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The Effect of Relabeling and Incentives on Retirement: Evidence from the Finnish Pension Reform in 2005*

Jon Gruber[1], Ohto Kanninen[2], Satu Nivalainen[3], Terhi Ravaska[4] & Roope Uusitalo[5]

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Eläketurvakeskus
PENSIONSSKYDDSCENTRALEN

[1] Jon Gruber, Massachusetts Institute of Technology
[2] Ohto Kanninen, Labour Institute for Economic Research, ohto.kanninen@labour.fi
[3] Satu Nivalainen, Finnish Center for Pension
[4] Terhi Ravaska, Labour Institute for Economic Research, terhi.ravaska@labour.fi
[5] Roope Uusitalo, University of Helsinki

Abstract

We exploit a reform in the Finnish public pension system in 2005 to study the effect of financial incentives (wealth effect and substitution effect) and relabeling of pensions on retirement decisions. These effects are distinguishable in the reform due to a heterogeneous, although correlated, impact of the reform on individuals. Relabeling in the reform means renaming the pension type from early retirement to full retirement based on age. Incentives were affected as a function of age and accrual-to-earnings ratio. We find that all three effects played a role. We show that the relabeling alone explains most of the immediate behavioral impact of the reform.

Keywords: Retirement, substitution effect, wealth effect, relabeling, pension reform JEL-Codes: D9, H55, H75, J14, J26

Tiivistelmä

Suomessa toteutettiin vuonna 2005 laaja eläkeuudistus, joka muutti eläkkeellejäämisen taloudellisia kannustimia ja eläkeikiä. Hyödyntämällä tätä muutosta tutkimme taloudellisten kannustimien ja eläkkeiden uudelleennimeämisen vaikutusta eläköitymiseen. Eläkkeiden uudelleennimeäminen johtui siitä, että reformi laski täyden eläkkeen alaikärajaa, jolloin aikaisemmin varhennetulle vanhuuseläkkeelle jäänyt henkilö oli reformin jälkeen oikeutettu täyteen eläkkeeseen. Taloudellisten kannustimien muutokset riippuivat iästä sekä ansioista ja karttuneesta eläkkeestä. Eläkereformi vaikutti eri tavalla yksilöihin, joten voimme erotella eläkeiän ja taloudellisten kannustimien vaikutukset. Näytämme, että eläkeiän alarajan muuttaminen selittää suurimman osan reformin jälkeisestä eläköitymisen kasvusta.

Avainsanat: Eläköityminen, substituutio- ja varallisuusvaikutus, uudelleennimeäminen, eläkereformi.
JEL-codes: D9, H55, H75, J14, J26

Palkansaajien tutkimuslaitos
Labour Institute for Economic Research
Pitkänsillanranta 3 A
00530 Helsinki

www.labour.fi

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1 Introduction

Developed countries around the world face enormous long run deficits with respect to their public pension systems. As a result, pension reform is a constant source of public policy debate. A common approach to addressing such fiscal deficits is to reform the underlying structure of pension plans, most commonly the retirement age.

Changes in retirement ages generally involve two separate elements:a change in the labeling of what is considered 'early' (ERA) or 'full' statutory retirement age (FRA), and a change in financing incentives. Usually, reforms affect both simultaneously. For example, when the U.S. raised its 'full' retirement age in 1983, starting after 2002, this amounted to a large benefits cut for those retiring at each age (Behaghel & Blau, 2012).

Yet these changes need not go hand in hand. In fact, if there are large behavioral responses to being labeled early or full retirement aged, then it is possible that reforming those ages alone, without changing financial incentives, could have important impacts on retirement ages and so in fiscal balance.

Separating the financial incentives associated with such ages from their impacts on retirement norms is difficult, however. The ages that are used for retirement targets may be correlated with retirement for other reasons, such as tastes for retirement at certain (round) ages, or other government programs that kick in at those same ages (such as the U.S. Medicare program which starts at age 65). Past models have either assumed that the impact of these ages is independent of these other factors, or have relied on reforms which changes both the statutory ages and financial incentives. There is no empirical work to date that distinctly separates and quantifies financial incentives from the impact of the actual age change.

