFP, as well as the total account balance. Additionally, an annual statement provides a consolidated summary of the year's transactions and an estimated pension projection based on current savings and future contributions (Superintendencia de Pensiones, 2011).

2.2 Simulation Evidence Illustrating the Kink in Chile's Cohort Pension Wealth Profile

To illustrate the differential impact of Chile's pension reform on birth cohorts fully- vs. partially-exposed, we conduct a simple simulation exercise. Overall, this exercise shows that it is variation in the size of the recognition bond, as a function of age, that creates the kink in Chile's cohort pension wealth profile.

Specifically, we use the linked *Encuesta de Protección Social* and the *Historia Previsional de Afiliados* (EPS-HPA) data described later in Section 3 to compute expected pension wealth (EPW) at the time of retirement for each birth cohort using the following procedure and assumptions. First, we compute contribution amounts using a third-order polynomial in age and cohort to capture changes in contributions across time.[16] Second, we assume that the rate of return to pension savings is 4% per year (the rate of return of the recognition bond).[17] More precisely:

$$EPW_{cg} = \sum_{s=1}^{S} cont\_am_{cg} \times (1+r)^{n_{gs}}, \quad (1)$$

where c indexes monthly cohorts; g indicates gender (female or male); s indexes working months (from s = 1, the month individuals in cohort g turns 18 years old, through month s = S, the month that the individuals in cohort c of gender g reach minimum legal retirement age);

[16]We tested several specifications and selected the one with the highest goodness of fit, as indicated by the Bayesian and Akaike information criteria (Schwarz, 1978; Akaike, 1974). To obtain the estimates used to predict contributions, we include contributions greater or equal to zero. Thus, we obtain a predicted contribution that reflects the probability of not contributing in a given month.

[17]Note that we do not include the recognition bond in this calculation.

$cont\_am_{cg}$ is the cohort- and gender-specific pension contribution; r is the monthly rate of return corresponding to an annual rate of return equal to 4%; and n_{gs} is the number of months between month s and the month of minimum legal retirement age for gender g.

The resulting EPW profile shown by the continuous line in Figure 1 Panel A is increasing across successive cohorts because average contributions rise over time due to earnings growth. Also, affiliates who turned 18 years of age (the legal working age in Chile) before the introduction of the DC system made fewer contributions to their individual accounts and, consequently, their account balance at retirement is smaller. These considerations result in a smooth and increasing EPW profile in which there is no evident kink. The vertical red line highlights the birth cohort that turned 18 years of age in May 1981, the month-year of implementation of the pension system reform. This line separates cohorts "fully-exposed" to the DC system (those who turned 18 years old as or after the DC system was implemented) from cohorts "partially-exposed" to the DC system (those who could have already participated in the DB system and therefore could only have contributed in the DC system for a shorter period of time).

In what follows, we maintain all of the assumptions above, but we also introduce the recognition bond (the compensatory payment designed to allow workers who made contributions to the DB system to transfer their savings to the DC system). Specifically, the amount of the cohort- and gender-specific recognition bond is:

$$rbond_{cg} = (income_g \times 0.8 \times 12) \times \frac{density_c/12}{35} \times weight_g \times rbpr_g, \tag{2}$$

where $income_g$ is the average monthly income (by gender) of individuals born before May 1963 (using income observed in the HPA between May 1981 and Dec 1982); $density_c$ is the potential cohort-specific working life until the change in the pension system (in months); $weight_g$ is equal to 10.35 for males, and 11.36 for females;[18] and $rbpr_g$ is the gender-specific probability of being entitled to receive the recognition bond, computed using the administrative records of issued recognition bonds (DB affiliates were only entitled to receive the recognition bond if they made at least twelve contributions to the pension system between May-1976 and April-1981).

[18] As established by Law DL 3,500.

The amount of the recognition bond is set to zero for cohorts born in May-1963 or later.

We then add these recognition bond values for each cohort to the cohort-specific EPW, compounding the interest rates earned from the time that an individual moved to the DC system (May 1981) until retirement:

$$EPW_{cg} \quad = \quad \sum_{s=1}^{S} cont\_am_{cg} \times (1+r)^{n_{gs}} + rbond_{cg} \times (1+rr)^{nr_{cg}}, \tag{3}$$

where rr is the real monthly rate of return to the recognition bond[19] and nr_{cg} is the number of months between May 1981 and the month-year that each cohort reaches minimum legal retirement age.

The dashed line in Figure 1 Panel B shows EPW values including the recognition bond. With the recognition bond, there is now a visible kink (change of slope) in the cohort pension wealth profile at the cohort born in May 1963.

Overall, this simulated example shows that the rules of the pension reform mechanically produce a kink in the EPW-cohort profile that is independent of individuals' decisions. Also, the kink is more visibly evident for males than for females, reflecting both lower formal labor force participation rates and later entry in the labor force among women (both reducing the probability of receiving the bond) (Contreras et al., 2005). We therefore focus our analysis on Chilean men.

3 Data

We use a variety of data sources for our analyses, and we present our Expected Pension Wealth (EPW) calculations in detail in Appendix Section A.2. To study household savings, financial behavior, and health investments, we use (1) Chilean administrative data on compulsory pension contributions (*Historia Previsional de Afiliados*, or HPA), (2) nationally-representative data from Chile's Social Protection Surveys (*Encuesta de Protección Social*, or EPS), and (3) nationally-representative data from the Chilean Household Finance

[19]The annual rate of return to the recognition bond was set by law at 4%, implying a monthly rate of return of 0.327% ($(1 + 0.00327)^{12} \approx 1.04$).

Survey (*Encuesta Financiera de Hogares*, or EFH). To study disease prevalence rates and mortality, we use (4) the Chilean National Health Survey (*Encuesta Nacional de Salud*, or ENS) and (5) death records from the Chilean government's vital registration system. We describe each data source in more detail below (and present descriptive statistics in Appendix Tables A.1, A.2, and A.3).[20]

3.1 Household Savings, Finances, and Health Investments

First, our analysis uses two rich sources of microdata linked at the individual level. One is Chile's Social Protection Survey (*Encuesta de Protección Social*, or EPS), with waves conducted in 2004, 2006, 2009, and 2015.[21] The EPS is a nationally representative survey designed to measure socio-economic status and retirement behavior, broadly defined. Importantly, the EPS also contains detailed individual- and household-level information about health care service use (specific health service use, including diabetes and hypertension screening), disease diagnoses (including cardiovascular and metabolic syndrome diseases), and private health behaviors (physical activity, alcohol consumption, and smoking). The EPS also contains information about labor market participation and the characteristics of respondents' current job.

The other dataset is the Chilean government pension system administrative records (*Historia Previsional de Afiliados*, or HPA), which we link to the EPS at the individual level. The HPA data contains information about DC affiliates (both currently working and retired affiliates), and it includes both employees of firms and the self-employed as well as those unemployed and no longer in the workforce. This HPA administrative data system spans all years of pension system participation for each affiliate (our HPA data extends through December 2017), and it includes earnings in each month of participation, additional pension contributions, pension fund type over time, and accumulated pension savings including recognition bonds from the DB system.

Using linked EPS-HPA data, we apply several sample restrictions. First, we only include

[20] Summary statistics from our sample are generally comparable with those from the CASEN survey (*Encuesta de Caracterización Socioeconómica Nacional*), the most widely-used Chilean population survey.

[21] There was a 2002 wave of the EPS as well, but detailed health information was not collected in the 2002 wave, so we do not include it in our analyses.

individuals observed below the minimum retirement age (65 for men). Second, we exclude individuals below age 25 when surveyed to avoid predicting labor market entry among those still in formal education (or who could still be in school or college). Finally, we only include men born beginning in 1943 or later because they were only entitled to claim pension benefits in January 2008 or later (the HPA do not include accumulated pension saving data for individuals who claimed pension benefits before January 2008). Our final sample is an unbalanced panel containing 18,836 observations (7,194 men) born between 1943 and 1990. Questions about disease screening were introduced in the 2009 EPS wave, so to study these outcomes, our sample is comprised of 2009 and 2015 waves (which we term the "two-wave sample"). For other outcomes, we use all four waves (which we term the "four-wave sample"). Because individuals at the kink were born in 1963, they are between 41 and 52 years old in the "four-wave sample" and between 46 and 52 years old in the "two-wave sample."

Separately, in supporting analyses, we use the 2017 Chilean Household Finance Survey (*Encuesta Financiera de Hogares*, or EFH) to measure non-pension savings. Covering a total of 4,549 urban households, the EFH is representative of the national urban population and collects comprehensive information on assets, debt, income, insurance contracts, and financial behavior.

3.2 Disease Prevalence and Mortality

To study differences in disease prevalence across the pension reform cohort kink, we also use the 2016-2017 Chilean National Health Survey (ENS), which contains nationally-representative epidemiological data on blood levels of cholesterol, glucose, and other biomarkers (collected through nurse visits to households). This cross-sectional household data includes 6,233 individuals 15 years of age or greater selected from both urban and rural areas of all 15 geographic regions of Chile.

Finally, to study differences in mortality by age and cause across the pension reform cohort kink, we use Chile's administrative death records between 2003 and 2018. Compiled by the Department of Information and Health Statistics within the Chilean Ministry of Health, this vital registry data includes individual-level demographic information (including sex, age, and municipality of residency for all deceased individuals) along with the primary cause of death. We combine these records with data from the 2002 Chilean population census to conduct survival analyses by age across various causes of death.

4 Empirical Framework

4.1 Fuzzy Regression Kink Estimation

Our identification strategy takes advantage of the exogenous kink in the EPW cohort profile differentiating men born before and after May 1963 (due to the structure of the recognition bond embedded in Chile's pension system reform) (Card et al., 2012, 2015). Those born after May 1963 were fully-exposed to the reform (i.e., enrolled to the DC system for their entire working life), while those born in May 1963 or earlier were only partially-exposed.[22] This kink is visible both in our simulated example (Figure 1 Panel B) and also in our data (Figure 2). We use a FRKD because the endogenous variable (EPW) is not uniquely determined by the age of the individual, but also by the current pension account balance (which is a function of previous contributions and the rate of return) and by estimated future pension contributions between the present and Chile's legal age of retirement.

Specifically, Following Card et al. (2015) and defining c_0 as the birth cohort at the kink (those born in May 1963), the effect of EPW on health-related outcomes H is given by:

$$\tau = \frac{\lim_{c_0 \to 0^+} \frac{d\mathbb{E}[H|cohort = c]}{dc}\Big|_{c=c_0} - \lim_{c_0 \to 0^-} \frac{d\mathbb{E}[H|cohort = c]}{dc}\Big|_{c=c_0}}{\lim_{c_0 \to 0^+} \frac{d\mathbb{E}[EPW|cohort = c]}{dc}\Big|_{c=c_0} - \lim_{c_0 \to 0^-} \frac{d\mathbb{E}[EPW|cohort = c]}{dc}\Big|_{c=c_0}} \tag{4}$$

In practice, the estimate of ${\beta_1}^h$ in the following reduced form equation for health outcome

[22] In our main analysis, we exclude the individuals born before May 1963 who stayed in the DB system because their pension records are not included in the administrative data and hence we cannot compute the Expected Pension Wealth for them. However, Appendix Figure A.12 indicates that the reduced form and kink are very similar independently of whether those who stayed in the DB system are excluded or not, which is consistent with only a small percentage staying in the DB system (13.4% according to our estimates). See subsection 6.2 for more details.

H can be used to estimate the numerator in Equation (4):

$$\mathbb{E}[H_{it}|cohort_i, \omega_t] = \alpha_0^h + \alpha_1^h(cohort_i - c_0) + \beta_1^h(cohort_i - c_0) \times D_i + \omega_t^h, \tag{5}$$

where i indexes individuals, t indexes EPS survey waves, $cohort_i$ is the month-year birth cohort, $D_i = \mathbb{1}[cohort_i > c_0]$ is an indicator variable, and ω_t are year fixed effects.

Similarly, the estimate of ${\beta_1}^{EPW}$ in the following reduced form equation for the EPW can be used to estimate the denominator in Equation (4):

$$\mathbb{E}[EPW_i|cohort_i, \omega_t] = \alpha_0^{EPW} + \alpha_1^{EPW}(cohort_i - c_0) + \beta_1^{EPW}(cohort - c_0) \times D_i + \omega_t^{EPW}. \tag{6}$$

Card et al. (2012) also show that τ can be directly estimated by regressing H_{it} on linear (or quadratic) terms in $(cohort_i - c_0)$ and $(cohort_i - c_0) \times D_i$, but leaving out the "main effect", D_i, replacing the interaction term $(cohort_i - c_0) \times D_i$ with EPW_i, and using $(cohort_i - c_0) \times D_i$ as an instrumental variable in a two-stage least- squares (2SLS) procedure. We therefore use 2SLS to estimate:

$$\mathbb{E}[H_{it}|cohort_i, \omega_t] = \alpha_0 + \alpha_1(cohort_i - c_0) + \tau \times EPW_i + \omega_t, \tag{7}$$

where the endogenous variable EPW_i is instrumented with $(cohort_i - c_0) \times D_i$.[23]

To select the appropriate degree of the polynomial for the running variable ($cohort$), we compute the Bayesian Information Criteria (BIC) for up to a second-order polynomial as suggested by Gelman and Imbens (2019). Although the goodness-of-fit statistics are very similar across most models, the first-order polynomial has slightly higher values in most cases. Therefore, we present the results with the first-order polynomial in the main paper but also show results with both first- and second-order polynomials in the Appendix. We also present 95% confidence sets, which are robust to the inclusion of weak instruments, based on the minimum distance version of the Anderson-Rubin test statistics (Finlay, 2009).

[23]To assess the sensitivity of our results, we also generate estimates using non-parametric procedures and different bandwidths around the kink following Calonico et al. (2014) and Calonico et al. (2019), but these estimates are imprecise, presumably because of the small number of observations in our sample.

Finally, when using several outcome variables to test the same hypothesis, we report Romano-Wolf p-values that are step-down adjusted and robust to multiple hypothesis testing (Romano and Wolf, 2005a,b). We also combine related outcomes into a single index, following Anderson (2008). We cluster our standard errors at the individual level.[24]

4.2 Reduced Form Models of Disease Prevalence and Mortality

Because we cannot link the HPA dataset directly to the Chilean National Health Survey or Chile's vital registration system, we do not use the framework described above in Section 4.1 to study the relationship between EPW and disease prevalence or mortality. For the prevalence of major chronic diseases for which we also observe health investments, we therefore estimate Equation (5) using these chronic diseases as outcomes instead.[25]

Alternatively, for mortality risk (and mortality risk by cause), we estimate discrete-time survival models using the following estimation framework (following Jenkins (1995)):

$$\begin{aligned} &\mathbb{P}r[death_{it} = 1 | cohort_i, age_{it}] = \\ &G(\gamma_1 age_{it} + \gamma_2 age_{it}^2 + \gamma_3 (cohort_i - c_0) + \gamma_4 (cohort_i - c_0) \times D_i), \end{aligned} \tag{8}$$

where $t = 2003, 2004, ..., 2018$ and G is the logistic cumulative distribution function. We use the resulting parameter estimates to compute the marginal effect of the kink as $\frac{\delta \mathbb{P}r[death|cohort, age]}{\delta(cohort - c_0) \times D}$, evaluated at ages 38 to 60 and $(cohort - c_0) = 0$. We compute the corresponding standard errors using the Delta Method.

Finally, we estimate changes in the probability of death within one year by age and cause at the EPW kink using a multinomial logit competing risk model. We focus specifically on causes

[24] Estimates clustered at the running variable level (available upon request) yield similar results. According to Lee and Card (2008), when employing RD designs in the context of a discrete running variable, it is recommended to cluster at the running variable level. In our dataset, the month-year cohort serves as the running variable, with fewer than 100 values on each side of the cutoff, indicating a discrete support. However, Kolesár and Rothe (2018) demonstrated that such clustering may introduce higher bias compared to using a standard sandwich-type estimator and proposed a non-parametric alternative for regression discontinuity designs. Considering these insights and the absence of a practical adaptation of the Kolesár and Rothe (2018)'s approach to the FRK design, we have opted to report the standard errors clustered at the individual level as our main results.

[25] For completeness, we also estimate reduced form models for the outcomes which are part of the EPS-HPA linked dataset (screening of chronic diseases, preventive check-ups, unhealthy lifestyle behaviors, and diagnosed conditions).

of death that are sensitive to the health investments that we study (the screenings and diagnoses discussed in Section 5.2). Specifically, we estimate:

$$\mathbb{P}r[death_{it} = m | cohort_i, age_{it}] = \qquad (9)$$
$$\frac{exp(\gamma_{1m} age_{it} + \gamma_{2m} age_{it}^2 + \gamma_{3m}(cohort_i - c_0) + \gamma_{4m}(cohort_i - c_0) \times D_i)}{1 + \sum_{m=1}^{M} exp(\gamma_{1m} age_{it} + \gamma_{2m} age_{it}^2 + \gamma_{3m}(cohort_i - c_0) + \gamma_{4m}(cohort_i - c_0) \times D_i)},$$

where $m = 0$ identifies censored individuals and $m = 1, ..., 8$ are mutually exclusive categories for cause of death (hypertension, diabetes, ischaemic heart disease, pulmonary heart disease, other heart diseases, kidney disease, prostate disease, and other causes). As before, we compute marginal effects of the kink for each cause of death m.

5 Results

5.1 The Effect of Chile's Pension Reform on Expected Pension Wealth (and Private Savings and Consumption)

Using our linked EPS-HPA sample, Figure 2 first shows calculations of Expected Pension Wealth (EPW) at age 65 for every individual in the sample (using local polynomial smoothing (Fan and Gijbels, 2018)). There is a clear kink at the cohort threshold differentiating those fully-exposed (i.e., those reaching age 18 after the reform, and hence exposed to it for their entire working life) and those partially-exposed (i.e., those exposed only a fraction of their working life according to their age at the time of the reform), matching our rule-based simulation in Figure 1 Panel B. Comparing cohorts just to the left of the kink (partially-exposed) with those just to the right of the kink (fully-exposed), differences in EPW are explained by eligibility for the recognition bond.[26]

Next, comparing fully- vs. partially-exposed individuals parametrically, Table 1 reports estimates of the effect of Chile's public pension reform on expected pension wealth (EPW)

[26]For partially-exposed cohorts further to the left of the kink, who were entitled to this bond, most of the variation in EPW across cohorts reflects differences in bond size related to differences in the number of contributions made under the DB system. For fully-exposed cohorts further to the right of the kink, variation in EPW across cohorts is primarily due to differences in number of contributions and contribution amounts, which increased over time alongside Chile's economic growth (see Appendix Table A.4).

from Equation (6). Column (1) shows that the kink (or slope change at the threshold) in the "four-wave" sample is USD $1,037.6 per month from the kink, a change of 0.77% relative to the sample mean. Similarly, Column (2) shows that the kink in the two-wave sample is USD $1,134.4 per month from the kink, a relative change of 0.71%.[27] These estimates are both significantly different from zero at the p<0.01 level, with corresponding F-statistics of 557 and 686, respectively. These results clearly suggest that younger cohorts who were fully-exposed to the reform accumulated pension wealth more rapidly than older cohorts who were only partially-exposed to it.

Another way to assess the magnitude of the kink in Table 1 is to compare the projected monthly pension at retirement for individuals belonging to the final year of partially-exposed birth cohorts under two scenarios: (1) using our actual EPW calculations, including the recognition bond, and (2) using a counterfactual scenario in which these individuals' EPW would increase in the same way that did for those fully-exposed to the reform for a year. In the counterfactual scenario, EPW is adjusted by adding the value of the kink (USD $1,037.6), multiplied by twelve. Using the Chilean Superintendency of Pensions' simulator along with our EPW calculations and kink estimates, we project that the actual monthly pension benefit at retirement is $394.11, while the counterfactual amount is $466.76.[28] The projected difference in monthly pension between the two scenarios ($72.65) is about 21.67% of the average monthly household expenditure reported in the EPS survey for the May 1962 to April 1963 birth cohorts ($335.23).[29]

[27] In the "four-wave" sample, average EPW is $135,139, and the kink estimate is a 0.77% change ($1,037.6 / $135,139 = 0.0077) per month from the kink. In the "two-wave" sample, average EPW is $160,320, and the kink estimate is a 0.71% change ($1,134.4 / $160,320 = 0.0071) per month from the kink.

[28] We express all monetary values in *Unidad de Fomento* (UF), an inflation-indexed unit published by the Central Bank of Chile. Because our monetary variables are presented in 2018 U.S. dollars, we use the exchange rate and UF values for that year. In 2018, the exchange rate was 640.29 Chilean pesos per U.S. dollar, and the UF was valued at 27,565.79 Chilean pesos. Our computations were performed on March 1, 2025, when the UF had increased to 38,663.05 Chilean pesos. Because the pension simulator provides projections for a minimum of two years into the future, we set the age to 63 to estimate pension benefits at the legal retirement age of 65. For males born between May 1962 and April 1963, the average balance of the mandatory contributions account at age 65 is $67,091.24 (UF 1,558.38), while the average recognition bond amount is $444.56 (UF 10.33). In the counterfactual scenario, we add the estimated twelve-month kink effect to the account balance, which corresponds to an additional $12,451.20 (UF 289.22). Our projections assume no voluntary pension savings, the Chilean government's default investment strategy, and no dependents (children or spouse). The Superintendency of Pensions' simulator used for these calculations is available at: `https://www.spensiones.cl/apps/simuladorPensiones/`.

[29] (466.76-394.11)/335.23=0.2167

An important related question is if the increase in EPW due to the pension reform is offset by compensating reductions in private savings (and accompanying increases in consumption). To test if such an effect is present at the cohort kink, we use both our linked sample and Chile's 2017 National Household Finance Survey (separately) to test for a kink in voluntary pension savings, the probability of saving in financial assets, and the probability of having other non-financial savings using Equation (5).[30] Our results are consistent with limited substitution between expected pension wealth and savings. Although Table 2 shows a small reduction in the probability of having voluntary pension savings (by 0.07 p.p.), this is only a relative decline of 0.51%.[31] The corresponding estimates for the probability of having financial or non-financial assets, as well as for household expenditures, are not statistically different from zero. There is a large literature on the offset between public pension and private wealth, but some studies are mixed (Daminato and Padula, 2023), with results varying by the way that the public pensions increase (Attanasio and Rohwedder, 2003; Chetty et al., 2014) and by education (Chetty et al., 2014; Lachowska and Myck, 2018).

Finally, if the public pension reform increased future – but not current – wealth, and if individuals cannot borrow against future wealth, there should be no general change in household consumption at the cohort kink. To test this, we re-estimate Equation (5) for monthly household consumption. Column (4) of Table 2 shows that the resulting estimate is negative and insignificant, indicating no evidence of an increase in current consumption.

