# Essays on the economics of household finance and social insurance

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# Chapter 3

# The Impact of Retirement on Income and Spending: Causal Evidence from Transaction Data

## Abstract

This chapter contributes to the literature that studies the impact of retirement on household finances and financial behavior, often using survey or yearly administrative data. We use high-quality Dutch transaction data to estimate the causal effect of retirement on households' financial outcomes. We use the discontinuity imposed by Statutory Retirement Age (SRA) and variation in the SRA in order to measure causal effects. The monthly data allow us to estimate the direct short-run impact using RD and DiD designs. Our findings show a positive spike in net flow balance at retirement, which financially constrained households use to pay off debts. Debts decline especially for low income, low wealth, blue collar workers, and social insurance recipients.

This chapter was co-authored by Max van Lent and Marike Knoef. This chapter is based on anonymized data from customers of ING Netherlands. Data was treated in strict compliance with the General Data Protection Regulation. The report has been prepared by the authors for the TFI long-term research track. The views and opinions expressed in this chapter are solely those of the authors and do not necessarily reflect the official policy or position of the Think Forward Initiative – TFI – or any of its partners. Responsibility for the data analyses and content in this chapter lies entirely with the authors. The primary purpose of the TFI Research Programme is to inspire practical research insights in the financial decision-making domain. It does not constitute any financial advice or service offer. The data used in this study are confidential and cannot be shared publicly. We are grateful to ING, Stefan van Woelderen, Dominic Keyzer. Additionally, Ruben Lageweg prepared the data. This project would not be possible without them. We thank seminar participants at Leiden University for useful comments and suggestions. We thank Jim Been and Jordy Meekes for useful comments and suggestions.

In addition, we see a gradual increase in the end-of-month balance over time, that is not directly caused by retirement itself.

**Keywords: Retirement, Personal Finance, Panel Data, Instrumental Variables, Regression Discontinuity, Difference-in-Difference, Transaction data**

**JEL Codes: C23, C24, C26, D14, D91, G21, H55, J26**

## 3.1 Introduction

There is a sizable literature that studies the impact of retirement on individual and household finances and financial behavior. Several seminal papers on the life cycle model such as Ando and Modigliani (1963); Heckman (1976); Modigliani and Brumberg (1954) predict smoothing of consumption over the lifetime and a decumulation of wealth over the course of retirement. The empirical evidence on the impact of retirement on consumption is mixed.[1] Furthermore, recent literature finds that wealth for most households remains constant or increases after retirement, contradicting the standard life cycle model.[2]

Current research typically suffers from at least one of the following two issues. The data quality is limited; these papers use either surveys that ask people about their financial position in hindsight or coarse administrative data that suffer from imprecision and/or insufficient frequency. Second, most of the older research suffers from endogeneity bias in the decision to retire. For many people the decision to retire may be related to their finances pre-retirement and/or their plans after retirement. This results in biased estimates of the impact of retirement itself on households finances and financial behavior. Recent literature — exacerbated by the Covid-19 Pandemic — uses transaction data to investigate household and firm behavior (Baker and Kueng (2022); Buda et al. (2023); Carvalho et al. (2021); Floccari et al. (2023); Kapetanios et al. (2022)), highlighting the aforementioned biases.

In this chapter we estimate the impact of retirement on the retiree's finances. Throughout this chapter we focus on the net flow balance (i.e. the total inflow minus the total outflow from accounts), the end-of-month balance (i.e., the sum of the accounts at the end of the month), and whether the person is in debt (i.e., a negative balance). We use variation before and after reaching the statutory retirement age, as well as cohort differences in the statutory retirement age – which strongly affect the actual retirement age – as instruments for

[1] For instance Agarwal et al. (2015); Aguila et al. (2011); Been and Goudswaard (2020); Battistin et al. (2009); Luengo-Prado and Sevilla (2013a,b) find no change in consumption patterns around retirement, while Banks et al. (1998a); Bernheim et al. (2001); Lührmann (2010) discover decreases in consumption around retirement.

[2] See for instance Kieren and Weber (2022); Love et al. (2009); Olafsson and Pagel (2018); Poterba et al. (2011).

retirement. Specifically, by using cohort differences, we identify on the basis age values for which one cohort has reached the statutory retirement age whereas the other has not. Consequently, we estimate the impact of retirement on the net flow balance, the end-of-month balance, and on whether the person is in debt.

Our data originate from ING Netherlands, a large Dutch retail bank. We obtain a sample of around 12,000 individuals born between April 1952 and August 1953 (of which half the sample has 66 and the other half has $66\frac{1}{3}$ as SRA). Everyone in our sample transitions from work to retirement during our sample period. Our data contain monthly total inflows and outflows, and transfers to and from specific (anonymized) bank accounts in the period 2017 to 2021. In order to identify the exact month of retirement, we use the start of repeated inflows from second-pillar pension funds.[3] This implies that our sample consists only of workers who have worked at an employer at some point in their lifetime.

We find no discrete change in the net flow balance or end-of-month balance around the months of retirement. Instead we see a gradual and significant increase in the end-of-month balance with age. This result implies that on average people are building up wealth during retirement, but that this is not caused by the exact timing of retirement. However, we do find that retirement leads to a strongly significant reduction in the probability to be in debt. This is driven by low income, low wealth, blue collar workers, and social insurance recipients.

Our chapter relates to research on consumption around retirement. This research finds mixed effects. Battistin et al. (2009) and Hori and Murata (2019) discover, using survey data from respectively the US and Japan, that consumption decreases after retirement. Alaudin et al. (2019) find – using Malaysian survey data – that this is driven to a large extent by work-related expenses. Aguila et al. (2011) find that food consumption decreases after retirement, and Li et al. (2015) conclude a decrease in the consumption of non-durable goods. On the other hand, Been and Goudswaard (2020) find – using Dutch survey data – no significant impact of retirement on consumption. We contribute to this literature by using detailed transaction data, and using

[3]Second-pillar pension funds are funds build up by a worker's employer during their working life, and these are automatically paid out monthly to the worker when the worker retires. This date can be, and often is, different from the statutory retirement age.

a causal identification strategy.

There is some research that studies the distributional impact of retirement. Fisher and Marchand (2014) find that the drop in consumption following retirement is primarily concentrated in high-consumption household. Hurd and Rohwedder (2013) on the other hand, discover decreases in consumption primarily for low-wealth households. We contribute to this literature by adding a range of short-run heterogeneity tests, with more detailed and more frequent data (on, for instance, spending patterns before retirement).

Our findings are also of interest for policymakers. Many papers have found decreases in consumption and attribute this to inadequate pension savings as a result of poverty prior to retirement. Our data – for the Netherlands – contrast the finding that on average consumption decreases. We do not observe a decrease in inflow, if anything balances increase following retirement in the short run. This leads to healthier finances after retirement, and contradicts the notion that decreased consumption is caused by a lack of finances. Our heterogeneity analyses show that in particular people with a worse financial position prior to retirement improve their financial position as a consequence of retirement.

The rest of this chapter is organized as follows. Section 2 discusses the key aspects of the Dutch retirement system and how these aspects factor into our analysis. Section 3 explain the identification strategy, and section 4 covers the data used. We show and discuss results in section 5. Finally, section 6 concludes.

## 3.2 Institutional setting

This section provides an overview of how the Dutch retirement system is organized.

As in many countries, the Dutch pension system consists of three pillars. The first pillar operates on a pay-as-you-go basis and entails a uniform public pension provision for all Dutch inhabitants starting from the statutory retirement age. The public pension amount is linked to the net minimum wage and depends on the duration of a person's residency in the Netherlands. Couples residing in the Netherlands in the 40 years preceding their statutory retirement age receive

50% of the minimum wage, while single pensioners receive 70% of the minimum wage. To ensure a minimum standard of living, for individuals with an incomplete public pension, limited pension income, and minimal assets, the public pension is topped up with social assistance (e.g., for immigrants who lived only part of their life in the Netherlands).

In many countries, individuals can access their public pension earlier or later, although with a reduction or additional benefits.[4] In the Netherlands, this is not possible. People cannot access their public pension flexibly. The payout starts at the statutory retirement age for everyone. From its introduction in 1956 until 2013, the statutory retirement age was 65 for both men and women. As from 2013 the statutory retirement age has gradually increased (OECD (2019a)). For the cohorts considered in this study (individuals born between April 1952 and August 1953), the statutory retirement age is 66 or 66 and 4 months (see Table 3.1). This was established in a law passed in June 2015 that allowed individuals to adjust to the new situation. In 2019, a new agreement reduced the pace of the increase in the retirement age, but this did not impact the individuals born between April 1952 and August 1953.

| Cohort | Statutory retirement age | Year of statutory retirement | Range of birth dates |
|---|---|---|---|
| 1 | 66 | 2018 | April 1, 1952 – December 31, 1952 |
| 2 | 66 and 4 months | 2019 | January 1, 1953 – August 31, 1953 |

Table 3.1: Retirement ages and birth years of the cohorts included in our analysis.

The Dutch second pension pillar comprises employer- and employee-funded occupational pensions. Occupational pensions in the Netherlands are capital-funded and have a mandatory nature, with approximately 90% of all employees having a pension scheme associated with their employer. Primarily, occupational pensions are structured as defined-benefit pension plans. Before the onset of the 21st century,

[4]For example, in the US, benefits can be claimed from the age of 62 and until the age of 70 (Duggan et al. (2007)).

the majority of pension plans aimed to supplement public pensions to achieve a combined pension income totaling 70% of the final gross wage, if an employee had worked full-time for at least 40 years, starting from the age of 65. However, since 2003, pension funds have revised their objectives, now targeting a payout equivalent to 70% of the average career salary (including public pension benefits). Furthermore, with the increase in the statutory retirement age, also the official age used for the accrual of occupational pensions increased. This all results in less generous pension incomes for younger cohorts. People can choose the age at which they access their occupational pension, with a reduction for early withdrawal and a compensation for later withdrawal. Usually, at the statutory retirement age job contracts are terminated. It is possible to work after the statutory retirement age. In such cases, earnings are received in addition to pension benefits. After the statutory retirement age, workers have a lower tax burden as they no longer have to pay pension contributions and employee insurance premiums. Contrariwise, it is possible to retire prior to the statutory retirement age, albeit subject to a lower occupational pension benefit.

Finally, the third pillar comprises private individual pension products, like life annuities, and other private savings. Third-pillar pensions are typically accumulated by self-employed workers, who mostly have an own responsibility to save for their pension, see e.g., Knoef et al. (2016). Throughout this chapter, we primarily focus on first- and second-pillar pensions, as our data contains transactional records detailing the inflow of both public pension and occupational pension on a monthly basis.

## 3.3 Data

For our analysis, we use transaction data from ING Netherlands, the largest retail bank in the Netherlands serving roughly 9 million Dutch clients. Our analysis starts with a random sample of approximately 20,000 individuals who receive a monthly inflow of at least €800 into their ING accounts and who start receiving occupational pension benefits between January 2016 and January 2021. By selecting individuals with a minimum monthly inflow of €800, we increase the likelihood that ING serves as their primary bank. Individuals included in the study are required to have received occupational pension benefits for at least two consecutive months. Typically, the first receipt of occupational pension benefits coincides with the moment of actual retirement.