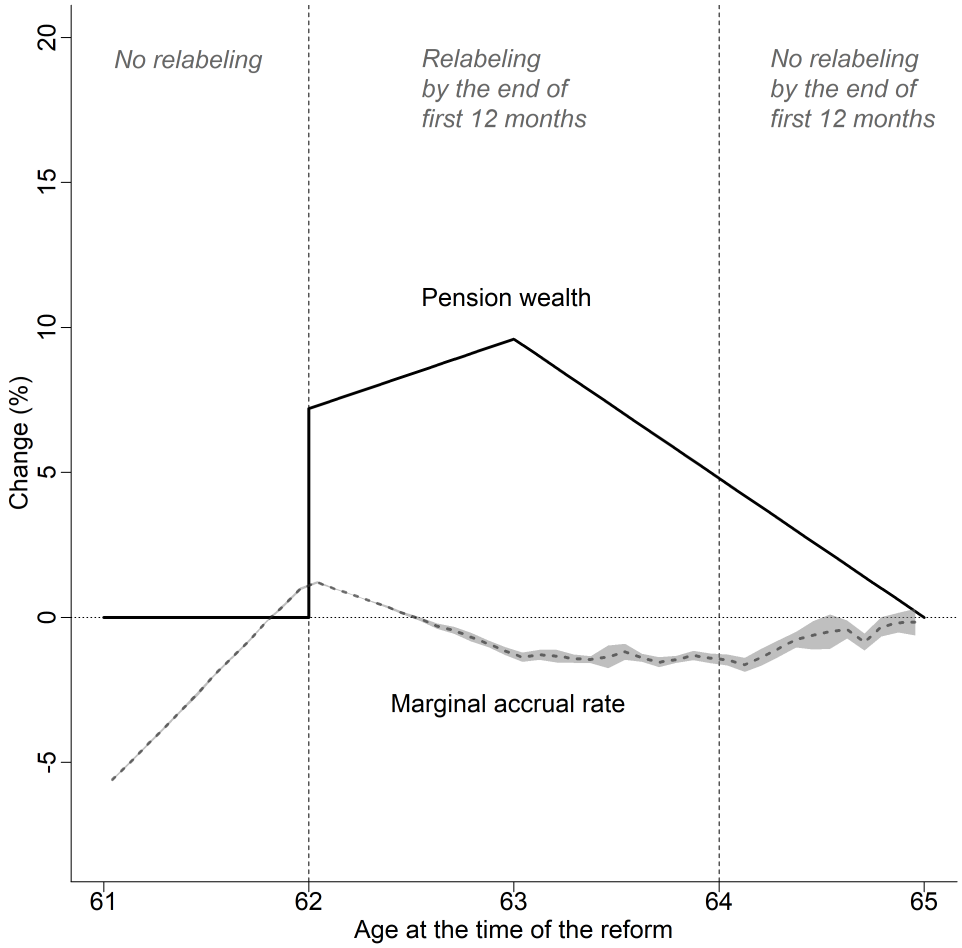
Recent literature has used quasi-experimental evidence to study the effect of incentives on retirement in (Brown, 2013; Manoli & Weber, 2016a; Furgeson et al., 2016, and in the Finnish context Uusitalo & Nivalainen 2011). The estimated effects vary enormously. Also, a recent branch of literature has exploited reforms to study the effect of a change in statutory retirement age and found that labels affect behavior in a manner which can not be rationalized by standard preferences (Behaghel & Blau, 2012; Cribb et al., 2016; Manoli & Weber, 2016b; Seibold, 2017).

A reform in Finland allows us to separate financial incentives and norms associated with retirement age. Before 2005, retirees in Finland faced an early retirement regime which ran from age 60 to age 65 in the earnings-related pension system, with full retirement at age 65. In 2005, the system was reformed so that a new 'flexible' retirement age was introduced at ages 63 to 68, which was treated as effectively lowering the full retirement age to 63. Yet while the reform also included changes in financial incentives, these changes were both modest and more continuous across cohorts than was this 'relabeling' - allowing us to separate the two.

Figure 1 illustrates this point. The figure is drawn for January 1, 2005, the date of the reform. The x-axis shows age as of that date, where the demarked ages represent the endpoint for that age. That is, the point labeled age 64 represents the last individuals who are age 64 as of January 1.

As shown by the two vertical dashed lines, ages 62 to 64 saw a large relabeling when the law took force. That is, before the law, in an observation window of twelve months, if they wanted to retire they were considered early retirees – whereas following the reform they are full retirees under the new flexible retirement regime. The solid line shows the change in

Figure 1: The effect of the reform on pension incentives and labeling.



Notes. Pension wealth, if retired immediately, increased on January 1, 2005 due to the reform as a function of age. Marginal accrual rate as a proportion of accrued pension calculated for a 12-month period changed due to the reform as a function of age, earnings and accrued pension. The means are estimated for bimonthly birth bins. The 95% confidence intervals are shown in the shaded area. The sample is those with only earnings-related pensions. The cohorts represented in the x-axis are 1940–1943.

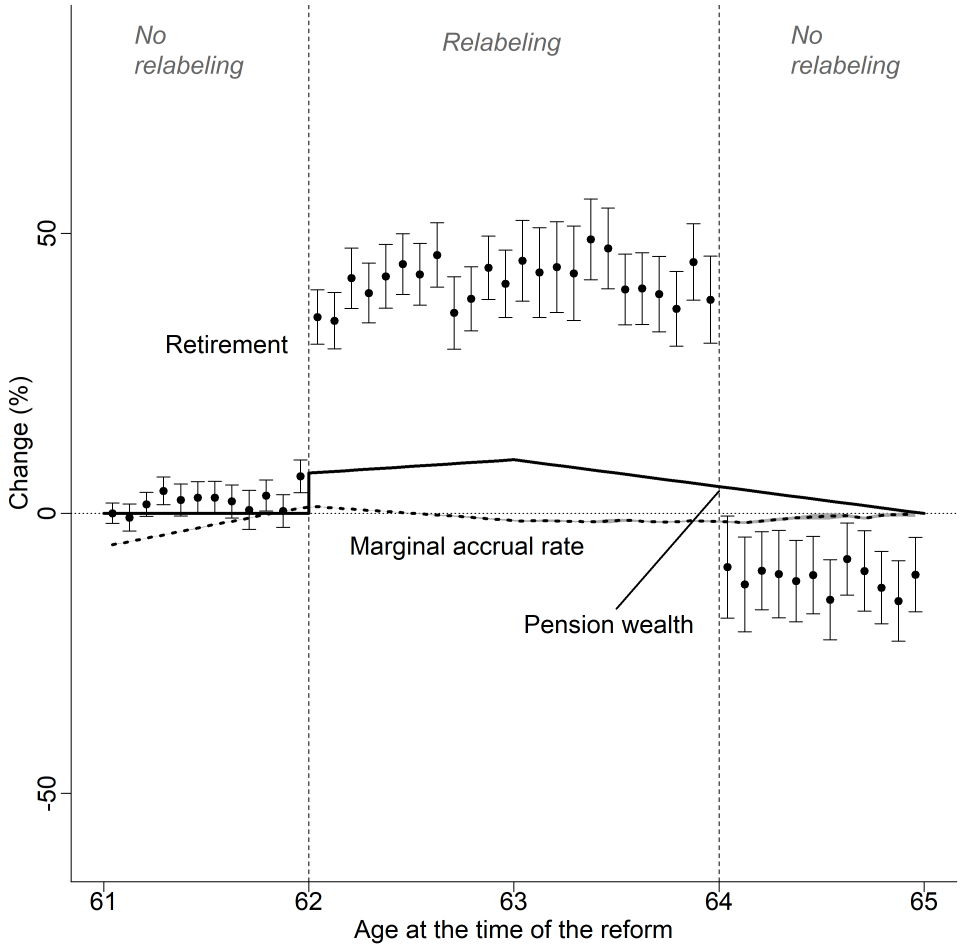
pension wealth that resulted from this reform – e.g. the overnight percentage increase in pension wealth due to the reform for individuals retiring at each age. The dashed line shows the percentage change in marginal accrual rate (with associated error bands).

