The Effect of Savings Commitments on Asset, Debt, and Retirement Decisions: Evidence from Mortgage Run-offs in Danish Registry Data

Steffen Andersen
Copenhagen Business School

Philippe d'Astous
HEC Montréal

Jimmy Martínez-Correa
Copenhagen Business School

Stephen H. Shore
Georgia State University

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Abstract

This paper examines the impact of mortgage run-offs – i.e., when the term of a mortgage comes to an end and monthly payments cease – on labor income and asset accumulation. Mortgage run-offs predictably relax a saving constraint for borrowers who chose mortgage contracts that committed them to effectively save by paying down mortgage principal. We examine registry data on the universe of all Danish individuals whose mortgages were on track to run off between 1995 and 2013. These data include year-end information on labor income and the level of nearly all assets and liabilities. We find that on average, borrowers use 21 percent of the resources previously devoted to mortgage payments to decrease labor income, and use 31 percent to pay down other debts. The labor supply response is limited to those without substantial assets or debts prior to the run-off, while the debt reduction response is limited to (and one-for-one among) those without substantial assets but with other debt prior to the run-off. We find no statistically significant results for asset accumulation in bank deposits, stocks, or bonds.

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1. Introduction

We use mortgage runoffs in Danish registry data to understand the impact of relaxing a saving constraint on leisure, consumption, saving, and investment decisions.

Compulsory saving schemes force many households to save more and spend less than they would otherwise choose. While employer and government pension programs are examples of such compulsory saving, most mortgages also impose a form of saving commitment. Mortgage borrowers effectively save by making principal payments to reduce their mortgage debt, and borrowers typically choose mortgage contracts that commit them to a predetermined schedule of such payments.

Mortgage run-offs provide an ideal natural experiment to identify the consequences of relaxing a saving constraint. Mortgages run off when borrowers complete their schedule of payments and bring their mortgages balance to zero without prepayment. After a run-off, borrowers are no longer forced to save by paying down their mortgages; they can allocate freed-up resources to saving elsewhere, spending more, or working less. Because unconstrained borrowers can offset saving commitments by borrowing or saving less elsewhere, savings commitments should only affect those for whom the mortgage contract constrains saving and consumption decisions.

The consumption and investment response to a mortgage run-off can be seen as a test of a theoretically interesting variant of Permanent Income Hypothesis, PIH henceforth (Modigliani and Brumberg, 1954; Friedman, 1957). The traditional PIH implies that unconstrained, rational, forward-looking, risk-averse individuals should not change their consumption in response to a predictable change in income. Individuals who anticipate that their income will increase in the future should draw down savings to increase consumption today, so that consumption will not increase when income does. A mortgage run-off has the same consumption-smoothing prediction: rational, unconstrained borrowers should not change consumption after the run-off. However, in the case of the run-off, this smoothing is achieved by substituting saving through mortgage principal payments for another form of savings. Since no action is required in advance, borrowers' response to the run-off – unlike their response to an income change in traditional PIH tests – should not depend on whether or not they anticipate it. While the traditional PIH is a joint test of whether individuals correctly anticipate an event and whether they smooth consumption around that event as theory would predict, our consumption-smoothing hypothesis for unconstrained borrowers does not make assumptions about the degree to which the run-off is anticipated.

There have been countless empirical tests of the PIH[1] and the failure of the PIH is often attributed to a liquidity constraint which prevents individuals from borrowing to smooth consumption (Deaton, 1991; Carroll, 1997). Therefore, in general the effect of a mortgage run-off

[1] Agarwal, Liu, and Souleles (2007), Agarwal and Qian (2014), Souleles (1999), Johnson, Parker, and Souleles (2006), and Hsieh (2003) are examples of papers that look at the consumption response to changes to income or cash on hand. Jappelli and Pistaferri (2010) survey theoretical results on the consumption response to income shocks, and Attanasio and Weber (2010) and Fuchs-Schuendeln and Hassan (2015) survey empirical results.

on consumption (in the form of goods or leisure), asset accumulation and other debt repayment should also vary with the financial position of the borrower. On one hand, the mortgage repayment schedule does not impose a constraint on the saving rate or consumption of individuals that choose to save elsewhere while paying down their mortgage. These individuals could save less elsewhere to offset the saving commitment imposed by the mortgage and they could always liquidate some of their savings to finance consumption if they wanted to increase it. On the other hand, individuals who do not wish to save as much as the mortgage contract requires must choose to either consume less or borrow elsewhere at higher rates. Individuals who chose to consume less in response to the mortgage's saving commitment would be expected to spend some of the resources freed up by the run-off, either on leisure (working less) or consumption. Individuals that had financed consumption using other debt prior to the run-off would be expected to use resources freed up by the run-off to pay down other debt one-for-one after the run-off; these individuals would not be expected to adjust consumption.

This paper investigates these predictions empirically by examining the evolution of the labor supply and of the main components of households' balance sheet in Denmark in the years before and after mortgage run-offs. The data used in our analysis include year-end information on the level of nearly all assets and liabilities – including those in bank accounts, investments, credit cards, mortgages, and homes – as well as employment status, pension contributions and payouts, and labor income. This allows us to examine many margins of adjustments in response to relaxing such constraints.

We test the hypothesis that borrowers reduce their labor supply and increase their savings (or reduce debt) after the run-off. We find that the liquidity freed up from mortgage payments ceasing leads to two observable adjustments. First, we confirm that just after run-offs borrowers reduce their labor supply – either by working less or retiring outright: our point estimates suggest that individuals reduce labor income by 21 percent of the amount previously devoted to mortgage payments. Second, we find a faster repayment of other debts after the mortgage is repaid: individuals devote 31 percent of this amount to reducing other debt. However, because most Danes save less in taxable or investments accounts relative to other countries, we find no statistically significant evidence of asset accumulation in bank deposits, stocks, or bonds. Danes are already subjected to compulsory savings scheme which means that most of them are already at a "corner solution" in terms of savings.