Our data include information on the inflow of statutory retirement benefits from September 2017 to January 2021. We select individuals who start receiving statutory retirement benefits at any point during this period. This means that they did not yet receive these benefits in September 2017, but did start receiving these benefits later on. This selection leaves us with approximately 12,000 individuals.

The data encompass all accounts held by the individuals, including shared accounts.[5] Finally, we exclude the top 1% and bottom 1% inflow and outflow observations to prevent outliers from skewing the results.

### 3.3.1 Variable definitions and descriptive statistics

Since we observe individuals who start receiving their statutory retirement between September 2017–January 2021, and because we have bank data until May 2021, our analyses run from September 2017 until May 2021. For these months we observe account balances and monthly cash flows. Account balances are recorded at the end of each month.

Cash flow data include details on occupational and statutory retirement benefits, as well as total inflow and outflow each month for individual and shared accounts. We compute total inflow and outflow by aggregating the individual and shared accounts. For shared accounts, flows are divided by the number of adults in the household. Since inflow and outflow measures might be affected by transfers between accounts, our primary interest lies in the net flow balance. This measure is calculated each month as the difference between total inflow and total outflow, providing a clear picture of financial movements. In the remainder of this study, we will focus on net flow balance and present results on total inflow and outflow in Appendix A3.1. Fur-

[5]Although our selection criteria ensure a monthly inflow of at least €800, it is possible that clients maintain accounts with other banks as well. This could pose an issue, particularly if the use of these alternative accounts changes post-retirement. However, according to the household survey of the Dutch central bank ((CentERdata (2022))), the majority of ING clients do not have a current account at another bank.

thermore, we compute a variable “In debt” on a monthly basis by generating a binary indicator. This indicator equals 0 when the total balance amount is zero or positive, and equals 1 when the total balance amount at the end of the month is negative.

To take into account inflation, we adjust our financial data with the Consumer Price Index provided by Statistics Netherlands, using April 2021 as the base month. This adjustment ensures that our results reflect real balances and flows.

Finally, individual characteristics such as age, gender, household size, and homeownership status are assessed in May 2021, based on the administrative data of the bank. In the Netherlands, pension funds are predominantly organized by sector, allowing us to categorize individuals into blue-collar and white-collar sectors based on their pension fund affiliations. We categorize blue-collar and white-collar sector workers on the basis of pension flows on individual accounts. This method prevents pension flows from other household members from influencing our classification. However, it also means that individuals who choose to receive their occupational pensions in a shared account cannot be classified into either group. Consequently, these individuals are categorized as neither, resulting in the sum of blue-collar and white-collar sector workers not equaling one. Note that working in a blue or white-collar sector does not necessarily mean being a blue or white-collar worker. For example, in the construction sector (considered blue-collar), there are also individuals with white-collar jobs (e.g., an administrative job).

| | Cohort 1 | | | Cohort 2 | | | |
|---|---|---|---|---|---|---|---|
| | Mean | Median | SD | Mean | Median | SD | P-value equal means |
| Age | 67.81 | 68 | 0.52 | 67.21 | 67 | 0.60 | 0.000 |
| Female | 0.45 | 0 | 0.50 | 0.46 | 0 | 0.50 | 0.000 |
| Household size | 1.76 | 2 | 0.65 | 1.78 | 2 | 0.64 | 0.000 |
| Blue-collar sector | 0.30 | 0 | 0.46 | 0.29 | 0 | 0.46 | 0.000 |
| White-collar sector | 0.31 | 0 | 0.46 | 0.34 | 0 | 0.47 | 0.000 |
| UI/DI recipient | 0.20 | 0 | 0.40 | 0.17 | 0 | 0.38 | 0.000 |
| Individuals | | 5734 | | | 6392 | | |

Table 3.2: Characteristics of the individuals included in the sample, as observed in May 2021. UI/DI recipient is defined as receiving a UI or a DI benefit in the month prior to reaching the statutory retirement age.

Table 3.2 describes the characteristics of the sample, separating the two cohorts defined in Table 3.1. Cohort 1 has a statutory retirement age of 66, while cohort 2 has a statutory retirement age of 66 years and 4 months. The two cohorts have a roughly equal number of observations. By construction, cohort 1 is older than cohort 2, with averages of 67.81 and 67.21 years, respectively. Other characteristics are very similar between the two cohorts. About 45% of the individuals are female, the average household size is 1.77, for approximately one-third of the sample we know that they work(ed) in a blue-collar sector, and for another one-third we know that they work(ed) in a white-collar sector. Although the differences between cohort 1 and 2 are statistically significant, they are not meaningful economically (e.g., a less than one percentage point difference in the fraction of females, and a 0.01 difference in household size). Finally, approximately 20% of cohort 1 and cohort 2 receives UI/DI benefits in the month prior to reaching the SRA, these are likely older workers having a relatively large distance from the labor market.

To investigate household finances around retirement, we introduce several key variables. First, we define a dummy variable to indicate whether an individual receives occupational pension income. Figure 3.1a illustrates the percentage of occupational pension recipients by age for cohorts 1 and 2. About 30-35% of the individuals receives occupational pension income at the age of 64. This gradually increases to 55%, after which there is a jump of 35%-points to around 90% upon reaching the retirement age. The remarkable increase in occupational pension recipients at the retirement age can be attributed to the typical termination of labor contracts at the statutory retirement age. In addition, the statutory retirement age may serve as a reference point for individuals in their decision to retire. Seibold (2021), for example, shows that in Germany financial incentives alone cannot explain retirement patterns, but there is a large direct effect of statutory retirement ages. Nearly all remaining individuals in the sample start receiving pension benefits within the two years after the statutory retirement age.

Interestingly, we also see a small jump at the age of 65. This also suggests the presence of a social norm effect. Until 2013, the Dutch statutory retirement age was 65. This appears to remain a crucial benchmark for workers, despite subsequent increases in the statutory retirement age. This observation aligns with Behaghel and Blau (2012), who identified a similar pattern in the U.S., indicating that earlier societal norms around retirement ages continue to affect retirement decisions.

Figure 3.1b shows the average unconditional pension inflow by age and cohort. Here we see a spike at the statutory retirement age, which seems to be caused by the one-time payout of small pensions. After this spike, unconditional pension inflow slowly increases, in line with the slow increase in the number of people receiving occupational pension income (Figure 3.1a).

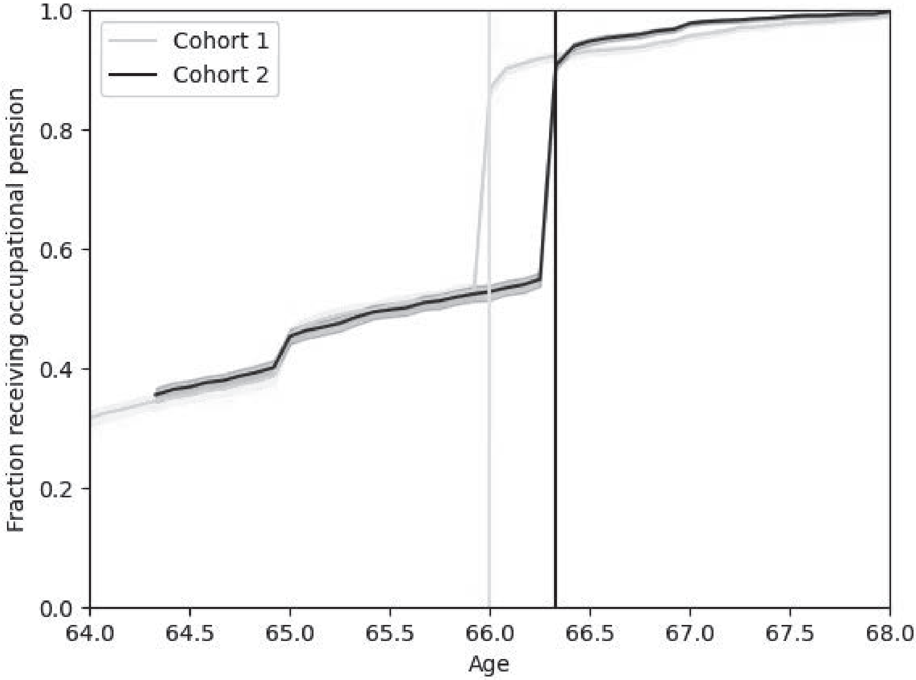


Figure 3.1a: Fraction receiving occupational pension by cohort and age.

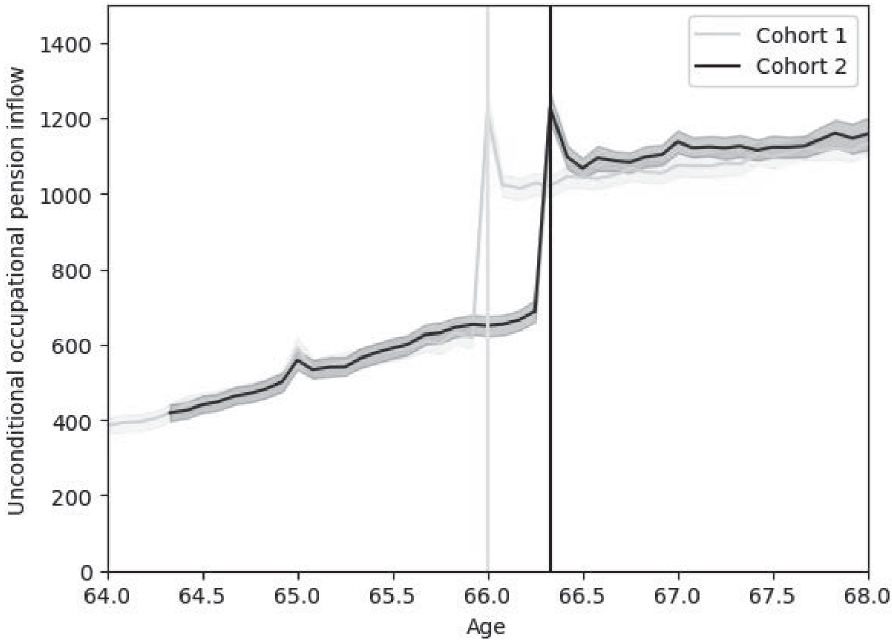


Figure 3.1b: Average occupational pension income by cohort and age.

Figure 3.1: Descriptives of pension recipiency

### 3.3.2 Financial data

Table 3.3 presents descriptive statistics of the financial variables in our data. Net flow balance is on average €48 for cohort 1 and €57 for cohort 2. The medians are €12 and €16, respectively, showing that for most people savings are low. The standard deviation, however is high with about 1800 euros for both cohorts.