5.2 Expected Pension Wealth and Forward-Looking Health Investments

After establishing a sufficiently strong first-stage relationship, we next estimate how personal health investments respond to an increase in EPW. Formalizing the intuition of our predictions, Appendix A.1 shows that the sign of the effect of an increase in EPW on health investments is positive unless consumption and health are substitutes and the degree of substitution is sufficiently large to offset the additional utility from a longer life.[32]

[30]For these exercises, we study birth cohorts at the annual- rather than month-level because month of birth is not provided by Chile's National Household Finance Survey.

[31]The probability of having voluntary pension savings is 13.72%. Then, the estimated relative effect is computed as (-.0007/0.1372)x100=-0.0051

[32]Empirical evidence on the substitution vs. complementarity between health and consumption is limited, and mixed: Lillard and Weiss (1997) and Low and Pistaferri (2015) find evidence of substitution; Viscusi and Evans

We start by considering the use of screenings for common chronic diseases, which are a key way to promote longevity at older ages. In contrast to health investments that require changing one's daily lifestyle (such as exercising, eating more healthfully, quitting smoking, or consuming less alcohol), these health investments are generally less costly (both in time and in direct utility loss) because they typically involve a single screening, are inexpensive, and are generally covered by insurance in the Chilean health system (see Appendix A.3). Health conditions identified through screenings are then often managed with pharmaceutical interventions, which also require less behavior change than lifestyle modification (i.e., are also relatively less costly).

Table 3 shows estimates of τ from Equation (7) for key health screenings related to major chronic diseases. Columns (1-3) report estimates for hypertension, diabetes, and cholesterol screenings, which are necessary for identifying (and managing) the risk of stroke, heart attack, and metabolic syndrome. Columns (4-5) then show estimates for prostate cancer screening, and preventive check-ups. We also construct an aggregate health investment index, following Anderson (2008). In general, these results show that use of screening for chronic diseases increases significantly with greater EPW. Specifically, a USD $1,000 increase in EPW (equivalent to approximately a 1% increase in the EPW around the kink) significantly increases the probability of screening for hypertension, diabetes, cholesterol, and prostate cancer by 0.06 percentage points (pp.), 0.04 pp., 0.04 pp., and 0.06 pp., respectively, representing increases of about 0.20%, 0.14%, 0.12%, and 0.40% relative to the mean of each outcome.[33] Additionally, the probability of visiting a healthcare center for a preventive check-up in the preceding two years increases by 0.03 pp (0.20%).[34]

We also consider unhealthy lifestyle behaviors, which are generally more costly for an individual to change. Table 4 shows estimates for smoking, drinking, and physical inactivity. We find that a USD $1,000 increase in EPW reduces the probability of smoking by 0.05 p.p.

(1990), Finkelstein et al. (2013), and Blundell et al. (2020) find evidence of complementarity; Evans and Viscusi (1991) and De Nardi et al. (2010) find no significant evidence of either. Complementarity between consumption and health will reinforce the incentive to increase health investments.

[33] (0.0006/0.299)x100=0.20, (0.0004/0.2918)x100=0.14, (0.0004/0.3251)x100=0.12, and (0.0006/0.1514)x100=0.40, respectively

[34] (0.0003/0.1514)x100=0.198.

(0.13%) and the number of cigarettes smoked per month by 0.14 units (0.20%).[35] We also find an increase in the probability of exercise at least once a week (i.e., a reduction in physical inactivity) by 0.06 pp (0.09%), but no significant change in alcohol consumption.[36] In general, these results show that more costly individual health investments also increased in response to greater EPW, but to a lesser extent.

The above IV estimates are consistent with Figure 3, and with Appendix Figures A.5 and A.6, which show reduced form graphs of these outcomes across the cohort kink. Appendix Tables A.7 and A.8 also report corresponding reduced-form estimates for indices and individual health outcomes (obtained using Equation (5)).

5.3 Expected Pension Wealth and Health Outcomes

The increases in long-term health investments that we find (preventive screening as well as other healthy lifestyle behaviors) are capable of increasing longevity at older ages through better detection of underlying chronic diseases – a prerequisite for subsequent therapeutic management. We therefore also test directly for changes in chronic disease diagnoses. Table 5 reports estimates for disease diagnoses from Equation (7) for chronic diseases corresponding to the health investments that we study (hypertension, diabetes, heart disease, and kidney failure as well as the summary index).[37] For a USD $ 1,000 increase in EPW, diagnosis (or detection) rates rise significantly for hypertension by 0.05 pp (a relative increase of 0.43%), for diabetes by 0.02 pp (an increase of 0.43%), and for heart disease by 0.02 pp (an increase of 0.69%).[38]

If increases in preventive screening lead to higher detection rates of chronic diseases, and their subclinical precursors, they could presumably also lead to lower prevalence rates of chronic diseases. Estimating changes in chronic disease prevalence at the cohort kink is also important to rule-out the possibility of an increases in chronic disease prevalence, which could provide an alternative explanation for the increases in diagnosis rates shown in Table 5. To test for a kink in underlying disease prevalence, we use data from Chile's National Health Survey. Because we cannot compute EPW in this dataset, we use reduced form models to

[35](-0.0005/0.3825)x100=-0.13 and (-0.1433/71.2213)x100=-0.20, respectively.
[36](-0.0006/0.6962)x100=-0.09.
[37]Appendix Figure A.7 and Table A.9 shows congruent reduced-form results.
[38](0.0005/0.1171)x100=0.43, (0.0002/0.0467)x100=0.43, and (0.0002/0.029)x100=0.69, respectively.

estimate the parameter β_1^h in Equation (5) using biomarker measures of disease prevalence as the dependent variable. Despite smaller sample sizes, Appendix Tables A.10 and A.11 show suggestive evidence that in some cases, the slope of chronic disease prevalence declines at c_0, suggesting reductions in chronic diseases (and no evidence of an increase).

Finally, we investigate if the changes in health investments that we find ultimately lead to reductions in mortality (and hence increases in longevity). Specifically, we test for a cohort kink in all-cause and cause-specific mortality related to chronic diseases (ischaemic heart disease, pulmonary heart disease, hypertension, diabetes, kidney failure, and prostate cancer) using Chile's vital statistics and population census data. Focusing first on total mortality, Figure 4 shows the age profile of the marginal effect of full (vs. partial) exposure to the pension reform using the discrete-time survival model described in Section 4.2 (Jenkins, 1995). Full- (relative to partial-) exposure to the reform reduces mortality risk, and increasingly so at older ages (more than three times more at age 60 than 38), although estimates at older ages also become less precise.[39] The average marginal effect of full (vs. partial) exposure on the probability of death across all ages is -.0003 (p-value=0.04). Given that the unconditional probability of death is 0.05, the decrease corresponds to a 0.65% decrease in mortality risk at the kink.[40]

Figure 5 also reports analogous results for cause-specific mortality. In general, it shows that cause-specific mortality sensitive to the individual health investments that we study in this paper follows a pattern similar to all-cause mortality, declining among fully- (vs. partially-) exposed cohorts, and increasingly so at older ages.[41] The disease for which the marginal effect is largest is ischemic heart disease, with an estimate of -.00005 (p-value=0.07), a 11.40% reduction of in the probability of dying at the kink.[42]

[39]Appendix Table A.12 reports analogous logit model estimates.

[40](0.00031/0.048)x100=0.65

[41]Corresponding multinomial logit estimates are reported in Appendix Table A.13.

[42]The unconditional probability of dying due to ischemic heart disease is equal to 0.00043. Then, the relative effect is obtained as (-.000049/0.00043)x100=11.40

6 Identifying Assumptions and Robustness

6.1 Assessment of Identifying Assumptions

Our empirical framework assumes no manipulation of the running variable (in our case, month of birth). Our birth date data are those contained in the Chilean government's administrative records, which are generally accurate and reliable.[43] Nonetheless, we also investigate the possibility of manipulation using an empirical test for a break or kink in sample density at the pension reform cohort threshold, and we assess balance at the threshold by testing for the presence of a kink in household characteristics which could not plausibly respond to the pension reform (because they reflect choices made earlier in time).

First, to test for a slope change in density of individuals across the May 1963 cohort threshold, we regress the frequency of observations in each birth month on a birth cohort polynomial (allowing the polynomial order to range up to 8 and using Akaike's information criteria to select the polynomial order with the best goodness-of-fit (Card et al., 2012).[44] Appendix Figure A.8 shows the number of observations in each month of birth along with the resulting fitted distribution. The bottom of the figure reports the test statistic of a discontinuity test performed on the fraction of observations at the kink cohort and corresponding standard errors. The resulting p-value is 0.66, suggesting little evidence of a slope change.

Second, we use individual socio-demographic characteristics determined before the reform to test for balance in observable characteristics across the kink. To do so, we estimate Equation (5) by OLS, using dichotomous indicators for place of birth (born in the metropolitan region of Santiago), educational attainment (completion of secondary school), and risk aversion as dependent variables.[45] Appendix Table A.14 shows that the resulting estimates of β_1^h from Equation (5) for these individual attributes are both small and precise. Appendix Figure A.9

[43] Birth data provided with the HPA comes from the Chilean Civil Registration Systems, and is also included in the *Registro de Información Social* (RIS), Chile's most comprehensive repository of social data, built using data provided by government agencies, municipalities, and other public or private entities (https://bidat.midesof.cl/bidat-ris-investigacion/). Overall, the RIS is designed to integrate and manage access to the information needed to design and deliver better social policies, based on the data available across the state.

[44] For this exercise, we use bins of 3 birth months.

[45] The measure of risk aversion is based on questions from Module J of the EPS 2004, 2006, and 2009 waves. The exact wording of these questions can be found in the available questionnaires at https://previsionsocial.gob.cl/datos-estadisticos/descargar-bases-de-datos-eps/.

also shows these results graphically, depicting smooth profiles of these variables across the May 1963 cohort threshold.

Finally, following the permutation test approach of Card et al. (2017), we also estimate reduced form equations at placebo cutoffs to test if observed slope changes clearly occur precisely at the specified kink point (rather than reflecting non-linearities apart from the kink). Specifically, we randomly draw 1,000 placebo (false) cutoffs between May 1946 and May 1955, and also between May 1971 and August 1989. Appendix Figure A.10 shows histograms of the distributions of these placebo estimates and their corresponding t-statistics for the three health indexes.[46] Importantly, these placebo estimates and t-statistics are distant from those obtained using the true kink point.

6.2 Robustness

To explore the sensitivity of our results to alternative functional forms of the running variable, we re-estimate models using second order polynomials of the running variable following Gelman and Imbens (2019) and report Bayesian Information Criteria (BIC) values.[47] Appendix Tables A.15, A.16, and A.17 show evidence of a kink in the EPW slope of at the May 1963 cohort, no evidence of a kink in the slope of household consumption or savings, and no evidence of a kink in the slope of socio-demographic outcomes determined prior to the reform (respectively). Appendix Tables A.18, A.19, and A.20 then present estimates of the effect of EPW on health investments, unhealthy related behaviors, and diagnoses of chronic conditions. In general, these results are qualitatively similar to those using a first order polynomial (but with somewhat less precision). BIC values for specifications with first-order polynomials are slightly lower than those for specifications with second-order polynomials, implying that the former are preferable.

Additionally, Figure A.11 also shows re-estimating results using alternative bandwidths (although these alternative bandwidths reduce sample sizes by up to 80% of the main sample

[46]For this analysis, we use two groups: individuals born between January 1943 and May 1959, who were partially-exposed to the DC system, and individuals born between May 1967 and December 1990, all of whom were fully-exposed to the DC system.

[47]In the Appendix Section A.4 we present the empirical models used to compute estimates controlling for a second-order polynomial in the cohort.

size).[48] The resulting point estimates are generally consistent with those from the full sample, although some outcomes exhibit less precision.

Finally, to provide evidence that our results are not biased by the exclusion of individuals who remained in the DB system, we explore reduced-form estimates using the Chile's Social Protection Surveys. Specifically, we test for the presence of a kink at the 1963 cohort in the analyzed outcome indices. Unlike the administrative data, which does not include the individuals who remained in the DB system, the survey data reports both self-reported birth year and type of pension affiliation for all individuals, regardless of whether or not they remained in the DB system. To keep the exercise as comparable as possible to our primary analyses, Appendix Figure A.12 presents the graphical reduced form using two samples: the full set of respondents (regardless of system affiliation) and a subset excluding individuals who remained in the DB system. Reassuringly, both sets of graphs closely resemble the reduced-form patterns found in our primary analyses, as shown in Appendix Figures A.5, A.7, and A.6. This is consistent with only a small share of individuals remaining in the DB system (13.4% according to our estimates). Also note that, for the mortality outcomes, we do not exclude individuals affiliated to the DB system, as this information is not available in the mortality data.

7 Conclusion

In this paper, we provide new empirical evidence that among working-age adults, individuals' current health investments respond to changes in expected future retirement wealth. Specifically, we find that a 1% increase in expected pension wealth leads to greater use of key preventive screening services (between 0.1% and 0.4%, depending on the specific screening), services that are central in the diagnosis and subsequent management of prevalent chronic diseases (cardiovascular disease, hypertension, and diabetes) which influence longevity. Studying the relationship with subsequent health and longevity directly, we also find that these additional health investments lead to higher rates of chronic disease diagnosis

[48] In all cases, the bandwidths are non-symmetric and chosen to reflect the asymmetry of the main sample by removing an equal number of observations from each side of the threshold.

(reflecting higher rates of disease detection, not disease prevalence) – and ultimately reduce age-specific mortality due to the same chronic conditions. Because our results should be interpreted as Local Average Treatment Effects, mostly driven by those born around the kink cohort whom we observe at ages 40-50, these findings imply forward-looking health investments over a horizon of 15-25 years (relative to a retirement age of 65).

Our results can be rationalized by a framework in which forward-looking individuals anticipate greater resources later in life, giving them stronger incentives for longevity, and therefore choose to invest more in their health. If health and consumption are complements (and hence the marginal utility of consumption increases with health), these effects will be amplified, and if health and consumption are sufficiently strong substitutes, these effects could be fully offset (reducing health investments). The fact that we do not find reductions in health investments suggests that if there is any degree of substitution, it is not meaningful in our context.

More generally, our paper provides new evidence that an important way in which economic circumstances can influence health is through the incentives they create for health investments. Consistent with canonical models of human capital accumulation by forward-looking individuals (Becker, 1964, 1967; Grossman, 1972b,a), these findings contribute to a broader understanding of the benefits of economic development through individuals' private investments in their own health (Pritchett and Summers, 1996; Deaton, 2003, 2024). In particular, they imply that the full return to growth and development may be undervalued, all else equal, if individuals' forward-looking health behavior is not taken into account.

References

ADVANCE COLLABORATIVE GROUP (2008): "Intensive Blood Glucose Control and Vascular Outcomes in Patients With Type 2 Diabetes," *New England Journal of Medicine*, 358, 2560–2572, pMID: 18539916.

AGUILA, E. (2011): "Personal Retirement Accounts and Saving," *American Economic Journal: Economic Policy*, 3, 1–24.

AKAIKE, H. (1974): "A New Look at the Statistical Model Identification," *IEEE Transactions on Automatic Control*, 19, 716–723.

ALPERT, A. (2016): "The Anticipatory Effects of Medicare Part D on Drug Utilization," *Journal of health economics*, 49, 28–45.

ANDERSON, M. L. (2008): "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects," *Journal of the American Statistical Association*, 103, 1481–1495.

ANGELETOS, G.-M., D. LAIBSON, A. REPETTO, J. TOBACMAN, AND S. WEINBERG (2001): "The Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evaluation," *Journal of Economic perspectives*, 15, 47–68.

ARELLANO, J. P. (1985): *Políticas Sociales y Desarrollo: Chile, 1924-1984*, Cieplan.

ARENAS DE MESA, A., D. BRAVO, J. R. BEHRMAN, O. S. MITCHELL, AND P. E. TODD (2008): "The Chilean Pension Reform Turns 25: Lessons From the Social Protection Survey," in Stephen and Kay (2008).

ARON-DINE, A., L. EINAV, A. FINKELSTEIN, AND M. CULLEN (2015): "Moral Hazard in Health Insurance: Do Dynamic Incentives Matter?" *The Review of Economics and Statistics*, 97, 725–741.

ASHENFELTER, O. (1978): "Estimating the Effect of Training Programs on Earnings," *The Review of Economics and Statistics*, 47–57.

ATTANASIO, O., C. MEGHIR, AND A. OTERO (2011): "Formal Labor Market and Pension Wealth: Evaluating the 2008 Chilean Pension Reform," *IFS Report*.

ATTANASIO, O., C. MEGUIR, AND A. OTERO (2014): "The Design of a Multitier Contributory Pension System: The Distributional Impact of the 2008 Chilean Pension Reform," in *Social Insurance, Informality and Labor Markets: How to Protect Workers While Creating Good Jobs*, Oxford University Press.

ATTANASIO, O. P. AND A. BRUGIAVINI (2003): "Social Security and Households' Saving*," *The Quarterly Journal of Economics*, 118, 1075–1119.

ATTANASIO, O. P. AND H. W. HOYNES (2000): "Differential Mortality and Wealth Accumulation," *Journal of Human Resources*, 35, 1–29.

ATTANASIO, O. P. AND S. ROHWEDDER (2003): "Pension Wealth and Household Saving: Evidence From Pension Reforms in the United Kingdom," *American Economic Review*, 93, 1499–1521.

Auerbach, A. (1989): "Tax Reform and Adjustment Costs: The Impact on Investment and Market Value," *International Economic Review*, 30, 939–62.

Bando, R., S. Galiani, and P. Gertler (2022): "Another Brick on the Wall: On the Effects of Non-Contributory Pensions on Material and Subjective Well Being," *Journal of Economic Behavior & Organization*, 195, 16–26.

Basta, S. S., Soekirman, D. Karyadi, and N. S. Scrimshaw (1979): "Iron Deficiency Anemia and the Productivity of Adult Males in Indonesia," *The American Journal of Clinical Nutrition*, 32, 916–925.

Becker, G. S. (1964): *Human Capital: A Theoretical and Empirical Analysis, With Special Reference to Education*, General Series number 80, National Bureau of Economic Research.

——— (1967): *Human Capital and the Personal Distribution of Income: An Analytical Approach*, No. 1, Institute of Public Administration.

Bliss, C. and N. Stern (1978): "Productivity, Wages and Nutrition: Part I: The Theory," *Journal of Development Economics*, 5, 331–362.

Blundell, R., M. Borella, J. Commault, and M. De Nardi (2020): "Why Does Consumption Fluctuate in Old Age and How Should the Government Insure It?" Tech. Rep. w27348, National Bureau of Economic Research, Cambridge, MA.

Calonico, S., M. D. Cattaneo, M. H. Farrell, and R. Titiunik (2019): "Regression Discontinuity Designs Using Covariates," *Review of Economics and Statistics*, 101, 442–451.

Calonico, S., M. D. Cattaneo, and R. Titiunik (2014): "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs," *Econometrica*, 82, 2295–2326.

Card, D., D. Lee, Z. Pei, and A. Weber (2012): "Nonlinear Policy Rules and the Identification and Estimation of Causal Effects in a Generalized Regression Kink Design," Working Paper 18564, National Bureau of Economic Research.

Card, D., D. S. Lee, Z. Pei, and A. Weber (2015): "Inference on Causal Effects in a Generalized Regression Kink Design," *Econometrica*, 83, 2453–2483.

——— (2017): "Regression Kink Design: Theory and Practice," in *Regression Discontinuity Designs*, Emerald Publishing Limited, vol. 38 of *Advances in Econometrics*, 341–382.

Chernew, M. E. and J. P. Newhouse (2011): "Chapter One - Health Care Spending Growth," in *Handbook of Health Economics*, ed. by M. V. Pauly, T. G. Mcguire, and P. P. Barros, Elsevier, vol. 2 of *Handbook of Health Economics*, 1–43.

Chetty, R., J. N. Friedman, S. Leth-Petersen, T. H. Nielsen, and T. Olsen (2014): "Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence From Denmark *," *The Quarterly Journal of Economics*, 129, 1141–1219, _eprint: https://academic.oup.com/qje/article-pdf/129/3/1141/30629219/qju013.pdf.

Cheung, B. M. Y., I. J. Lauder, C.-P. Lau, and C. R. Kumana (2004): "Meta-Analysis of Large Randomized Controlled Trials to Evaluate the Impact of Statins on Cardiovascular Outcomes," *British Journal of Clinical Pharmacology*, 57, 640–651.

CLARKE, D., J. P. ROMANO, AND M. WOLF (2020): "The Romano–Wolf Multiple-Hypothesis Correction in Stata," *The Stata Journal*, 20, 812–843.

CONGRESO NACIONAL DE CHILE (1980): "ESTABLECE NUEVO SISTEMA DE PENSIONES," Decreto Ley 3500.

CONTRERAS, D., E. PUENTES, AND D. BRAVO (2005): "Female Labour Force Participation in Greater Santiago, Chile: 1957–1997. A Synthetic Cohort Analysis," *Journal of International Development*, 17, 169–186.

COSTA, D. L. AND M. E. KAHN (2004): "Changes in the Value of Life, 1940–1980," *Journal of Risk and Uncertainty*, 29, 159–180.

CUTLER, D., A. DEATON, AND A. LLERAS-MUNEY (2006): "The Determinants of Mortality," *Journal of Economic Perspectives*, 20, 97–120.

CUTLER, D. AND G. MILLER (2005): "The Role of Public Health Improvements in Health Advances: The 20th Century United States," *Demography*, 42, 1–22.

CUTLER, D. M. (2007): "The Lifetime Costs and Benefits of Medical Technology," *Journal of Health Economics*, 26, 1081–1100.

CUTLER, D. M., G. LONG, E. R. BERNDT, J. ROYER, A.-A. FOURNIER, A. SASSER, AND P. CREMIEUX (2007): "The Value of Antihypertensive Drugs: A Perspective on Medical Innovation," *Health Affairs*, 26, 97–110, pMID: 17211019.

CUTLER, D. M. AND M. MCCLELLAN (2001): "Is Technological Change in Medicine Worth It?" *Health Affairs*, 20, 11–29, _eprint: https://doi.org/10.1377/hlthaff.20.5.11.

DAMINATO, C. AND M. PADULA (2023): "The Life-Cycle Effects of Pension Reforms: A Structural Approach," *Journal of the European Economic Association*, 22, 355–392, _eprint: https://academic.oup.com/jeea/article-pdf/22/1/355/56636960/jvad049.pdf.

DASGUPTA, P. (1997): "Nutritional Status, the Capacity for Work, and Poverty Traps," *Journal of Econometrics*, 77, 5–37.

DE NARDI, M., E. FRENCH, AND J. JONES (2010): "Why Do the Elderly Save? The Role of Medical Expenses," *Journal of Political Economy*, 118, 39–75.

DEATON, A. (2003): "Health, Inequality, and Economic Development," *Journal of economic literature*, 41, 113–158.

——— (2024): "The Great Escape: Health, Wealth, and the Origins of Inequality," .