Our results differ across sub-samples in ways that line up our intuition about how individuals in various financial positions should respond to a run-off. We find no statistically significant results among borrowers with pre-run-off assets, as these borrowers are few in number and swings in their other assets add noise that swamps our results. For borrowers without pre-run-off assets or other debt – for whom we would expect the savings constraint imposed by the mortgage to bind – labor income falls by 32 percent of freed up liquidity after the run-off. Borrowers had presumably been constrained to consume less leisure (and presumably fewer goods and services, though we cannot measure this directly) than they would have preferred prior to the run-off, and the run-off relaxed this constraint and increased leisure consumption. For these borrowers, we find no statistically significant change in other debts or assets. For borrowers without pre-runoff assets but with pre-run-off other debt, there is no evidence of a reduction in labor income. While leisure consumption does not fall after the run-off for these borrowers, borrowers with other debt devote nearly all (94 percent) of the resources previously devoted to mortgage payments to paying down these other debts.

While the institutional setting of mortgage run-off on fixed rate mortgages will be familiar to U.S. readers, the data environment is much richer than is possible in the U.S. We use registry data from the Danish government covering all Danes' mortgages. We do not observe the mortgage terms explicitly, so we identify mortgage run-off as a mortgage with a balance that falls steadily to zero; given the cost of prepayment, this will not reflect an individual consistently making larger-than-required payments each month.[2] Nearly all mortgages that have run off in recent years were standard, 20- or 30-year fixed rate mortgages with 240 or 360 monthly payments of equal size. These mortgages differ from their counterparts in the U.S.A. in that they typically come with a prepayment penalty and are not discharged in foreclosure; these features imply that it is almost never optimal for borrowers to default or prepay in the years leading up to mortgage run-off when the mortgage balance is relatively low. Although more flexible mortgages have been available in Denmark in recent years, such mortgages are a decade or more from run-off.

The run-offs we consider here inherit the appealing econometric features of a regression discontinuity design (RDD) or regression kink design (RKD) (Lee and Lemieux, 2010). The run-off leads to a discontinuity in the cash flow to individuals around the time of run-off, which should place a kink in the profile of wealth levels. The timing of this discontinuity is determined 20 or 30 years before when the mortgage is originated. To overcome the problem that prepayment could create a selection problem, we look at mortgages whose balances appear on track to run off at time t0 based on changes in balances in years t0-6 to t0-3. We then examine the evolution of wealth from years t0-3 to t0+3. This *intent-to-treat* approach (Imbens and Rudin, 2015) looks at mortgages on the glide path to run off, whether they actually run off or not. This allows us to observe households who take out a new mortgage just when their old mortgage is running out so that their total mortgage balance never falls to zero.

This is not the first paper to consider runoffs. Coulibaly and Li (2006) and Stephens (2008) examine the run off of mortgages and auto loans, respectively, using data from the Consumer Expenditure Survey (CEX). While our final sample includes 24,584 run-offs, the small size of the CEX limits the number of run offs in these papers to 286 and about 200[3], respectively. While our data include exact wealth holdings collected by the government for use collecting taxes, the CEX relies on individuals' self-reported wealth holdings. d'Astous (2016) considers the run off of a consumer term loan using administrative data from a North American financial institution. Similarly, Scholnick (2013) examines mortgage run-offs using data from a Canadian financial institution on credit cards and mortgages. In these cases, data are limited to information on one or two credit products offered by one financial institution; there is no way to observe substitution into other assets.

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[2] In our data, we do not observe the mortgage balance. Rather, we observe the value of the component of the mortgage backed security attributable to that mortgage. This value represents the mortgage balance, adjusted for the gap between the interest rate on the mortgage and the current market interest rate for mortgages with that maturity. We have data on mortgage-backed security prices to infer the mortgage balances from these data. These calculations can be made more precise using data on the annual mortgage interest paid.

[3] About 4% of an original sample of 5,000 according to Table 1 presented in the paper.

2. Theoretical Framework

Mortgages can be seen as saving commitments that tie a considerable portion of households' disposable income to savings in the form of mortgage payments. If we think of a mortgage as a negative bond – as a bond that a homeowner sells to investors – then paying down mortgage principal reduces the holding of this negative bond. The mortgage repayment schedule therefore imposes to borrowers a saving commitment in this bond-like asset.

We use this setting to make predictions about how a rational, forward-looking, risk-averse individual would respond when a saving commitment is relaxed in a *predictable* manner. Our theoretical framework borrows from elements of the literature on the Permanent Income Hypothesis, PIH henceforth (Modigliani and Brumberg, 1954; Friedman, 1957), and of the literature on liquidity, saving, and borrowing constraints (e.g, Zeldes, 1984; Carroll, 2001; Dau-Schmidt, 1997; Epper, 2016; Meier and Sprenger, 2010; Holden Shiferaw, and Wik, 1998; Pender, 1996).

There is an important distinction between our setting and usual tests of the PIH. The standard PIH predicts that unconstrained individuals should adjust consumption and saving prior to predictable changes in resource flows in order to smooth consumption. Because future resource flows (such as changes in income) might not always be fully anticipated by individuals, the PIH is a *joint* hypothesis that an individual rationally anticipates the change *and* adjusts consumption correctly given that anticipation. By contrast, we consider a predictable change in a saving requirement (the mortgage run-off), not in resource flows. In this context, unconstrained individuals should not adjust consumption in response to this change but instead are predicted to substitute one form of saving (paying down a mortgage) for another (paying down other debt or saving more) once the saving constraint is relaxed. This substitution from one form of saving to another would be predicted by standard economic models whether or not the change was anticipated.

For rationally anticipated income changes, the failure of the PIH is often attributed to a liquidity constraint which prevents individuals from borrowing to smooth consumption (Deaton, 1991; Carroll, 1997). Similarly, the response of consumers to relaxing a saving constraint should also depend on one's financial position. Consumers who were saving elsewhere in the years leading to the mortgage run-off are not constrained as they could have chosen to save less elsewhere in order to increase consumption. For such individuals, a PIH-type of model would predict that saving will increase in other accounts one-for-one with the reduced mortgage payments once it runs out. Consumers who were constrained by the saving rate imposed by their mortgage can choose to borrow to fund consumption or not. For individuals who chose not to increase consumption early, we would predict that relaxing a saving constraint would lead to an increase in consumption (or an increase in leisure). For constrained consumers who had chosen to finance consumption through other debt prior to the mortgage run-off, we would predict that they would use the freed-up liquidity from mortgage payments to pay down their other accumulated debts.

[INSERT TABLE 1 ABOUT HERE]

Table 1 summarizes how individuals are predicted to behave in response to a change in income or in saving commitments. The first row of this table shows the prediction when an individual's resource flow (e.g., income) changes. The second row shows the predictions when a saving commitment is removed and the individual has no borrowing constraints. Finally, the third row shows the predictions when a saving commitment is removed and the individual has borrowing constraints. Importantly, for both anticipated and unanticipated changes in saving commitments, unconstrained individuals are predicted not to change consumption. Conversely, constrained individuals are predicted to increase consumption in response to the removal of a saving commitment whether they anticipated it or not.