The end-of-month balance, consisting of assets in individuals' ING accounts, is on average 32 thousand euros[6]. Also here the median is smaller at about 11 thousand euros. This discrepancy indicates skewness in the distribution, suggesting that some accounts hold much higher balances. The standard deviations are large, reaching nearly 79 thousand euros for cohort 1 and approaching 66 thousand euros for cohort 2. 4% of cohort 1 is in debt, as compared to 3% of cohort 2.

[6]This fairly closely matches the population average (CBS (2021c)).

The remainder of the variables in Table 3.3 are related to pensions. For about half of the observations in cohort 1, individuals receive a public pension. For the younger cohort 2 this is 44%. The public pension inflow (conditional on receiving public pension), is on average €700. This is in line with the full public pension being about €690 per individual for couples and €998 for singles in 2018 (depending also on a tax credit determined by the amount of other income). Occupational pension inflow, conditional on receiving occupational pensions, is quite similar for both cohorts: on average €919 for cohort 1 and €925 for cohort 2, with medians of 712 and 725 for cohort 1 and 2, respectively. Finally, total pension inflow, equaling the sum of public and occupational pensions, is on average €1411 for cohort 1 and €1345 for cohort 2. Also total pensions are right-skewed, with medians of 1217 and 1184 for cohort 1 and 2, respectively.

| | Cohort 1 | | | Cohort 2 | | | |
|---|---|---|---|---|---|---|---|
| | Mean | Median | SD | Mean | Median | SD | P-value equal means |
| Net flow balance | 48 | 12 | 1800 | 57 | 16 | 1774 | 0.0582 |
| End-of-month balance | 31954 | 10752 | 78916 | 32394 | 11980 | 65510 | 0.0277 |
| In debt (binary) | 0.04 | 0 | 0.19 | 0.03 | 0 | 0.16 | 0.0000 |
| Fraction receiving public pension | 0.52 | 1 | 0.50 | 0.44 | 0 | 0.50 | 0.0000 |
| Public pension inflow (conditional) | 700 | 677 | 370 | 701 | 682 | 372 | 0.0000 |
| Fraction receiving occupational pension | 0.70 | 1 | 0.46 | 0.69 | 1 | 0.46 | 0.0000 |
| Occupational pension inflow (conditonal) | 919 | 712 | 889 | 925 | 725 | 884 | 0.0000 |
| Fraction receiving any pension | 0.72 | 1 | 0.45 | 0.72 | 1 | 0.46 | 0.0000 |
| Total pension inflow (conditional) | 1411 | 1217 | 980 | 1345 | 1184 | 985 | 0.0000 |
| Observations | | 270296 | | | 261884 | | |
| Individuals | | 5734 | | | 6392 | | |

Table 3.3: Descriptive statistics of financial variables. Net flow balance is defined as the total inflow minus the total outflow in a given month. Total pension inflow is defined as the sum of public and occupational pensions.

Figure 3.2 shows the development of net flow balance, end-of-month balance and ‘in debt’ before and after retirement. The graphs on the left present age on the horizontal axis. The graphs in the middle and the right show the distance to the statutory and the actual retirement age on the horizontal axis, respectively.

Focusing first on the graphs in the top row, we find that net flow balance is predominantly positive and has pronounced spikes at the statutory retirement age. An explanation for these spikes is that a lot of labor contracts are terminated at the statutory retirement age, and

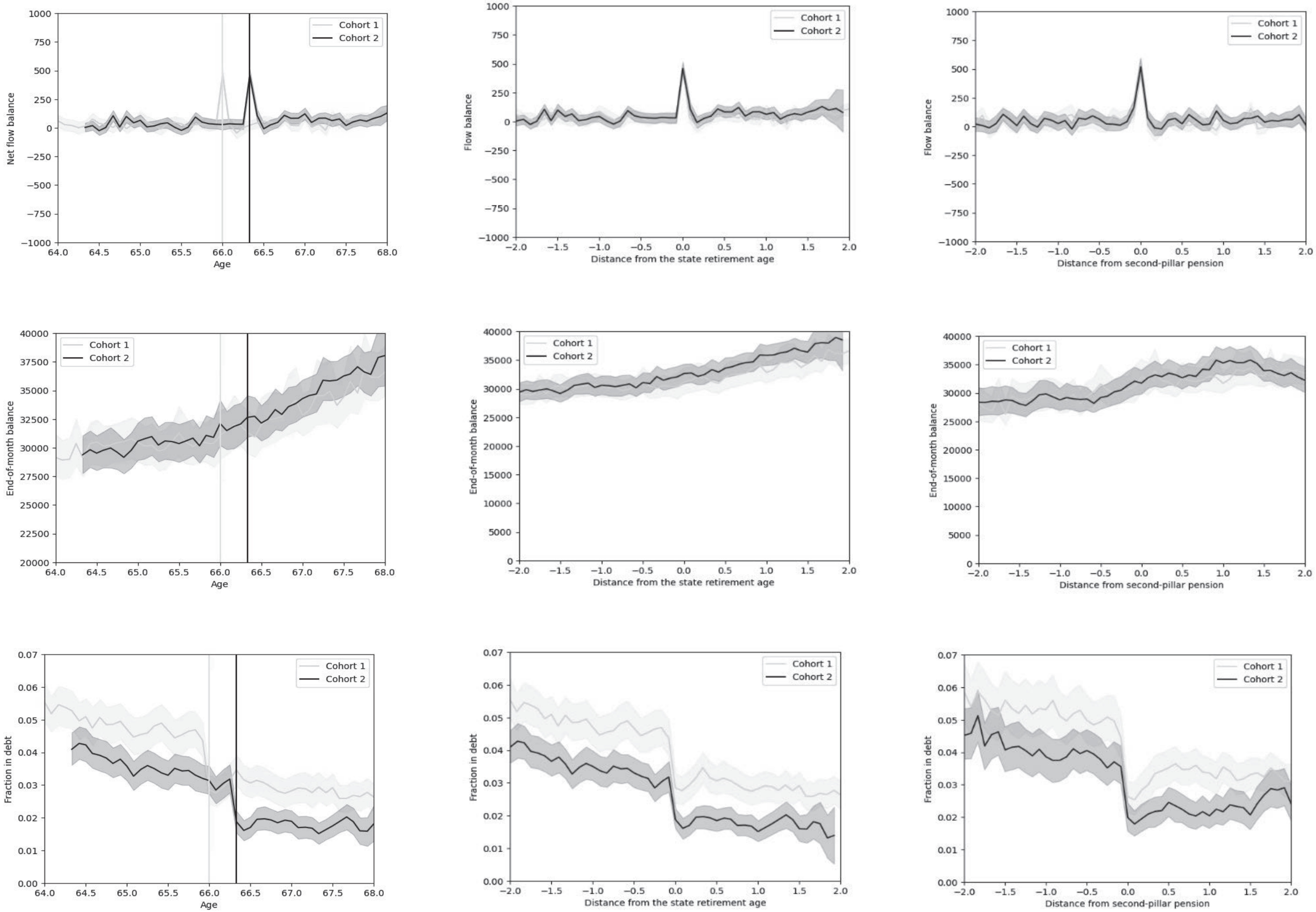


Figure 3.2: Net flow balance, end-of-month balance, and debt by age, as well as distances to the statutory and actual retirement age

that accumulated holiday pay and year-end bonuses are paid out at that moment. Also, at the statutory retirement age some small pensions are paid out as a lump-sum (which we also saw in Figure 3.1b). As detailed in Appendix A3.1, both inflow and outflow peak at the statutory retirement age, with inflow exceeding outflow. When comparing the periods before and after the statutory retirement age, we find that the net flow balance is quite similar.

Looking at the graphs in the middle row, we observe that the end-of-month balance increases with age. In the middle-right figure, however, we do not observe the clear upward trajectory in end-of-month balance. This can be explained by the fact that the end-of-month balance (wealth) is likely to influence the timing of actual retirement. More affluent individuals tend to retire relatively early, resulting in a more stable end-of-month balance around the actual retirement age compared to around the statutory retirement age.

The left-bottom graph shows the fraction in debt by age. In line with Table 3.3, cohort 1 is more often in debt than cohort 2. The percentage of individuals in debt decreases with age, and particularly around the statutory and actual retirement age debts are often paid off.

## 3.4 Methodology

To assess the effect of retirement on financial outcomes, we estimate several models. We will start with a description of a fixed effects model (Section 3.4.1), then a regression discontinuity design (Section 3.4.2), and finally a difference-in-differences approach in Section 3.4.3.

### 3.4.1 Fixed effects model

We start with the following Fixed Effects models:

$$F_{it} = \alpha_0 + \alpha_1 R_{it} + X_{it}' \alpha_3 + \eta_i + u_{it} \tag{3.1}$$

Where $F_{it}$ denotes a financial outcome of individual $i$ in month $t$ (that is, net flow balance, end-of-month balance, or in debt). $R_{it}$ denotes a dummy for whether individual $i$ is actually retired in month

$t$ (measured by the inflow of second-pillar pensions), and $X_{it}$ denotes a vector of controls. We control for household size, gender, cohort, and calendar month fixed effects (to capture seasonality). Finally, $\eta_i$ captures individual-fixed effects, and $u_{it}$ are time-varying error terms. The assumption that the errors $u_{it}$ are identically and independently distributed and independent of $R_{it}$ and $X_{it}$, and that $\eta_i$ are not necessarily independent of $R_{it}$ and $X_{it}$ leads to the Fixed Effects model. We will also estimate equation (3.1) without individual-fixed effects using OLS.

The parameter of interest in these regressions is $\alpha_1$, which describes the association between retirement and the financial outcomes. Although the Fixed Effects model controls for time-invariant individual heterogeneity that is related to selection into retirement, $\alpha_1$ may not reflect the causal effect of retirement on financial outcomes. That is because there may also be unobserved shocks that affect both retirement behavior and financial outcomes. For example, a health shock or the receipt of an unexpected bequest (or other windfall gains or financial setbacks) may influence both the retirement decision and financial outcomes. In this case, the error terms $u_{it}$ are not independent of $R_{it}$. Therefore, next we describe a regression discontinuity approach and a difference-in-differences approach where we exploit the discontinuity induced by the SRA and the increase in the SRA to estimate the causal effects of retirement on financial outcomes.