DEOLALIKAR, A. B. (1988): "Nutrition and Labor Producvivity in Agriculture: Estimates for Rural South India," *The Review of Economics and Statistics*, 70, 406–413.

DIAMOND, P. (1994): "Privatization of Social Security: Lessons From Chile," *Revista de Análisis Económico–Economic Analysis Review*, 9, 21–33.

DIAMOND, P. A. (2002): *Social Security Reform*, Oxford University Press on Demand.

EDWARDS, S. (1998): "The Chilean Pension Reform: A Pioneering Program," in *Privatizing Social Security*, University of Chicago Press, 33–62.

ENGEL, E., E. FAJNZYLBER, P. FERNÁNDEZ, S. GRAY, A. REPETTO, AND D. VERGARA (2017): "Principios Para una Reforma al Sistema de Pensiones," *Espacio público, Informe de Políticas Pública*, 12.

EVANS, W. N. AND W. K. VISCUSI (1991): "Estimation of State-Dependent Utility Functions Using Survey Data," *The Review of Economics and Statistics*, 73, 94.

FAN, J. AND I. GIJBELS (2018): *Local Polynomial Modelling and Its Applications: Monographs on Statistics and Applied Probability 66*, Routledge.

FELDSTEIN, M. (1974): "Social Security, Induced Retirement, and Aggregate Capital Accumulation," *Journal of Political Economy*, 82, 905–926.

FINKELSTEIN, A., E. LUTTMER, AND M. NOTOWIDIGDO (2013): "What Good Is Wealth Without Health? The Effect of Health on the Marginal Utility of Consumption," *Journal of the European Economic Association*, 11, 221–258.

FINLAY, K. (2009): "Implementing Weak-Instrument Robust Tests for a General Class of Instrumental-Variables Models," *Stata Journal*, 9, 398–421(24).

FOGEL, R. W. (1994): "Economic Growth, Population Theory, and Physiology: The Bearing of Long-Term Processes on the Making of Economic Policy," *American Economic Review*, 84, 369–95.

FRENCH, E., A. LINDNER, C. O'DEA, AND T. ZAWISZA (2022): "Labor Supply and the Pension-Contribution Link," Tech. Rep. w30184, National Bureau of Economic Research, Cambridge, MA.

FRIEDMAN, M. (1957): *A Theory of the Consumption Function*, Princeton University Press.

GALIANI, S., P. GERTLER, AND R. BANDO (2016): "Non-Contributory Pensions," *Labour Economics*, 38, 47–58.

GARBER, A., D. P. GOLDMAN, AND A. B. JENA (2007): "The Promise of Health Care Cost Containment," *Health Affairs*, 26, 1545–1547, pMID: 17978370.

GELMAN, A. AND G. IMBENS (2019): "Why High-Order Polynomials Should Not Be Used in Regression Discontinuity Designs," *Journal of Business & Economic Statistics*, 37, 447–456.

GROSSMAN, M. (1972a): *The Demand for Health: A Theoretical and Empirical Investigation*, New York: National Bureau of Economic Research; distributed by Columbia University Press.

——— (1972b): "On the Concept of Health Capital and the Demand for Health," *Journal of Political Economy*, 80, 223–255.

GUIRGUIS-BLAKE, J. M., C. V. EVANS, E. M. WEBBER, E. L. COPPOLA, L. A. PERDUE, AND M. S. WEYRICH (2021): "Screening for Hypertension in Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force," *JAMA*, 325, 1657–1669.

HALL, R. E. (1971): "The Dynamic Effects of Fiscal Policy in an Economy With Foresight," *The Review of Economic Studies*, 38, 229–244.

HALL, R. E. AND C. I. JONES (2007): "The Value of Life and the Rise in Health Spending*," *The Quarterly Journal of Economics*, 122, 39–72.

HARRIS, C. AND D. LAIBSON (2001): "Dynamic Choices of Hyperbolic Consumers," *Econometrica*, 69, 935–957.

HECKMAN, J. J. AND J. A. SMITH (1999): "The Pre-Programme Earnings Dip and the Determinants of Participation in a Social Programme. Implications for Simple Programme Evaluation Strategies," *The Economic Journal*, 109, 313–348.

HODDINOTT, J., H. ALDERMAN, J. R. BEHRMAN, L. HADDAD, AND S. HORTON (2013): "The Economic Rationale for Investing in Stunting Reduction," *Maternal & Child Nutrition*, 9, 69–82.

HOLMAN, R. R., S. K. PAUL, M. A. BETHEL, D. R. MATTHEWS, AND H. A. W. NEIL (2008): "10-Year Follow-Up of Intensive Glucose Control in Type 2 Diabetes," *New England Journal of Medicine*, 359, 1577–1589, pMID: 18784090.

HOUSE, C. L. AND M. D. SHAPIRO (2006): "Phased-in Tax Cuts and Economic Activity," *American Economic Review*, 96, 1835–1849.

IMMINK, M. D. AND F. E. VITERI (1981): "Energy Intake and Productivity of Guatemalan Sugarcane Cutters: An Empirical Test of the Efficiency Wage Hypothesis Part II," *Journal of Development Economics*, 9, 273–287.

JAYACHANDRAN, S. AND A. LLERAS-MUNEY (2009): "Life Expectancy and Human Capital Investments: Evidence From Maternal Mortality Declines," *The Quarterly Journal of Economics*, 124, 349–397.

JENKINS, S. P. (1995): "Easy Estimation Methods for Discrete-Time Duration Models," *Oxford Bulletin of Economics and Statistics*, 57, 129–136, _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1468-0084.1995.tb00031.x.

KACZOROWSKI, J., L. W. CHAMBERS, L. DOLOVICH, J. M. PATERSON, T. KARWALAJTYS, T. GIERMAN, B. FARRELL, B. MCDONOUGH, L. THABANE, K. TU, B. ZAGORSKI, R. GOEREE, C. A. LEVITT, W. HOGG, S. LARYEA, M. A. CARTER, D. CROSS, AND R. J. SABALDT (2011): "Improving Cardiovascular Health at Population Level: 39 Community Cluster Randomised Trial of Cardiovascular Health Awareness Program (CHAP)," *BMJ*, 342.

KNIESNER, T. J., W. K. VISCUSI, AND J. P. ZILIAK (2010): "Policy Relevant Heterogeneity in the Value of Statistical Life: New Evidence From Panel Data Quantile Regressions," *Journal of Risk and Uncertainty*, 40, 15–31.

KOLESÁR, M. AND C. ROTHE (2018): "Inference in Regression Discontinuity Designs With a Discrete Running Variable," *American Economic Review*, 108, 2277–2304.

LACHOWSKA, M. AND M. MYCK (2018): "The Effect of Public Pension Wealth on Saving and Expenditure," *American Economic Journal: Economic Policy*, 10, 284–308.

LAIBSON, D. (1997): "Golden Eggs and Hyperbolic Discounting," *The Quarterly Journal of Economics*, 112, 443–478.

LAW, M. R., J. K. MORRIS, AND N. J. WALD (2009): "Use of Blood Pressure Lowering Drugs in the Prevention of Cardiovascular Disease: Meta-Analysis of 147 Randomised Trials in the Context of Expectations From Prospective Epidemiological Studies," *BMJ*, 338.

LEE, D. S. AND D. CARD (2008): "Regression Discontinuity Inference With Specification Error," *Journal of Econometrics*, 142, 655–674, the regression discontinuity design: Theory and applications.

LEMOS, S. (2006): "Anticipated Effects of the Minimum Wage on Prices," *Applied Economics*, 38, 325–337.

LILLARD, L. A. AND Y. WEISS (1997): "Uncertain Health and Survival: Effects on End-of-Life Consumption," *Journal of Business & Economic Statistics*, 15, 254.

LOW, H. AND L. PISTAFERRI (2015): "Disability Insurance and the Dynamics of the Incentive Insurance Trade-Off," *American Economic Review*, 105, 2986–3029.

LUECK, D. AND J. A. MICHAEL (2003): "Preemptive Habitat Destruction Under the Endangered Species Act," *The Journal of Law and Economics*, 46, 27–60.

MALANI, A. AND J. REIF (2015): "Interpreting Pre-Trends as Anticipation: Impact on Estimated Treatment Effects From Tort Reform," *Journal of Public Economics*, 124, 1–17.

MCKEOWN, T. (1976): *The Modern Rise of Population*, Academic Press, New York.

MODIGLIANI, F., R. BRUMBERG, ET AL. (1954): "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data," *Post-keynesian economics*, 1.

NEWHOUSE, J. P. (2004): *Pricing the Priceless: A Health Care Conundrum*, MIT press.

O'DONOGHUE, T. AND M. RABIN (1999): "Doing It Now or Later," *American Economic Review*, 89, 103–124.

OSTER, E. (2012): "HIV and Sexual Behavior Change: Why Not Africa?" *Journal of Health Economics*, 31, 35–49.

PISTAFERRI, L. (2001): "Superior Information, Income Shocks, and the Permanent Income Hypothesis," *The Review of Economics and Statistics*, 83, 465–476.

PRESTON, S. H. (1975): "The Changing Relation Between Mortality and Level of Economic Development," *Population Studies*, 29, 231–248.

PRITCHETT, L. AND L. H. SUMMERS (1996): "Wealthier Is Healthier," *Journal of Human Resources*, 31, 841–868.

QUINTANILLA, X. (2011a): "Did Chileans Maximize Pensions When Choosing Between PAYG and DC?" Discussion Paper Series 46, Superintendencia de Pensiones, Chile.

——— (2011b): "The Effect of the Chilean Pension Reform on Wealth Accumulation," Discussion Paper Series 47, Superintendencia de Pensiones, Chile.

RODGERS, G. B. (1975): "Nutritionally Based Wage Determination in the Low-Income Labour Market," *Oxford Economic Papers*, 27, 61–81.

ROMANO, J. P. AND M. WOLF (2005a): "Exact and Approximate Stepdown Methods for Multiple Hypothesis Testing," *Journal of the American Statistical Association*, 100, 94–108.

——— (2005b): "Stepwise Multiple Testing as Formalized Data Snooping," *Econometrica*, 73, 1237–1282.

SCHWARZ, G. (1978): "Estimating the Dimension of a Model," *The Annals of Statistics*, 6, 461 – 464.

STEPHEN, E. AND J. KAY (2008): *Lessons From Pension Reforms in the Americas and Tapen Sinha*, Oxford University Press.

STRAUSS, J. (1986): "Does Better Nutrition Raise Farm Productivity?" *Journal of political economy*, 94, 297–320.

STRAUSS, J. AND D. THOMAS (1998): "Health, Nutrition, and Economic Development," *Journal of Economic Literature*, 36, 766–817.

SUPERINTENDENCIA DE PENSIONES (2011): "Compendio de Normas del Sistema de Pensiones," `https://www.spensiones.cl/portal/compendio/596/w3-propertyvalue-5814.html`, libro I, Título IV, Capítulo III. Accessed: June, 2025.

——— (2020): "Compendio de Normas del Sistema de Pensiones," `https://www.spensiones.cl/portal/compendio/596/w3-propertyvalue-3516.html`, libro III, Título IX, Capítulo III. Accessed: June, 2025.

THE ACTION TO CONTROL CARDIOVASCULAR RISK IN DIABETES STUDY GROUP (2008): "Effects of Intensive Glucose Lowering in Type 2 Diabetes," *New England Journal of Medicine*, 358, 2545–2559, pMID: 18539917.

THOMAS, D. AND J. STRAUSS (1997): "Health and Wages: Evidence on Men and Women in Urban Brazil," *Journal of Econometrics*, 77, 159–185.

VISCUSI, W. K. AND W. N. EVANS (1990): "Utility Functions That Depend on Health Status: Estimates and Economic Implications," *The American Economic Review*, 80, 353–374, publisher: American Economic Association.

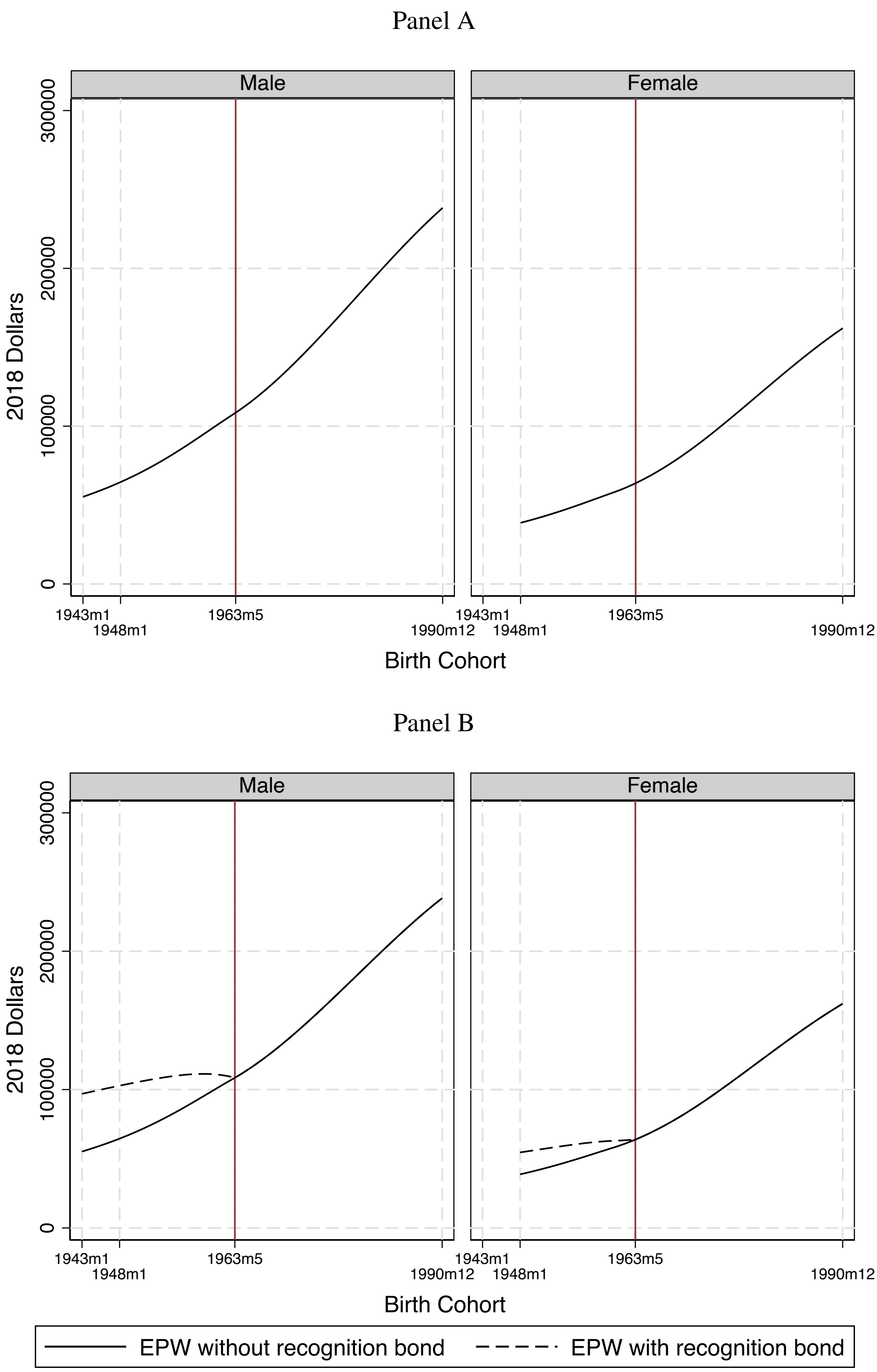
VOGL, T. S. (2014): "Height, Skills, and Labor Market Outcomes in Mexico," *Journal of Development Economics*, 107, 84–96.

WEISBROD, B. A. (1991): "The Health Care Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment," *Journal of economic literature*, 29, 523–552.

YANG, S.-C. S. (2005): "Quantifying Tax Effects Under Policy Foresight," *Journal of Monetary Economics*, 52, 1557–1568.

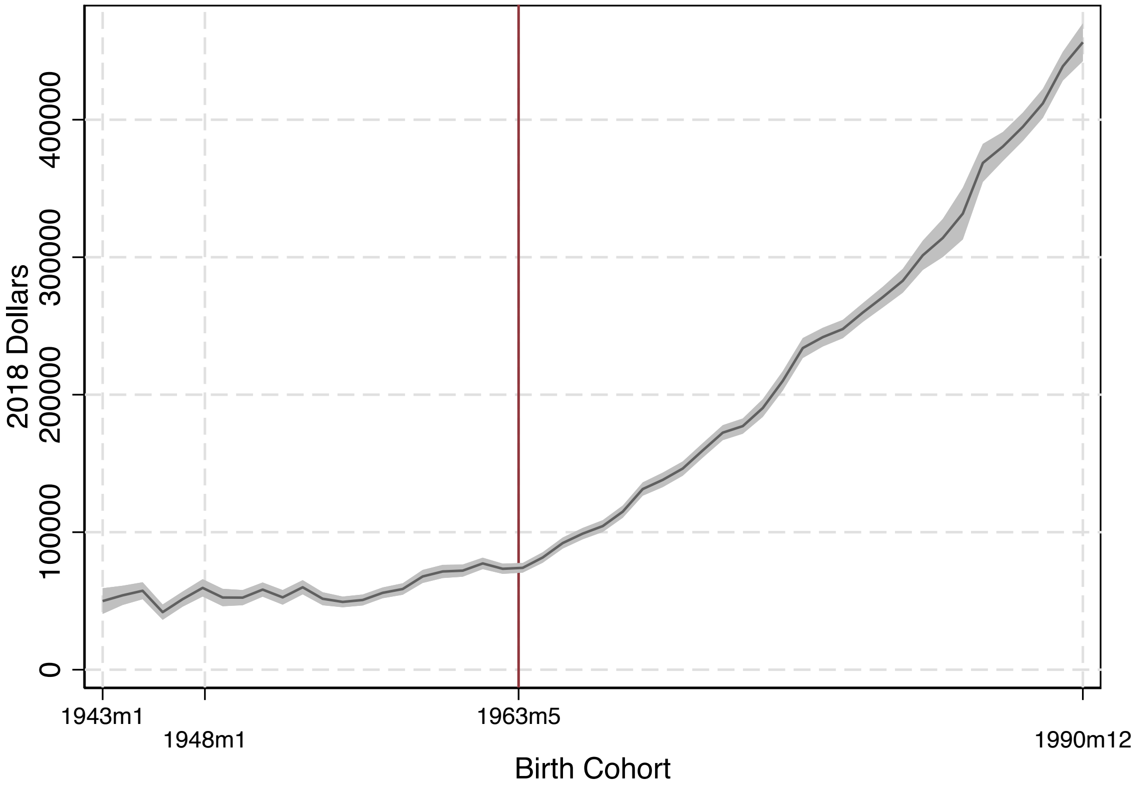
Figures

Figure 1: Simulated Expected Pension Wealth and Recognition Bond by Month of Birth



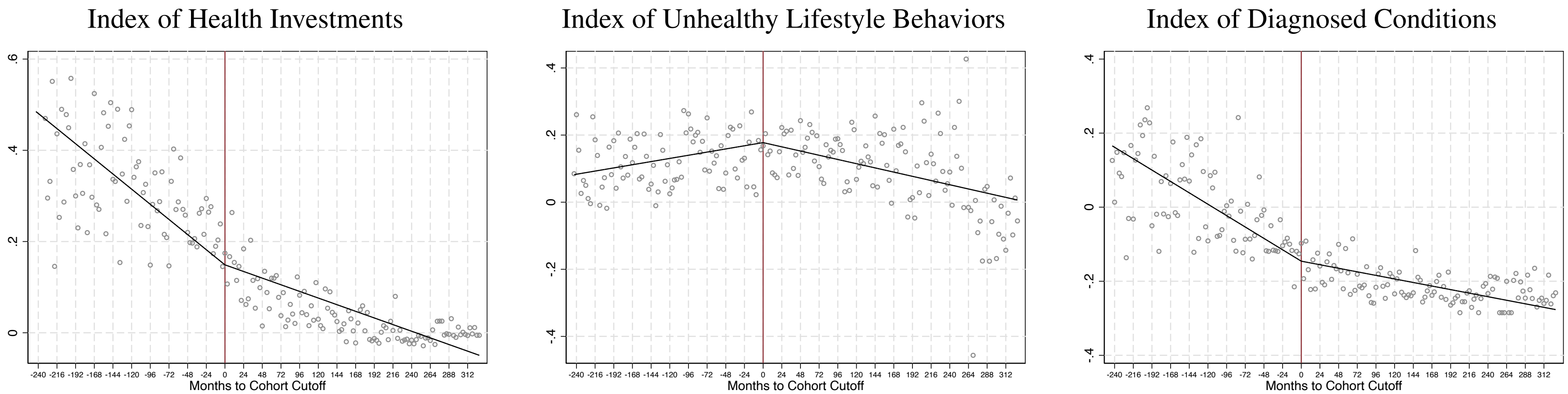
NOTE: Simulated Expected Pension Wealth (EPW) calculated from Equation (1) and (3), using contributions by cohort and age, and a rate of return to pension savings of 4%, both with and without the recognition bond (calculated using Equation (2)). The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. EPW values are CPI adjusted to December 2018 dollars.

Figure 2: Expected Pension Wealth among Chilean Men



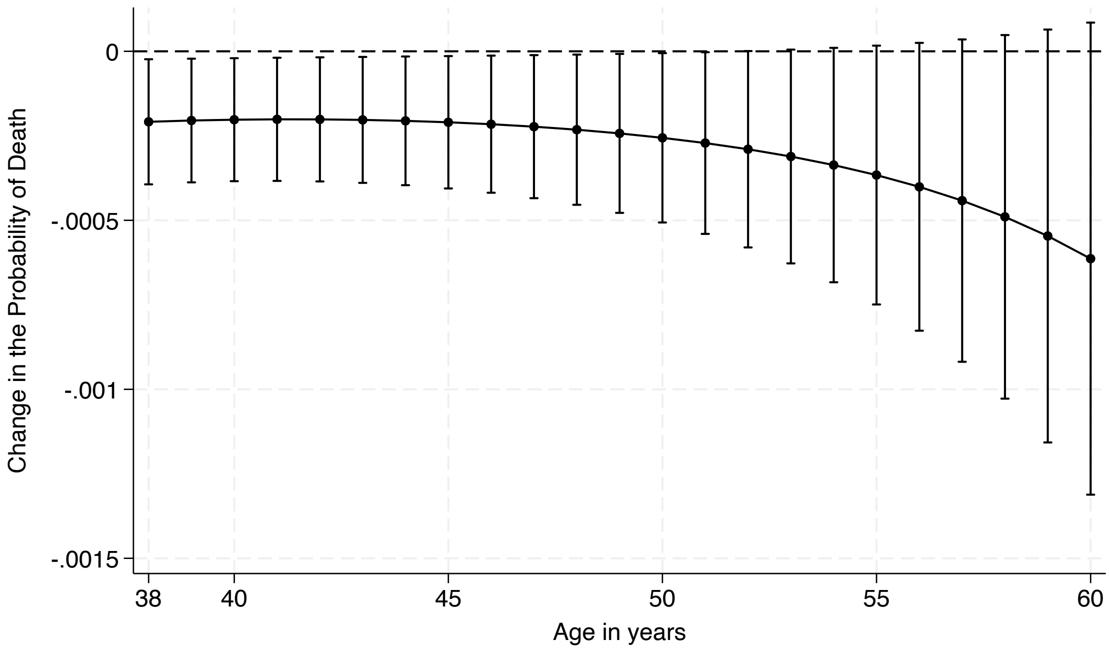
NOTE: Expected Pension Wealth (EPW) and 95% confidence interval (shaded) among Chilean men, with local polynomial smoothing (Fan and Gijbels, 2018). For men reaching legal retirement age before December 2017, we observe actual EPW at the time of retirement. For those retiring after December 2017 (born before December 1952), we predict pension contributions from January 2018 until the month that an individual reaches the minimum legal retirement age (as well as the return to fund-specific investments) using Equation (18). The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. EPW values are CPI adjusted to December 2018 dollars.