Mortgage run-offs are such predictable and important landmarks in people's life cycle that most individuals should be able to correctly anticipate them and time their economic choice according to the mortgage run-off date. However, our approach has the strength that our predictions of the effects of mortgage run-off on behavior do not depend on whether individuals are able or not to anticipate that the mortgage run-off is coming to an end.

We use a saving commitment (mortgage run-off) to get around this non-trivial issue of anticipation of the changes in income. Previous studies have focused on highly predictable income changes such as UI exhaustion (e.g. Ganong and Noel, 2016) or tax rebates (e.g. Agarwal et al., 2007) to study theories of consumption. These studies are effectively making a joint test of anticipation ability and rational behavior. It is interesting in its own right to study and tease apart these two. However, since our predictions are independent of whether the individual is able or not to anticipate the change, we are making a barebones test of rationality of what people do when they don't have to commit part of their income to pay for their mortgage. Even inattentive individuals that do not realize that their mortgage is coming to an end should respond according to our predictions. Therefore, our rationality test focuses on consumption, saving and borrowing choices and does not require perfect foresight and anticipation of the discontinuous change in freed up resources that other papers study.

3. Data and Research Design

3.1 Danish Registry Data

Our dataset covers the universe of adult Danes in the period between 1986 and 2013, and contains demographic and economic information. We derive data from three different administrative registers made available through Statistics Denmark.

We obtain demographic information from the official Danish Civil Registration System (*CPR Registeret*). These records include the individual's personal identification number (CPR), as well as their gender; date of birth; and the individual's marital history (number of marriages, divorces, and history of spousal bereavement). The CPR number is unique for each individual in the population, and this number is used as the unique individual identification number across all administrative datasets. The administrative record also contains a unique household identification number, as well as CPR numbers of each individual's spouse and any children in the household. We use these data to obtain basic demographical information about each individual.

The sample contains the entire Danish population and provides a unique identifying number across individuals, households, and time.

We obtain income, wealth information and outstanding mortgages from the official records at the Danish Tax Authority (SKAT). This dataset contains total and disaggregated income and wealth information by CPR numbers for the entire Danish population. SKAT receives this information directly from the relevant third-party sources, because employers supply statements of wages paid to their employees, and all financial institutions supply information to SKAT on their customers' deposits, interest paid (or received), security investments, and dividends. Because taxation in Denmark mainly occurs at the source level, the income and wealth information are highly reliable. For our purpose here, the records include the total outstanding mortgages at the end of the year, as well as the total interest payments paid on the mortgage within the year. Though SKAT information is extensive, not all components of wealth are recorded by SKAT. The Danish Tax Authority does not have information about individuals' holdings of unbanked cash, the value of their cars, their private debt (i.e., debt to private individuals), pension savings, private businesses, or other informal wealth holdings. Finally, we obtain the level of education from the Danish Ministry of Education Undervisningsministeriet). This register identifies the highest level of education and the resulting professional qualifications. On this basis we calculate the number of years of schooling.

3.2 Methodology

We have identified an economically interesting discontinuity in Danish registry data. Mortgage run-offs remove a savings constraint; a borrowers' cash available jumps discontinuously when the mortgage runs off at a pre-specified time (Coulibaly and Li, 2006; Scholnick, 2013). We can exploit the appealing econometric features of a regression discontinuity design (RDD) or regression kink design (RKD) (Lee and Lemieux, 2010) to analyze such setting. This technique was originally used by Thistlethwaite and Campbell (1960) to study the impact of merit awards on future academic outcomes, and has been recently applied to Norwegian register data by Kirkeboen et al. (2016) to study the impact of type and quality of education on income later in life. These methodologies rely on the assumption that individuals are unable to precisely manipulate their position around the discontinuity and effectively replicate a randomized experiment in which individuals would be randomly assigned to the treatment. In our case, because borrowers have committed to their mortgage repayment schedule many years ago, the actual date of their final payment can be considered quasi-exogenous to their financial condition in the years surrounding the run-off, justifying the use of such methods. As a practical matter, our annual data make high frequency analysis before and after the run-off difficult, since the run-off event can happen at any time of the year. Instead, our primary analysis focuses on a comparison of economic outcomes in the years before versus after the run-off.

However, because the mortgage could be refinanced (or prepaid, although at a substantial cost), unobservable variables could correlate with the decision to *refinance* the mortgage and with other outcomes studied in the analysis. For this reason, the main analysis uses the *anticipated* date of final payment — predicted three years before its realization — as the event relaxing the saving commitment. In this intention-to-treat (ITT) approach (e.g. Imbens and Rudin, 2015), random assignment into the treatment is assumed to hold for the predicted final payment date, not its actual realization. This mitigates concerns about unobservable variables correlating with the final payment and subsequent behavior, while still capturing a discontinuous change in annual required mortgage payments.

3.3 Sample Construction

We do not have the terms of the mortgage other than the balance at the end of the calendar year and the amount of interest paid during the calendar year. In any given year, we predict whether individuals are on track to repay their mortgage in exactly three years based on their mortgage balance changes over the past three years. Three years prior to the final mortgage payment, the payments made in the last three years should be close to the current mortgage balance (i.e., what is left to be paid over the next three years should be close to what has been paid over the past three years). Therefore, we look for individuals for whom the sum of the three past yearly mortgage balance changes, divided by this current end-of-year mortgage balance is about 1 (we allow this ratio to be between 0.8 and 1.2). To ensure that these individuals are decreasing their balance at a roughly constant rate, we require that the ratio of mortgage decreases in two consecutive years over this period $\left(\text{i.e. } \frac{change\ in\ mortgag\ balance\ from\ t{-}2\ to\ t{-}1}{change\ in\ mortgag\ balance\ from\ t{-}1\ to\ t}\right)$ be about 1 (we allow this ratio to be between 0.75 and 1.33). Finally we impose that each of the three past balance changes are negative (so these individuals are actually decreasing their balance).