What is notable here is two things. First, on Jan 1, 2005 the changes in pension wealth and accrual rate due to the reform are relatively small – pension wealth rises by up to 10%, and accrual rates fall by only a small percentage amount. Second, while the changes in for financial incentives are discontinuous for individuals around age 62, they are continuous for individuals around age 64. This allows us to separate the discontinuous impact of relabeling from the continuous changes in financial incentives.

Our results suggest that in fact this relabeling had an enormous effect. Figure 2 shows a rescaled version the same type of graph as Figure 1. But this figure also includes the percentage change in retirement rates from 2005 relative to the pre-reform year of 2004. What we find is an enormous rise in retirement probabilities in the range that was suddenly eligible for flexible retirement, on the order of 40% or more. Not only does this huge impact seem inconsistent with the relatively modest change in financial incentives, but in addition to a decrease in retirement rates for those close to age 65, we see a huge discontinuity in impacts right around the end of the relabeling period. Taken together, this provides strong evidence that it is relabeling, and not financial incentives, driving most of the change in retirement behavior.

Regarding financial incentives, the reform allows us to separate the effect of a sudden jump in pension wealth on January 1, 2005, from the exogenous change in marginal accrual rates, also caused by the reform. Consequently, we can study the relative importance of all three effects. We show that the relabeling alone, holding incentives constant, had an impact on

Figure 2: The effect of the reform on pension incentives and labeling, and change in retirement rates by monthly birth bins in 2005 vs 2004.



Notes. Pension wealth increased on January 1, 2005 due to the reform as a function of age. Marginal accrual rate as a proportion of accrued pension calculated for a 12-month period changed due to the reform as a function of age, earnings and accrued pension. The means are estimated for monthly age bins. The 95% confidence intervals are shown in the shaded area. Retirement is estimated as a t-test of the difference in 2005 and 2004 for monthly birth bins. The 95% confidence intervals are shown by the error bars. The sample is those with only earnings-related pensions.

retirement roughly two times the effect the maximum wealth change of just under 10% had on retirement. Exogenous changes on accrual rates had an even smaller marginal effect.

The rest of the paper is organized as follows. Section 2 describes the Finnish earnings-related pension scheme, the reform and the data used. Section 3 presents the empirical model. Section 4 discusses the results and section 5 concludes.

2 Institutional Setting, the Reform and Data

2.1 Finnish pension system and the reform in 2005

The Finnish pension system is a combination of earnings-related pension and residence-based national pension. The earnings-related pension system is mandatory for the workers and cover virtually all earnings. It is a defined benefit system where the pension level is determined by the length of work history and by the amount of past earnings. The average replacement rate is 55% (OECD 2018). The national pension (and a complementary guarantee pension starting 2011) is paid in proportion to the employment pension so that only individuals with very short careers or low earnings history are granted for the full national pension. Each additional earnings-related pension euro below 1300 euros per month (in 2019) decreases national pension by 50 cents.[1]

There are statutory retirement ages for the old-age pension but also several early retirement pathways such as disability, part-time and previously unemployment or individual early retirement with varying eligibility criteria. The early-exit benefits can be claimed until the

[1] In 2005 the full national pension was approximately 500 euros.

statutory retirement age, except for the unemployment retirement, which can be claimed until age 65 if already in the unemployment tunnel. The statutory old-age retirement age thresholds are early old-age retirement (ERA) age and full old-age retirement age (FRA). Claiming old-age pension before the full old-age retirement age decreases the pension amount permanently.

There are some differences in the pension rules between public and private sector workers. We only study the private sector, since the rule for the public sector are more complex and the data less coherent.

In 2005, the pension system was reformed substantially. The system prior to the reform had FRA at 65 and the pension accrued from earnings between the ages 23–64. The pension was calculated based on the earnings from the last 10 years of each employment contract prior to retirement. Accrual rates were 1.5% below the age of 59 and 2.5 % between ages 60–65 (Table 1). There was also a pension cap at 60% of the highest annual salary during the period where pension was calculated. Early old-age retirement (possible from the age of 60 onwards) reduced pension permanently by 0.4 percent of accrued pension for each month before the age 65. If retiring was postponed after the age of 65, each month increased the pension by 0.6 percent.

The reform in 2005 introduced a flexible FRA and changed the calculation of pension. From 2005 onwards the whole working history is taken into account when calculating the pension. The minimum eligibility age was reduced to 63. However, if the individual continued working between the ages 63–68, the earnings accrued pension by 4.5 %. This high accrual rate was popularly dubbed the 'super accrual', although the accrual rate was not superior to the pre-reform rates due to the lack of early claiming penalties post-reform. The accrual rate was

Table 1: The incentives in the reform.

	Before reform	After reform
Accrual %	Ages 23-59 1.5%	Ages 18-52 1.5%
	Ages 60-65 2.5%	Ages 53-62 1.9%
		Ages 63-68 4.5%
Early claiming	-0.4% for each month	-0.6% for each month
Reference age for early claiming	65	63
Delayed claiming	0.6% for each month	0.4% for each month
Reference age for delayed claiming	65	68

Notes. The accrual rates are proportionate to annual earnings. Early claiming penalties and delayed claiming credits are proportionate to accrued pension. Reform took place at the beginning of year 2005.