Figure 3: Average Index of Health Investments, Unhealthy Lifestyle Behaviors, and Diagnosed Conditions, across Birth Cohort



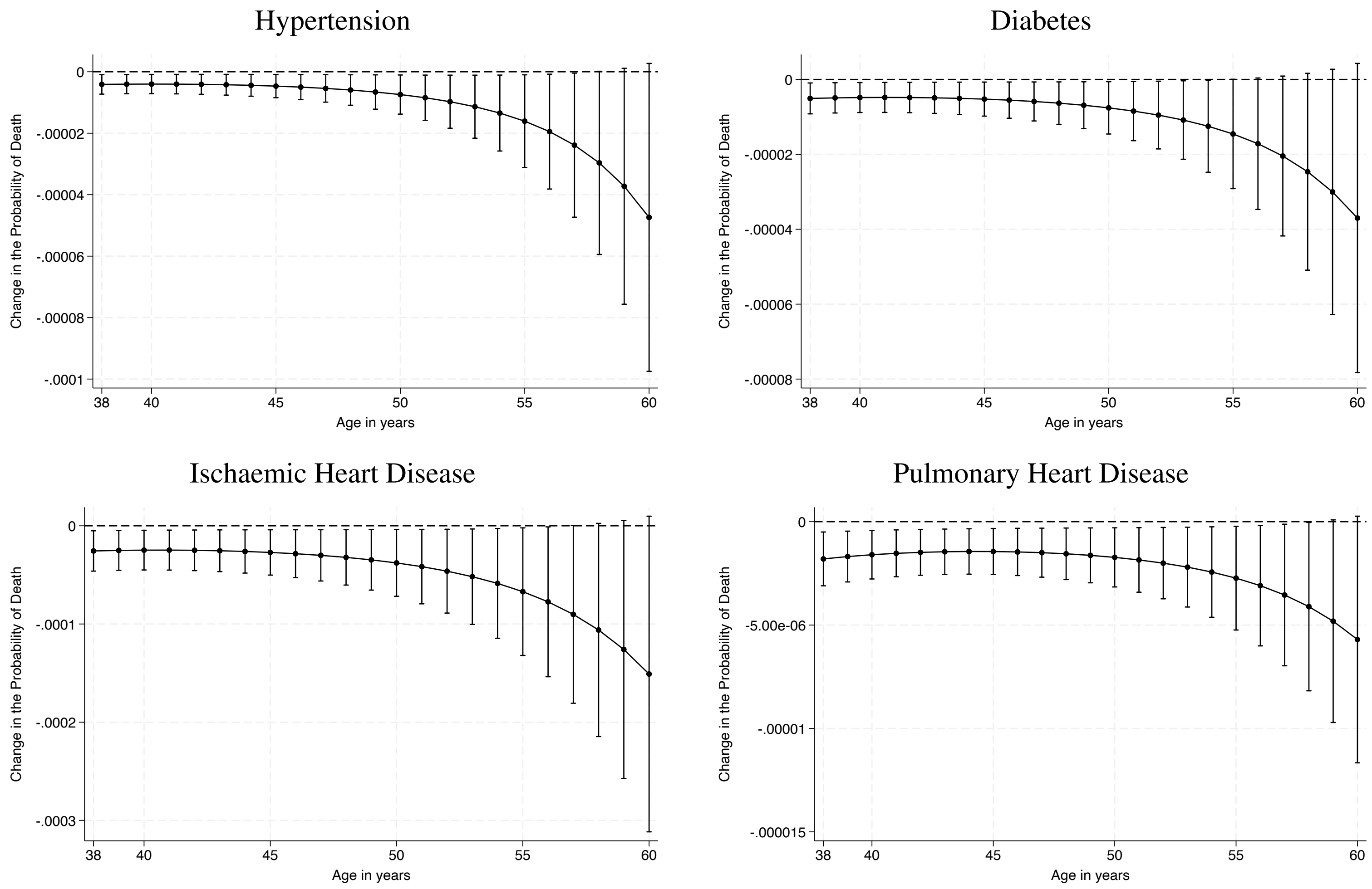
NOTE: Dots corresponds to scatter plots of the average of each Index across birth cohorts. Black lines are predicted values of each Index for each birth cohort, obtained using OLS and Equation (5). The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform.

Figure 4: Marginal Effect of the Expected Pension Wealth Kink on the Probability of Death by Age



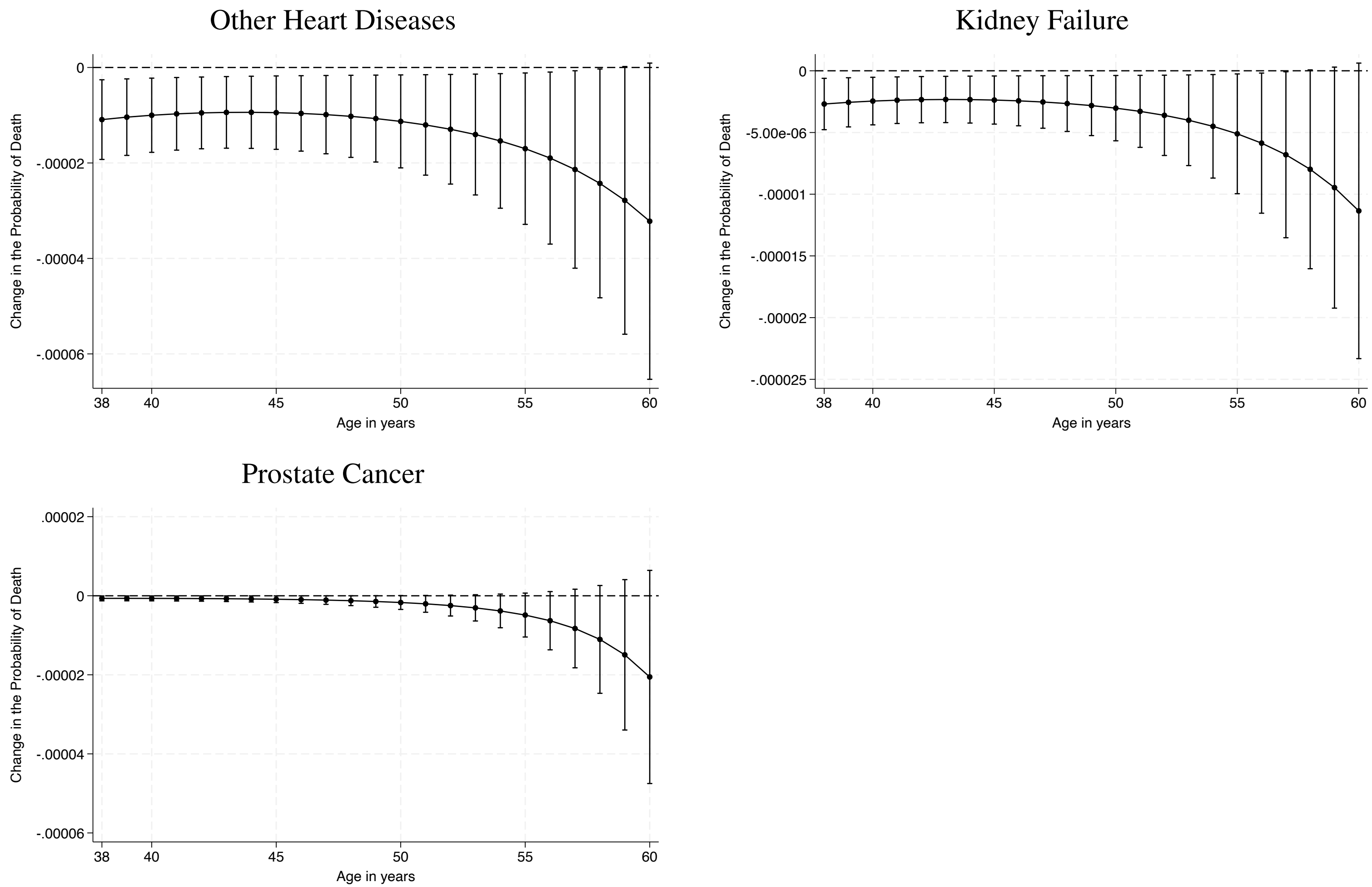
NOTE: Marginal effect of the Expected Pension Wealth (EPW) kink of the probability of death, by age, computed using logit estimates from the discrete survival model shown in Equation (8). 90% confidence intervals are constructed using the Delta Method.

Figure 5: Marginal Effect of the Expected Pension Wealth Kink on the Probability of Death, by Cause of Death and Age



NOTE: Marginal effect of the Expected Pension Wealth (EPW) kink of the probability of death, by age, computed using logit estimates from the discrete survival model shown in Equation (9). 90% confidence intervals are constructed using the Delta Method.

Figure 5: (*cont.*) Marginal Effect of the Expected Pension Wealth Kink on the Probability of Death, by Cause of Death and Age



NOTE: Marginal effect of the Expected Pension Wealth (EPW) kink of the probability of death, by age, computed using logit estimates from the discrete survival model shown in Equation (9). 90% confidence intervals are constructed using the Delta Method.

Tables

Table 1: Chile's Pension Reform and the Birth Cohort Kink in Expected Pension Wealth

	Four-Waves Sample	Two-Waves Sample
	(1)	(2)
Cohorts Relative to Kink $(cohort - c_0)$	16.9	-29.4
	(15.4)	(18.2)
Slope Change at Kink $((cohort - c_0) \times D)$	1037.6***	1134.4***
	(23.6)	(26.2)
Observations	18836	8685
Mean	135193	160320

NOTE: OLS estimates of α_1^{EPW} (cohort relative to the kink) and β_1^{EPW} (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (6). The "four-waves" sample includes observations from EPS waves conducted in 2004, 2006, 2009 and 2015. The "two-waves" sample includes observations from EPS waves conducted in 2009 and 2015 (see Section 3 for a description of the difference between both samples). EPW is CPI adjusted to December 2018 dollars. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2: Chile's Pension Reform and Voluntary Pension Savings, Other Financial and Non-Financial Savings, and Household Consumption

	Has Voluntary Pension Savings	Household Has Financial Assets	Household Has Non-Financial Savings	Monthly Household Expenditure
	(1)	(2)	(3)	(4)
Cohorts Relative to Kink $(cohort - c_0)$	0.0002**	0.0011	0.0055***	19.7861
	(0.00009)	(0.0022)	(0.0016)	(19.8723)
Slope Change at Kink $((cohort - c_0) \times D)$	-.0007***	0.0024	-.0046	-42.7917
	(0.0001)	(0.0037)	(0.003)	(42.8708)
Observations	8737	2279	2279	18560
Mean	0.1372	0.4208	0.1768	1326

NOTE: OLS estimates of α_1^{EPW} (cohort relative to the kink) and β_1^{EPW} (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5). Outcomes in Columns (1), (2), and (3) are binary variables, and are estimated using linear models. Household expenditure (Column (4)) is CPI adjusted to December 2018 dollars. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Fuzzy Regression Kink Estimates of the Effect of Expected Pension Wealth on Health Investments

	Screenings				Preventive Check-up	Index
	Hypertension	Diabetes	Cholesterol	Prostate		
	(1)	(2)	(3)	(4)	(5)	(6)
Expected Pension Wealth (EPW)	0.0006***	0.0004***	0.0004***	0.0006***	0.0003***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.00007)	(0.0001)
Romano-Wolf p-value	0.001	0.002	0.001	0.001	0.001	
95% Robust confidence set	[.0003,.0008]	[.0001,.0006]	[.0002,.0007]	[.0004,.0008]	[.0002,.0005]	[.0004,.0008]
AR test p-value	3.00e-06	0.0023	0.0004	1.83e-07	7.00e-06	1.55e-07
F-stat	1861.6470	1862.3720	1868.5290	1853.9960	1935.4060	1833.3330
Observations	8679	8683	8690	8572	18793	8518
Mean	0.299	0.2918	0.3251	0.1514	0.1514	

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on health investments. "EPW" is the estimate of τ in Equation (7). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. Outcomes in columns (1) through (5) are binary variables and are estimated using linear models. The index, computed following Anderson (2008), includes the outcomes of hypertension, diabetes, cholesterol, and prostate screenings, and is standardized. All regressions include a first-order cohort polynomial centered at the kink $(cohort - c_0)$ and linear time trends. Standard errors are clustered at the individual level and reported in parenthesis.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing (Romano and Wolf, 2005a,b), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-statistic shown for the instrument in the first stage.

Table 4: Fuzzy Regression Kink Estimates of the Effect of Expected Pension Wealth on Unhealthy Lifestyle Behaviors

	Smokes Tobacco	Number of Cigarettes per month	Drinks Alcohol	Frequency of Alcohol Consumption per Week	Physically Inactive	Index
	(1)	(2)	(3)	(4)	(5)	(6)
Expected Pension Wealth (EPW)	-.0005***	-.1433***	0.00007	0.0006	-.0006***	-.0007***
	(0.0001)	(0.0405)	(0.0001)	(0.0005)	(0.0001)	(0.0001)
Romano-Wolf p-value	0.001	0.001	0.5834	0.3187	0.001	
95% Robust confidence set	[-.0008,-.0003]	[-.2219,-.0678]	[-.0002,.0003]	[-.0003,.0016]	[-.0008,-.0004]	[-.001,-.0005]
AR test p-value	0.00006	0.0003	0.5627	0.1768	7.73e-10	6.26e-07
F-stat	1929.4740	1926.1980	1935.8670	1943.0630	1934.8360	1905.8550
Observations	18781	18746	18780	18547	18681	18182
Mean	0.3825	71.2213	0.5879	1.3480	0.6962	

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on unhealthy lifestyle behaviors. “EPW” is the estimate of τ in Equation (7). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. Outcomes in columns (1), (3), and (5) are binary variables and are estimated using linear models. The Index is computed following Anderson (2008) and is standardized. All regressions include a first-order cohort polynomial centered at the kink $(cohort - c_0)$ and linear temporal trends. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing (Romano and Wolf, 2005a,b), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-statistic shown for the instrument in the first stage.

Table 5: Fuzzy Regression Kink Estimates of the Effect of Expected Pension Wealth on Diagnosed Conditions

	Hypertension	Diabetes	Heart Disease	Kidney Failure	Index
	(1)	(2)	(3)	(4)	(5)
Expected Pension Wealth (EPW)	0.0005***	0.0002***	0.0002***	-.00003	0.0006***
	(0.00009)	(0.00006)	(0.00004)	(0.00003)	(0.0001)
Romano-Wolf p-value	0.001	0.005	0.001	0.2248	
95% Robust confidence set	[.0003,.0007]	[.0001,.0003]	[.0002,.0003]	[-.0001,0]	[.0004,.0008]
AR test p-value	4.93e-09	0.0018	2.17e-08	0.2306	1.68e-07
F-stat	1934.6070	1930.8610	1944.3370	1931.8560	1903.8680
Observations	18798	18793	18801	18782	18541
Mean	0.1171	0.0467	0.029	0.0178	

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on diagnosed conditions. "EPW" is the estimate of τ in Equation (7). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. Outcomes in columns (1) through (4) are binary variables and are estimated using linear models. The Index is computed following Anderson (2008) and is standardized. All regressions include a first-order cohort polynomial centered at the kink $(cohort - c_0)$ and linear temporal trends. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing (Romano and Wolf, 2005a,b), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-statistic shown for the instrument in the first stage.

Appendix

A.1 Conceptual Framework

We outline a simple two-period model to understand the role that the complementarity/substitution between health and consumption plays when deriving predictions on how expected pension wealth affects health investments. We assume that in period 1, an individual is endowed with $\bar{T}$ time units, that he/she splits between working time, W, leisure time, L, and time dedicated to invest in health, I. The first period utility function, $F(C_1, L)$, depends on period 1 consumption, C_1, and leisure, L. In the second period, the individual maximizes $S(C_2, H)$, which depends on period 2 consumption C_2 and health, H, which has been produced using the period 1 health investment, I. The level of health, H, also enters in the probability of survival between period 1 and 2, $p(H)$. The individual chooses C_1, C_2, L, I, and hence, H, in order to solve the following maximization problem:

$$\underset{C_1,C_2,I,L}{\text{Max}} \quad \left\| F(C_1, L) + \beta p(H) S(C_2, H) \right\| \tag{10a}$$

$$\text{subject to} \quad C_1 = w(\bar{T} - L - I), \tag{10b}$$

$$H = f(I), \tag{10c}$$

$$m = C_2, \tag{10d}$$

where β refers to the discount factor, w is the wage rate and m is the pension wealth. We model the pension wealth as exogenous because the pension contributions are compulsory and voluntary contributions are very small in the setting that we study.

After substituting (10b), (10c), and (10d) in (10a), the first order conditions are:

$$U_L : -wF_{C_1} + F_L = 0, \tag{11a}$$

$$U_I : -wF_{C_1} + \beta p' f' S(m, f(I)) + \beta p(f(I)) S_H = 0 \tag{11b}$$

The second derivatives of the utility function are:

$$U_{LL} = w^2 F_{C_1C_1} - 2wF_{C_1L} + F_{LL}, \tag{12a}$$

$$U_{II} = w^2 F_{C_1C_1} + \beta p'' f' S + \beta p' f'' S + \beta p' S_H (f')^2 + \beta p' f' S_H + \beta p S_{HH} f', \tag{12b}$$

$$U_{Im} = \beta p' f' S_{C2} + \beta p S_{HC_2}, \tag{12c}$$

$$U_{IL} = w^2 F_{C1C1} - wF_{C1L}, \tag{12d}$$

$$U_{Lm} = 0. \tag{12e}$$

Rewriting the first order conditions, (11a) and (11b) as:

$$U_L(L(m), I(m), m) = 0, \tag{13a}$$

$$U_I(L(m), I(m), m) = 0, \tag{13b}$$

and differentiating both equations with respect to m, we obtain:

$$U_{LL}\frac{dL}{dm} + U_{LI}\frac{dI}{dm} = -U_{Lm} \tag{14a}$$

$$U_{IL}\frac{dL}{dm} + U_{II}\frac{dI}{dm} = -U_{Im} \tag{14b}$$

Applying Cramer's Rule, the comparative statics are:

$$\frac{dI}{dm} = \frac{-U_{LL}U_{Im} + U_{IL}U_{Lm}}{U_{LL}U_{II} - U_{IL}^2} \tag{15a}$$

$$\frac{dL}{dm} = \frac{-U_{II}U_{Lm} + U_{IL}U_{Im}}{U_{LL}U_{II} - U_{IL}^2} \tag{15b}$$

Substituting 12a, 12c, 12d, 12e into 15a, we find how health investments in the first period, I change with the pension wealth, m:

$$\frac{dI}{dm} = \frac{-U_{LL}(\beta p' f' S_{C_2} + \beta p S_{HC_2})}{U_{LL}U_{II} - U_{IL}^2}, \tag{16a}$$

where the denominator and $-U_{LL}$ are positive due to the second order conditions. The term $\beta p' f' S_{C_2}$ is also positive and can be interpreted as how much utility increases due to the increase in longevity associated to the increase in higher health investment. However, the sign of $\beta p S_{HC_2}$ is ambiguous and given by the sign of S_{HC_2}. If health and consumption are complements, $S_{HC_2} > 0$, then all the terms are positive and it is clear that $\frac{dI}{dm} > 0$. Intuitively, the individual invests more in health because this increases the marginal utility of consumption, and consumption in period 2 increases due to the increase in pension wealth. However, if health and consumption are substitutes, $S_{HC_2} < 0$, the effect will be the contrary. Note that if $\beta p S_{HC_2}$ is negative but sufficiently close to zero, it might not offset the positive longevity effect of $\beta p' f' S_{C_2}$ and $\frac{dI}{dm}$ still be positive. Otherwise, if $\beta p S_{HC_2}$ were negative and sufficiently large in absolute value, then $\frac{dI}{dm}$ would be negative.

A.2 Calculation of Individual-Level Expected Pension Wealth

For individuals reaching legal retirement age before December 2017, we observe actual EPW at the time of retirement. For those retiring after December 2017, we use their actual account balance as of December 2017, and predict the stream of pension contributions from January 2018 until the month that an individual reaches minimum legal retirement age, as well as the return to fund-specific investments. Specifically, we compute EPW for these individuals i as:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017} \times f1_i(rm, n_i, n1_i, n2_i) + \sum_{s=1}^{S} \widehat{cont\_am}_{i,s} \times f2_i(rm, n_i, n1_i, n2_i) \\ &\quad + \mathbb{1}[i \epsilon DB] \times rbond_i \times (1+rr)^{nr_i}, \end{aligned} \tag{17}$$

where $acc\_bal_{i,Dec-2017}$ is the observed value of the individual's pension savings accumulated by December 2017; $f1_i$ and $f2_i$ are functions used to compound the returns on the value of past and future pension contributions, respectively, up to the month of minimum legal retirement age (this functions are further explained below); rm is a set that includes the r_j, for $j = A, B, C, D, E$, the real monthly average pension fund type j's rate of return computed using observed returns from January 1982 to December 2018, excluding the period corresponding to the subprime crisis; n_i is the number of months from January 2018 until the month-year the individual has the legal right to claim pension benefits; $n1_i$ is the number of months from January 2018 until the month at which the individual turns either 56 (males) or 51 (females), and $n2_i$ is the number of months from January 2018 until the month at which the individual turns 36; $\widehat{cont\_am}_{is}$ is the predicted individual's real pension contribution in month s; s indexes working months (from s = 1 in January 2018 through s = S in the month that the individual reaches minimum legal retirement age); $rbond_i$ is the observed value of the recognition bond (0, except for individuals that participated in the DB system); rr is the real monthly rate of return to the recognition bond;[49] and nr_i is the number of months between when an individual exits the DB system and reaches minimum legal retirement age.