This baseline selection into the glidepath to mortgage paydown selects individuals three years before they are predicted to repay their mortgage. We can put more structure on the evolution of the mortgage balance in the three years prior to the predicted final payment, which we call compliance. For each of the three years before the anticipated final mortgage payment, we can impose that individuals keep decreasing their balance at a roughly constant rate (using the same criterion for the ratio of mortgage decreases in two consecutive years but this time over the three year period just before the anticipated final payment). We gradually increase the compliance requirement on individuals by requiring that they are decreasing their balance at t0-2, t0-1 and t0. Finally, we also look at individuals that comply with all these requirements and for who the mortgage balance is actually 0 as predicted at t0. We do these extensions to the baseline selection into the glidepath in our robustness exercises.

The sample selection starts with the universe of Danes between the age of 18 and 100 years old. We identity 76,984 individuals in the population for which the anticipated final payment year is between 2001 and 2010. Therefore, we analyze individuals' behavior in years ranging from 1998 to 2013 (three years prior and after the final payment year). We further employ the following restrictions to our sample: [4] (i) We focus on individuals who receive labor income and rule out 17,019 individuals that get income from a private company (22.11% of our initial sample). [5] (ii) As we analyze different types of wealth we omit individuals with changes in

[4] In section 5 we examine how robust our results are to the selection of sample when we relax some of these restrictions.

[5] We exclude self-employed individuals because they can use their companies as a saving mechanism in the sense that they can decide to take out or not earnings from the companies for tax reasons. This is in effect an important saving mechanism that could be affected by mortgage run-offs and that it is not easily observable, if not impossible in some cases, in the Danish registers.

wealth from year to year or with size of assets that are unusually high; [6] this rules out 980 individuals (1.27% of our initial sample). (iii) As we are interested in mortgages that are economically significant for households we only consider individuals for which the ratio of their mortgage payments to working income is higher than 10%. This rules out 43,642 individuals (56.69% of our initial sample). Finally, we omit 70 individuals that have missing observations for their working status. After imposing all these restrictions, our final sample consists of 24,584 individuals with a well-defined anticipated final mortgage payment of an economically significant size.

3.4 Identification Strategy

We analyze individual responses using an event-study methodology.

First, because borrowers finish repaying their mortgages in different years, the variation in the timing of the final mortgage payment across individuals averages out seasonal effects. Second, to measure the response as a fraction of the amount of mortgage payment reduction, we use the variation in the size mortgage payment. Specifically we estimate a baseline equation of the form

$$Y_{i,t} = \beta_1 After_{i,t} \times Payment_i + \beta_2 After_{i,t} + \lambda_t + \alpha_i + \varepsilon_{i,t},$$

where $Y_{i,t}$ is either labor income or year-to-year changes in financial assets, all measured in thousands of DKK. $Payment_i$ is the annual mortgage payment (in thousands of DKK) calculated as the value of the mortgage three years prior to the anticipated final payment divided by three and its average value is reported in Table 1. The dummy variable *After* is equal to 1 if the year is one, two, or three years after the anticipated final payment and 0 if it is one, two, or three years before. We omit the year in which the payment is anticipated to end to circumvent the fact that different mortgages run out at different times in the year and therefore individuals benefit from different levels of increased liquidity within that year. The interaction term $After_{i,t} \times Payment_i$ therefore captures how the outcome variable varies in proportion of the mortgage payments once the mortgage runs off. An individual-level dummy variable (α_i) which absorbs all time-invariant effects at the individual level and a year dummies (λ_t) that absorb year effects are included in all specifications unless otherwise specified.

We present our results in two ways. First, we measure the effect on monetary terms for the typical mortgage payment by calculating $\beta_1 \times \overline{Payment} + \beta_2$ with the estimated coefficients, and where $\overline{Payment}$ is the mean mortgage payment before the run-off. Second, we measure the effect as a proportion of $Payment_i$ by looking at the β_1 coefficient.

To be unbiased, our specification above requires that the location of the discontinuity to be uncorrelated with errors. In our case, a comparison of pre- and post-run-off behavior will only reveal the true effect of relaxing the saving constraint if the exact timing of the run-off is exogenous. Given that the exact run-off date had been chosen many years in the past -- typically

[6] We rule out individuals with year-to-year changes in net financial wealth (defined as the sum of stocks, bonds, and bank deposits, net of non-housing debt) that are larger 1M DKK in absolute value. We additionally rule out individuals with housing wealth larger than 10M DKK.

among a set of round-numbered options -- this assumption appears quite benign. If we were to accept this assumption, we would need only to compare pre- and post-run-off behavior. However, our preferred specification addresses concerns about the endogenous timing of run-offs by comparing the pre- and post-run-off patterns of those with large and small mortgages. We examine how economic outcomes change post-run-off as mortgage payment size -- and with it, the amount of wealth freed up by the run-off -- gets bigger.

4. Results

4.1 Compliance with the predicted runoff

Figure 1 (a) shows in the y-axis statistics for the end-of-year mortgage value normalized by its value three years prior to the anticipated final payment. The x-axis shows the time before, at and after run-off where the year of predicted run-off is normalized at zero. The balance decreases steadily in our sample selection period (t0-6 to t0-3) by definition, and keeps on decreasing although the fact that some individuals are taking up new mortgages pushes the average up. Nevertheless, the boxplot shows that at the median that the mortgage balance is equal to zero at the year of run-off (year=0).

Figure 1 (b) shows the proportion of individuals for whom the total value of their mortgage is zero. There is a clear discontinuity in the year of the anticipated final payment and three years after about 70% of individuals have no outstanding mortgage.

[INSERT FIGURE 1 ABOUT HERE]

4.2 Descriptive Statistics

Table 2 presents descriptive statistics for the sample used in the analysis. All variables are recorded at the end of the calendar year and are measured three years prior to the year in which the mortgage is paid off. All monetary amounts are expressed in Danish kroner (DKK).[7] Panel A. shows that our sample consists of individuals who are on average 56 years old, approximately 63% of which are male, with about 2 adults in the household and out of which71% are married, 7% are divorced and 38% are retired. Panel B. shows that the average annual labor income is about 231,000 Danish kroner (DKK). Pension income (payouts from pension retirement funds) is on average 46,000 DKK a year, (although people that have not retired have zero pension payouts). The total contributions to pensions is on average about 22,000 DKK a year. Panel C shows the financial assets and liabilities (beyond mortgages). Individuals in our sample keep on average 91,000 DKK in liquid bank deposits, 34,000 DKK in stocks, 47,000 DKK in bonds and 30,000 DKK in loans. Panel D shows that housing assets are on average 926,000DKK, with a mortgage value of about 116,000DKK and mortgage payments of about 39,000DKK a year. These payments represent on average about 37% of the individual's labor income.