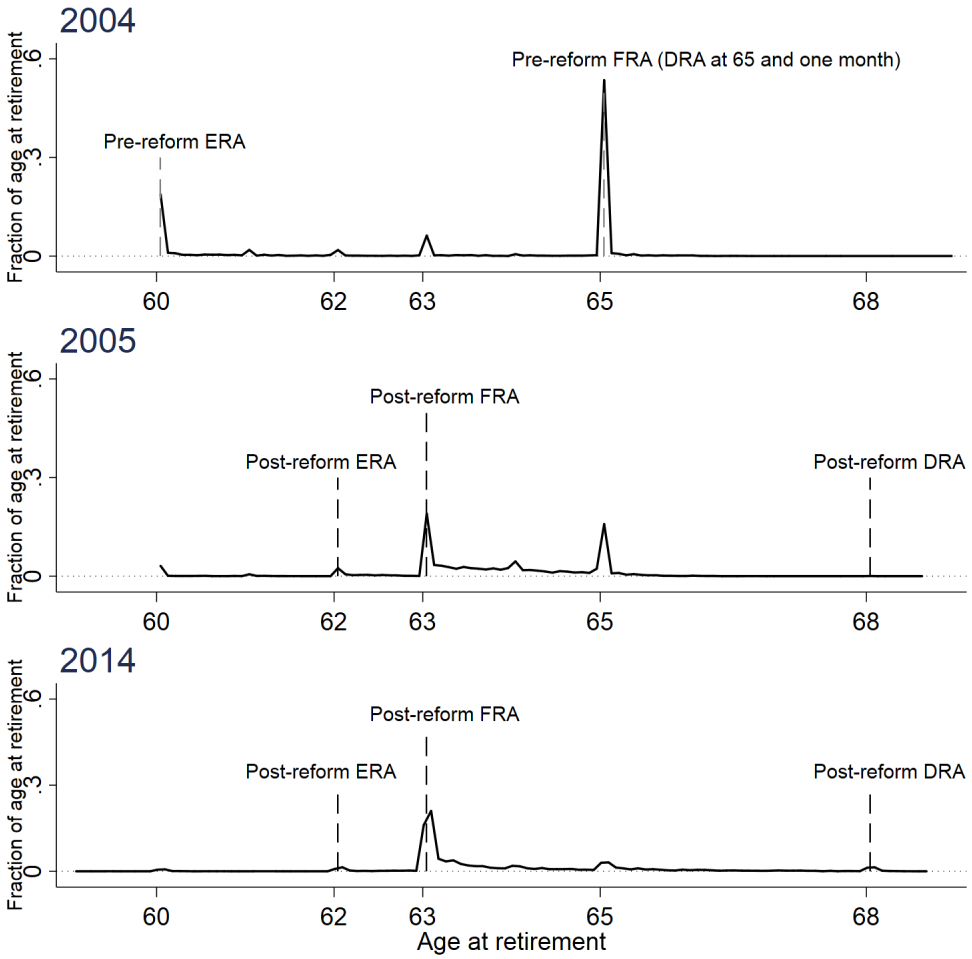
set to 1.9% for ages 53–62 and to 1.5% for work done before the age of 53. The early old-age minimum age was increased to 62 and the penalty for claiming pension early was 0.6 % for each month. The increase in pension for delaying retirement after the age 68 was 0.4 %. The pension wealth and accrual levels before and after the reform are defined as shown in table 1 and the change in these incentives is shown in Figure 1. The overnight jump in pension wealth shown in the figure stems mainly from a reduction in early retirement penalty, which resulted from a reduction in the reference age for early claiming from 65 to 63. For example, at age 63, the reform reduced the penalty from 9.6% (24 times 0.4%) to zero (0 times 0.6%) for a total of 9.6% overnight increase in pension wealth.

The reform did not change ERA or FRA for the national pension, but did abolish the implicit tax of the earnings-related pension on national pension between ages 63 to 65, increasing marginal accrual rates for that age group for those with low accrued pensions.

The retirement pattern shifted strongly from 2004 to 2005 and further still in the ten-year period following the reform (Figure 3). In a 10-year time span, the exact age of 65 lost

significance as a retirement age, replaced by 63 as the new mode. Ages 62 and 68 also became more popular ages to retire in the longer run.

Figure 3: Retirement fractions at different ages.



Notes. Figure shows distribution of retirement claiming ages for private sector workers born between 1935 and 1955.

2.2 Data

We use administrative data from Finnish Center for Pensions combined with the information in Statistics Finland for years 2000–2015. The main data include individuals earnings history and pension claiming including the exact day of the start (and ending) of specific pension spell. The supplementary data include a wide set of labor market and employer characteristics and individual characteristics for all Finnish individuals between the ages 40 and 75. Our sample is limited to those workers who are in labour force at the age of 59 and we study their retirement through the old-age pension pathway. We exclude those who were protected from the reform due to being adversely affected by it. The main sample includes 58,910 individuals.

Our main sample includes those who are employed and had an accrued pension income high enough to be claiming only earnings-related pension ($\sim$11,000 euros or higher, depending on marital status and municipality). We focus on this subset, since they faced the full impact of the relabeling. We show our main results also for those with also national pension, i.e., an accrued pension below 11,000 euros. We define the retirement date as the first date of claiming old-age pension and in the main analysis exclude individuals who prior to old-age retirement have claimed pension from a different pension program.

We form a pension wealth variable in the following manner. The net present value (NPV) of the pension for a worker *i* who have accrued pension enough to claim only earnings-related pension and decides to claim pension immediately at the age R_i can be written as:

$$NPV_i(R_i) = \sum_{t=0}^{S_i} \delta^t (B(R_i)),$$

where S_i is the life-expectancy and δ the discount factor and $B(R_i)$ denotes the pension benefit received each month. The survival probabilities in each age are gender-specific and discount factor of 0.98. The data are described in table 2.