To predict monthly pension contributions made between January 2018 and minimum legal retirement age (or calculate $\widehat{cont\_am}_{is}$), we stratify by level of education and estimate:[50]

$$
\begin{aligned}
cont\_am_{is} &= \alpha + \sum_{j=1}^{3} \beta_j age_{is}^{j} + \sum_{j=1}^{3} \gamma_j cohort_i^{j} + \delta(age_{is} \times cohort_i) \\
&\quad + \zeta female_i + \lambda' X_i^{meduc} + \pi' X_i^{region} + u_{is},
\end{aligned} \tag{18}
$$

where age_{is} is the age in months of individual i at month s; $cohort$ is the individual i birth cohort in months; $female$ is a dummy variable that takes value 1 if the individual is female; $X^{meduc} = (elem, hs, ungrad)$ is a vector of dummy variables for an individual's mother's educational attainment ($elem$ takes value 1 if the mother completed elementary education, hs takes value 1 if the mother completed high school, and $ungrad$ takes value 1 if the mother completed undergraduate studies; the omitted category is $elem\_inc$ that takes value 1 if the mother did not complete elementary education); and X^{region} is a vector of dummy variables for an individual's region of birth.

Before we provide the details for the functions $f1_i$ and $f2_i$ used to compute the EPW, we explain two features of the pension fund's rate of return, namely the multi-fund scheme and the default fund assignment. The precise pension savings investments made by PFAs are

[49] The annual rate of return to the recognition bond was set by law at 4%. The corresponding monthly rate of return is equal to 0.327%.

[50] We tested several alternative specifications to predict monthly contributions and selected the one with the highest goodness of fit using Bayesian and Akaike information criteria (Schwarz, 1978; Akaike, 1974)

standardized, regulated, and monitored by the Superintendencia de Pensiones. Since 2002, this regulatory agency created a multi-fund DC scheme that allow beneficiaries to choose asset allocations across five different investment categories, varying in their degree of risk and expected return. Each PFA is required to offer all five types of fund types (A-E): fund type A is the highest risk/highest expected return, and fund type E is the lowest risk/lowest expected return. Appendix Figure A.13 summarizes historical returns by fund type from 2002 to 2018.

In general, Figure A.13 shows higher average returns and greater volatility in the riskier funds, and the drop in returns during the 2008 subprime crisis. In the computation of the EPW we use the average monthly returns excluding the 2008 subprime crisis period (between October 2007 and November 2008) that are equal to 0.87%, 0.69%, 0.71%, 0.44%, and 0.40%, for fund types A to E, respectively.[51]

Chilean government regulates beneficiary choices of fund type in several ways. One restricts the amount of risk taken by those close to retirement. Within ten years of the legal retirement age, beneficiaries are unable to choose the riskiest fund category (fund A). Also, pensioners cannot choose the two riskier (fund A and B). Another is the use of default fund assignments based on age and sex. If the beneficiary does not actively choose a fund allocation, the following default assignments are made: fund B for males and females ages 35 and younger; fund C for females 36-50 and males 36-55; and fund D for females above 50 and males above 55. In our computation of the EPW we follow the default fund assignment.

The default fund assignment generates 5 different equations for the computation of the EPW:[52]

- Case 1: individuals aged 55 years old or more if she is a woman, and 60 years old or more if he is a man, in December 2017:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017}(1+r_D)^{n_i} + [\sum_{s=1}^{n_i} \widehat{cont\_am}_{is}(1+r_D)^s \\ &\quad + \mathbb{1}[i \epsilon DB] rbond_i (1+rr)^{nr_i}. \end{aligned} \tag{19}$$

[51]The reported average monthly returns are arithmetic means.

[52]We use the formulae established by the Superintendencia de Pensiones to inform PFA's affiliates about their projected pensions, as described in Superintendencia de Pensiones (2020), modified to incorporate our predicted contributions.

- Case 2: individuals aged between 51 and 54 years old if she is a woman, and between 56 and 59 if he is a man, in December 2017:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017} X_{CD}(1+r_D)^{60} + \sum_{s=1}^{n} \widehat{cont\_am}_{is}(1+r_D)^s \\ &+ \mathbb{1}[i\epsilon DB] rbond_i (1+rr)^{nr_i}, \end{aligned} \quad (20)$$

where:

if individual i is 51 years old and woman or 56 years old and man: $X_{CD} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_C) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_D)\big]$

if individual i is 52 years old and woman or 57 years old and man: $X_{CD} = \prod_{k=1}^{4} \big[\big[0.6 - (k-1)0.2\big](1+r_C) + \big[1 - (0.6 - (k-1)0.2)\big](1+r_D)\big]$

if individual i is 53 years old and woman or 58 years old and man: $X_{CD} = \prod_{k=1}^{4} \big[\big[0.4 - (k-1)0.2\big](1+r_C) + \big[1 - (0.4 - (k-1)0.2)\big](1+r_D)\big]$

if individual i is 54 years old and woman or 59 years old and man: $X_{CD} = 0.2(1+r_C) + 0.8(1+r_D)$

- Case 3: individuals aged between 40 and 50 years old if she is a woman, and between 40 and 55 years old if he is a man, in December 2017:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017}(1+r_C)^{n1_i} X_{CD}(1+r_D)^{60} \\ &+ \big[\sum_{s=1}^{n1_i} \widehat{cont\_am}_{is}(1+r_C)^s\big](1+r_D)^{108} + \sum_{s=1}^{108} \widehat{cont\_am}_{is}(1+r_D)^s \\ &+ \mathbb{1}[i\epsilon DB] rbond_i (1+rr)^{nr_i}, \end{aligned} \quad (21)$$

where:

$X_{CD} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_C) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_D)\big]$, and

- case 4: individuals aged between 36 and 39 years old in December 2017:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017} X_{BC}(1+r_C)^{n3_i} X_{CD}(1+r_D)^{60} \\ &+ \big[\sum_{s=1}^{n3_i+48} \widehat{cont\_am}_{is}(1+r_C)^s\big](1+r_D)^{108} + \sum_{s=1}^{108} \widehat{cont\_am}_{is}(1+r_D)^s \\ &+ \mathbb{1}[i\epsilon DB] rbond_i (1+rr)^{nr_i}, \end{aligned} \quad (22)$$

where:

$X_{CD} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_C) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_D)\big]$, and

if individual i is 36 years old: $X_{BC} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_B) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_C)\big]$

if individual i is 37 years old: $X_{BC} = \prod_{k=1}^{4} \big[\big[0.6 - (k-1)0.2\big](1+r_B) + \big[1 - (0.6 - (k-1)0.2)\big](1+r_C)\big]$

if individual i is 38 years old: $X_{BC} = \prod_{k=1}^{4} \big[\big[0.4 - (k-1)0.2\big](1+r_B) + \big[1 - (0.4 - (k-1)0.2)\big](1+r_C)\big]$

if individual i is 39 years old: $X_{BC} = 0.2(1+r_B) + 0.8(1+r_C)$

- case 5: individuals aged 35 years old or less in December 2017:

$$\begin{aligned} EPW_i &= acc\_bal_{i,Dec-2017}(1+r_B)^{n2_i} X_{BC}(1+r_C)^{n3_i} X_{CD}(1+r_D)^{60} \\ &+ \big[\sum_{s=1}^{n2_i} \widehat{cont\_am}_{is}(1+r_B)^s\big](1+r_C)^{n3_i+48}(1+r_D)^{108}, \end{aligned} \tag{23}$$

where:

$X_{BC} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_B) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_C)\big]$

$X_{CD} = \prod_{k=1}^{4} \big[\big[0.8 - (k-1)0.2\big](1+r_C) + \big[1 - (0.8 - (k-1)0.2)\big](1+r_D)\big]$

Definitions applying to all cases (case 1 to 5):

$acc\_bal_{i,Dec-2017}$ is the real value of the individual's pension savings accumulated by December 2017; r_j, for $j = A, B, C, D, E$, is the real monthly average pension fund type j's rate of return computed using observed returns from January 1982 to December 2018, explicitly excluding the period corresponding to the subprime crisis; n_i is the number of months from January 2018 until the month-year the individual i has the legal right to claim pension benefits; $n1_i$ is the number of months from January 2018 until the month-year the turns 56 if he is a man or 51 if she is a woman; $n2_i$ is the number of months from January 2018 until the month-year the individual i turns 36; $n3_i$ is equal to 192 if individual i is a men and 132 if individual i is a woman. s indexes working months (from s = 1 in January 2018); $\widehat{cont\_am}_{is}$ is the individual's predicted real pension contribution in month s; $rbond_i$ is the value of a recognition bond (0, except for individuals that participated in the DB system); rr is the real monthly rate of return to the recognition bond;[53] nr_i is the number of months between when an individual exits the DB system and reaches minimum legal retirement age.

A.3 Direct Financial Costs of Preventive Health Screening in Chile

Appendix Table A.5 shows small direct financial costs of preventive health screening for a large share of the individuals in our sample. Cost-sharing rates at Chilean healthcare providers vary depending on the type of health insurance and the healthcare provider. For beneficiaries of public health insurance, which make up roughly 70% of the individuals in the working sample, copayment rates at public healthcare providers range from zero to 20%, depending on the specific insurance program (see the Appendix Table A.6 for details). Individuals with public health insurance can choose to seek care at private providers and are required to pay a copayment rate of 40%.[54] For them, copayment amounts are US $0.96 (for blood glucose tests), $1.04 (for cholesterol tests), $1.52 (for high-density lipoprotein tests), $6.68 (for a visit to a generalist doctor's office), and $11.76 (for a visit to an urologist's office).[55] These direct out-of-pocket screening costs are very low relative to a mean monthly income of US $1,080 (for males in 2017), and taken together with the finding that consumption expenditures do not change at the threshold (Table 2), imply that contemporaneous financial considerations are unlikely to explain the increases in preventive screening that we observe.

A.4 Sensitivity Analysis

In this section we present the equations used to estimate regression models with a second-order polynomial in the cohort centered at the kink, similar to Equations (5), (6), and (7) in Section 4.1.

[53]The annual rate of return to the recognition bond was set by law at 4%. The corresponding monthly rate of return is equal to 0.327%.

[54]Public health insurance at zero premium covers individuals who have no income. This group, which makes up about 18.14% of the working sample, is not permitted to opt for private healthcare providers.

[55]The public health insurance account for about 80% of the Chilean population; roughly 17% is in private health insurance providers, and 3% is in other private programs or formally uninsured (https://www.superdesalud.gob.cl/app/uploads/2022/03/articles-20754_recurso_1.pdf)

The health outcome function is:

$$\begin{aligned}\mathbb{E}[H_{it}|cohort_i, \omega_t] &= \alpha_0^h + \alpha_1^h(cohort_i - c_0) + \alpha_2^h(cohort_i - c_0)^2 \\ &+\beta_1^h(cohort_i - c_0) \times D + \beta_2^h(cohort_i - c_0)^2 \times D + \omega_t,\end{aligned} \quad (24)$$

where i indexes individuals, t indexes EPS survey waves, $cohort_i$ is the year-month birth cohort, $D_i = \mathbb{1}[cohort_i > c_0]$ is an indicator variable, and ω_t are year fixed effects.

Similarly, the EPW function is:

$$\begin{aligned}\mathbb{E}[EPW_i|cohort_i, \omega_t] &= \alpha_0^{EPW} + \alpha_1^{EPW}(cohort_i - c_0) + \alpha_2^{EPW}(cohort_i - c_0)^2 \\ &+\beta_1^{EPW}(cohort_i - c_0) \times D + \beta_2^{EPW}(cohort_i - c_0)^2 \times D + \omega_t.\end{aligned} \quad (25)$$

To estimate the structural estimator of τ in the FRKD using the two stage least squares (2SLS) procedure we use:

$$\mathbb{E}[H_{it}|cohort_i, \omega_t] = \alpha_0 + \alpha_1(cohort_i - c_0) + \alpha_2(cohort_i - c_0)^2 + \beta_2(cohort_i - c_0)^2 * D + \tau * EPW + \omega_t, \quad (26)$$

where the endogenous variable EPW_i is instrumented with $(cohort_i - c_0) \times D_i$.

Appendix Figures

Figure A.1: Newspaper Front Page, November 7th, 1980

Esto Es lo que se Sabe Del Remedio Anticáncer

• Hay en Chile algunas cajas disponibles del Lisado de corazón

las últimas noticias

DIARIO POPULAR E INDEPENDIENTE

$ 10.- IVA incluido

EDICION DE HOY: 203.133 EJEMPLARES

Normas de la Nueva Previsión

PENSIONES TENDRAN REAJUSTE AUTOMATICO

100% del Alza del Costo De la Vida una Vez al Año

AHORRO VOLUNTARIO ADMINISTRADO POR ORGANOS PRIVADOS

ASEGURA EL MINISTRO

¡Fin del Drama De Jubilados!

El que la Sigue la Consigue.

NOTE: Published in Las Últimas Noticias, 11/7/1980. *Source*: Engel et al. (2017).

TEXT IN ENGLISH:
Rules of the New Social Security
PENSIONS WILL HAVE AUTOMATIC ADJUSTMENT
100% of the Increase in the Cost of Living Once a Year
VOLUNTARY SAVINGS MANAGED BY PRIVATE COMPANIES
THE MINISTER ASSURES
An end to retirees' struggles!

Figure A.2: Newspaper Column, November 7th, 1980

Ministro Piñera dio a conocer nuevo sistema previsional

Asegurado Reajuste Automático Para Jubilados, Una Vez al Año

Expresando la convicción del Gobierno que con el programa de modernizaciones, en cuyo contexto se inserta la reforma a la prevision, se transformará a Chile en un país desarrollado y en una nación de hombres libres, el Ministro del Trabajo, José Piñera dio a conocer anoche, por red nacional de radio y televisión, el contenido fundamental de la Reforma Previsional.

NO AFECTA BENEFICIOS

Luego de hacer un recuento de los vicios del sistema previsional imperante hasta la fecha, generador de injusticias y de una desigual distribución en las jubilaciones y pensiones, que condujo a que 7 de cada 10 jubilados ricibieran pensiones inferiores a tres mil pesos, el Secretario de Estado entró a detallar los principales aspectos de la Reforma Previsional, cuyos lineamientos básicos son los siguientes:

A partir del primero de marzo de 1981, las cotizaciones previsionales serán de cargo del trabajador, pero al mismo tiempo todas las remuneraciones brutas imponibles serán reajustadas con el sólo efecto de mantener constante la renta líquida de cada trabajador.

El Ministro Piñera destacó también que la reforma Previsional consiste fundamentalmente en crear un nuevo sistema de pensiones, que no afecta a los otros beneficios de la previsión social, y que está basado en una serie de libertades, entre ellas la de optar entre el viejo y el nuevo sistema; libertad de elegir la institución de capitalizacion; de realizar ahorros voluntarios para mejorar la pensión o adelantarla; de escoger como jubilación una renta vitalicia o un retiro programado, y otras.

Con respecto al sector pasivo, el Ministro Piñera expresó "que este Gobierno no tiene responsabilidad alguna en el drama de tantos pensionados". Agregó el Secretario de Estado en su intervención, "que no desentendiéndose de ellos, por primera vez en la historia, se ha consagrado en la ley el reajuste automático de pensiones en un 100% del alza del costo de la vida, por lo menos una vez al año".

"Nunca más el jubilado tendrá que sufrir la angustia de esperar que eventuales leyes le devuelvan el poder adquisitivo de sus pensiones erosionadas por la inflación", señaló el Ministro del Trabajo.

ASEGURA PENSION MINIMA

Entre las importantes disposiciones del conjunto de leyes que se promulgan, según señaló el Ministro Piñera está el hecho de que "todo trabajador dependiente deberá aportar mensualmente un 10% de su remuneración para incrementar su fondo individual".

"Esta cifra, de acuerdo a supuestos razonables, permitirá a un trabajador obtener una pensión cercana a sus últimas remuneraciones".

Se asegurará una pensión mínima a quiènes hayan trabajado una parte signficativa de su vida, siempre que cuenten con los requisitos de edad actualmente vigentes, 60 años para la mujer y 65 años para el hombre. En caso de que sus ahorros acumulados sean insuficientes, estos serán complementados por la vía del subsidio estatal.

La puesta en marcha del nuevo sistema, continuó el Ministro del Trabajo, permitirá a los trabajadores que a partir del 1° de mayo próximo, se trasladen libremente a el, obteniendo un aumento de remuneraciones líquidas.

"La opción a cambiarse al nuevo sistema podrá ser ejercida en cualquier momento a contar del 1° de mayo de 1981 hasta el 1° de mayo de 1986".

También dentro del conjunto de nuevas leyes, se aprovechó de cambiar el financiamiento de la asignación familiar y del subsidio de cesantía, transformándolo en prestaciones redistributivas financiadas con impuestos generales de la nación.

No existirán, en consecuencia, cotización con ese destino, sin perjuicio de que ambos beneficios seguirán siendo percibidos por los trabajadores dependientes, afiliados a los actuales sistemas previsionales o al nuevo que se crea. Parte del costo de esta medida se financiará con un impuesto transitorio del 3% del empleador, que disminuirá en un uno por ciento anual, hasta desaparecer en 1984.

Ministro José Piñera: "el nuevo sistema de pensiones no afecta a los otros beneficios de la previsión social".

Dudas e Interrogantes Trabajadores ante la

- Comisión de Resguardo de los Derechos Pre sus juicios sobre el sistema y lamentó que no tado "la opinión de los trabajadores"

Para expresar su preocupación sobre la Reforma Previsional, y su rechazo a la privatización del sistema, a pocas horas de ser dadas a conocer por el Gobierno las nuevas normas que regirán en esta materia, varios sectores gremiales aglutinados en la llamada "Comisión de Resguardo de los Derechos Previsionales", hicieron pública una declaración al respecto.

En un documento entregado a la prensa por Federico Mujica y Ramiro de La Vega, dirigentes de empleados particulares y periodistas, respectivamente, se expresa que **"en víspera de que se ponga en vigencia la Reforma Previsional en la cual la opinión de los trabajadores no fue considerada, las organizaciones gremiales abajo firmantes, creen oportuno entregar al Supremo Gobierno esta declaración oficial con sus puntos de vista y consideraciones".**

Luego de enumerar una serie de medidas legales que han significado importantes pérdidas de derechos adquiridos por los trabajadores, quebrando **"dramáticamente el equilibrio entre capital y trabajo, con desmedro para los segundos"**, la declaración

40 Años de Chile en La Antártica

NOTE: Published in Las Últimas Noticias, 11/7/1980. *Source*: Engel et al. (2017).

TEXT IN ENGLISH:

Minister Piñera unveiled the new pension system

Automatic annual adjustment for retirees guaranteed

“Never again will a retiree have to suffer the anxiety of waiting for eventual laws to restore the purchasing power of pensions eroded by inflation. . . ,” said the Minister of Labor.

DOES NOT AFFECT BENEFITS

Starting March 1, 1981, pension contributions will be the responsibility of the worker, but at the same time all gross taxable wages will be adjusted solely to keep each worker’s net income constant.

GUARANTEES A MINIMUM PENSION

“Every salaried worker must contribute 10% of their wage each month to increase their individual account.”

“Under reasonable assumptions, this amount will allow a worker to obtain a pension close to their most recent wages.”

Figure A.3: Newspaper Column, April the 2nd, 2000

TRABAJADORES QUE COTIZARON EN AFP DESDE SU INICIO:

Chilenos Se Pensionarían con El 100% de Su Sueldo el 2020

● **Esta predicción de expertos previsionales se basa en una rentabilidad anual promedio de los fondos del 6% y 7%.**

Para el año 2020, la Asociación de AFP asegura que los actuales afiliados al sistema jubilarán con una renta equivalente o superior al 100% de su remuneración promedio durante sus años trabajados.

Esto, si se mantiene de aquí en adelante una rentabilidad de los Fondos de Pensiones semejante a la de países desarrollados que fluctúa entre el 6% y 7%, que es la pronosticada por expertos del sistema para Chile.

"Las personas que jubilen en 20 años más podrían recibir incluso como pensión más del 100% de su sueldo promedio si se alcanzan buenos resultados de los fondos", pronosticó el gerente de operaciones de la Asociación de AFP, Fernando Avila.

Este grupo de futuros jubilados son aquellos trabajadores que cotizaron en las AFP desde que ellas entraron en vigencia, en 1981.

Avila afirma que los afiliados que estén más cerca de la edad de jubilar, por ejemplo, en 10 años más, tendrán una pensión mayor a la que recibirían en la actualidad si fuesan jubilados, pero lo más probable es que no alcance a igualar su remuneración promedio.

Sin embargo, el representante de la Asociación de AFP reconoce que no existen estudios que permitan cuantificar el porcentaje de pensión que recibirán.

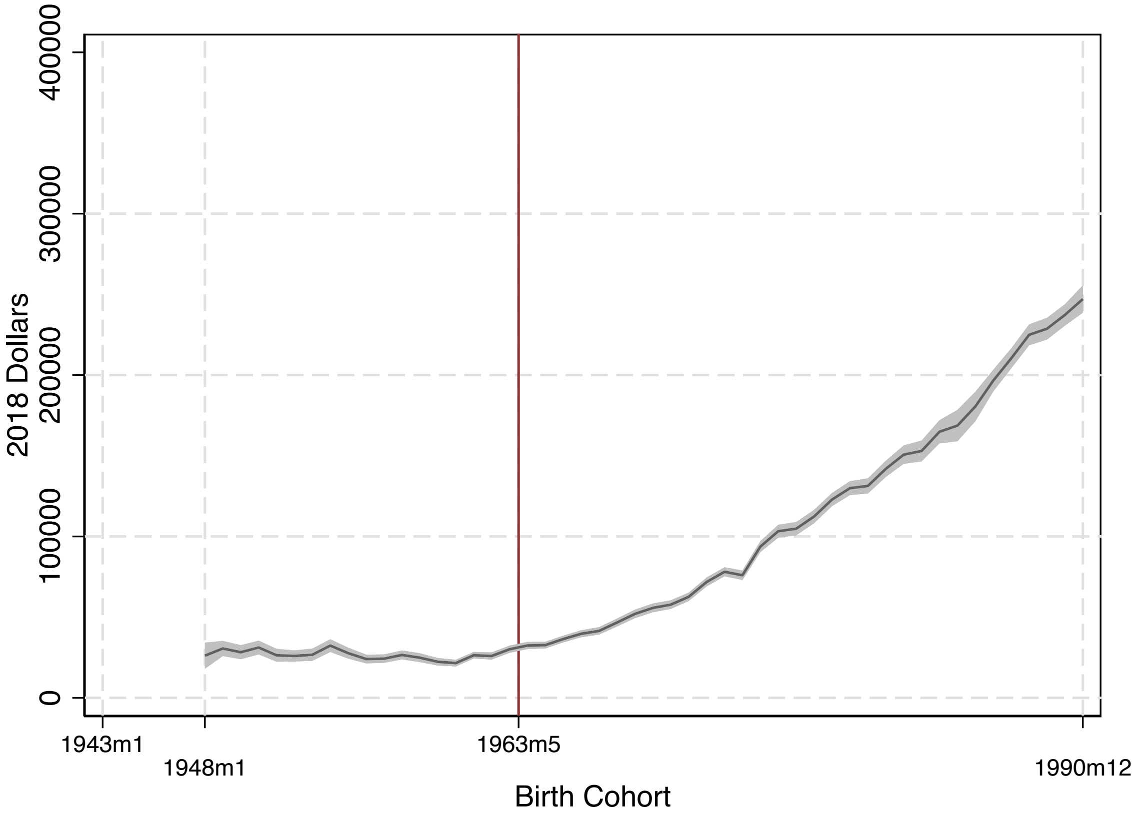
Cabe destacar que la rentabilidad anual promedio de los Fondos de Pensiones en Chile ha sido de 11,1% desde que comenzaron a funcionar, aunque se espera que esta cifra se estabilice alrededor

(Continúa en la página B 7)

NOTE: Published in El Mercurio, 2/4/2000. *Source*: Engel et al. (2017).