[INSERT TABLE 2 ABOUT HERE]

[7] The exchange rate between DKK and U.S. dollar was 14.94% at the beginning of our sample in 1998, averaged 16.27% over the sample and was 17.81% at the end of our sample in 2013.

4.3 Main Results

Table 3 presents our baseline results including all 24,584 run-off events. The table shows the results of OLS regressions which control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The sample used is based on the mortgage run-off as predicted three years before the mortgage is paid off. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. *After* is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. *Payment* is a variable equal to the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. Standard errors clustered at the individual level are presented in parentheses.

[INSERT TABLE 3 ABOUT HERE]

We find that on average individuals adjust only two of the margins we study: labor income and other bank loans. The estimated coefficients on *After* x *Payment* indicate that on average people work less (i.e., consume more leisure) in an amount equivalent to 21% of the freed up liquidity after the run-off. This amounts to approx. 8,100 DKK or 3.5% of the average income three years prior to the run-off. Alternatively, by considering the fact that the coefficient on *After* is positive, we find that this amounts to a reduction of about 4,400 DKK in average income.[8] Additionally, individuals use 31% of the freed up liquidity (aprox. 12,000 DKK) to pay down bank loans after the run-off, or, calculated at the average mortgage payment in the sample, a reduction of 2,500 DKK of other bank loans, although this last amount is not statistically significant.[9]

Because theory suggests individuals with different assets and debt should respond differently to a relaxation of the saving constraint, we divide our sample into four groups depending on people's financial position in the years prior to the run-off: a) people with no financial assets (i.e., no stock nor bond holdings) and no bank loan debt; b) people with no financial assets but with bank loan debt; c) people with financial assets (i.e., some stock or some bond holdings) and no bank loan debt; and d) people with financial assets and bank loan debt. Table 4 shows the same analysis as Table 3 but for each of these four groups.

[INSERT TABLE 4 ABOUT HERE]

The reduction in labor supply found in the average results is exclusively driven by individuals who had no assets and no other debt at the moment of the run-off. Such individuals use 32% of the freed up liquidity to decrease their labor income, which amounts to 11,560 DKK or 7.4% of the average income of this group (i.e. 155,800 DKK). Calculated at the average value of mortgage payment in the sample, this amounts to a reduction of 4,800 DKK in average labor

[8] That is, at the average sample value of *Payment* of 38,587, we get that 3.542 - 0.2068*38.587 = -4.437, with a p-value of 0.000.

[9] That is, 9.351 – 0.309 * 38.587 = -2.558, with a p-value of 0.129.

income.[10] Interestingly, the reduction in bank loan debt found in the average results is driven exclusively by individuals who had previous outstanding debt. Such individuals decrease their debt by 93% of the increase in liquidity, a usage of almost one-for-one of the liquidity which leaves no or little room to increase in consumption. At the average mortgage payment value for this group, this amounts to a reduction in other debt of close to 27,000 DKK per year.[11] Finally, we find no statistically significant results among borrowers with pre-run-off assets, as these borrowers are few in number and have swings in their other assets add noise that swamp our results.

5. Robustness Checks

Table 5 presents OLS regressions on pension outflows and inflows, as well as coefficients from fixed effect logit regressions on the probability of retiring and becoming unemployed. Retirement and unemployment are defined as going from unretired to retired and employed to unemployed in a given year, respectively.[12] The results show no impact on pension outflows although there is possibly a slight decrease in pension contributions. The results show no impact of the mortgage run-off on the probability of retirement although there is a slightly lower probability of becoming unemployed.

[INSERT TABLE 5 ABOUT HERE]

Table 6 shows the extensive and intensive analysis for new mortgage take out. There is no systematic change in the rate of taking a new mortgage out after the original one runs out. The size of new mortgages for people increase after the run-off for individuals with larger mortgage payments but once we consider that almost all individuals have smaller mortgages after the run-off (as evidenced by the negative values on the After coefficient), we find that the size of new mortgages taken out are smaller after the original one runs out.

[INSERT TABLE 6 ABOUT HERE]

Additional robustness checks are reported for different definitions of compliance. We calculate the same models as presented in Table 3 but we impose additional further restrictions of decreasing mortgage balances up to (i) two years prior to predicted run-off year, (ii) one year prior to predicted run-off year, and (iii) the year of the run-off event. These three alternative definitions of compliance make tighter restrictions of our baseline definition of glide path where we only require individuals to have decreasing mortgage balances in year six through three prior to run-off. Table A1 in in the Appendix shows that our results about decreasing labor income is robust to the different specifications of compliance, and the result of reduction in bank loan debt is robust to most of the specifications.

[10] That is, at the average sample value of *Payment* of 36,127 for this group, we get that 6.723 - 0.319*36.127 = -4.803, with a p-value of 0.000.
[11] That is, at the average sample value of *Payment* of 43,463 for this group, we get that 13.468 - 0.930*43.463 = -26.956, with a p-value of 0.000.
[12] Being employed is defined as receiving labor income during the calendar year, alternatively, being unemployed is defined as any form of unemployment (including being on leave for maternity or medical reasons, being a student, being retired or being on poverty cash benefits).

We also conduct the same analyses as presented in Table 3 and Table 4 but dropping individuals that are retired at any point in the sample. The results show that the reduction in labor income is not being driven by individuals retiring after run-off. These results provides further evidence that our identification is robust to endogeneity concerns regarding people timing the run-off date with the retirement decision. Table A2 shows a reduction of bank loan debt in an amount equivalent to 70% of the freed up resources after the run-off. We also find as before that people without financial assets and no debt reduce labor supply in an amount equivalent to 40% of the freed-up resources and people with no preexisting financial assets but with bank loan debt decreases debt after mortgage run-off in an amount equivalent to 1.8 times the amount of freed up resources. Meanwhile, people with no financial assets and preexisting bank loan debt will spend 100% of the freed up resources.