Table 2: Descriptive statistics.

	Aged 62 to 64		**Aged 64 to 65**	
	Mean	SD	Mean	SD
2003 (Control year)				
Female	0.28	0.45	0.28	0.45
Tertiary education	0.30	0.46	0.25	0.43
Died before age 74	0.11	0.31	0.08	0.28
On sick leave at 62	0.13	0.34	0.13	0.34
Annual earnings (thousand euros)	33.80	25.18	37.17	27.93
Pension wealth at the beginning of the year (logs)	6.39	0.37	6.34	0.36
Marg accrual rate, no reform (logs)	3.96	0.40	3.82	0.37
2004 (Control year)				
Female	0.26	0.44	0.29	0.45
Tertiary education	0.33	0.47	0.27	0.45
Died before age 74	0.11	0.31	0.10	0.30
On sick leave at 62	0.12	0.33	0.11	0.31
Annual earnings (thousand euros)	35.30	28.16	36.77	23.74
Pension wealth at the beginning of the year (logs)	6.40	0.36	6.36	0.38
Marg accrual rate, no reform (logs)	3.98	0.40	3.84	0.39
2005 (Reform year)				
Female	0.26	0.44	0.25	0.43
Tertiary education	0.35	0.48	0.29	0.46
Died before age 74	0.11	0.32	0.11	0.31
On sick leave at 62	0.11	0.32	0.11	0.31
Annual earnings (thousand euros)	41.50	36.92	40.89	31.81
Pension wealth at the beginning of the year (logs)	6.42	0.37	6.37	0.35
Marg accrual rate, no reform (logs)	4.01	0.41	3.83	0.37
Immediate increase in pension wealth, %	7.80	1.24	2.25	1.33
Increase in marginal accrual rate, % of pension	-0.70	1.76	-0.73	2.60

Notes. Those aged 62 to 64 at the start of the year are the relabeling treatment group in 2005. Those aged 64 to 65 at the start of the year are the control group in 2005.

3 Empirical setup

As described above, the reform changed multiple facets of the pension system at once. We also know that in the longer run, retirement bunched at age 63 instead of the prior 65. Our focus is to exploit the exogenous short-term effect of the reform to discern the wealth effect,

the substitution effect and a relabeling effect. The financial incentives were affected by a continuous treatment where as the relabeling was a binary dif-in-dif treatment. The exogenous change in marginal accrual rates was on average -1 percentage points relative to accrued pensions with a standard deviation of 2. Econometrically, the more difficult effect to discern is the wealth effect, since wealth was only affected positively. Also, relabeling is correlated with the wealth change. However, as will be shown below, the treatment was strong enough to give us statistical power to discern the effects.

We study a sample that was aged between 62.0 and 65.0 years at the beginning of each sample year (2003–2005). Years 2003 and 2004 are considered control years.

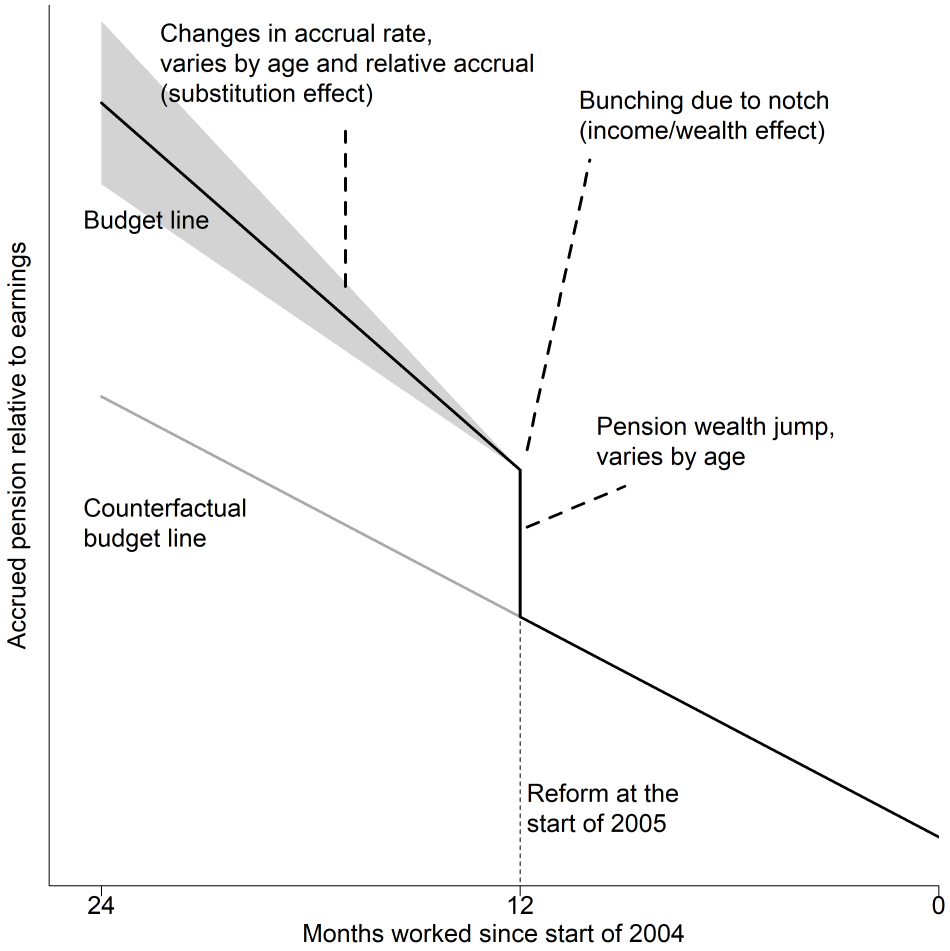
In 2005, cohort 1941 (aged 63.0 to 64.0) is the full treatment cohort in the sense that they had a jump in pension wealth, changes in marginal accrual rates and were relabeled to full pension on January 1 2005. Cohort 1942 (aged 62.0 to 63.0) is very similar, except that the relabeling happened only when they turned 63. For the purpose of identifying the effect of the relabeling, these two cohorts are considered treatment cohorts.