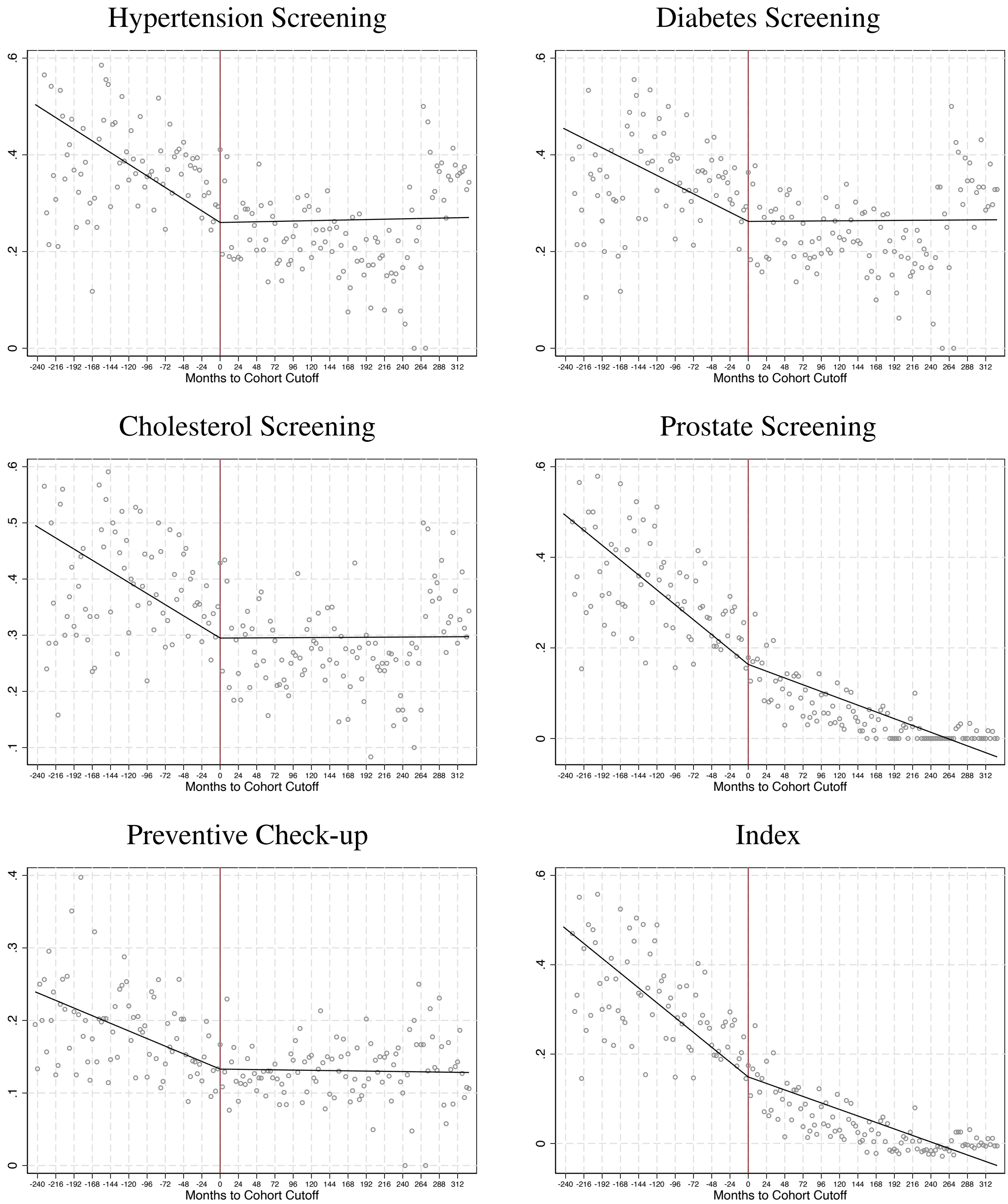
TEXT IN ENGLISH:
WORKERS WHO CONTRIBUTED TO THE AFP SINCE IT BEGAN:
Chileans Would Retire With 100% of Their Salary by 2020
• This projection by pension experts is based on an average annual return on the funds of 6% to 7%.
By 2020, the AFP Association states that current affiliates to the system will retire with an income equivalent to or greater than 100% of their average remuneration over their working years.
This would hold if, from now on, pension fund returns remain similar to those in developed countries, fluctuating between 6% and 7%, which is the figure forecast by system experts for Chile.
"People who retire twenty years from now could even receive a pension above 100% of their average wage if strong fund results are achieved," predicted the operations manager of the AFP Association, Fernando Avila.
This group of future retirees are those workers who have contributed to the AFPs since they came into force in 1981.
Affiliates who are closer to retirement age — for example, in ten more years — will have a higher pension than they would receive today if they retired now; but it is most likely that it will not match their average remuneration.
However, the representative of the AFP Association acknowledged that there are no studies that would allow the percentage of the pension they will receive to be quantified.
It should be noted that the average annual return of Pension Funds in Chile has been 11.1% since they began operating, although this figure is expected to stabilize around ....

Figure A.4: Expected Pension Wealth among Chilean Women



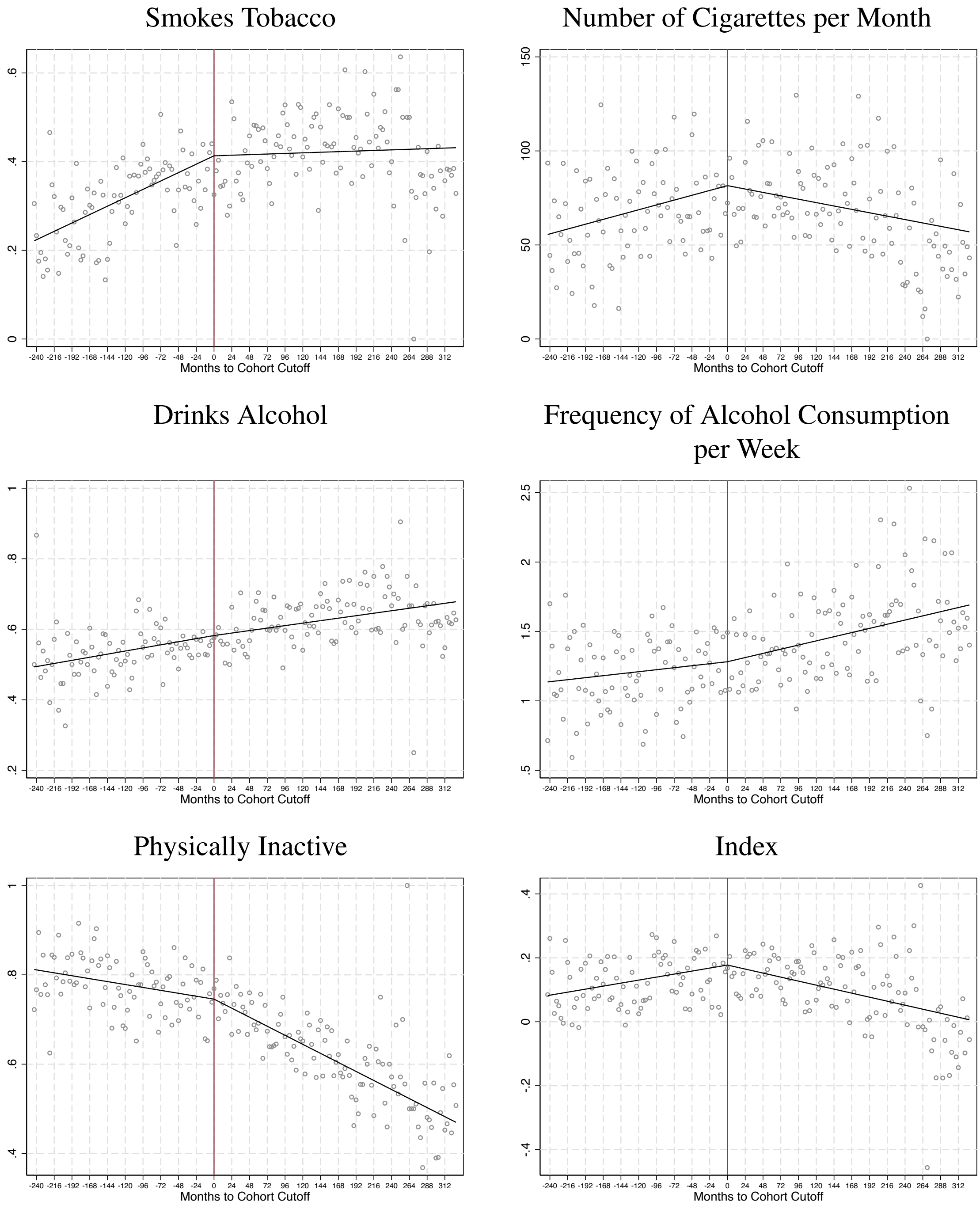
NOTE: Expected Pension Wealth (EPW) and 95% confidence interval (shaded) among Chilean women, with local polynomial smoothing (Fan and Gijbels, 2018). For women reaching legal retirement age before December 2017, we observe actual EPW at the time of retirement. For those retiring after December 2017 (born before December 1952), we predict pension contributions from January 2018 until the month that an individual reaches the minimum legal retirement age (as well as the return to fund-specific investments) using Equation (18). The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. EPW values are CPI adjusted to December 2018 dollars.

Figure A.5: Average Value of Health Investments across Birth Cohorts



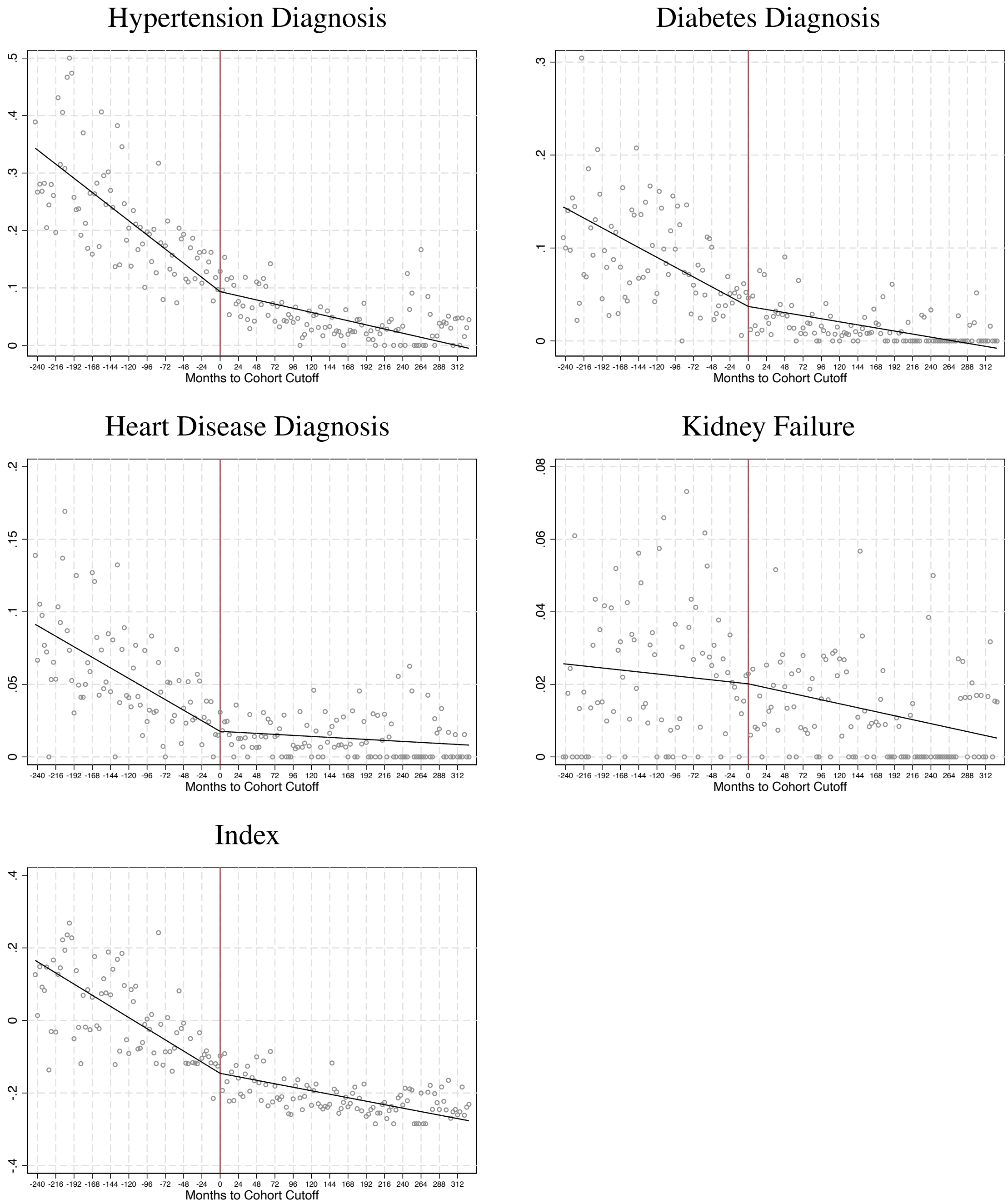
NOTE: Dots corresponds to scatter plots of each outcome across birth cohorts. Black lines are predicted values of each outcome for each birth cohort, obtained using OLS and Equation (5). The sample used for Screening outcomes includes observations from the EPS waves conducted in 2009 and 2015, that is the "two-waves" sample. The sample used for Preventive Check-up includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. All outcomes are binary variables.

Figure A.6: Average Value of Unhealthy Lifestyle Behaviors across Birth Cohorts



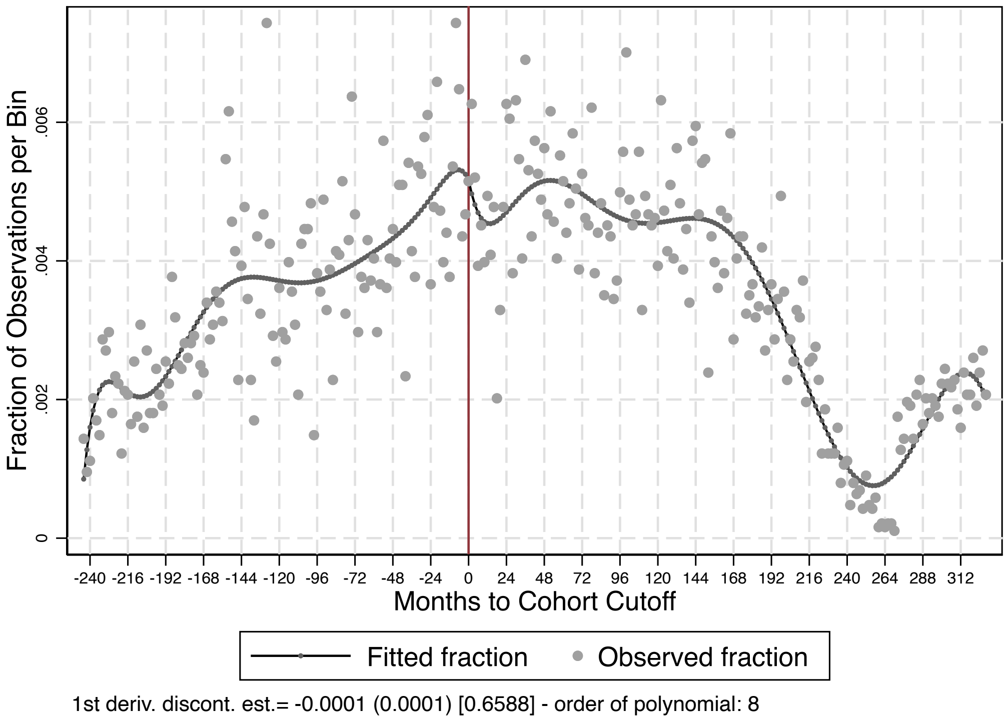
NOTE: Dots corresponds to scatter plots of each outcome across birth cohorts. Black lines are predicted values of each outcome for each birth cohort, obtained using OLS and Equation (5). The sample includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. All outcomes are binary variables.

Figure A.7: Average Value of Diagnosed Conditions across Birth Cohorts



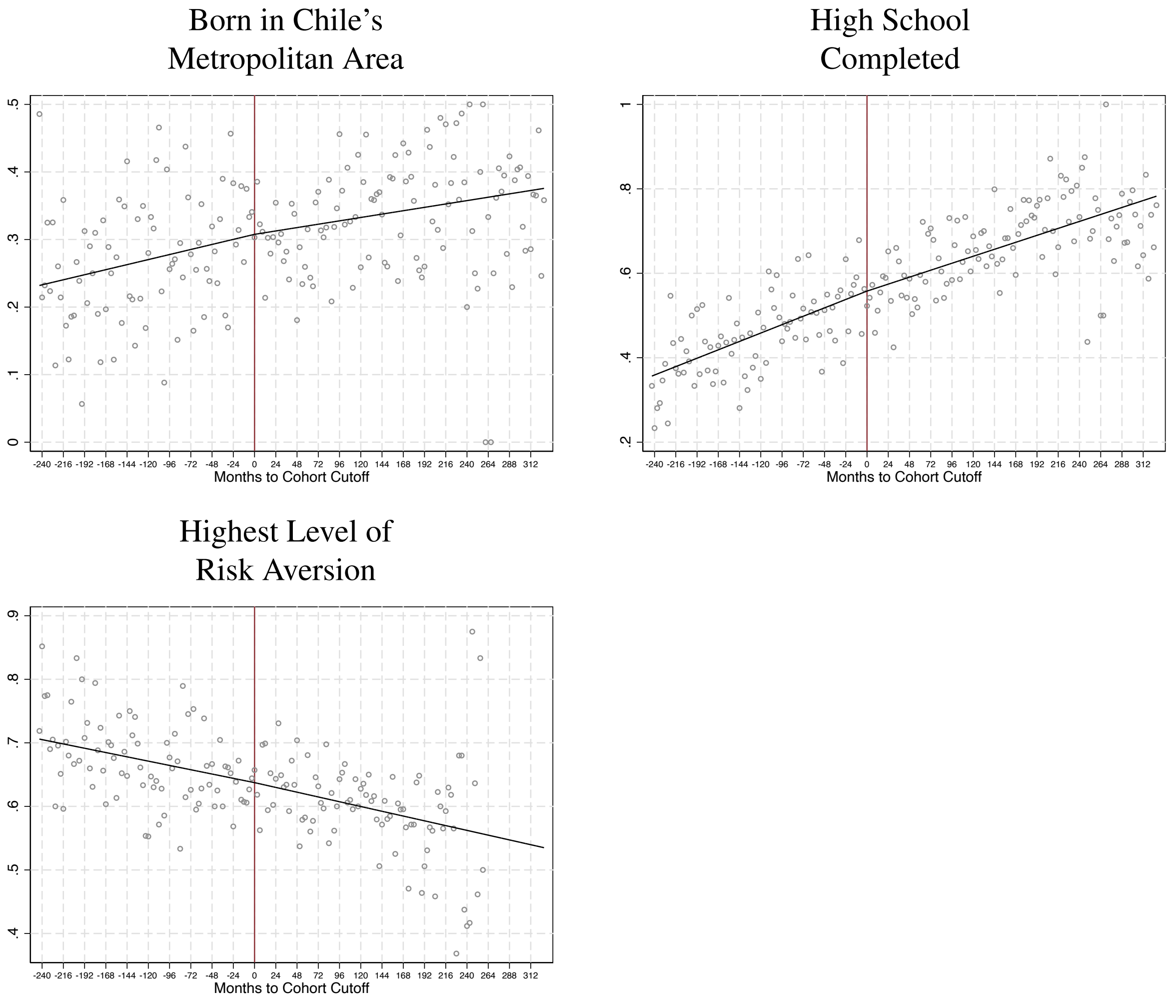
NOTE: Dots corresponds to scatter plots of each outcome across birth cohorts. Black lines are predicted values of each outcome for each birth cohort, obtained using OLS and Equation (5). The sample includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. All outcomes are binary variables.