6. Conclusions

This paper documents consumers' responses to a change in saving commitments. Because mortgages commit borrowers to a repayment schedule that pays down their mortgage balance, a mortgage run-off relaxes a saving commitment. This saving commitment does not bind for consumers who choose to save more than is required by the mortgage contract or who borrow elsewhere to undo the saving requirement of the mortgage. Theory predicts that such consumers should not adjust their consumption but should increase savings or decrease debt one-for-one with mortgage payments once they cease. We find that individuals with pre-run-off debts (but without pre-run-off assets) – for whom the mortgage saving commitment should not bind – perfectly offset the end of the mortgage saving commitment by paying down other debt post-run-off one-for-one. For this subset of borrowers, they work around the saving constraint of the mortgage just as theory would suggest.

Borrowers with neither pre-run-off savings or other debt are most likely to be constrained by the mortgage saving requirement to save more and spend less than they would like pre-run-off. We find that these borrowers reduce labor supply post-run-off, increasing their consumption of leisure once they are no longer forced to saving by paying down their mortgage balance. The savings constraint imposed by the mortgage binds for these borrowers. In contrast with other tests of PIH-type models, our setting does not require that individuals rationally anticipate the mortgage run-off. Whereas standard empirical tests of the PIH are a joint test of rational anticipation and respond to income changes, our predictions are the same whether individual rationally anticipate or not the change in saving commitment.

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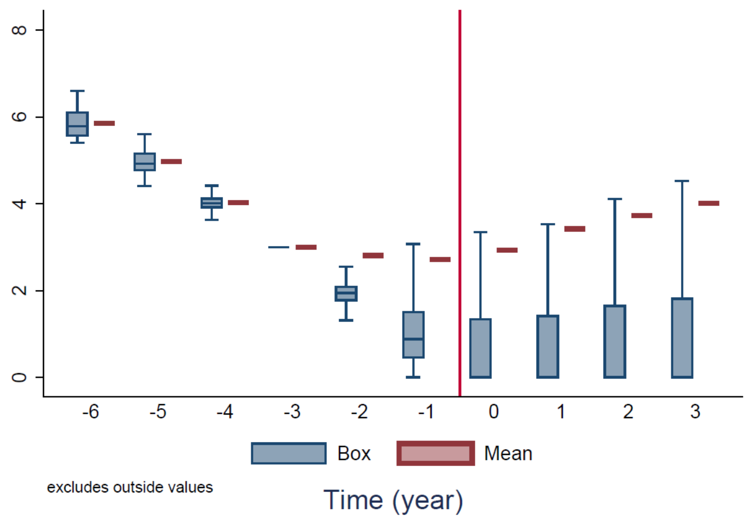
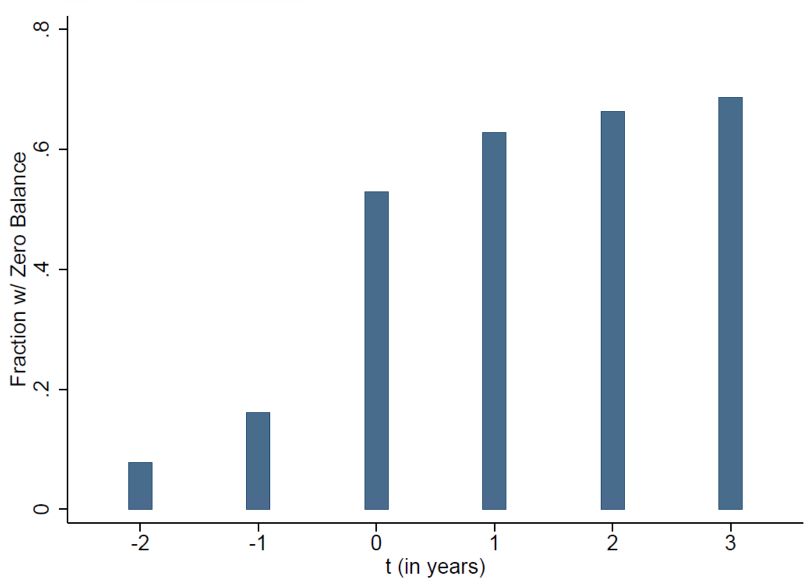
7. Tables and Figures

Figure 1. Mortgage Runoffs



(a) Mortgage value as a proportion of its value three years prior to the anticipated final payment



(b) Proportion of individuals with a zero mortgage value

Table 1: Predicted Change in Behavior to Income or Saving Commitments Changes

	Anticipation of the Change	
	Anticipated	**Unanticipated**
Change in income	Changes in income do not affect consumption	Consumption changes proportionally to change in income
Removal of saving commitment *without* borrowing constraints	Resources freed up from the saving commitment are shifted to other types of saving Consumption and leisure do not change.	Resources freed up from the saving commitment are shifted to other types of saving Consumption and leisure do not change.
Removal of saving commitment *with* borrowing constraints	Resources freed up from the saving commitment are used to take on more debt and increase consumption or leisure.	Resources freed up from the saving commitment are used to take on more debt and increase consumption or leisure.

Table 2. Descriptive Statistics

	Mean		Std. Dev.
A. Demographics			
Age	56.1		10.3
Male	62.5	%	-
# Adults in household	1.9		0.6
Married	71.3	%	-
Divorced	7.3	%	-
Retired	38.3	%	-
B. Income and Pensions ('000s DKK)			
Labor Income	231.4		113.8
Total Pension Outflows	45.5		70.3
Total Pension Inflows	21.7		50.8
C. Wealth ('000s DKK)			
Bank Deposits	90.9		148.6
Stocks	33.6		138.2
Bonds	47.2		300.5
Bank Loans	29.9		78.5
D. Housing ('000s DKK)			
Housing Assets	925.9		596.8
Mortgage Value	115.8		64.8
Mortgage Payments	38.6		21.6
Mortgage Payments/Labor Income	36.5	%	21.1

This table provides descriptive statistics for the main variables used in the analysis. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. There are 24,584 runoff events. All variables are recorded at the end of the calendar year and are measured three years prior to the year in which the mortgage is paid off. Labor income, pension inflows/outfloes and mortgage payments are annual. All monetary amounts are expressed in Danish kroner (DKK). The exchange rate between DKK and U.S. dollar was 14.94% at the beginning of our sample in 1998, averaged 16.27% over the sample and was 17.81% at the end of our sample in 2013.