The cohort of 1940 (aged 64.0 to 65.0) is similar to 1941 and 1942, except that in an 12 month observation window, the cohort would have been labeled in to full retirement age even without the reform. Although the reform caused them to be labeled on January 1 instead of their 65th anniversary, there was no label change in an 12 month observation window. The cohort of 1940 is the control cohort with respect to the relabeling effect.

Conceptually, the retirement decision is a labor supply question. People make a labor supply choice, given their preferences regarding consumption, leisure and other factors. The setting is depicted in Figure 4. All individuals in our cohorts of interest received a non-negative increase in their pension wealth (see Figure 1). Marginal accrual rates were affected by the

reform as a function of age and the ratio of accrued pension to earnings. Empirically, we can study how much labor supply was affected by the income and the substitution effects. The substitution effect is the compensated wage effect, which is the appropriate concept to describe the effect here, since the reform changed accrual rates only at the margin for accrual after the reform.

Figure 4: The budget line due to the reform and its counterfactual.



Our main analysis is a Cox proportional hazard model regression,

$$\lambda(t|X_{ip}) = \lambda_0(t)exp(\beta_0 X_{i0} + ... + \beta_p X_{ip}),$$

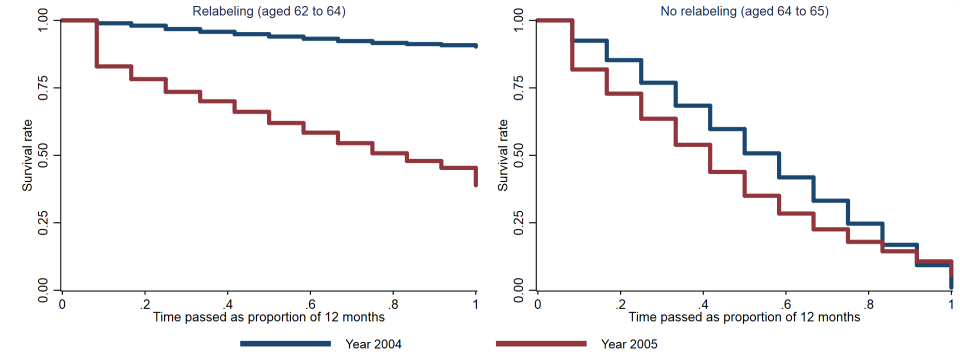
where the dependent variable is a dummy for retirement. Retirement is defined as starting to claim old-age pension. The parameters of interest are the coefficients for the continuous treatments in 2005, i.e., the relative immediate increase in pension wealth (income effect) and increase in marginal accrual rate, relative to accrued pension (substitution effect), and the binary treatment for reaching full retirement age in 12 months due to the reform (relabeling effect). We control for monthly age, year, pension wealth, non-pension wealth decile, spouse, pre-reform marginal accrual rate, sex, sickness absence at age 62 and tertiary education. Our main specification is a regression with cohorts which were aged 62.0 to 65.0 at the start of the year for years 2003–2005 in the pure earnings-related pension sample.

In our setting, a behavioral response to a jump in pension wealth (on January 1, 2005) could come from individuals who would have retired later who could now afford to retire earlier due to the higher wealth. Our setting allows us to identify this income/wealth effect. However, some individuals might also react already before the reform by postponing retirement to benefit from the wealth jump. This challenges our identification strategy in two ways. First, the control group estimates are biased due to the anticipation effect. Second, the sample we study in the reform year suffers from self-selected attrition, causing bias. We study anticipation by comparing retirement behavior in 2003 and 2004.

4 Results

As discussed earlier, figure 2 shows in the vicinity of age 64 that relabeling affects retirement behavior. Figure 5 shows the time perspective of survival estimates. Note that most of the retirement in the data take place in the first day of each month. The right panel show that the no-relabeling age group did not change their aggregate behavior much in the reform year. However, there is some change in the trajectory throughout the year. During the years 2003 and 2004 individuals retire steadily and rather linearly throughout the year as they turn 65. However, during 2005, there is a visible change in the retirement trajectory within the year. There is also a substantial change in the retirement behavior during the whole year in the relabeling group (left panel), starting with an initial jump and subsequently a steeper trajectory in retirements. The graphical evidence establishes that the reform affected retirement behavior especially in the relabeling group at the annual level, but also affected the within-year allocation of retirement in 2005. Note that the Cox proportional hazards model captures also changes in the within-year allocation of retirement.

Figure 5: Kaplan-Maier survival estimates by relabeling status and year.



The main regression results are presented in table 3, column 1. The results show significant income, substitution and relabeling effects. The first row point estimate shows that increas-

ing the pension wealth by one percentage point leads to 1.113 ($exp(0.107)$) times higher retirement hazard. Also, changing the 12-month accrual rate has an expected sign, the improvement in accrual rate by one percentage point relative to accrued earnings multiplies the hazard rate of retirement by roughly 0.942 ($exp(-0.060)$). The third row of the table shows the relabeling effect. The estimate for this effect is large, leading to the interpretation that reaching the full retirement age within next 12 months affects strongly the retirement decision making, multiplying the hazard by a factor of 7.644. The relabeling had an impact on retirement roughly equivalent to a 20 percentage point increase in pension wealth or a 30 percentage point decrease in marginal accrual rates.