Figure A.8: Density of Observations by Birth Cohort



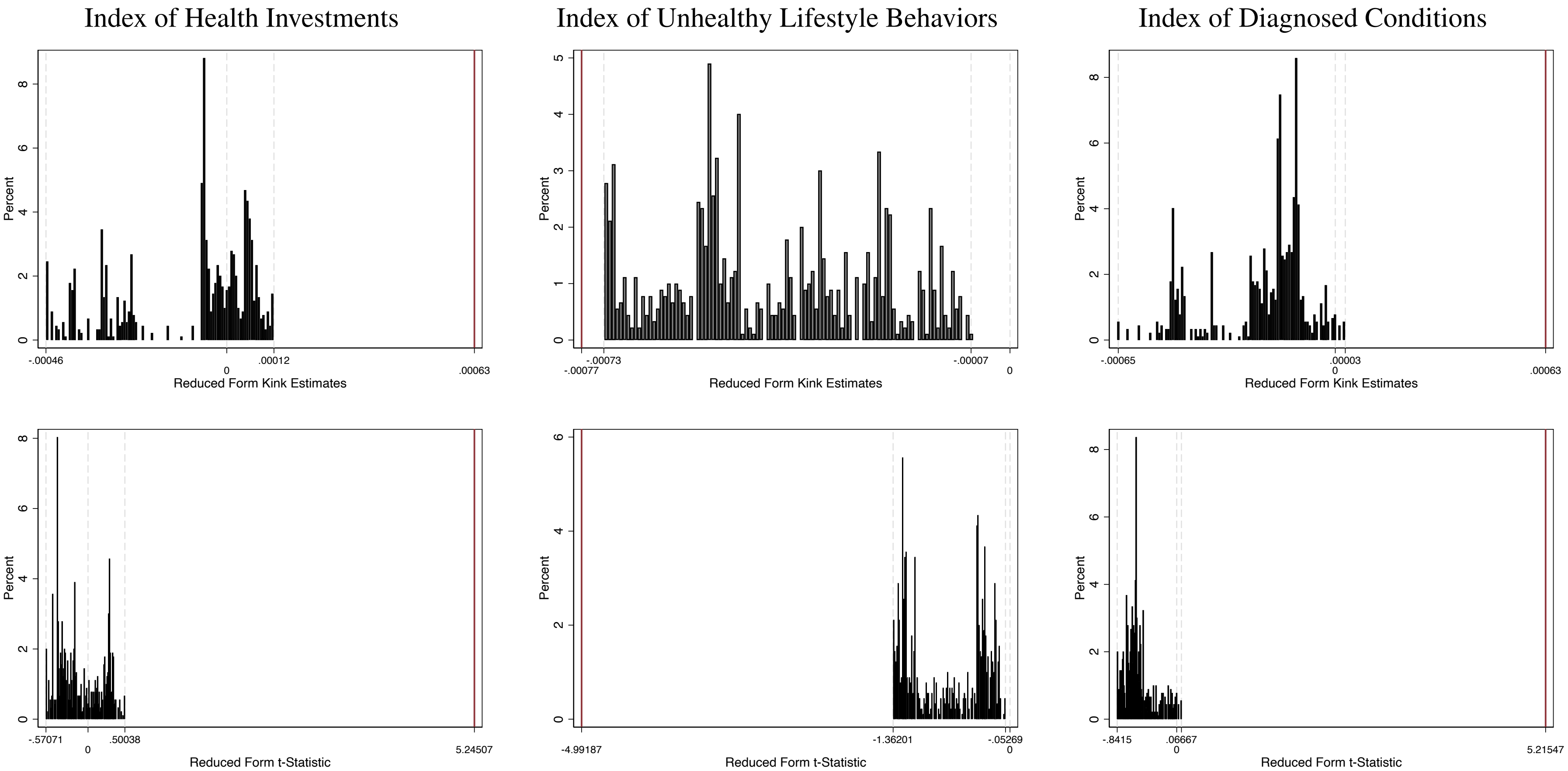
NOTE: Distribution of observations for men, across monthly birth cohorts, using a two months bin. The sample includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. Grey dots depict the observed fraction of observations. Black dots are the estimated fraction of observations obtained with OLS estimators and a cohort polynomial of degree up to 8 chosen using the Akaike's information criteria. 1st deriv. discont. est is the result of a discontinuity test performed on the fraction of observations at the kink cohort, with the reported standard error in parenthesis and p-value in brackets.

Figure A.9: Balance of Observable Predetermined Characteristics across Birth Cohorts



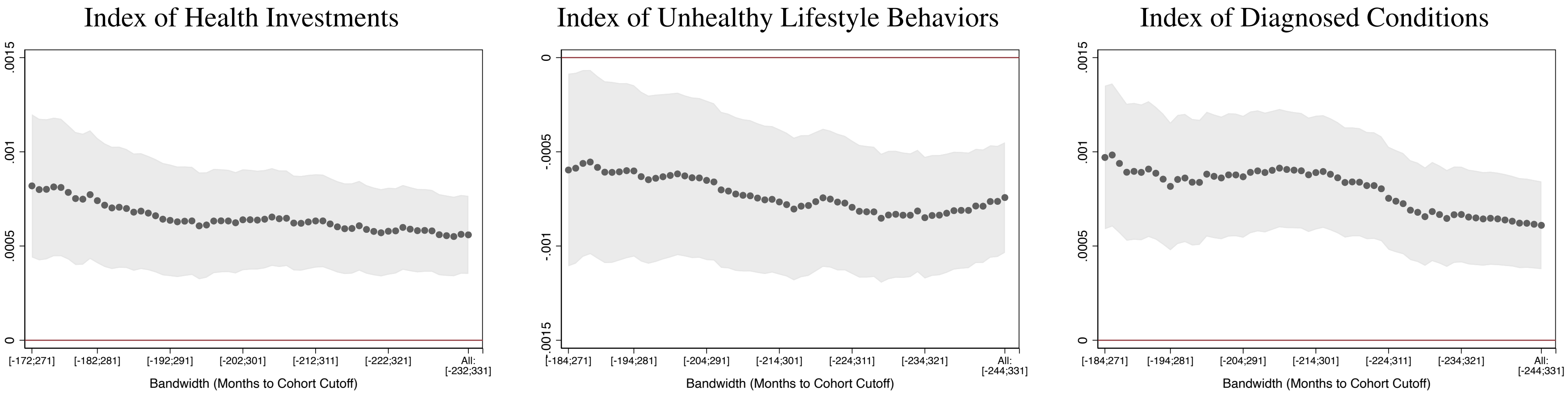
NOTE: Dots corresponds to scatter plots of each predetermined characteristic across birth cohorts. Black lines are predicted values of the predetermined characteristics for each birth cohort, obtained using OLS and Equation (5). The sample includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. The vertical red line is set at the cohort that turns 18 years old at the month-year of the pension system reform. All outcomes are binary variables.

Figure A.10: Permutation Test on Reduced Form Estimates of Index of Health Investments, Unhealthy Lifestyle Behaviors, and Diagnosed Conditions using Randomly Drawn Placebo Cutoffs



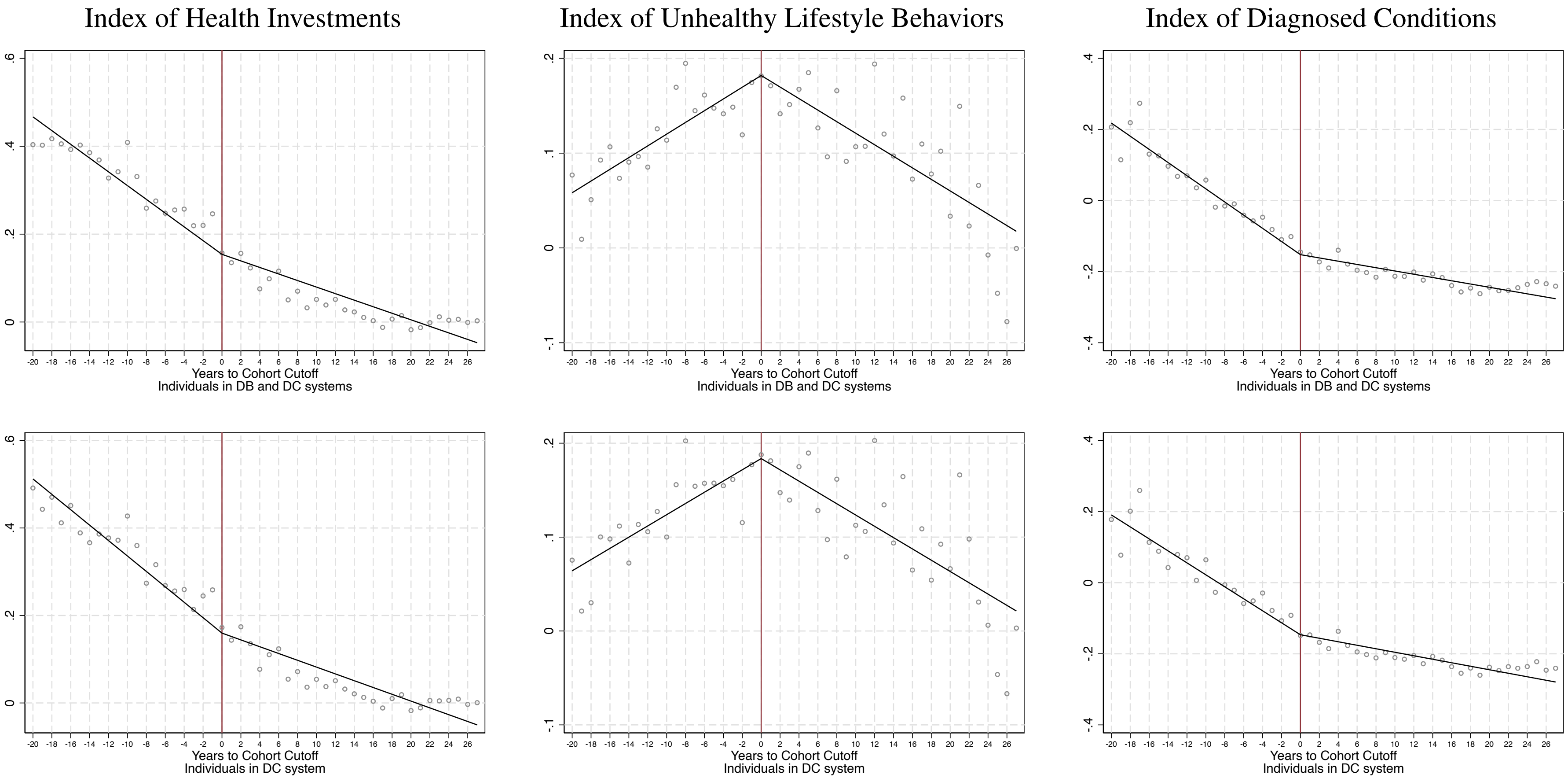
NOTE: Reduced Form Estimates and t-Statistics histograms obtained using randomly drawn placebo cutoffs, as described in Section 6.2. Reduced Forms are estimated by OLS using the Equation (5), and the estimates displayed correspond to the parameter β_1. Vertical red lines are kink estimates and t-Statistics at the true cut-off.

Figure A.11: FRKD Estimates for the Sensitivity to Bandwidth Choice on Index of Health Investments, Unhealthy Lifestyle Behaviors, and Diagnosed Conditions



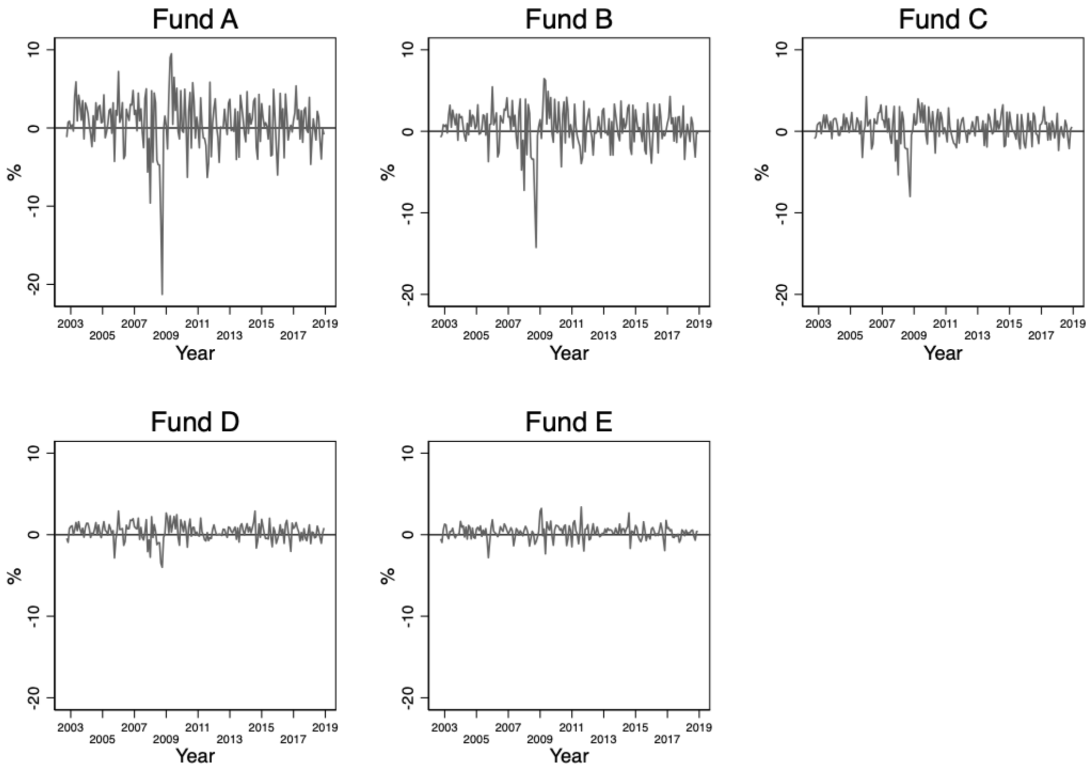
NOTE: 2SLS estimates of the effect of the Expected Pension Wealth (EPW) on health investment outcomes, for males. Point estimates are estimates of the parameter τ in the Equation (7) and the instrument is $(cohort - c_0) \times D$. Outcomes are binary variables and are estimated using linear models that include a first-order polynomial in the cohort centered at the kink $(cohort - c_0)$ and linear temporal trends. The sample used for the Index of Health Investments includes observations from the EPS waves conducted in 2009 and 2015, that is the "two-waves" sample. The sample used for the Index of Unhealthy Lifestyle Behaviors and for the Index of Diagnosed Conditions includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015, that is the "four-waves" sample. Shaded gray areas are 95% confidence intervals computed with standard errors clustered at the individual level. The "all" bandwidth includes all observations in the working sample.

Figure A.12: Average Values of Health Investment, Unhealthy Behaviors, and Diagnosed Conditions Indices by Birth Cohort, Using Survey Data for Individuals in Both DB and DC Pension Systems



NOTE: Dots corresponds to scatter plots of each outcome across birth cohorts. Black lines are predicted values of each outcome for each birth cohort, obtained using OLS and Equation (5). The sample used for the Index of Health Investments includes observations from the EPS waves conducted in 2009 and 2015. The sample used for the Index of Unhealthy Lifestyle Behaviors and for the Index of Diagnosed Conditions includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015. The vertical red line is set at the cohort that turns 18 years old at the year of the pension system reform. All outcomes are binary variables.

Figure A.13: Monthly Rate of Return by Fund Type



Appendix Tables

Table A.1: Characteristics of Individuals in the “Four-Waves” Sample, by Exposure to the Pension Reform and Gender

	Men			Women		
	All (1)	Partially-Exposed (2)	Fully-Exposed (3)	All (4)	Partially-Exposed (5)	Fully-Exposed (6)
Expected Pension Wealth (mean)	135,193	60,293	192,441	68,192	26,444	91,374
Age (mean)	43	53	35	41	51	35
Categories of Level of Education Completed (proportion):						
1.None	0.03	0.04	0.02	0.02	0.03	0.02
2.Elementary school	0.29	0.38	0.22	0.23	0.32	0.18
3.High school	0.57	0.47	0.65	0.63	0.53	0.68
4.Undergrad or Higher	0.11	0.10	0.11	0.12	0.12	0.12
Proportion with Highest Level of Risk Aversion	0.63	0.66	0.61	0.69	0.71	0.68
Hypertension Screening Rate	0.30	0.38	0.25	0.40	0.45	0.37
Diabetes Screening Rate	0.29	0.36	0.25	0.41	0.44	0.40
Cholesterol Screening Rate	0.33	0.39	0.28	0.46	0.49	0.44
Prostate Screening Rate	0.15	0.31	0.06			
Preventive Check-up Rate	0.15	0.18	0.13	0.30	0.29	0.30
Smoking Rate	0.38	0.33	0.42	0.33	0.32	0.33
Alcohol Consumption Rate	0.59	0.54	0.63	0.27	0.22	0.30
Physical Inactivity Rate	0.70	0.77	0.64	0.82	0.84	0.81
Hypertension Diagnosis Rate	0.12	0.20	0.05	0.15	0.25	0.09
Diabetes Diagnosis Rate	0.05	0.09	0.02	0.06	0.09	0.04
Heart Disease Diagnosis Rate	0.03	0.05	0.01	0.03	0.06	0.02
Kidney Failure Diagnosis Rate	0.02	0.02	0.01	0.02	0.03	0.02
Observations	18,836	8,160	10,676	17,567	6,272	11,295

NOTE: Expected pension wealth values are CPI adjusted to December 2018 dollars.

Table A.2: Characteristics of Individuals in the “Two-Waves” Sample, by Exposure to the Pension Reform and Gender

	Male			Female		
	All	Partially-Exposed	Fully-Exposed	All	Partially-Exposed	Fully-Exposed
	(1)	(2)	(3)	(4)	(5)	(6)
Expected Pension Wealth (mean)	160,320	59,927	220,707	82,877	25,411	107,077
Age (mean)	44	56	36	42	54	37
Categories of Level of Education Completed (proportion):						
1.None	0.05	0.07	0.03	0.04	0.05	0.03
2.Elementary school	0.27	0.38	0.21	0.21	0.32	0.17
3.High school	0.58	0.45	0.65	0.63	0.52	0.67
4.Undergrad or Higher	0.10	0.09	0.11	0.12	0.11	0.13
Proportion with Highest Level of Risk Aversion	0.64	0.66	0.62	0.70	0.72	0.69
Hypertension Screening Rate	0.30	0.38	0.25	0.40	0.45	0.37
Diabetes Screening Rate	0.29	0.36	0.25	0.41	0.44	0.40
Cholesterol Screening Rate	0.32	0.39	0.28	0.46	0.49	0.44
Prostate Screening Rate	0.15	0.31	0.06			
Preventive Check-up Rate	0.16	0.21	0.14	0.34	0.33	0.34
Smoking Rate	0.36	0.30	0.39	0.31	0.30	0.31
Alcohol Consumption Rate	0.57	0.52	0.60	0.28	0.22	0.31
Physical Inactivity Rate	0.71	0.80	0.66	0.82	0.85	0.81
Hypertension Diagnosis Rate	0.14	0.26	0.06	0.16	0.30	0.10
Diabetes Diagnosis Rate	0.06	0.11	0.03	0.07	0.12	0.05
Heart Disease Diagnosis Rate	0.03	0.05	0.01	0.03	0.05	0.02
Kidney Failure Diagnosis Rate	0.02	0.02	0.01	0.02	0.03	0.02
Observations	8,685	3,262	5,423	8,504	2,520	5,984

NOTE: Expected Pension Wealth values are CPI adjusted to December 2018 dollars.

Table A.3: Chilean Men's Death Records from 2003 to 2018 and 2002 Chilean Population Census

Age in Years	Population (in 2002)	Total Deaths (2003 to 2018)	Number of Deaths by Cause							
			Hypertension	Diabetes	Ischaemic Heart Disease	Pulmonary Heart Disease	Other Heart Diseases	Kidney Disease	Prostate Disease	Other Causes
Younger than 25	1,839,414	33,766	90	133	559	62	576	83	6	32,257
Between 25 and 44	2,346,908	107,346	1,360	1,807	8,551	328	3,081	702	359	91,158
Older than 44	743,798	96,073	2,127	3,437	11,119	304	3,150	999	1,610	73,327

Age in Years	Total Deaths by 1,000 Individuals	Deaths by Cause, by 1,000 Individuals							
		Hypertension	Diabetes	Ischaemic Heart Disease	Pulmonary Heart Disease	Other Heart Diseases	Kidney Disease	Prostate Disease	Other Causes
Younger than 25	18.36	0.05	0.07	0.30	0.03	0.31	0.05	0	17.54
Between 25 and 44	45.74	0.58	0.77	3.64	0.14	1.31	0.30	0.15	38.84
Older than 44	129.17	2.86	4.62	14.95	0.41	4.24	1.34	2.16	98.58

Table A.4: Average Contribution Amounts, Rates of Return, and Number of Contributions by Selected Birth Cohorts

	May-1953 to April-1954	May-1963 to April-1964	May-1973 to April-1974
	(1)	(2)	(3)
Age at Affiliation to the DC System:			
Mean	31	22	19
Min	27	17	15
Max	41	39	31
Monthly Return Rate (%):			
Mean	0.534	0.530	0.508
Min	0.391	0.389	0.400
Max	0.579	0.596	0.586
Average Monthly Contribution Amount, by Categories of Age:			
35-44	72.6	76.5	119.8
45-54	86.8	108.3	157.6 (a)
55-64	98.6	134.6 (a)	196.5 (a)

NOTE: Affiliation to the DC system does not necessarily imply that the individual made pension contributions, as it is possible to be affiliated without actively contributing. In Chile, adolescents may begin working—and thus potentially affiliate with the pension system—from the age of 15, subject to specific legal conditions. The average return rate corresponds to the mean of the weighted returns an individual would have earned by contributing every month from the time of affiliation to the DC system until retirement. This measure assumes the default investment strategy described in Appendix A.2, using observed returns through December 2017 and the historical average thereafter. The average monthly contribution amount (by age category) is calculated as the average of actual contributions up to December 2017 and the average of predicted contributions thereafter (denoted with (a)), expressed in CPI-adjusted December 2018 dollars.

Table A.5: Direct Financial Costs of Preventive Health Screening in Chile for Affiliates to the Public Health Insurance (FONASA)

	Public Health Care Provider				Private Health Care Provider	
	Total Cost	Copayment			Total Cost	Copayment
		Groups A-B (rate 0%)	Group C (rate 10%)	Group D (rate 20%)		Groups B-C-D (rate 40%)
Blood Glucose Test	1.6	0	0.16	0.32	2.4	0.96
Total Cholesterol Test	1.6	0	0.16	0.32	2.6	1.04
LDL Cholesterol Test	2.4	0	0.24	0.48	3.8	1.52
Visit to a General MD	6.7	0	0.67	1.34	16.7	6.68
Visit to an Urologist	11	0	1.1	2.2	29.4	11.76

NOTE: Values CPI adjusted to December 2017 dollars. The reported copayment rates correspond to the rates in effect in 2017. Since September 2022, all beneficiaries of public health insurance who receive care from public healthcare providers do not pay copayments `https://www.fonasa.cl/sites/fonasa/tramos`.
SOURCE: Financial costs for public providers: `https://www.fonasa.cl/sites/fonasa/adjuntos/MAI2017`. Financial costs for private providers: `https://www.fonasa.cl/sites/fonasa/adjuntos/MLE%202017`.