### 3.4.2 Regression Discontinuity approach

The statutory retirement age creates a discontinuity in the probability of retirement that enables us to apply a regression discontinuity (RD) framework, with age minus the statutory retirement age as the running variable. Elaborating on Stancanelli and Van Soest (2012) and Been and Goudswaard (2020), we use a "fuzzy" regression discontinuity design, because the jump in the probability of retirement at the statutory retirement age is between zero and one.[7] Our fuzzy RD model is specified as follows:

[7]Stancanelli and Van Soest (2012) use a fuzzy RD design to identify the causal effect of retirement on home production. Been and Goudswaard (2020) use this design to estimate the causal effect of retirement on spending and time use decisions using survey data.

$$F_{it} = \beta_0 + \beta_1 R_{it} + \beta_2 f(A_{it}) + \beta_3 PUB_{it} f(A_{it}) + X'_{it}\beta_4 + v_{1it} \quad (3.2)$$

$$R_{it} = \gamma_0 + \gamma_1 PUB_{it} + \gamma_2 f(A_{it}) + \gamma_3 PUB_{it} f(A_{it}) + X'_{it}\gamma_4 + v_{2it} \quad (3.3)$$

Where $F_{it}$, $R_{it}$, and $X_{it}$ are specified before, and $A_{it}$ denotes age minus the individual's statutory retirement age (i.e., the distance to the statutory retirement age). $PUB_{it}$ is a dummy variable that indicates whether an individual has reached the statutory retirement age. The discontinuity introduced by the statutory retirement age is the instrument in the analysis. $f(A_{it})$ is a polynomial centered around the statutory retirement age. The term $PUB_{it} f(A_{it})$ allows the slope to be flexible on each side of the statutory retirement age. Finally, the $v$'s are zero-mean errors, and the correlation between the elements of $v_1$ and $v_2$ are presumably nonzero. The crucial condition for the instrument $PUB_{it}$ to be valid, is that it is correlated with actual retirement $R_{it}$, but that it is uncorrelated with $v_1$. The parameter of interest in the regression is $\beta_1$, which provides us with an estimate of the causal effect of retirement on the financial outcomes.

In the baseline we use a first-degree order polynomial for $f(.)$, but we also estimate second-degree order polynomials as a robustness check. Furthermore, our baseline RD specification is a donut RD, where we exclude the month in which the statutory retirement age is reached, as well as the months just before and after the statutory retirement age. We thus exclude the spikes in Figure 3.2, to prevent our findings to be affected by payments, bonuses and/or expenses related to the date of retirement. In Appendix A3.2, we also show the estimation results using the complete dataset (without the donut). We cluster standard errors at the individual level.

Note that the RD model estimates local average treatment effects around the statutory retirement age. The estimates do not necessarily apply to individuals further away from the statutory retirement age. Furthermore, by using the statutory retirement age as an instrument, we estimate a complier average causal effect, where the compliers are those who retire at the statutory retirement age.

### 3.4.3 Difference-in-Differences approach

Whereas the regression discontinuity design exploits the discontinuity induced by the statutory retirement age, in the difference-in-differences approach we will exploit the increase in the statutory retirement age between cohort 1 and cohort 2. Due to the gradual phase-in of the increase in the statutory retirement age, cohort 2 had to wait an additional 4 months before receiving public pension benefits compared to cohort 1. That is, they became eligible at the age of 66 years and 4 months, while cohort 1 became eligible at the age of 66. On this basis, we can compare cohort 2 with cohort 1, which was not affected by a 4-month delay in receiving public pension benefits. Our reduced form is in line with the models of Staubli and Zweimüller (2013) and Rabaté et al. (2024):

$$F_{it} = \eta_0 + \eta_1 COH2_i + \eta_2 AGE_{it} + \eta_3 PUB_{it} + X_{it}\eta_4 + \iota_{it} \tag{3.4}$$

Where $COH2_i$ denotes a dummy variable indicating whether individual $i$ belongs to cohort 2. $AGE_{it}$ represents the age of the individual. $PUB_{it}$ is one if an individual's age in month $t$ is below the statutory retirement age, and zero otherwise. $X_{it}$ represents a vector of demographic controls, and $\iota_{it}$ is the error term.

Since we are interested in the effect of retirement on financial outcomes, we estimate the following instrumented difference in differences model:

$$F_{it} = \delta_0 + \delta_1 COH2_i + \delta_2 AGE_{it} + \delta_3 R_{it} + X_{it}\delta_4 + w_{1it} \tag{3.5}$$

$$R_{it} = \zeta_0 + \zeta_1 COH2_i + \zeta_2 AGE_{it} + \zeta_3 PUB_{it} + X_{it}\zeta_4 + w_{2it} \tag{3.6}$$

The identifying assumption is that, if the statutory retirement age had not been increased, the development of financial outcomes over the life cycle would have been similar between cohort groups not yet qualified for retirement benefits ($COH2$, the treatment group) and those already eligible ($COH1$, the comparison group), after controlling for background characteristics. Under this assumption, $\delta_3$ measures the average causal impact of an increased statutory retirement age on $F_{it}$, using variation over time. A possible concern is that trends in financial outcomes may alter across age groups over time for reasons not related to the increase in the statutory retirement age.

Our identification stems from age ranges in which one cohort has reached the statutory retirement age whereas others have not yet. We cluster standard errors at the individual level.

## 3.5 Results

This section shows and interprets the results of our estimations and robustness checks.

### 3.5.1 OLS and FE results

Table 3.4 presents OLS and Fixed Effects (FE) estimates examining the impact of retirement on net flow balance, end-of-month balance, and the fraction in debt. The OLS results including control variables suggest a slight decrease in net flow balance after retirement, a weakly significant increase in end-of-month balance of about €2000, and a significant decline of 1 percentage point in the fraction of individuals with debt. These findings, however, may be driven by a composition effect. For instance, those possessing substantial pension wealth and savings are more likely to retire early. Such individuals can also afford to save less or dissave after retirement, leading to a negative net flow balance.

Next, we take into account individual fixed effects. The FE estimates including control variables show a slight increase in net flow balance, indicating that individuals have on average €9 per month more left at the end of the month after retirement compared to before retirement. Furthermore, the results show that individuals have on average a significant €1000 more in their bank accounts after retirement than they had before. Finally, debts decrease significantly post-retirement relative to the pre-retirement period, but this is only a decline of -0.6%-points.

In the baseline estimations we exclude the month of retirement, and the months just before and just after retirement (the peak in net flow balance at retirement). Appendix A3.2 shows the OLS and FE results including these months. The conclusions are very similar.

The difference between the OLS and FE results underscores the importance of accounting for individual fixed effects when analyzing the financial implications of retirement. However, there may also be time-variant factors that affect both retirement and financial outcomes. For example, a health shock could act as a third factor, influencing early retirement and simultaneously affecting individuals' financial situation. Additionally, the retirement decision is an outcome of one's financial situation (Burkhalter et al. (2022)). To address this endogeneity, we proceed to estimate models where we exploit discontinuities in the statutory retirement age using a Regression Discontinuity (RD) and Difference-in-Differences (DiD) approach.

| Dependent variable | OLS | OLS | FE | FE |
|---|---|---|---|---|
| Net flow balance | 2.73 | -22.03*** | 6.59 | 9.09** |
| | (4.57) | (5.36) | (3.98) | (4.12) |
| End-of-month balance | 3995.67*** | 2011.50* | 3189.52*** | 1053.64*** |
| | (722.64) | (1035.08) | (205.81) | (182.91) |
| In debt (binary) | -0.020*** | -0.013*** | -0.015*** | -0.006*** |
| | (0.002) | (0.003) | (0.001) | (0.001) |
| Controls | x | ✓ | x | ✓ |
| Observations | 497271 | 497271 | 497271 | 497271 |
| Individuals | 12125 | 12125 | 12125 | 12125 |

Clustered Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.4: OLS and Fixed Effects (FE) results on the relationship between retirement and several financial outcome measures. FE models estimate individual-fixed effects. Control variables are gender, household size, age, a cohort 2 dummy, and a set of calendar month dummies.

### 3.5.2 Fuzzy donut RD results

Table 3.5 presents the results of the fuzzy donut RD model. We exclude the month in which the statutory retirement age is reached, as well as the months immediately preceding and following the statutory retirement age. Throughout we choose a bandwidth of 2 years (left and right of the statutory retirement age), based on the results of the optimal bandwidth selection strategy outlined by Imbens and Kalyanaraman (2012). The results of the first stage can be found in

Appendix A3.5. The instrument (that is, the binary indicator of receiving statutory retirement benefits) has a highly significant positive coefficient of 0.36, in line with the fraction of people who retire at the statutory retirement age in Figure 3.1.

Model (2) shows that the results with regard to net flow balance and end-of-month balance are roughly similar to the FE estimates, but less significant. Retirement increases the monthly net flow balance with €16 (similar to the FE estimate of €9, but not significant anymore). The coefficient for end-of-month balance has the same order of magnitude as the FE estimates (€890 compared to €1000), but is no longer significant. Both the FE and fuzzy RD estimates show that the fraction of individuals in debt declines significantly when people retire. The fuzzy RD estimates show a decline of 3.1%-points (compared to an average fraction in debt of 4% in cohort 1 and 3% in cohort 2).

Appendix Table A3.6 presents the full list of coefficients. Interestingly and as expected, we observe a substantial and highly significant positive coefficient for net flow balance in the month of May, which is the month when typically holiday payments are received. Accordingly, the end-of-month-balance is €1529 euros higher than in January (the reference month). Holiday payments are (partly) used to pay off debts, as evidenced by the decline in the fraction of individuals in debt by 1.3%-points during the same month. In the months that follow, the net flow balance turns negative (e.g. holiday spending). Furthermore, in December the end-of-month balance is relatively low compared to January (the reference month). On average, the end-of-month balance is €798 lower in December compared to January. The net flow balance is €99 lower in December compared to the reference month of January.

Appendix Table A3.6 shows the results including the donut observations. That is, including the month in which the statutory retirement age is reached, and the months immediately preceding and following the statutory retirement age. While the results for the end-of-month-balance and 'in debt' remain similar, the coefficient for net flow balance shifts to a substantial and significant value of €239. This shift is likely caused by the high peak in net flow balance observed in the retirement month.

Robustness checks in Appendix A3.3 show that the coefficient for 'in debt' is robust for varying bandwidth sizes around the statutory retirement age. The coefficients for end-of-month balance are similar for bandwidths of 1.5, 2, 2.5, and 3 years, but are more volatile for smaller bandwidths of 0.5 an 1 year. Net flow balance is only significant for larger bandwidths of 2.5 and 3 years. We also estimate the model with a second-order polynomial instead of a first-order polynomial. This leads to conclusions similar to the baseline results. Finally, Table A3.10 shows the reduced form results. These results align with the baseline results, indicating a consistent pattern across the models. However, the coefficients are smaller in the reduced form model as they reflect the intention to treat effects (focusing on the statutory retirement age, instead of actual retirement).

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Net flow balance | -20.28 | 16.33 |
| | (24.79) | (25.07) |
| End-of-month balance | 760.97 | 890.13 |
| | (1043.53) | (1037.97) |
| In debt (binary) | -0.033*** | -0.031*** |
| | (0.004) | (0.004) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 23716 | 23017 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.5: Fuzzy donut RD estimates examining the effect of retirement on several financial outcome measures. Bandwidth of two years. Control variables are gender, household size, a cohort 2 dummy, and a set of calendar month dummies. Extended estimation results can be found in Appendix A3.6.