Column 2 of Table 3 show the same regression for a lower-accrual sample, who have between $\sim$6,000 and 11,000 of accrued earnings-related pension. Column 2 shows that the wealth effect is similar also for a group that had a smaller wealth jump due to being only exposed to the reform for earnings-related part of their pension. The change in marginal accrual rates had a slightly smaller effect. The relabeling effect is very similar in this group compared to the main sample. The subsample in Column 2 was exposed to relabeling only with the earnings-related part of their pension, since labels did not change for the national pension.

Around 98% for all retirement program claiming in our main sample in 2005 is within the old-age retirement system. Figure A1 shows the distribution of claiming of any retirement program, including disability pension and unemployment pension. As a robustness check, we run a regression where the dependent variable is claiming of any retirement program. Table 4 shows that the results stay fairly unchanged.

It is possible that there is an anticipatory behavioral impact to the reform, since the law was passed in the middle of 2004 and information letters were sent early in the year of 2004 about

Table 3: Cox proportional hazard model regressions, different samples.

Sample	Earnings-related pension (1)	0.5 to 1 threshold (2)
Effect of the reform (in 2005):		
Immediate increase in pension wealth, %	0.107***	0.179***
	(0.0194)	(0.0280)
Increase in marginal accrual rate, % of pension	-0.0600***	-0.0281***
	(0.0107)	(0.00647)
Reach full retirement age in 12 months	2.034***	2.113***
	(0.122)	(0.120)
On sick leave at 62	0.0902***	-0.00141
	(0.0329)	(0.0525)
Has spouse	0.0740***	0.108***
	(0.0262)	(0.0404)
Tertiary education	-0.0344	0.0674
	(0.0261)	(0.0525)
Female	0.124***	0.114***
	(0.0269)	(0.0429)
Pension wealth at the beginning of the year (logs)	0.549***	0.358
	(0.0969)	(0.221)
Marg accrual rate, no reform (logs)	-0.392***	-0.0575
	(0.0905)	(0.0882)
Monthly age controls	Yes	Yes
Year controls	Yes	Yes
Individual controls	Yes	Yes
N	25,172	10,793

*Notes.*Years covered: 2003 – 2005 (reform year). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The threshold refers to the limit when individuals have only earnings-related pension. Individual controls are non-pension wealth decile, having been on sick leave at age 62, having a spouse, tertiary education, female, pension wealth at the beginning of the year in logs and marginal accrual rate assuming no reform in logs.

Table 4: Cox proportional hazard model regressions, by program.

	Main specification (1)	All pension programs (2)
Effect of the reform (in 2005):		
Immediate increase in pension wealth, %	0.107***	0.093***
	(0.0194)	(0.0179)
Increase in marginal accrual rate, % of pension	-0.0600***	-0.0539***
	(0.0107)	(0.0104)
Reach full retirement age in 12 months	2.034***	1.536***
	(0.122)	(0.111)
Pension wealth at the beginning of the year (logs)	0.549***	0.457***
	(0.0969)	(0.092)
Marg accrual rate, no reform (logs)	-0.392***	-0.359***
	(0.0905)	(0.0851)
Monthly age controls	Yes	Yes
Year controls	Yes	Yes
Individual controls	Yes	Yes
N	25,172	10,793

Notes. *** p<0.01, ** p<0.05, * p<0.1. Years covered: 2003 (baseline year)–2005 (reform year). Standard errors in parentheses. Individual controls are non-pension wealth decile, having been on sick leave at age 62, having a spouse, tertiary education, female, pension wealth at the beginning of the year in logs and marginal accrual rate assuming no reform in logs.

the upcoming reform. Figure A2 shows that no systematic anticipation effect is visible in the year preceding the reform.

5 Discussion

We have shown that the relabeling effect, holding incentives constant, had an immediate impact on retirement roughly two times the effect the maximum wealth change of just under 10% had on retirement. Exogenous changes in accrual rates had an even smaller marginal effect.

For the design of public pension systems, our current findings imply that instead of focusing on changing the accrual rates and other financial incentives, it would be more cost-effective to nudge people to retire later by changing the eligibility age for the statutory pension. However, for utility-maximizing policies, more research is needed to understand the nature of the relabeling effect. Whether it is driven by e.g. reference-dependent preferences, possible mistakes, the labor demand side or social norms and whether the behavioral adjustment to relabeling, carries a utility cost which matters for optimal policy design.

6 References

Atalay, K. & Zhu, R. (2018). The effect of a wife's retirement on her husband's mental health. Applied Economics, In Press

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

Brown, K. M. (2013). The link between pensions and retirement timing: Lessons from California teachers. Journal of Public Economics, 98, 1-14.

Cribb, J., Emmerson, C., & Tetlow, G. (2016). Signals matter? Large retirement responses to limited financial incentives. Labour Economics, 42, 203-212.

Furgeson, J., Strauss, R. P., & Vogt, W. B. (2006). The effects of defined benefit pension incentives and working conditions on teacher retirement decisions. Education Finance and Policy, 1(3), 316-348.

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

Manoli, D. S., & Weber, A. (2016b). The effects of the early retirement age on retirement decisions (No. w22561). National Bureau of Economic Research.

OECD (2018). OECD Pensions Outlook 2018.