Table A.6: Distribution of Individual Men in the Sample by Type of Health Insurance

	%
Public Health Insurance Group A (indigent)	18.14
Public Health Insurance Group B	22.27
Public Health Insurance Group C	14.74
Public Health Insurance Group D	12.74
Public Health Insurance (unknown group)	7.17
Private Health Insurance	16.44
Other or No-Insurance	8.5

Table A.7: Reduced Form Estimates of Health Investments

	Screenings				Preventive	Index
	Hypertension	Diabetes	Cholesterol	Prostate	Check-up	
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	-.0011***	-.0009***	-.0009***	-.0014***	-.0004***	-.0014***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.00005)	(0.0001)
Slope Change at Kink $((cohort - c_0) \times D)$	0.0006***	0.0004***	0.0005***	0.0006***	0.0003***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.00008)	(0.0001)
Observations	8679	8683	8690	8572	18793	8518
Mean	0.299	0.2918	0.3251	0.1514	0.1514	

NOTE: OLS estimates of α_1^h (cohort relative to the kink) and β_1^h (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5). Outcomes in columns (1) to (5) are binary variables and are estimated using linear models. The index, computed following Anderson (2008), includes the outcomes of hypertension, diabetes, cholesterol, and prostate screenings, and is standardized. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.8: Reduced Form Estimates of Unhealthy Lifestyle Behaviors

	Smokes Tobacco	Number of Cigarettes per Month	Drinks Alcohol	Frequency of Alcohol Consumption per Week	Physically Inactive	Index
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	0.0008***	0.1081***	0.0003***	0.0006*	-.0003***	0.0004***
	(0.00009)	(0.0281)	(0.00008)	(0.0003)	(0.00006)	(0.0001)
Slope Change at Kink $((cohort - c_0) \times D)$	-.0005***	-.1485***	0.00007	0.0007	-.0006***	-.0008***
	(0.0001)	(0.042)	(0.0001)	(0.0005)	(0.0001)	(0.0002)
Observations	18781	18746	18780	18547	18681	18182
Mean	0.3825	71.2213	0.5879	1.3480	0.6962	

NOTE: OLS estimates of α_1^h (cohort relative to the kink) and β_1^h (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5). Outcomes in columns (1), (3), and (5) are binary variables and are estimated using linear models. The Index is computed following Anderson (2008) and is standardized. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.9: Reduced Form Estimates of Diagnosed conditions

	Hypertension	Diabetes	Heart Disease	Kidney Failure	Index
	(1)	(2)	(3)	(4)	(5)
Cohorts Relative to Kink $(cohort - c_0)$	-.0010***	-.0004***	-.0003***	-.00002	-.0013***
	(0.00007)	(0.00005)	(0.00004)	(0.00002)	(0.00009)
Slope Change at Kink $((cohort - c_0) \times D)$	0.0005***	0.0002***	0.0003***	-.00003	0.0006***
	(0.00009)	(0.00006)	(0.00005)	(0.00003)	(0.0001)
Observations	18798	18793	18801	18782	18541
Mean	0.1171	0.0467	0.029	0.0178	

NOTE: OLS estimates of α_1^h (cohort relative to the kink) and β_1^h (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5). Outcomes in columns (1) to (4) are binary variables and are estimated using linear models. The Index is computed following Anderson (2008) and is standardized. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.10: Chilean National Health Survey Database: Existence of a Kink in the Prevalence of Selected Diseases - Laboratory Exams

	High Level of Total Cholesterol (Total Cholesterol $\geq$ 240)		High Level of Bad Cholesterol (LDL $>$ 100)		High Level of Glucose (Glucose$>$130)	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	0.0008**	0.003**	0.002***	0.002	-.0004	-.0003
	(0.0004)	(0.001)	(0.0006)	(0.002)	(0.0003)	(0.001)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		1.00e-05*		3.74e-06		-1.10e-06
		(7.08e-06)		(1.00e-05)		(9.30e-06)
Slope Change at Kink $((cohort - c_0) \times D)$	-.001**	-.003*	-.003***	-.001	0.0001	-.0006
	(0.0005)	(0.002)	(0.0008)	(0.003)	(0.0003)	(0.002)
BIC	101	110	1242	1250	-318	-311
Mean	0.081	0.081	0.401	0.401	0.079	0.079
Observations	872	872	872	872	1207	1207

NOTE: OLS estimates of α_1^h (cohort relative to the kink), α_2^h (square of cohort relative to kink), and β_1^h (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5 and Equation (24). BIC is the Bayesian Information Criterion. Odd columns include in the list of controls a first-order polynomial in cohort. Even columns include in the list of controls a second-order polynomial in cohort. All outcomes are binary variables and are estimated using linear models. All regressions estimated using analytic weights provided in the survey database. Robust standard errors are reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.11: Chilean National Health Survey Database: Existence of a Kink in the Prevalence of Selected Diseases - Clinical Exams

	Diastolic Blood Pressure		Systolic Blood Pressure		Hemo-Glucotest (Hgt)		Hgt>100		Bmi≥30	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cohorts Relative to Kink $(cohort - c_0)$	0.017	-.027	-.064***	-.089	-.006	0.062	0.0006	0.0007	0.0007	0.0004
	(0.011)	(0.05)	(0.019)	(0.096)	(0.026)	(0.11)	(0.0006)	(0.002)	(0.0005)	(0.002)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-.0003		-.0003		0.0003		9.23e-08		4.77e-07
		(0.0003)		(0.0006)		(0.0007)		(1.00e-05)		(1.00e-05)
Slope Change at Kink $((cohort - c_0) \times D)$	-.046***	0.008	0.027	0.016	-.037	-.162	0.0004	0.00002	-.001	0.00003
	(0.014)	(0.06)	(0.023)	(0.114)	(0.036)	(0.148)	(0.0007)	(0.003)	(0.0007)	(0.003)
BIC	9498	9510	10649	10654	11659	11669	1560	1574	1743	1754
Mean	79.346	79.346	130.327	130.327	101.890	101.890	1.679	1.679	0.358	0.358
Observations	1282	1282	1282	1282	1272	1272	1282	1282	1275	1275

NOTE: OLS estimates of α_1^h (cohort relative to the kink), α_2^h (square of cohort relative to kink), and β_1^h (slope change at the kink), conditional on a first- or second-order birth cohort polynomial (in odd and even columns, respectively) and linear time trends, shown from Equation (5 and Equation (24). BIC is the Bayesian Information Criterion. Outcomes in columns (7) to (10) are binary variables and are estimated using linear models. All regressions estimated using analytic weights provided in the survey database. Robust standard errors are reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.12: Logit Estimates: Probability of Death by Age

	Logit estimates
age	-.2682***
	(0.0181)
age^2	0.0032***
	(0.0003)
$(cohort - c_0)$	0.0032
	(0.0485)
$(cohort - c_0) \times D$	-.1115**
	(0.0562)

NOTE: Logit estimates of the survival model discussed in Section 4.2. Standard errors are clustered at the cohort level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.13: Multinomial Logit Estimates: Probability of Death by the Cause of Death and Age

	Hypertension	Diabetes	Ischaemich Heart Disease	Pulmonary Heart Disease	Other heart Diseases	Kidney Failure	Prostate Disease	Other Diseases
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	-.4997***	-.4702***	-.3955***	-.4995***	-.4093***	-.4838***	-.6059***	-.2665***
	(0.0211)	(0.0198)	(0.0187)	(0.0198)	(0.0175)	(0.0187)	(0.0288)	(0.0182)
age^2	0.0062***	0.0057***	0.0049***	0.0056***	0.0047***	0.0056***	0.0078***	0.0031***
	(0.0004)	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0004)	(0.0006)	(0.0003)
$(cohort - c_0)$	0.0554	-.0065	0.0161	0.0531	0.0084	0.0007	-.0067	0.0035
	(0.0531)	(0.0531)	(0.0517)	(0.0544)	(0.0501)	(0.0519)	(0.0614)	(0.0484)
$(cohort - c_0) \times D$	-.2594***	-.2028***	-.2108***	-.2731***	-.1912***	-.2194***	-.2529***	-.1132**
	(0.0626)	(0.063)	(0.0629)	(0.0614)	(0.0583)	(0.0607)	(0.0764)	(0.0559)

NOTE: Multinomial logit estimates of the survival model discussed in Section 4.1. Standard errors are clustered at the cohort level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.14: Test for a Birth Cohort Kink in Predetermined Individual Characteristics

	Born in Chile's Metropolitan Area	High School Completed	Highest Level of Risk Aversion
	(1)	(2)	(3)
Cohorts Relative to Kink $(cohort - c_0)$	0.0003***	0.0008***	-.0003***
	(0.0001)	(0.0001)	(0.00007)
Slope Change at Kink $((cohort - c_0) \times D)$	-.00008	3.86e-08	-.00004
	(0.0001)	(0.0001)	(0.0001)
Observations	18758	18836	14216
Mean	0.309	0.5714	0.6335

NOTE: OLS estimates of α_1^h (cohort relative to the kink) and β_1^h (slope change at the kink), conditional on a first-order birth cohort polynomial and linear time trends, shown from Equation (5). The sample includes observations from the EPS waves conducted in 2004, 2006, 2009 and 2015. All outcomes are binary variables and are estimated using linear models. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.15: Existence of a Kink in the Slope of the EPW: Sensitivity to the Polynomial Order of the Running Variable

Order of the polynomial	Four-Waves Sample 1^{st}	Four-Waves Sample 2^{nd}	Two-Waves Sample 1^{st}	Two-Waves Sample 2^{nd}
	(1)	(2)	(3)	(4)
Cohorts Relative to Kink $(cohort - c_0)$	16.8835	247.4569***	-29.4056	278.6383***
	(15.3540)	(55.0313)	(18.2088)	(61.9476)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		0.6283**		0.8281***
		(0.2506)		(0.3034)
Slope Change at Kink $((cohort - c_0) \times D)$	1037.5890***	325.7517***	1134.4460***	245.9527***
	(23.5525)	(85.7190)	(26.2401)	(95.1346)
BIC	479650	479255	221722	221471
Mean	135193	135193	160320	160320
Observations	18836	18836	8685	8685

NOTE: OLS estimates of α_1^h (cohort relative to the kink), α_2^h (square of cohort relative to kink), and β_1^h (slope change at the kink), conditional on a first- or second- order birth cohort polynomial (in odd and even columns, respectively) and linear time trends, shown from Equations (6) and (25). The "four-waves" sample includes observations from EPS waves conducted in 2004, 2006, 2009 and 2015. The "two-waves" sample includes observations from EPS waves conducted in 2009 and 2015 (see Section 3 for a description of the two samples). Expected Pension Wealth is CPI adjusted to December 2018 dollars. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.16: Existence of a Kink in the Slope of Individual Voluntary Pension Savings, Other Financial and Non-Financial Savings, and Households' Consumption: Sensitivity to the Polynomial Order of the Running Variable

	Has Voluntary Pension Savings		Household Has Financial Assets		Household Has Non-Financial Savings		Monthly Household Expenditure	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cohorts Relative to kink $(cohort - c_0)$	0.0002**	-.0004	0.0011	-.0031	0.0055***	0.0083*	19.7861	86.9078
	(0.00009)	(0.0003)	(0.0022)	(0.0057)	(0.0016)	(0.005)	(19.8723)	(87.2892)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-2.00e-06		-.0001		0.0002		0.3432
		(2.00e-06)		(0.0002)		(0.0002)		(0.3449)
Slope Change at Kink $((cohort - c_0) \times D)$	-.0007***	0.0004	0.0024	0.0129	-.0046	-.0030	-42.7917	-120.6474
	(0.0001)	(0.0005)	(0.0037)	(0.01)	(0.003)	(0.0084)	(42.8708)	(120.9849)
BIC	6016	6023	3813	3826	2917	2928	489943	489961
Mean	0.1372	0.1372	0.4208	0.4208	0.1768	0.1768	1326	1326
Observations	8737	8737	2279	2279	2279	2279	18560	18560

NOTE:OLS estimates of α_1^h (cohort relative to the kink), α_2^h (square of cohort relative to kink), and β_1^h (slope change at the kink), conditional on a first- or second-order birth cohort polynomial (in odd and even columns, respectively) and linear time trends, shown from Equations (5) and (24). BIC is the Bayesian Information Criterion. Outcomes in columns (1) to (6) are binary variables and are estimated with linear models. Household expenditure (Columns (7) and (8)) is CPI adjusted to December 2018 dollars. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.17: (Non-)Existence of a Kink in the Slope of Predetermined Observable Characteristics. Sensitivity to the Polynomial Order of the Running Variable

	Born in Chile's Metropolitan Area		High School Completed		Highest Level of Risk Aversion	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	0.0003***	0.0002	0.0008***	0.0004	-.0003***	-.00003
	(0.0001)	(0.0004)	(0.0001)	(0.0004)	(0.00007)	(0.0003)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-3.39e-07		-2.00e-06		1.00e-06
		(2.00e-06)		(2.00e-06)		(1.00e-06)
Slope Change at Kink $((cohort - c_0) \times D)$	-.00008	0.00007	3.86e-08	0.0007	-.00004	-.0002
	(0.0001)	(0.0006)	(0.0001)	(0.0005)	(0.0001)	(0.0005)
BIC	24216	24236	26088	26102	19537	19553
Mean	0.309	0.309	0.5714	0.5714	0.6335	0.6335
Observations	18758	18758	18836	18836	14216	14216

NOTE: OLS estimates of α_1^h (cohort relative to the kink), α_2^h (square of cohort relative to kink), and β_1^h (slope change at the kink), conditional on a first- or second-order birth cohort polynomial (in odd and even columns, respectively) and linear time trends, shown from Equations (5) and (24). BIC is the Bayesian Information Criterion. All outcomes are binary variables and are estimated with linear models. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.18: FRKD Estimates of the Effect of EPW on Health Investments: Sensitivity to the Polynomial Order of the Running Variable

	Screenings					
	Hypertension		Diabetes		Cholesterol	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	-.0011***	-.0017*	-.0009***	-.0025**	-.0009***	-.0026**
	(0.0001)	(0.0009)	(0.00009)	(0.0011)	(0.0001)	(0.0012)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-2.00e-06		-6.00e-06		-6.00e-06
		(3.00e-06)		(4.00e-06)		(4.00e-06)
Expected Pension Wealth (EPW)	0.0006***	0.0022	0.0004***	0.0044*	0.0004***	0.0049*
	(0.0001)	(0.0021)	(0.0001)	(0.0025)	(0.0001)	(0.0027)
Romano-Wolf p-value	0.001	0.2068	0.002	0.1149	0.001	0.1149
95% Robust confidence set	[.0003,.0008]	[-.0022,.0103]	[.0001,.0006]	[.0006,.0141]	[.0002,.0007]	[.0007,.0155]
AR test p-value	3.00e-06	0.2788	0.0023	0.0281	0.0004	0.0263
F-stat	1861.6470	6.7288	1862.3720	6.5349	1868.5290	6.2406
BIC	-14945	-14100	-15021	-11066	-14150	-10062
Observations	8679	8679	8683	8683	8690	8690
Mean	0.299	0.299	0.2918	0.2918	0.3251	0.3251
	Prostate Screening		Preventive Check-up		Index	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(7)	(8)	(9)	(10)	(11)	(12)
Cohorts Relative to Kink $(cohort - c_0)$	-.0014***	-.0024***	-.0004***	-.0017***	-.0014***	-.0025***
	(0.00009)	(0.0008)	(0.00005)	(0.0005)	(0.00009)	(0.0008)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-4.00e-06		-4.00e-06**		-4.00e-06
		(3.00e-06)		(2.00e-06)		(3.00e-06)
Expected Pension Wealth (EPW)	0.0006***	0.0024	0.0003***	0.0032***	0.0006***	0.0027
	(0.0001)	(0.0018)	(0.00007)	(0.0011)	(0.0001)	(0.0019)
Romano-Wolf p-value	0.001	0.1808	0.001	0.023		
95% Robust confidence set	[.0004,.0008]	[-.0011,.0091]	[.0002,.0005]	[.0016,.0069]	[.0004,.0008]	[-.0009,.0099]
AR test p-value	1.83e-07	0.1543	7.00e-06	0.0001	1.55e-07	0.1281
F-stat	1853.9960	7.7259	1935.4060	13.9550	1833.3330	7.1574
BIC	-19069	-17159	-38907	-32780	-19097	-16761
Observations	8572	8572	18793	18793	8518	8518
Mean	0.1514	0.1514	0.1514	0.1514		

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on health outcomes. "Cohorts relative to kink" is the estimate of α_1^h, "Square of cohorts relative to kink" is the estimate of α_2^h, and "EPW" is the estimate of τ in Equations (7) and (26). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. All outcomes are binary variables and are estimated using linear models, with the exception of the Index, that is computed following Anderson (2008) and is standardized. Odd columns include in the list of controls a first-order polynomial in cohort. Even columns include in the list of controls a second-order polynomial in cohort. All regressions include linear temporal trends. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing (Romano and Wolf, 2005a,b), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-stats is the F-statistic to test the statistical significance of the instrument in the first stage. BIC is the Bayesian Information Criterion.

Table A.19: FRKD Estimates of the Effect of EPW on Unhealthy Lifestyle Behaviors: Sensitivity to the Polynomial Order of the Running Variable

	Smokes Tobacco		Number of Cigarettes per Month		Drinks Alcohol	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	0.0008*** (0.00009)	-.0006 (0.0008)	0.1107*** (0.0288)	-.0963 (0.2306)	0.0003*** (0.00008)	-.0004 (0.0007)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-5.00e-06* (3.00e-06)		-.0008 (0.0008)		-2.00e-06 (2.00e-06)
Expected Pension Wealth (EPW)	-.0005*** (0.0001)	0.0025 (0.0017)	-.1433*** (0.0405)	0.2765 (0.4969)	0.00007 (0.0001)	0.0019 (0.0014)
Romano-Wolf p-value	0.001	0.2797	0.001	0.7892	0.5834	0.3457
95% Robust confidence set	[-.0008,-.0003]	[-.0005,.0074]	[-.2219,-.0678]	[-.7662,1.4766]	[-.0002,.0003]	[-.0008,.0059]
AR test p-value	0.00006	0.1015	0.0003	0.6159	0.5627	0.1551
F-stat	1929.4740	14.3498	1926.1980	14.2235	1935.8670	14.3805
BIC	-27487	-23560	188951	189606	-26841	-25503
Observations	18781	18781	18746	18746	18780	18780
Mean	0.3825	0.3825	71.2213	71.2213	0.5879	0.5879

	Frequency of Alcohol Consumption per Week		Physically Inactive		Index	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(7)	(8)	(9)	(10)	(11)	(12)
Cohorts Relative to Kink $(cohort - c_0)$	0.0005 (0.0003)	-.0003 (0.0026)	-.0003*** (0.00006)	0.0004 (0.0006)	0.0004*** (0.0001)	-.0002 (0.0008)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-1.00e-06 (9.00e-06)		2.00e-06 (2.00e-06)		-2.00e-06 (3.00e-06)
Expected Pension Wealth (EPW)	0.0006 (0.0005)	0.0035 (0.0057)	-.0006*** (0.0001)	-.0023* (0.0013)	-.0007*** (0.0001)	0.0005 (0.0018)
Romano-Wolf p-value	0.3187	0.7892	0.001	0.1618		
95% Robust confidence set	[-.0003,.0016]	[-.008,.0176]	[-.0008,-.0004]	[-.0058,-.0001]	[-.001,-.0005]	[-.0032,.0048]
AR test p-value	0.1768	0.5122	7.73e-10	0.0473	6.26e-07	0.7587
F-stat	1943.0630	14.5375	1934.8360	14.4705	1905.8550	14.4139
BIC	28734	28930	-29767	-27556	-18149	-18003
Observations	18547	18547	18681	18681	18182	18182
Mean	1.3480	1.3480	0.6962	0.6962		

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on health outcomes. "Cohorts relative to kink" is the estimate of α_1^h, "Square of cohorts relative to kink" is the estimate of α_2^h, and "EPW" is the estimate of τ in Equations (7) and (26). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. Outcomes in columns (1), (2), (5), (6), (9), and (10) are binary variables and are estimated using linear models. The Index is computed following Anderson (2008) and is standardized. Odd columns include in the list of controls a first-order polynomial in cohort. Even columns include in the list of controls a second-order polynomial in cohort. All regressions include linear temporal trends. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing (Romano and Wolf, 2005a,b), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-stats is the F-statistic to test the statistical significance of the instrument in the first stage. BIC is the Bayesian Information Criterion.

Table A.20: FRKD Estimates of the Effect of EPW on Diagnosed Conditions: Sensitivity to the Polynomial Order of the Running Variable

	Hypertension		Diabetes		Heart Disease	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}	1^{st}	2^{nd}
	(1)	(2)	(3)	(4)	(5)	(6)
Cohorts Relative to Kink $(cohort - c_0)$	-.0010***	-.0015***	-.0004***	-.0014***	-.0003***	-.0006**
	(0.00007)	(0.0005)	(0.00005)	(0.0005)	(0.00004)	(0.0003)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-1.00e-06		-3.00e-06*		-6.98e-07
		(2.00e-06)		(2.00e-06)		(9.60e-07)
Expected Pension Wealth (EPW)	0.0005***	0.0019*	0.0002***	0.0024**	0.0002***	0.001*
	(0.00009)	(0.0011)	(0.00006)	(0.0009)	(0.00004)	(0.0005)
Romano-Wolf p-value	0.001	0.1339	0.005	0.0559	0.001	0.1339
95% Robust confidence set	[.0003,.0007]	[.0001,.0052]	[.0001,.0003]	[.001,.0055]	[.0002,.0003]	[.0001,.0026]
AR test p-value	4.93e-09	0.0442	0.0018	0.0007	2.17e-08	0.0277
F-stat	1934.6070	14.5636	1930.8610	14.4118	1944.3370	14.8923
BIC	-43953	-39768	-59139	-47273	-66970	-62975
Observations	18798	18798	18793	18793	18801	18801
Mean	0.1171	0.1171	0.0467	0.0467	0.029	0.029

	Kidney Failure		Index	
Order of the Polynomial	1^{st}	2^{nd}	1^{st}	2^{nd}
	(7)	(8)	(9)	(10)
Cohorts Relative to Kink $(cohort - c_0)$	-.00002	-.0003*	-.0013***	-.0031***
	(0.00002)	(0.0002)	(0.00009)	(0.0009)
Square of Cohorts Relative to Kink $(cohort - c_0)^2$		-1.00e-06**		-6.00e-06*
		(5.66e-07)		(3.00e-06)
Expected Pension Wealth (EPW)	-.00003	0.0005	0.0006***	0.005***
	(0.00003)	(0.0003)	(0.0001)	(0.0019)
Romano-Wolf p-value	0.2248	0.1339		
95% Robust confidence set	[-.0001,0]	[-.0001,.0015]	[.0004,.0008]	[.0022,.0114]
AR test p-value	0.2306	0.1151	1.68e-07	0.00009
F-stat	1931.8560	14.1601	1903.8680	14.6497
BIC	-76005	-74098	-29698	-18150
Observations	18782	18782	18541	18541
Mean	0.0178	0.0178		

NOTE: 2SLS estimates of the effect of Expected Pension Wealth (EPW) on health outcomes. "Cohorts relative to kink" is the estimate of α_1^h, "Square of cohorts relative to kink" is the estimate of α_2^h, and "EPW" is the estimate of τ in Equations (7) and (26). EPW is measured in thousands of dollars and is CPI adjusted to December 2018 dollars. All outcomes are binary variables and are estimated using linear models, with the exception of the Index, that is computed following Anderson (2008) and is standardized. Odd columns include in the list of controls a first-order polynomial in cohort. Even columns include in the list of controls a second-order polynomial in cohort. All regressions include linear temporal trends. Standard errors are clustered at the individual level and reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Romano-Wolf p-values are step-down adjusted p-values robust to multiple hypothesis testing Romano and Wolf (2005a) and Romano and Wolf (2005b)), implemented using the Stata command rwolf2 by Clarke et al. (2020). 95% confidence set and the AR test p-value are robust to the inclusion of weak instruments, are based on the minimum distance version of the Anderson-Rubin test statistics, and are implemented using the Stata command rivtest by Finlay (2009). F-stats is the F-statistic to test the statistical significance of the instrument in the first stage. BIC is the Bayesian Information Criterion.