### 3.5.3 Instrumented difference in differences model

Whereas the RD in Table 3.5 exploits the discontinuity in retirement caused by the statutory retirement age, Table 3.6 shows the estimation results of the Instrumented difference-in-differences model, exploiting the increase in the statutory retirement age between cohort 1 and cohort 2. Figure 3.1a shows a clear parallel trend for cohorts 1 and 2 before the statutory retirement age. At the age of 66, cohort 1 reaches their statutory retirement age of 66. Upon examining the figure, it seems very likely that, in the absence of the increase in the retirement age, cohort 2 would have exhibited a similar pattern to cohort 1. Also with regard to the financial outcomes (Figure 3.2) we see clear parallel trends in the graphs in the left column.

The first-stage results show that the instrument (that is, the binary indicator of receiving occupational pension benefits) has a highly significant positive coefficient of 0.35 (Appendix A3.5). This is very similar to the coefficient found in the fuzzy donut RD model. Also the second stage results lead to similar conclusions. The coefficient for 'in debt' shows again a significant drop in the fraction of individuals in debt by 3.5%-points. The coefficients for net flow balance and end-of-month balance have the same order of magnitude and are not significantly different from zero. Appendix Table A3.6 presents the full list of coefficients and show similar dynamics across the year as we found in the fuzzy donut RD model (a relatively large net flow balance and end-of-month balance in May, and a relatively low end-of-month balance in December). In both models, the coefficients suggest that part of the holiday payments are used to pay off debt.

To make a clean comparison with the fuzzy RD donut model, in the instrumented diff-in-diff model we used the same estimation sample as in the fuzzy RD donut model. That is, we excluded the observations at the statutory retirement age, and the months immediately preceding and following the statutory retirement age. In Table A3.6 we estimate the same model including these observations. The results lead to the same conclusions as the fuzzy RD model (without the donut). Namely, the fraction in debt declines with 3.5%points, the coefficient of the end-of-month balance is not significant, and net flow balance is relatively large: €239. The reduced form results (Appendix Table A3.10) align again with the baseline results, and are smaller than the baseline results as they reflect the intention to treat effect.

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Net flow balance | -5.76 | 26.20 |
| | (34.53) | (25.43) |
| End-of-month balance | 1020.52 | 1436.00 |
| | (1775.47) | (1053.85) |
| In debt (binary) | -0.029*** | -0.031*** |
| | (0.005) | (0.004) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 22429 | 22191 |

Clustered Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.6: Instrumented DiD estimates examining the effects of retirement on financial outcome measures. Control variables are gender, household size, age, and month dummies. Extended estimation results can be found in Appendix A3.6.

### 3.5.4 Heterogeneity

Next, we are interested in heterogeneity analyses for several subsamples. We separate our estimates by gender, by blue/white collar sector, income, household size, wealth, and whether the individual received UI or DI benefits prior to receiving statutory retirement benefits.[8].

Table 3.7 shows RD estimates for the aforementioned subgroups. We find small but positive net flow balance effects for women, but no other gender-related differences. Net flow balances increase sharply for single-person households, and point estimates are significantly higher than for multi-person households. When comparing blue-collar workers to white-collar workers, UI/DI recipients to non-UI/DI recipients, and comparing high-inflow groups to low-inflow groups we find remarkable differences: Debt decreases more sharply for low-inflow groups, and end-of-month balances increase. The accumulation of savings observed in low-inflow and low-wealth households after retirement is particularly noteworthy, given their relatively limited savings prior to retirement.

[8] We define income and wealth as 'high' ('low') as the individual has an above (below) median income and wealth in 2016, as compared to the rest of the individuals in the sample. By selecting on flows and balances in 2016, we preclude income and wealth being an outcome of occupational pensions, as none of the individuals in the sample receive occupational pension benefits yet in this year. Group means of the dependent variables for these subgroups prior to receiving occupational pensions are shown in Table A3.17 of A3.6

The net flow balance and end-of-month balance estimates based on wealth initially appear counter-intuitive. The positive net flow balance estimate for the high-wealth group is attributable to high-wealth individuals with low inflows improving their net flow balance. Conversely, the absence of a positive net flow balance effect for the low-wealth group is because low-wealth individuals with high inflows worsen their net flow balances after retirement.

Comparing estimates to the base levels in Table A3.17, net flow balances increase sharply for financially constrained individuals, whereas debts decrease by over half of their mean value. For UI/DI recipients, Appendix A3.8 presents outcome measures based on age, distance from the statutory retirement age, and distance from receiving occupational pensions. This subgroup exhibits lower net flow balances and higher debt rates, which decrease more sharply after retirement than in the remainder of the sample.

Table 3.8 presents DiD estimates for the aforementioned subgroups. The results are similar to the findings in Table 3.7, albeit less precisely estimated. We no longer observe any significant net flow balance effects. Only end-of-month balance estimates for low-wealth individuals remain significantly positive. However, remarkable differences in debt remain intact. Contrasting white-collar and blue-collar workers, we find larger decreases in debt for blue-collar workers than for white-collar workers. As in Table 3.7, debt decreases more sharply for UI/DI recipients, low-inflow and low-wealth individuals, and blue collar workers than for the remainder of the sample. The decrease in accuracy is likely driven by our DiD model identifying based on a four-month difference in the SRA, whereas our RD model identifies based on a 2-year bandwidth around the SRA.

| Dependent variable / subgroup | Men | Women | Single-person | Multi-person | DI/UI | No DI/UI |
|---|---|---|---|---|---|---|
| Net flow balance | 6.52 | 23.25*** | 101.35*** | -28.92 | 26.85*** | 13.03* |
| | (8.75) | (7.44) | (34.80) | (6.53) | (9.05) | (7.06) |
| End-of-month balance | -799.34 | 1738.02 | 1133.81 | 1234.66 | 2151.58* | 805.57 |
| | (1225.87) | (1098.49) | (2883.33) | (1631.46) | (1212.78) | (1051.05) |
| In debt (binary) | -0.031*** | -0.032*** | -0.032*** | -0.031*** | -0.044*** | -0.028*** |
| | (0.003) | (0.003) | (0.009) | (0.004) | (0.006) | (0.002) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 265436 | 219710 | 162217 | 323372 | 92515 | 403074 |
| Individuals | 6569 | 5544 | 3897 | 8151 | 2211 | 9837 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

| Dependent variable / subgroup | White-collar | Blue-collar | High-inflow | Low-inflow | High-wealth | Low-wealth |
|---|---|---|---|---|---|---|
| Net flow balance | 4.23 | 69.78*** | -6.68 | 34.05*** | 39.17*** | -3.75 |
| | (12.73) | (10.20) | (11.15) | (5.75) | (10.74) | (6.23) |
| End-of-month balance | -3148.53** | -1124.62 | 381.94 | 2106.76*** | 227.98 | 2360.75*** |
| | (1516.77) | (1208.20) | (1819.63) | (573.37) | (1840.97) | (218.43) |
| In debt (binary) | -0.028*** | -0.039*** | -0.024*** | -0.037*** | -0.002** | -0.056*** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.001) | (0.003) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 158813 | 143579 | 247780 | 247809 | 247766 | 247843 |
| Individuals | 3991 | 3603 | 6002 | 6046 | 6042 | 6006 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.7: Heterogeneity analyses for the instrumented donut fuzzy RD estimates, examining the effects of retirement on several financial outcome measures. Estimates control for gender, household size, a cohort 2 dummy, and a set of month dummies.

| Dependent variable / subgroup | Men | Women | Single-adult | Multi-adult | UI/DI | No UI/DI |
|---|---|---|---|---|---|---|
| Net flow balance | 10.69 | 27.10 | 109.95 | -17.82 | 33.04 | 24.15 |
| | (65.64) | (71.33) | (116.81) | (45.80) | (95.37) | (52.48) |
| End-of-month balance | -576.30 | 1903.96 | 1599.16 | 1754.26 | 2479.36 | 1342.85 |
| | (3179.30) | (3038.71) | (4200.52) | (2083.77) | (3270.23) | (2126.04) |
| In debt (binary) | -0.031*** | -0.032*** | -0.033** | -0.031*** | -0.045* | -0.028*** |
| | (0.010) | (0.011) | (0.015) | (0.008) | (0.023) | (0.007) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 265436 | 219710 | 162217 | 333372 | 92515 | 403074 |
| Individuals | 6569 | 5544 | 3897 | 8151 | 2211 | 9837 |

| Dependent variable / subgroup | White-collar | Blue-collar | High-income | Low-income | High wealth | Low wealth |
|---|---|---|---|---|---|---|
| Net flow balance | 11.55 | 72.00 | 8.84 | 39.97 | 51.52 | 4.62 |
| | (122.19) | (106.30) | (72.95) | (53.87) | (78.91) | (50.88) |
| End-of-month balance | -2949.49 | -1120.25 | 1147.78 | 2387.56 | 1071.83 | 2534.76** |
| | (6177.27) | (5861.48) | (3017.58) | (1839.27) | (3431.65) | (1289.69) |
| In debt (binary) | -0.028*** | -0.039*** | -0.024*** | -0.037*** | -0.003 | -0.056*** |
| | (0.015) | (0.016) | (0.008) | (0.012) | (0.002) | (0.014) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 340554 | 143579 | 247780 | 247809 | 247766 | 247823 |
| Individuals | 3991 | 3603 | 6002 | 6046 | 6042 | 6006 |

Table 3.8: Heterogeneity analyses for the instrumented DiD estimates, examining the effects of retirement on several financial outcome measures. Control variables are gender, household size, age, and a set of month dummies

## 3.6 Conclusion

In this chapter, we investigate how retirement affects the financial behavior of retirees. Using the statutory retirement age as an instrument for actual retirement, we estimate how retirement affects cash flows and account balances using data from the largest retail bank in the Netherlands.

One of the contributions of our chapter lies in the use of high quality and high frequency bank account data. As compared to survey data, we have richer and more detailed data. This allows us to estimate a new support of income and spending behavior more accurately. For instance, we can identify effects in the exact month of retirement. This new support exhibits effects similar to those found in the existing survey data literature. With our identification strategy we estimate causal effects, as opposed to most of the existing retirement literature.

In the short-run, we find a spike in the net flow balance at the retirement age that is used to pay off debt, whereas account balances increase over time. As such, retirement spending behavior exhibits both an anticipatory effect and an immediate response, but exhibits smoothing effects in the longer run after retirement (positive age effects). These findings add a layer of depth to the retirement-consumption puzzle.

Additionally, our findings suggest that retirement in the Netherlands alleviates financial constraints. Specifically, for groups with lower educational levels, incomes, wealth, and UI/DI benefits. For them, we observe increases in both net flow balances and end-of-month balances after retirement. We do not observe decreases for individuals with higher education levels, incomes, and wealth, indicating that retirement does not impose financial constraints on wealthier individuals.

In general, our findings on the retirement-consumption puzzle may explain existing findings in the survey data literature of both papers that do (i.e., Hori and Murata (2019)) and do not (i.e., Been and Goudswaard (2020) show a drop in consumption after retirement. We discover positive net flow balances and wealth accumulation in the longer run, but no short-run effects of retirement apart from the spike at retirement. These findings indicate that capital accumulation is a long-run effect rather than a direct result of retirement.