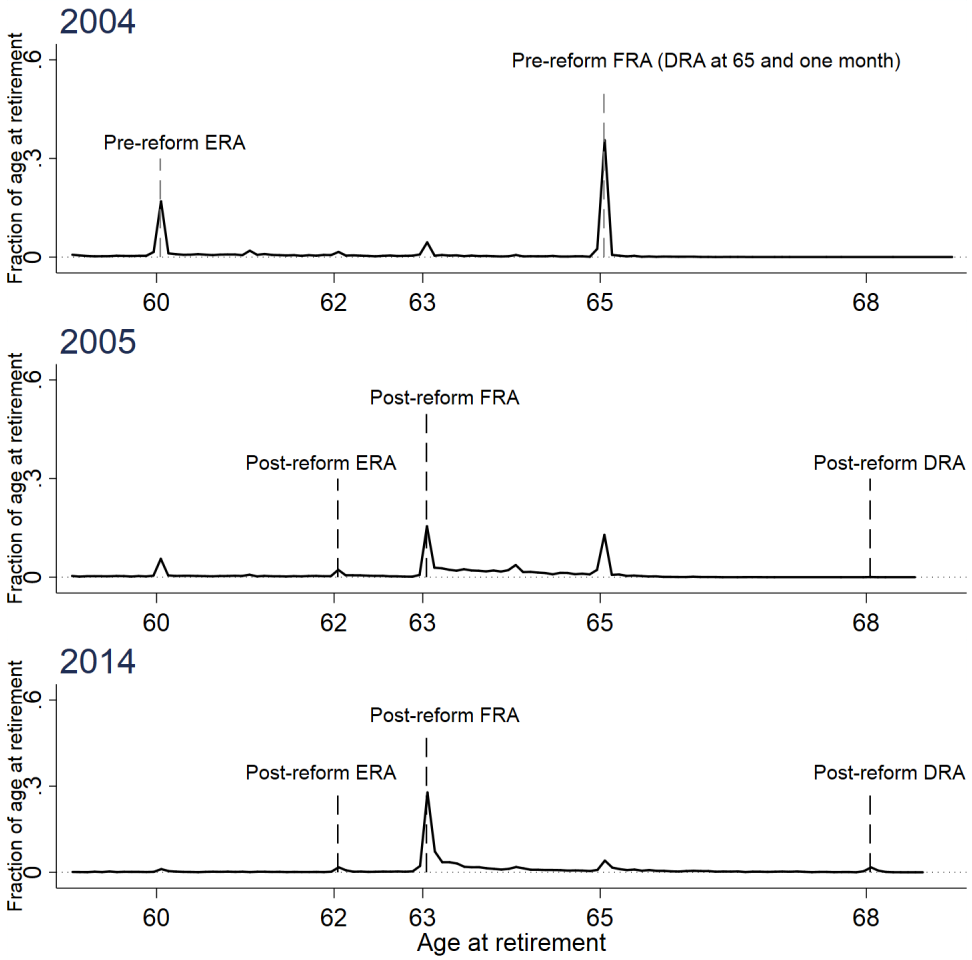
Seibold, A. (2017). Reference Dependence in Retirement Behavior: Evidence from German

Pension Discontinuities, mimeo.

Uusitalo, R. & Nivalainen, S. (2013) Vuoden 2005 eläkeuudistuksen vaikutus eläkkeellesiirtymisikään, Valtioneuvoston kanslian raporttisarja 5/2013

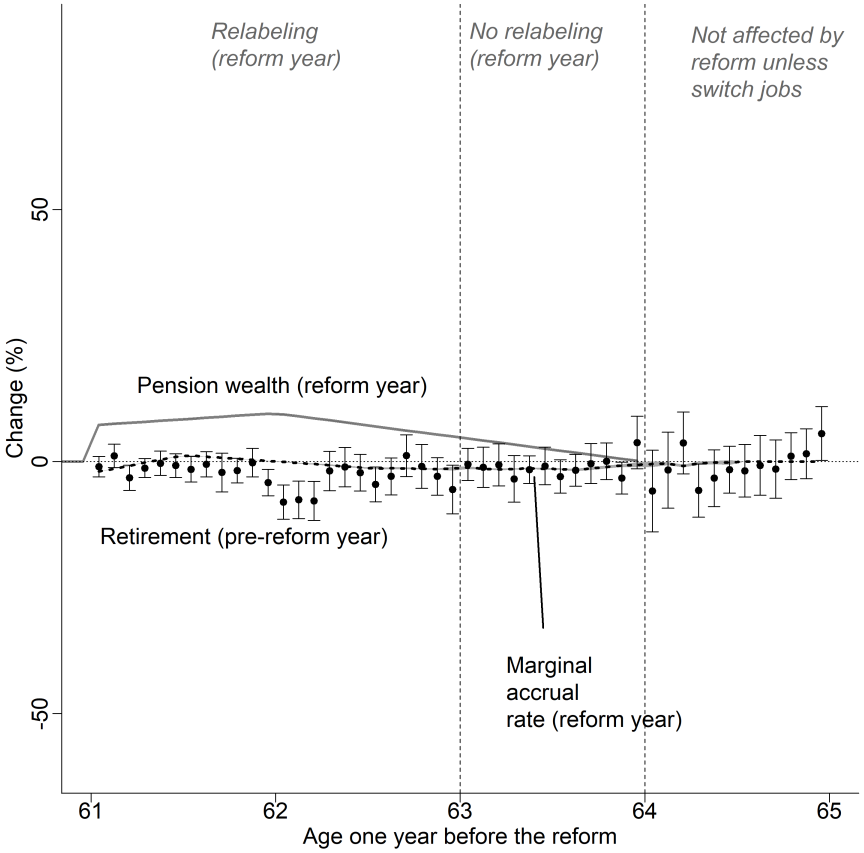
Appendix

Figure A1: Retirement fractions at different ages, all programs.



Notes. Figure shows distribution of retirement claiming ages for all retirement programs for those born between 1935 and 1955.

Figure A2: The effect of the anticipation of the reform on pension incentives and change in retirement rates by monthly birth bins in 2004 vs 2003.



Notes. Pension wealth increased on January 1 2005 due to the reform as a function of age. Marginal accrual rate as a proportion of accrued pension calculated for a 12 month period changed due to the reform as a function of age, earnings and accrued pension. The means are estimated for bimonthly birth bins. The 95% confidence intervals are shown in the shaded area. Retirement is estimated as a t-test of the difference in 2004 and 2003 for monthly birth bins. The 95% confidence intervals are shown by the error bars. The dots with no confidence intervals are such where there is no retirement in either year.