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A nudge to quit? The effect of a change in pension information on annuitization, labor supply and retirement choices among older workers

By Johannes Hagen, Daniel Hallberg and Gabriella Sjögren Lindquist[1]

Abstract

Nudge is about affecting behavior in a certain way through small changes to the choice architecture. However, a nudge may also affect behaviors that the architect did not intend. We show that such spillover effects exist in a highly policy relevant context where the use of nudge is widespread; retirement. Specifically, we find that an exogenous application form change in the Swedish pension system that highlighted a five-year payout on the expense of a life annuity not only increased the demand for the nudged payout (as expected), but also induced individuals to retire earlier. We attribute the effects to decision-framing.

Keywords: annuity, pension, nudge, decision framing

JEL codes: D91, G41, J26, J32

1 Introduction

Nudge is about affecting peoples' behavior in a certain way, by making small changes in the choice architecture without changing available options or the right to choose. However, even if individuals respond to a nudge in the way we expect them to, a nudge may also affect other behaviors that the choice architect did not consider in the first place. Such spillover effects should be of first-order importance, especially if they are not in the self-interest of the individuals, or the choice architect herself.

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This study provides clear evidence that the effects of nudging interventions may extend beyond the actual decision-making context and have implications for real behavior in other markets. Specifically, in the context of the Swedish pension system, we show that highlighting a shorter payout period (a so-called fixed term pension) [2] on the expense of a life annuity not only increased the demand for this payout, but also induced individuals to retire earlier. The possibility that short-term payout options could have negative effects on the actual retirement age is important from a policy perspective, as it may counteract governments' primary weapon against the challenges of an aging population – increased labor supply among older workers.

To our knowledge, there is no previous empirical evidence of nudge spillovers. We show that such effects exist in a highly policy relevant context where the use of nudge is widespread; accumulation and decumulation of pension capital. Our study also contributes directly to the strand of the nudge literature that focuses on retirement by switching focus to decisions close to retirement. Most previous studies have focused on the role of nudge, particularly through default provision, for savings decisions.[3]

In this study, we examine the direct effect on payout choices and the spillover effects on labor supply and other retirement-related behavior of two information changes implemented in 2008 and 2011 for local government workers belonging to the Swedish occupational pension plan. Three months before their 65th birthday, which is the normal retirement age for local government employees, these workers received an application form from the pension company that manages their occupational pension wealth. The old version of the form stated the monthly benefit amount under the default option – the life annuity – only. If individuals preferred a shorter payment horizon, the minimum being 5 years, they had to apply for this on a separate sheet of paper enclosed with the form.[4]

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[2] A fixed-term payout means that the pension capital is paid out during a fixed number of years, the minimum being 5 years. Annuity payout means that the capital is distributed over the expected remaining life. Typically, the monthly amount in a 5-year pay-out relates to that of an annuity as about 3.5 to 1.

[3] For example, Madrian and Shea (2001), Beshears et al. (2009) and Choi et al. (2004a,b) show that enrollment rates in workplace pension plans are much higher when employers are automatically enrolled (with an option to opt out) compared to when employers have to make a decision to opt in. Studies that explore employees' contribution rates include e.g.Thaler and Benartzi (2004), Shlomo Benartzi and Thaler (2007), Shlomo Benartzi and Thaler (2013), Benartzi et al. (2013), Beshears et al. (2009, 2011), Brown et al. (2006), Choi et al. (2002, 2003, 2009, 2017), Goda et al. (2014), Clark et al. (2000), Duflo et al. (2006), Dworak-Fisher (2011), Engelhardt and Kumar (2007), Even and Macpherson (2005), Mitchell et al. (2007) and Huberman et al. (2007). Cronqvist and Thaler (2004) and Cronqvist et al. (forthcoming) evaluate the role of default allocation for portfolio decisions in the Swedish Premium Pension. Some studies analyze the effects of receiving personalized pension information or general information about the pension system on the retirement decision (Finseraas and Jakobsson, 2014; Liebman and Luttmer, 2011; Mastrobuoni, 2011).

[4] To receive information about the size of the payment under a fixed-term payout, individuals had to contact the customer support service at their pension manager.

The 2008 application form change made the existence and economic implications of the 5-year payout option salient by adding the monthly benefit amount under the 5-year option. A checkbox for the 5-year payout was also added, thus providing a clear "nudge" from the life annuity to this option. In 2011, the information and checkbox on the 5-year payout was replaced in favor of the 10-year payout. In relation to the previous application form, the 2011 reform therefore nudged individuals to a *longer* payout. Throughout, the default option – the annuity payout – was unchanged.