This chapter informs policy in two ways. First, the absence of negative net flow balance effects suggests that the combination of first- and second-pillar pensions is, in general sufficient. The observed decreases in debt, particularly for low-income groups, indicates that retirement may help relatively vulnerable individuals pay off debts and accumulate wealth in the short run. Secondly, both the cash flow and end-of-month balance dynamics that we observe contribute to the discussion on the size as well as flexibility of retirement benefits over time.

For future research we emphasize the importance of more detailed and more frequent transaction data: Data at an even higher frequency, more detailed measures of flows and a broader range of individual characteristics may help further understand the nuances underlying the retirement-consumption puzzle.

## A3 Appendices

### A3.1 Inflow and outflow summary statistics and estimates

Table A3.1 presents summary statistics of inflow and outflow, separated on the basis of cohort. The average Inflow and outflow are slightly higher for cohort 1, as is the median. The difference in means is significantly different from zero.

| | Cohort 1 | | | Cohort 2 | | | |
|---|---|---|---|---|---|---|---|
| | Mean | Median | SD | Mean | Median | SD | P-value equal means |
| Total inflow | 3440 | 2427 | 3375 | 3353 | 2347 | 3352 | 0.0000 |
| Total outflow | 3392 | 2369 | 3253 | 3296 | 2287 | 3219 | 0.0000 |
| Observations | | 270296 | | | 261884 | | |
| Individuals | | 5734 | | | 6392 | | |

Table A3.1: Descriptive statistics of total inflow and total outflow.

Table A3.2 presents OLS and FE estimates for inflow and outflow. Inflow and outflow are estimated to slightly decrease after retirement in our OLS models. Controls reduce the estimated effect. FE estimates instead show increases in inflow and outflow of approximately €100. Our findings indicate that, as with our other outcome measures, the retirement decision is highly endogenous. OLS and FE models consequently cannot capture causal effects.

| Dependent variable | OLS | OLS | FE | FE |
|---|---|---|---|---|
| Inflow | -218.96*** | -160.48*** | 99.88*** | 106.19*** |
| | (37.26) | (36.46) | (14.04) | (14.06) |
| Outflow | -207.27*** | -147.13*** | 93.29*** | 101.44*** |
| | (36.78) | (35.97) | (13.69) | (13.72) |
| Controls | x | ✓ | x | ✓ |
| Observations | 487402 | 487402 | 487402 | 487402 |
| Individuals | 12102 | 12102 | 12102 | 12102 |

Clustered Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.2: OLS and FE estimates of inflow and outflow as a result of retirement. FE models include individual-fixed effects. Control variables are a cohort 2 dummy, household size, gender, age, and a set of month dummies.

Figure A3.1 illustrates inflow and outflow dynamics on the basis of distance from the statutory retirement age and occupational pension recipiency, respectively. Inflow and outflow spike after the receipt of statutory retirement benefits as well as the receipt of occupational benefits. Afterward, inflow and outflow decline, but remain slightly higher than before receiving statutory retirements and occupational pensions.

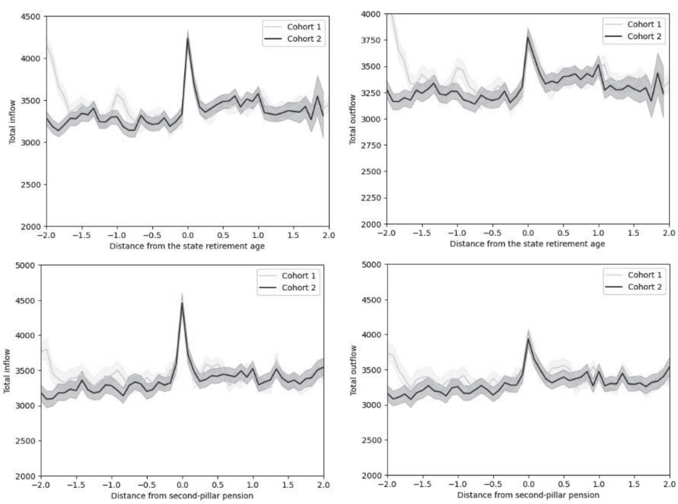


Figure A3.1: Inflow and outflow before and after the statutory retirement age and receiving occupational pension.

Tables A3.3 and A3.4 present RD and DiD estimates, respectively, for inflow and outflow. Inflow and outflow sharply increase for individuals who comply with the statutory retirement age, and the estimated effect intensifies after accounting for controls. However, we cannot verify whether these effects are due to increases in income and spending or whether they result from administrative processes such as transfers between bank accounts.

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Inflow | 724.24*** | 855.75*** |
| | (54.62) | (82.58) |
| Outflow | 794.52*** | 839.42*** |
| | (57.63) | (53.35) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 23716 | 23017 |

Clustered standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3.3: Instrumented RD estimates of inflow and outflow as a result of retirement. Control variables are a cohort 2 dummy, household size, gender, and a set of calendar month dummies.

| Dependent variable | | |
|---|---|---|
| Inflow | 854.88*** | 904.86*** |
| | (55.74) | (56.39) |
| Outflow | 871.33*** | 878.66*** |
| | (70.07) | (54.55) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 22429 | 22191 |

Clustered Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3.4: Instrumented DiD estimates of inflow and outflow as a result of retirement. Control variables are age, household size, gender, and a set of calendar month dummies.

## A3.2 Robustness checks: including the cutoff observations

The baseline models are estimated with a donut: we exclude the observation at the statutory retirement age, the observation just before the statutory retirement age, and the observation just after the statutory retirement age. In this way, we mitigate the effect of the peak in net flow balance at retirement. Since this effect is interesting in itself, and we are interested in the robustness of the results, we also estimated the models including these cutoff observations and show the results in this appendix.

Table A3.5 present OLS and Fixed Effects including the cutoff observations. Estimates are highly similar to those in 3.4: We find slight negative estimates for flow balance, positive effects for end-of-month balances in the fixed effects models, and strong negative effects on debt.

| Dependent variable | OLS | OLS | FE | FE |
|---|---|---|---|---|
| Net flow balance | 10.06*** | -11.97** | 21.87*** | 7.46* |
| | (4.51) | (5.28) | (3.92) | (4.07) |
| End-of-month Balance | 3784.72*** | 1861.50* | 3079.27*** | 1044.20*** |
| | (723.41) | (1018.87) | (197.72) | (173.96) |
| In debt (binary) | -0.010*** | -0.013*** | -0.015*** | -0.007*** |
| | (0.002) | (0.003) | (0.001) | (0.001) |
| Controls | x | ✓ | x | ✓ |
| Observations | 531277 | 531277 | 531277 | 531277 |
| Individuals | 12125 | 12125 | 12125 | 12125 |

Clustered Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3.5: OLS and FE estimates of cash flows as a result of retirement including the cutoff observations. FE models include individual-fixed effects. Control variables are gender, age, a cohort 2 dummy, household size, and a set of month dummies.

Tables A3.6 and A3.7 report estimates that include the threshold observations for the instrumented RD model and the instrumented DiD model, respectively. Net flow balances sharply increase as a result of the statutory retirement cutoff observations. As in our donut models, we find no short-run effect for end-of-month balances and observe a sharp decrease in debt.

| Dependent variable | Model 1 | Model 2: |
|---|---|---|
| Net flow balance | 200.31*** | 238.78*** |
| | (22.42) | (22.98) |
| End-of-month Balance | 1067.46 | 1236.26 |
| | (1514.98) | (1010.56) |
| Debt (Binary) | -0.035*** | -0.034*** |
| | (0.003) | (0.003) |
| Controls | x | ✓ |
| Observations | 532177 | 532177 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 30042 | 29261 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.6: RD estimates of cash flows as a result of retirement including the cutoff observations. Control variables are gender, a cohort 2 dummy, household size, and a set of month dummies.

| Dependent variable | Model 1 | Model 2: |
|---|---|---|
| Net flow balance | 200.08*** | 239.14*** |
| | (22.35) | (23.09) |
| End-of-month balance | 805.61 | 1881.29 |
| | (1511.56) | (1272.59) |
| Debt (Binary) | -0.033*** | -0.034*** |
| | (0.004) | (0.004) |
| Controls | x | ✓ |
| Observations | 532177 | 532177 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 29693 | 29313 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.7: DiD estimates of cash flows as a result of retirement including the cutoff observations. Control variables are gender, age, household size, and a set of month dummies.

## A3.3 Robustness checks fuzzy donut RD model

To check the robustness of the fuzzy donut RD results, we estimate our models with different bandwidths and we estimate our model with a second-order polynomial instead of a first-order polynomial.

Table A3.8 exhibits RD estimates with varying bandwidths. As in the main results, roughly 35% of the sample complies with the statutory retirement age. We find effects close to 0 for net flow balances, only positive for the three-year bandwidth. End-of-month balance estimates likewise show no statistically significant effects, only being positive for the half-year bandwidth. Finally, debt decreases for all bandwidth sizes, with the magnitude of the decrease amplifying as the bandwidth size decreases.

| Dependent variable | Bandwidth 3 yr | Bandwidth 2.5 yr | Bandwidth 1.5 yr | Bandwidth 1 yr | Bandwidth 0.5 yr |
|---|---|---|---|---|---|
| Occupational pension (binary) | 0.378*** | 0.367*** | 0.355*** | 0.376*** | 0.380*** |
| | (0.002) | (0.002) | (0.003) | (0.004) | (0.007) |
| Net flow balance | 52.94*** | 37.49* | 31.39 | 31.07 | -74.56 |
| | (19.52) | (21.21) | (29.67) | (41.18) | (79.51) |
| End-of-month balance | 770.89 | 1007.84 | 900.22 | 565.50 | 3777.18* |
| | (1069.80) | (1007.34) | (1088.16) | (1233.61) | (1944.07) |
| In debt | -0.029*** | -0.029*** | -0.034*** | -0.036*** | -0.044*** |
| | (0.003) | (0.004) | (0.004) | (0.004) | (0.008) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 652391 | 594220 | 385560 | 252228 | 115769 |
| Individuals | 12125 | 12125 | 12125 | 12124 | 12114 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.8: Donut RD estimates with varying bandwidth sizes between 0.5 and 3 years. Control variables are gender, a cohort 2 dummy, household size, and a set of month dummies.

Table A3.9 presents RD estimates using a second-order polynomial instead of a first-order polynomial. Compliance with the statutory retirement age closely aligns to the main results. Similarly, the estimates for our dependent variables are similar to those in 3.5: Net flow balances and end-of-month balances are not affected by receiving occupational pension, whereas debt sharply decreases.

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Occupational pension (binary) | 0.360*** | 0.363*** |
| | (0.004) | (0.004) |
| Net flow balance | -18.08 | 27.05 |
| | (45.92) | (45.47) |
| End-of-month Balance | -179.56 | 650.34 |
| | (1820.32) | (1412.72) |
| In debt (binary) | -0.032*** | -0.039*** |
| | (0.005) | (0.005) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |
| First-stage F-stat | 7751 | 7877 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.9: Donut RD estimates with a second-order polynomial instead of a first-order polynomial. Control variables are gender, a cohort 2 dummy, household size, and a set of month dummies.