Table 3. Average Results

	Labor Income	ΔBank Deposits	ΔStocks	ΔBonds	ΔBank Loans
After x Payment	-0.21**	0.11	0.10	-0.01	-0.31*
	(0.09)	(0.22)	(0.09)	(0.14)	(0.16)
After	3.54	-9.69	-5.69*	-0.09	9.35*
	(3.43)	(7.93)	(3.22)	(4.77)	(5.46)
R^2	0.054	0.001	0.018	0.002	0.003

This table shows the results of OLS regressions which control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. There are 24,584 runoff events. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

Table 4. Wealth Effects

	Labor Income	ΔBank Deposits	ΔStocks	ΔBonds	ΔBank Loans
A. No Stocks+Bonds, No Debt (No. of Runoffs = 14,581)					
After x Payment	-0.32***	-0.11	-0.01	0.20	0.11
	(0.10)	(0.24)	(0.08)	(0.12)	(0.11)
After	6.72**	1.91	1.28	-0.71	1.09
	(3.19)	(7.95)	(2.60)	(3.86)	(3.64)
R^2	0.046	0.001	0.011	0.002	0.004
B. No Stocks+Bonds, Yes Debt (No. of Runoffs = 4,319)					
After x Payment	-0.01	0.28	0.03	0.06	-0.93**
	(0.11)	(0.34)	(0.06)	(0.24)	(0.44)
After	-5.52	-34.32**	0.57	0.51	13.47
	(4.71)	(14.23)	(2.42)	(9.45)	(17.51)
R^2	0.066	0.003	0.018	0.002	0.016
C. Yes Stocks+Bonds, No Debt (No. of Runoffs = 4,883)					
After x Payment	0.13	0.41	0.30	0.00	0.08
	(0.11)	(0.44)	(0.32)	(0.44)	(0.18)
After	-6.93**	-11.18	-25.18**	-14.27	5.79
	(3.50)	(16.25)	(11.52)	(16.35)	(6.67)
R^2	0.062	0.003	0.118	0.017	0.002
D. Yes Stocks+Bonds, Yes Debt (No. of Runoffs = 801)					
After x Payment	-0.99	1.26	0.47	-0.68	-0.86
	(0.90)	(1.85)	(0.63)	(0.89)	(1.42)
After	46.29	-105.00	-41.23	-27.98	-24.51
	(44.20)	(88.92)	(31.03)	(45.18)	(66.89)
R^2	0.077	0.009	0.019	0.003	0.025

This table shows the results of OLS regressions which control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. It is equal to 36.13, 43.46, 39.44, and 51.86 for individuals in Panels A., B., C., and D., respectively. An individual is identified as having debt if her end-of-year debt is higher than 50,000 DKK on average in the six years before the predicted final payment. Similarly, an individual is identified as holding stocks and bonds if the value of her end-of-year stocks and bonds combined is higher than 50,000 DKK on average in the six years before the predicted final payment. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

Table 5. Pension, Retirement, and Unemployment

	Pension			
	Outflows	Inflows	Retire	Unemployment
After x Payment	0.03	-0.10*		
	(0.02)	(0.06)		
After x Payment/100			0.88	-1.25**
			(0.71)	(0.61)
After	0.05	2.58	-3.01***	-0.17
	(0.77)	(1.86)	(0.34)	(0.28)
R^2	0.1864	0.0043	0.7601	0.0691
No. of Runoffs	24,584	24,584	4,789	1,881

This table shows OLS regressions on pension outflows and inflows, as well as coefficients from logit regressions on the probability of retiring and becoming unemployed. All regressions control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. Pension outflows and inflows are the sum of employer and private pensions measured in thousands of Danish kroner (DKK) at the end of the year. Retirement and unemployment are defined as going from unretired to retired and employed to unemployed in a given year, respectively. Being employed is defined as receiving labor income during the calendar year, alternatively, being unemployed is defined as any form of unemployment (including being on leave for maternity or medical reasons, being a student, being retired or being on poverty cash benefits). The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

Table 6. New Mortgage

	All	No Stock+Bond, No Debt	No Stock+Bond, Yes Debt	Yes Stock+Bond, No Debt	Yes Stock+Bond, Yes Debt
A. Extensive Margin					
After x Payment	-0.32	0.7	-0.91	-0.7	-79
	(0.46)	(0.72)	(0.84)	(1.34)	(1.49)
After	-0.53*	-0.76*	-0.5	-0.53	-0.31
	(0.29)	(0.44)	(0.55)	(0.79)	(1.10)
R^2	0.0341	0.0449	0.0404	0.0317	0.0344
B. Intensive Margin					
After x Payment	8.94	-11.64**	73.07***	25.30***	30.82***
	(8.61)	(5.85)	(25.84)	(6.13)	(5.15)
After	-1.32*	0.34	-6.75***	-2.04***	-3.23***
	(0.75)	(0.34)	(1.59)	(0.59)	(0.43)
R^2	0.1267	0.5755	0.6578	0.7303	0.995
No. of Runoffs	1,436	618	441	251	126

This table shows the extensive and intensive margins of new mortgage takeout. We call an annual increase in mortgage balance greater than 500,000 Danish kroner (DKK) a new mortgage. Panel A. shows the coefficients of logit regressions on a binary variable equal to one if the individual has a new mortgage in a calendar year and zero otherwise. Panel B. shows the results of an OLS regression on the size of the new mortgage, conditional on having one, expressed in millions of DKK. All regressions control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. An individual is identified as having debt if her end-of-year debt is higher than 50,000 DKK on average in the six years before the predicted final payment. Similarly, an individual is identified as holding stocks and bonds if the value of her end-of-year stocks and bonds combined is higher than 50,000 DKK on average in the six years before the predicted final payment. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is a variable equal to the average annual mortgage payment three to six years before the mortgage is paid off (expressed in hundreds of thousands of DKK in Panel A. and in millions of DKK in Panel B.) Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