The effects of the application form changes are estimated using a difference-in-differences framework. The comparison group is made up of local government workers of the same age who had the same pension agreement, but had chosen another pension company managing their pension capital. The comparison group thus had the same pension plan, lifelong payout as default option, and the same payout options as the group facing the application form change, but experienced no change in their own application form. We use high-quality data on individuals' payout choices from two large pension companies, the default company and the second-largest pension company in Sweden, along with rich background data from Statistics Sweden's longitudinal registers.

First, we show that the first application form change more than doubled the share choosing 5-year payouts, from about 24 per cent to 54 per cent from one month to the next. The demand for life annuities was reduced by about the same magnitude. We then show that this remarkable change in the demand for 5-year payouts had negative and significant spillover effects on the extensive margin of labor supply at ages 66–67.[5] We believe that the key to this effect is that the new application form meant that many individuals, be they ignorant or only partially informed about fixed-term payouts, suddenly realized that they could afford to retire; the fixed-term pension unexpectedly gave them a possibility to achieve a high-enough pension level to stop working.

We also show that the second application form change, which made the 10-year payout option more salient, had an even greater impact on payout choices. The share choosing 10-year payouts almost tripled on behalf of the share choosing 5-year payouts. These results – that individuals react strongly to simple nudges – suggest that individuals are highly prone to follow what they may perceive as the recommended choice. The nudge from 5- to 10-year payouts also had spillover effects on the retirement decision. It delayed the claiming of public

[5] Workers are not protected by labor law after age 67 which is equivalent to mandatory retirement. Hence, we are only following individuals up to age 67.

pension, thus, effectively, having the opposite effect from the nudge from lifelong to 5-year payouts.

Our heterogeneity analysis provides some interesting insights as to the mechanisms behind these results. First, we find that women were most likely to be affected by a nudge. This is consistent with the evidence on gender differences in receptivity to informational interventions in other contexts (Bhargava and Manoli, 2015; Liebman and Luttmer, 2015) and financial literacy (Bucher-Koenen et al., 2012; Lusardi and Mitchell, 2011; Almenberg and Säve-Söderbergh, 2011 for gender differences in Sweden). Less financially literate individuals should be more likely to follow what may be perceived as the recommended choice, which, in our case, would be the check-box alternative. Second, we find that individuals with high education were less likely to choose in accordance with the two nudges. High-educated individuals may be more aware of the different fixed-term payout options independently of the design of the application form.[6] They might also respond less to new information since they have had higher incentive to gather information about their pension in the first place compared to others (Mastrobuoni, 2011).

Third, we find that the spillover effects on labor supply and other retirement behavior is driven by high-educated. We interpret this as high-educated having more flexibility to choose retirement or continued work, both in terms of health and in the type of jobs they perform. To the extent that high-educated have higher incomes and less present-bias, the reduction in labor supply after the 5-year nudge is not likely accounted for by myopia or credit-constraints.

This study also makes several important contributions to the literature on the so-called annuity markets participation puzzle.[7] First, we propose that individuals choose to withdraw their pensions during a short period of time instead of annuitizing to be able to reduce labor supply and retire early.[8] Second, previous studies on the effect of nudge and framing on

[6] This interpretation is supported by earlier studies on financial literacy which show that education level is positively related to both financial literacy (Almenberg and Säve-Söderbergh, 2011) and knowledge about pensions (Gustman and Steinmeier, 2005). Poorly informed individuals tend to not understand their workplace pension, not to plan for retirement and are less responsive to pension incentives (Chan and Stevens, 2008; Lusardi and Mitchell, 2007; Dushi and Honig, 2015).

[7] While standard economic models predict risk-averse consumers who face uncertainty about length of life to choose annuities since annuities eliminates longevity risk (Davidoff et al., 2005; Yaari, 1965), empirical studies usually find that relatively few individuals choose annuities.