## A3.4 Reduced form results

Tables A3.10 and A3.11 present reduced form estimates of Tables 3.5 and 3.6, respectively. The estimates in Tables A3.10 and A3.11 are approximately a quarter of the estimates in the main results. These estimates closely match our main results when scaled by the first stage in Tables A3.15 and A3.16

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Net flow balance | -7.31 | 5.82 |
| | (8.93) | (8.94) |
| End-of-month Balance | 274.57 | 317.49 |
| | (374.64) | (370.25) |
| In debt (binary) | -0.012*** | -0.011*** |
| | (0.001) | (0.001) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.10: RD reduced form estimate on the basis of receiving statutory retirement benefits. Control variables are a cohort 2 dummy, household size, gender, and a set of month dummies.

| Dependent variable | Model 1 | Model 2 |
|---|---|---|
| Net flow balance | -5.76 | 9.16 |
| | (8.87) | (8.89) |
| End-of-month Balance | 357.74 | 502.33 |
| | (370.75) | (370.25) |
| In debt (binary) | -0.011*** | -0.012*** |
| | (0.001) | (0.001) |
| Controls | x | ✓ |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |

Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A3.11: DiD reduced form estimate on the basis of receiving statutory retirement benefits. Control variables are age, household size, gender, and a set of month dummies.

## A3.5 First stage results

Table A3.12 presents the full coefficient estimates of the first-stage models for the RD estimates and the DiD estimates, respectively. Individuals receive occupational pension benefits before the statutory retirement age at a rate of 12% per year, which decelerates to 4% per year after the statutory retirement age. Cohort 2 receives occupational pensions more often, whereas we find mixed effects for women. Larger households are less likely to receive occupational pensions, potentially due to financial constraints. Finally, individuals retire in January and September relatively often, and less often in April, May, and June.

| Dependent variable: | Occupational pension | Occupational pension |
|---|---|---|
| Model: | RD approach | DiD approach |
| State pension | 0.3567*** | 0.3498*** |
| | (0.002) | (0.002) |
| Distance SRA | 0.1206*** | |
| | (0.001) | |
| State pension * Distance SRA | -0.0799*** | |
| | (0.002) | |
| Cohort 2 | 0.0328*** | 0.0089*** |
| | (0.001) | (0.001) |
| Age minus 66 | | 0.0859*** |
| | | (0.001) |
| Female | -0.0239*** | 0.0240*** |
| | (0.001) | (0.001) |
| Household size | -0.0200*** | -0.0199*** |
| | (0.001) | (0.001) |

| | | |
|---|---|---|
| Month = 2 | -0.0015 | -0.0010 |
| | (0.003) | (0.003) |
| Month = 3 | -0.0040 | -0.0040 |
| | (0.003) | (0.003) |
| Month = 4 | -0.0047* | -0.0066** |
| | (0.003) | (0.003) |
| Month = 5 | -0.0049* | -0.0042 |
| | (0.003) | (0.003) |
| Month = 6 | -0.0056** | -0.0056** |
| | (0.003) | (0.003) |
| Month = 7 | -0.0020 | -0.0023 |
| | (0.003) | (0.003) |
| Month = 8 | -0.0009 | -0.0014 |
| | (0.003) | (0.003) |
| Month = 9 | 0.0014 | 0.0008 |
| | (0.003) | (0.003) |
| Month = 10 | -0.0002 | -0.0010 |
| | (0.003) | (0.003) |
| Month = 11 | -0.0022 | -0.0033 |
| | (0.003) | (0.003) |
| Month = 12 | -0.0032 | -0.0041 |
| | (0.003) | (0.003) |
| Constant | 0.5809*** | 0.5413*** |
| | (0.003) | (0.003) |
| Observations | 497271 | 497271 |
| Individuals | 12125 | 12125 |

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

Table A3.12: Full parameter list of the first stage estimates of the models estimated in Table 3.5 and 3.6, respectively. Reference categories are the first month of the year (January) and male. Baseline age is equal to the statutory retirement age (66 for cohort 1 and 66.33 for cohort 2).

## A3.6 Full estimation results

Tables A3.13 and A3.14 show the full estimation results of our OLS and FE models, respectively. In the OLS estimates there are minor differences on the basis of demographic characteristics. Total balance and debt respectively decrease with age. In months 5, we observe a spike in the net flow balance and total balance, and a drop in debt, these effects slowly return to 0 throughout months 6 to 8. The FE estimates reveal roughly similar, but far more precisely estimated differences than in the OLS models, revealing more small but significant monthly differences in household finance.

| Dependent variable: | Net flow balance | End-of-month balance | In debt |
|---|---|---|---|
| Occupational pension | -22.231*** | 2011.50* | -0.013*** |
| | (5.238) | (1035.08) | (0.003) |
| Female | 22.275*** | -1815.48 | -0.003 |
| | (4.048) | (1163.59) | (0.002) |
| Age minus 66 | 7.816 | 1511.45*** | -0.005*** |
| | (5.298) | (299.71) | (0.001) |
| Household size | -38.495*** | 265.28 | 0.004* |
| | (4.865) | (1020.19) | (0.002) |
| Cohort 2 | 20.884** | 318.22 | -0.011*** |
| | (10.222) | (1146.28) | (0.002) |
| Month = 2 | 67.60*** | 674.17*** | -0.002*** |
| | (13.43) | (201.19) | (0.001) |
| Month = 3 | 38.512*** | 687.68*** | -0.000 |
| | (13.59) | (246.89) | (0.001) |
| Month = 4 | 2.47 | 891.22*** | 0.001 |
| | (12.99) | (255.05) | (0.001) |
| Month = 5 | 338.51*** | 1522.04*** | -0.012*** |
| | (13.54) | (268.52) | (0.001) |
| Month = 6 | -64.77 | 831.59*** | -0.008*** |
| | (13.95) | (252.32) | (0.001) |
| Month = 7 | -181.40*** | 819.69*** | -0.003*** |
| | (13.05) | (269.66) | (0.001) |
| Month = 8 | -49.56*** | 1021.22*** | 0.000 |
| | (13.492) | (261.62) | (0.001) |
| Month = 9 | 4.29 | 905.69*** | -0.002** |
| | (12.75) | (255.84) | (0.001) |
| Month = 10 | -103.14*** | 610.74*** | 0.002*** |
| | (12.55) | (233.28) | (0.001) |
| Month = 11 | 17.40 | 437.40* | 0.001 |
| | (12.95) | (249.04) | (0.001) |
| Month = 12 | -98.91*** | -770.38*** | -0.001 |
| | (15.70) | (288.52) | (0.001) |
| Constant | 143.532*** | 30320*** | 0.044*** |
| | (14.34) | (2383) | (0.005) |
| Observations | 497,241 | 497,241 | 497,241 |
| Individuals | 12,125 | 12,125 | 12,125 |

*Clustered standard errors in parentheses*
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3.13: Full parameter list of the OLS model estimated in Table 3.4. FE models include individual-fixed effects. Reference categories are the first month of the year (January), cohort 1, and male.

| Dependent variable: | Net flow balance | End-of-month balance | In debt |
|---|---|---|---|
| Occupational pension | -9.09 | 1053.64*** | -0.006*** |
| | (9.68) | (182.91) | (0.001) |
| Female | 0.33*** | -7.46 | 0.000* |
| | (0.14) | (8.15) | (0.000) |
| Age minus 66 | 14.38*** | 1579.17*** | -0.007*** |
| | (1.94) | (121.56) | (0.000) |
| Household size | 0.10 | 47.53*** | -0.000*** |
| | (0.12) | (6.55) | (0.000) |
| Cohort 2 | 0.58** | -75.10*** | 0.000** |
| | (0.29) | (12.23) | (0.000) |
| Month = 2 | 65.75*** | 215.10*** | -0.002*** |
| | (13.35) | (68.27) | (0.001) |
| Month = 3 | -68.46*** | 6.29 | 0.000 |
| | (12.49) | (83.27) | (0.000) |
| Month = 4 | 0.92 | 235.26*** | 0.002*** |
| | (12.87) | (83.52) | (0.001) |
| Month = 5 | 335.86*** | 730.73*** | -0.012*** |
| | (13.56) | (134.37) | (0.001) |
| Month = 6 | -65.94*** | 796.14*** | -0.008*** |
| | (13.84) | (101.32) | (0.001) |
| Month = 7 | -181.22*** | 589.62*** | -0.003*** |
| | (13.02) | (109.93) | (0.001) |
| Month = 8 | -50.50*** | 542.99*** | 0.001 |
| | (13.38) | (102.18) | (0.001) |
| Month = 9 | 3.53 | 573.79*** | -0.001* |
| | (12.70) | (95.74) | (0.001) |
| Month = 10 | -104.67*** | 275.18** | 0.002*** |
| | (12.51) | (109.44) | (0.001) |
| Month = 11 | 16.00 | 347.06*** | 0.001** |
| | (12.51) | (102.72) | (0.001) |
| Month = 12 | -97.35*** | -148.77* | -0.001 |
| | (15.61) | (84.76) | (0.001) |
| Constant | 17.70* | -1173.32*** | 0.006*** |
| | (9.68) | (145.56) | (0.001) |
| Observations | 497,241 | 497,241 | 497,241 |
| Individuals | 12,125 | 12,125 | 12,125 |

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

Table A3.14: Full parameter list of the FE model estimated in Table 3.4. Reference categories are the first month of the year (January), cohort 1, and male.