8. Appendix

Table A1. Compliance Analysis

	Labor Income	ΔBank Deposits	ΔStocks	ΔBonds	ΔBank Loans
A. Baseline - Compliance at T0-3 (No. of Runoffs = 24,584)					
After x Payment	-0.21**	0.11	0.10	-0.01	-0.31*
	(0.09)	(0.22)	(0.09)	(0.14)	(0.16)
After	3.54	-9.69	-5.69*	-0.09	9.35*
	(3.43)	(7.93)	(3.22)	(4.77)	(5.46)
R^2	0.054	0.001	0.018	0.002	0.003
B. Compliance at T0-3 and T0-2 (No. of Runoffs = 22,339)					
After x Payment	-0.22**	0.12	0.15	0.10	-0.30*
	(0.10)	(0.24)	(0.10)	(0.14)	(0.16)
After	3.17	-11.21	-7.46**	-2.74	6.70
	(3.68)	(8.50)	(3.49)	(4.79)	(5.57)
R^2	0.058	0.001	0.018	0.002	0.003
C. Compliance at T0-3, T0-2, and T0-1 (No. of Runoffs = 18,928)					
After x Payment	-0.25**	0.33	0.19*	0.13	-0.24
	(0.12)	(0.23)	(0.11)	(0.15)	(0.14)
After	3.10	-11.67	-8.08**	-1.33	2.46
	(4.32)	(8.53)	(3.71)	(5.19)	(5.01)
R^2	0.061	0.003	0.034	0.004	0.003
D. Compliance at T0-3, T0-2, T0-1, and T0 (No. of Runoffs = 11,074)					
After x Payment	-0.23***	0.11	0.40**	0.00	-0.35**
	(0.07)	(0.22)	(0.17)	(0.21)	(0.17)
After	1.35	-6.82	-15.87***	3.62	1.97
	(2.27)	(7.84)	(5.44)	(6.71)	(5.59)
R^2	0.068	0.003	0.036	0.004	0.003

This table shows the results of OLS regressions which control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The samples used vary by definition of compliance with the predicted mortgage runoff. The sample used in Panel A. is based on the mortgage runoff as predicted three years before the mortgage is paid off and the results are identical to the results presented in Table 2. The sample used in Panel B. adds the restriction that the mortgage balance is decreasing two years prior to the year in which the mortgage is paid off. The sample used in Panel C. further adds the restriction that the mortgage balance is decreasing one year prior to the year in which the mortgage is paid off. Finally, the sample used in Panel D. further adds the restriction that the value of the mortgage is zero in the year in which it is predicted to be paid off. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

Table A2. Intensive Margin (No Retirement)

	Labor Income	ΔBank Deposits	ΔStocks	ΔBonds	Bank Loans
A. All Sample (No. of Runoffs = 9,704)					
After x Payment	-0.27	0.23	-0.13	-0.16	-0.70**
	(0.20)	(0.41)	(0.14)	(0.14)	(0.30)
After	9.89	-12.67	3.66	7.39	24.32**
	(8.46)	(17.03)	(5.54)	(5.84)	(12.36)
R^2	0.044	0.003	0.011	0.001	0.004
B. No Stocks+Bonds, No Debt (No. of Runoffs = 5,653)					
After x Payment	-0.40**	0.18	-0.17	0.08	-0.23
	(0.19)	(0.39)	(0.16)	(0.08)	(0.18)
After	14.98*	-4.82	8.19	2.85	12.73*
	(7.74)	(14.92)	(6.34)	(3.95)	(7.32)
R^2	0.051	0.004	0.016	0.002	0.004
C. No Stocks+Bonds, Yes Debt (No. of Runoffs = 2,116)					
After x Payment	0.08	0.22	0.04	-0.26	-1.85**
	(0.14)	(0.44)	(0.05)	(0.25)	(0.79)
After	-8.35	-27.77	-0.55	12.69	57.64*
	(6.36)	(19.23)	(1.97)	(10.01)	(32.14)
R^2	0.054	0.003	0.024	0.004	0.023
D. Yes Stocks+Bonds, No Debt (No. of Runoffs = 1,593)					
After x Payment	0.24	0.07	-0.06	-0.51	0.29
	(0.19)	(0.74)	(0.47)	(0.59)	(0.35)
After	-8.17	4.78	-11.83	5.59	-9.54
	(8.20)	(34.31)	(20.04)	(27.89)	(18.10)
R^2	0.029	0.007	0.151	0.006	0.002
E. Yes Stocks+Bonds, Yes Debt (No. of Runoffs = 342)					
After x Payment	-1.51	1.36	-0.32	0.26	-1.32
	(1.38)	(3.09)	(0.75)	(0.50)	(2.22)
After	73.02	-117.09	-15.55	-32.17	-7.54
	(75.19)	(159.29)	(45.92)	(32.22)	(116.93)
R^2	0.068	0.02	0.016	0.007	0.037

This table shows the results of OLS regressions which control for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off, with the additional restriction that we drop individuals who are retired at any point of the sample. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. An individual is identified as having debt if her end-of-year debt is higher than 50,000 DKK on average in the six years before the predicted final payment. Similarly, an individual is identified as holding stocks and bonds if the value of her end-of-year stocks and bonds combined is higher than 50,000 DKK on average in the six years before the predicted final payment. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.

Table A3. Robustness of Specifications

	(1)	(2)	(3)	(4)	(5)
A. Labor Income					
After x Payment	-0.21**	-0.21**	-0.22**	-0.73***	-0.73***
	(0.09)	(0.09)	(0.10)	(0.06)	(0.06)
After	3.54	3.53	3.63	23.56***	23.56***
	(3.43)	(3.40)	(3.43)	(2.36)	(2.36)
R^2	0.0542	0.0516	0.2342	0.0532	0.0532
B. ΔBank Loans					
After x Payment	-0.31*	-0.33**	-0.31*	-0.13**	-0.13**
	(0.16)	(0.16)	(0.16)	(0.06)	(0.06)
After	9.35*	10.85**	9.35*	2.35	2.35
	(5.46)	(5.45)	(5.45)	(2.56)	(2.56)
R^2	0.0029	0.0004	0.0033	0.0028	0.0028
Year F.E.	YES	NO	YES	YES	YES
Person F.E.	YES	YES	NO	YES	YES
Event-Time	YES	YES	YES	YES	NO
Event-Time x D	YES	YES	YES	NO	NO

This table shows the results of OLS regressions with varying controls for year fixed effects, individual fixed effects, and linear runoff year and its interaction with the size of annual mortgage payment. Specification (1) reproduces the baseline results of Table 2. The sample used is based on the mortgage runoff as predicted three years before the mortgage is paid off. Dependent variables are labor income, measured as total income in thousands of Danish kroner (DKK) received during the calendar year, and bank deposits, stocks, bonds and bank loans, measured as changes in thousands of DKK from their value at the end of the previous calendar year. After is a variable equal to zero in the three years before the mortgage is paid off and to one in the three years after the mortgage is paid off. Payment is the average annual mortgage payment in thousands of DKK three to six years before the mortgage is paid off, as reported in Table 2. Standard errors clustered at the individual level are presented in parentheses. ***, **, * represent statistical significance at the 1, 5, and 10 percent levels respectively.