Tables A3.15 and A3.16 present the estimates shown in Table 3.5 and 3.6. In addition to the results shown in the main chapter, several differences are present. Net flow balance and end-of-month balance spike in month 5, likely due to workers getting their vacation payout. In month 12, flow balance and end-of-month balance decrease, likely due to expenses related to end-of-year holidays. and end-of-year payout in these months, respectively.

| Dependent variable: | Net flow balance | End-of-month balance | In debt |
|---|---|---|---|
| Distance SRA | -9.40 | 718.04** | -0.001 |
| | (7.22) | (278.83) | (0.001) |
| State pension * Distance SRA | 40.22*** | 2224.53*** | -0.000 |
| | (7.98) | (406.90) | (0.001) |
| Occupational pension | 16.33 | 890.13 | -0.031*** |
| | (25.07) | (1037.97) | (0.003) |
| Female | -23.17*** | -1786.96 | -0.003*** |
| | (4.97) | (1161.06) | (0.001) |
| Household size | -37.68*** | 244.58 | 0.004*** |
| | (4.13) | (1025.91) | (0.000) |
| Cohort 2 | 14.18*** | 985.93 | -0.012*** |
| | (5.08) | (1136.08) | (0.001) |
| Month = 2 | 68.21*** | 683.54*** | -0.002** |
| | (13.43) | (202.43) | (0.001) |
| Month = 3 | -65.77*** | 676.45*** | 0.000 |
| | (12.56) | (246.42) | (0.001) |
| Month = 4 | 2.66 | 822.86*** | 0.001 |
| | (12.99) | (248.16) | (0.001) |
| Month = 5 | 339.80*** | 1528.57*** | -0.013*** |
| | (13.56) | (268.82) | (0.001) |
| Month = 6 | -63.90*** | 818.55*** | -0.009*** |
| | (13.95) | (248.76) | (0.001) |
| Month = 7 | -181.06*** | 802.69*** | -0.004*** |
| | (13.05) | (268.96) | (0.001) |
| Month = 8 | -49.53*** | 1002.80*** | -0.001 |
| | (13.39) | (261.89) | (0.001) |
| Month = 9 | 4.00 | 889.28*** | -0.002** |
| | (12.75) | (255.14) | (0.001) |
| Month = 10 | -103.59*** | 589.42** | 0.002* |
| | (12.55) | (233.38) | (0.001) |
| Month = 11 | 16.78 | 406.88 | 0.001 |
| | (12.95) | (248.24) | (0.001) |
| Month = 12 | -99.38*** | -797.68*** | -0.001 |
| | (15.70) | (287.05) | (0.001) |
| Constant | 93.84*** | 29930*** | 0.058*** |
| | (24.25) | (2518.08) | (0.003) |
| Observations | 497271 | 497271 | 497271 |
| Individuals | 12125 | 12125 | 12125 |

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

Table A3.15: Full parameter list of the models estimated in Table 3.5. Reference categories are the first month of the year (January) and male. Baseline age equals 66 for cohort 1, and 66.33 for cohort 2.

| Dependent variable: | Net flow balance | End-of-month balance | In debt |
|---|---|---|---|
| Occupational pension | 26.20 | 1436.00 | -0.031*** |
| | (25.430) | (1053.85) | (0.004) |
| Cohort 2 | 9.19* | 301.81 | -0.011*** |
| | (5.01) | (1139.03) | (0.002) |
| Age minus 66 | 7.23 | 1637.63*** | -0.001 |
| | (5.88) | (236.39) | (0.001) |
| Female | -23.43*** | -1801.68 | -0.003 |
| | (4.98) | (1161.20) | (0.002) |
| Household size | -37.51*** | 253.57 | 0.004** |
| | (4.14) | (1025.89 | (0.002) |
| Month = 2 | 67.96*** | 669.87*** | -0.002* |
| | (13.43) | (201.97) | (0.001) |
| Month = 3 | -65.74*** | 678.00*** | -0.001 |
| | (12.56) | (246.53) | (0.001) |
| Month = 4 | 3.64 | 877.24*** | 0.001 |
| | (13.00) | (249.57) | (0.001) |
| Month = 5 | 339.47*** | 1510.56*** | -0.013*** |
| | (13.56) | (268.34) | (0.001) |
| Month = 6 | -63.86*** | 820.68*** | -0.009*** |
| | (25.43) | (248.72) | (0.001) |
| Month = 7 | -180.37** | 813.35*** | -0.004*** |
| | (13.06) | (269.31) | (0.001) |
| Month = 8 | -49.26*** | 1017.66*** | -0.000 |
| | (13.39) | (262.58) | (0.001) |
| Month = 9 | 4.29 | 905.63*** | -0.002 |
| | (12.75) | (255.85) | (0.001) |
| Month = 10 | -103.20*** | 611.40*** | 0.002* |
| | (12.55) | (233.26) | (0.001) |
| Month = 11 | 17.34 | 438.09* | 0.001 |
| | (25.43) | (248.93) | (0.001) |
| Month = 12 | -98.90*** | -770.52*** | 0.001 |
| | (15.70) | (288.55) | (0.001) |
| Constant | 108.45*** | 30740*** | 0.058*** |
| | (23.57) | (2513.49) | (0.003) |
| Observations | 497271 | 497271 | 497271 |
| Individuals | 12125 | 12125 | 12125 |

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

Table A3.16: Full parameter list of the models estimated in Table 3.6. Reference categories are the first month of the year (January) and male. Baseline age equals 66.

## A3.7 Means of dependent variables by subgroup

Table A3.17 presents the means of the dependent variables utilized in 3.7 and 3.8 for each subgroup. On average, net flow balances and end-of-month balances are positive for every subgroup, but they are higher for men, single-adult households, individuals who do not receive UI/DI benefits, white-collar individuals, and individuals with high inflows and wealth prior to retirement. Conversely, debt follows the opposite pattern.

| Mean for: | Men | Women | Single-adult | Multi-adult | UI/DI | No UI/DI |
|---|---|---|---|---|---|---|
| Net flow balance | 51.10 | 32.91 | 81.77 | 23.85 | 18.35 | 48.42 |
| End-of-month Balance | 33017.07 | 31209.03 | 31445.69 | 32479.22 | 23673.31 | 34084.44 |
| In debt (binary) | 0.035 | 0.031 | 0.037 | 0.032 | 0.053 | 0.029 |

| Mean for: | White-collar | Blue-collar | High-inflow | Low-inflow | High-wealth | Low-wealth |
|---|---|---|---|---|---|---|
| Net flow balance | 46.73 | 33.74 | 58.58 | 27.04 | 64.35 | 21.28 |
| End-of-month Balance | 34699.49 | 20590.07 | 43693.14 | 18262.30 | 57154.13 | 7133.48 |
| In debt (binary) | 0.030 | 0.041 | 0.023 | 0.044 | 0.001 | 0.066 |

Table A3.17: Means of dependent variables by subgroup.

## A3.8 Cash flows and balances for UI/DI recipients

Figures A3.2 and A3.3 illustrate occupational pension recipiency on the basis of age, occupational pension inflow on the basis of distance from the statutory retirement age, and outcome measures on the basis of distance from the statutory retirement age and occupational pension recipiency, respectively. Pension recipiency is slightly higher prior to reaching the statutory retirement age, and the jump incurred by the statutory retirement age is larger than for the main sample. Occupational pension flows are lower than for the rest of the sample. Flow balances and total balances are higher for UI/DI recipients than for the rest of the sample. Finally, debt is higher among UI/DI recipients than for the rest of the sample.

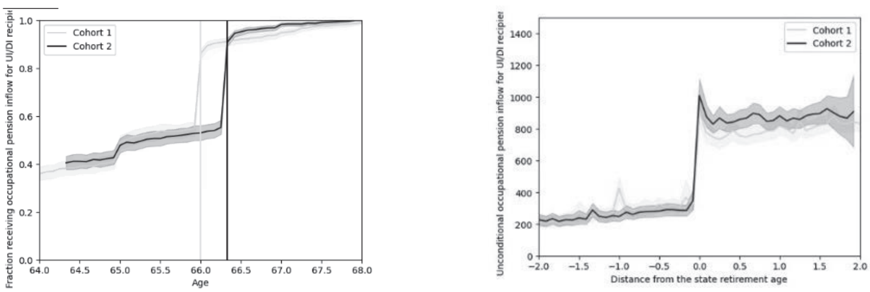


Figure A3.2: Pension recipiency and unconditional pension inflow for UI/DI recipients.

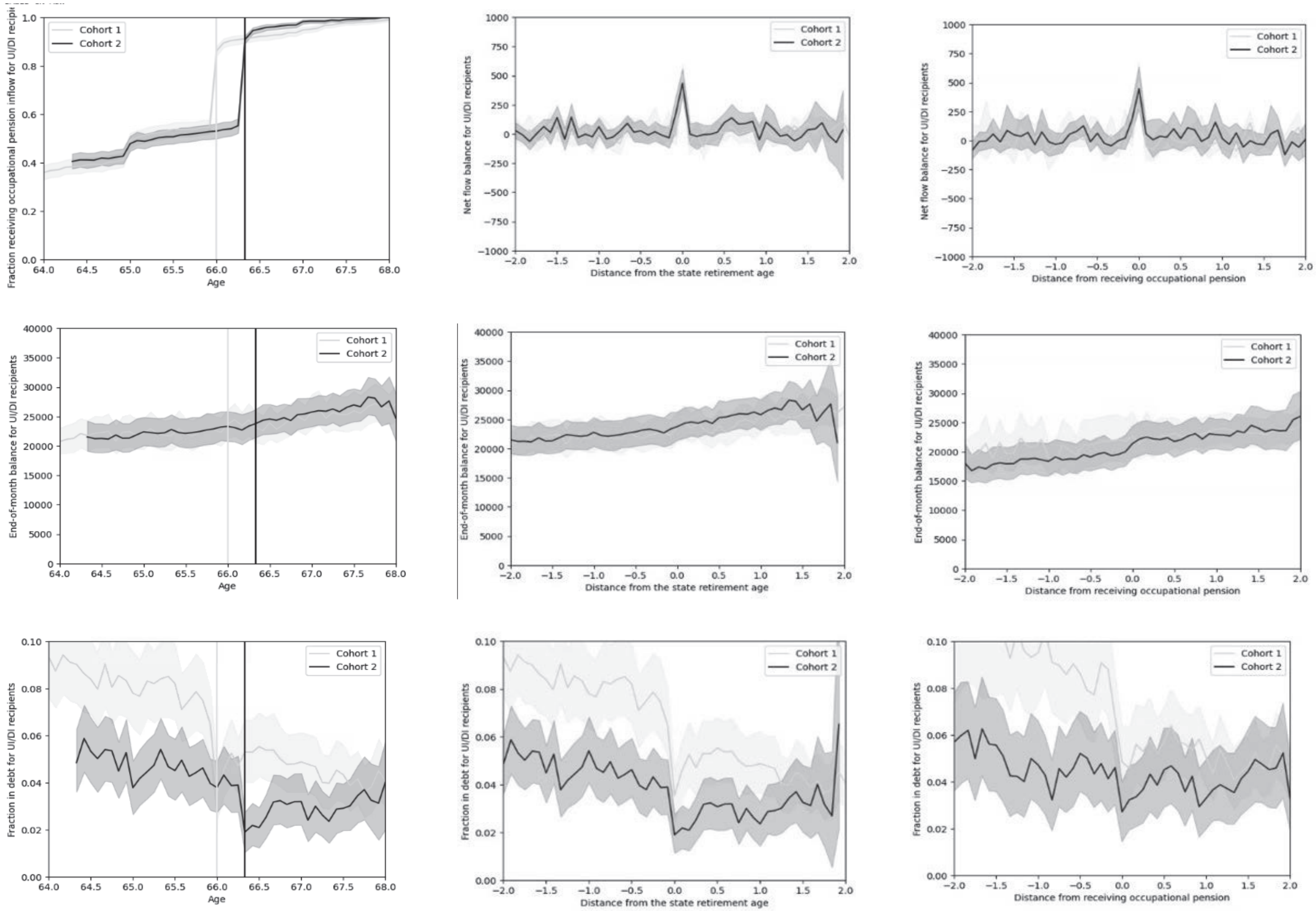


Figure A3.3: Outcome measures on the basis of age, distance from the statutory retirement age, and distance from occupational pension for UI/DI recipients.