[8] Other explanations involve the presence of load factors that arise from administrative costs, incomplete markets and adverse selection (Finkelstein and Poterba, 2002, 2004; Hagen, 2015; Mitchell et al., 1999), bequest motives (Ameriks et al., 2011; Brown, 2001), high annuity prices (Chalmers and Reuter, 2012), the presence of pre-annuitized first-pillar pension income (Bernheim, 1991)), qualifying for means-tested government benefits (Bütler et al., 2011; Pashchenko, 2013), decision framing in investment decisions (Beshears et al.,

annuity decisions are either based on laboratory settings (Agnew et al., 2008) or survey data (Beshears et al., 2014; Bockweg et al., 2017). To complement earlier findings, we study real life payout decisions reaching over a significant part of the labor market (local government workers constitute about one-quarter of the labor force in Sweden), and adopt a quasi-experimental setup which allows for a causal interpretation. Third, our access to high-quality administrative data on both actual payout decisions and various individual-level outcomes is rare in the empirical literature on annuity decisions, and nudge and retirement savings, respectively.[9]

The remainder of the paper is structured as follows; Section 2 provides a background to the Swedish pension system and payout choices in the occupational pension plan for local government workers; Sections 3 and 4 describe the application form change and the data, respectively; Section 5 discusses the empirical strategy and the results; and Section 6 concludes.

2 Background information

2.1 The structure of the Swedish pension system

Sweden's pension system has two main pillars, a universal public pension system and an occupational pension system for workers whose employer is tied to some occupational pension plan. Participation in the second pillar is mandatory for these employees. The public pension is the most important source of pension income, amounting to 50–80 percent of an individual's total pension income. Mandatory annuitization applies to all pension wealth in the public pension system. The public pension system has three tiers, of which two are earnings-related and defined contribution pensions. They insure income up to a certain threshold level called the "income ceiling". About 85 percent of all employees have wages below the income ceiling. The third tier is called the minimum guarantee pension and is paid out to retirees who have low or no earnings-related pension.

The earnings-related pension and the minimum guarantee pension can be withdrawn from age 61 and age 65, respectively, and there is no legislated normal retirement age. Workers are, however, obliged to leave their employment at age 67 if requested by the

2014; Brown et al., 2008) and default options (Agnew et al., 2008; Bütler and Teppa, 2007; Hagen, 2015; Mitchell and Utkus, 2006).

[9] Hagen (2015) uses similar data but for Swedish white-collar workers.

employer to do so, according to the Employment Protection Act[10].

The second pillar consists of several different occupational, employer-provided pension plans. Occupational pension plans are constructed and thought of as supplements to the public pension system, as they also provide pension benefits above the income ceiling in the public pension system. The occupational pension therefore plays a more important role for total retirement income for individuals with earnings above the income ceiling than for those below. Contributions to the second pillar are essentially proportional to insured income up to the income ceiling. Typically, the employer is mandated to contribute between 4.5 and 6 percent of the wage portion of the insured employee that does not exceed the income ceiling. For wage portions above this threshold, a defined benefit pension amounting to 55 to 65 percent of wages at retirement is provided. For younger generations, the defined benefit pension is replaced by a defined contribution pension with a contribution rate around 30 (!) percent of wage parts above the income ceiling. There is also a third pillar for voluntary savings available to anyone who cares to supplement the retirement income provided by the first two pillars.

Most occupational pension plans are designed and implemented at the union-level. There are four large agreement-based occupational pension plans that cover around 90 percent of the total work force. Two of these plans cover workers employed in the public sector. The other two pension plans cover white-collar workers and blue-collar workers in the private sector, respectively. This study focuses on payout patterns in the pension plan for local government workers. About 25 per cent of all employees in Sweden are local government workers.

Employer-sponsored contributions to the second pillar are managed by some occupational pension companies. Each pension plan has its own "default" managing company, meaning that if the individual takes no action, her pension assets will be managed by her pension plan's default company.

2.2 Payout options

In contrast to the public pension system where annuitization is mandatory, second pillar pensions can be withdrawn, partly or fully, over a fixed number of years, for example 5 or 10 years in Sweden.[11] The pension plan for local government workers introduced this possibility

[10] Lag (1982:80) om anställningsskydd.

[11] Private pension plans in many countries have started to introduce more fixed-term pay-out options alongside the traditional life annuity. This is true both in countries such as Sweden, Denmark, Norway, Switzerland and

in 1998, several years after the pension plan for privately employed white collar workers (1977), central government employees (1991) and private-sector blue-collar workers (1996). The share of pensioners choosing to withdraw their pensions over a fixed number of years has increased in all major pension plans (Hagen, 2015, 2017; ISF, 2015, 2017).

The life annuity guarantees the retiree a stream of money right up until the point of death, whereas payments cease after a certain date under the fixed-term payout options. Fixed-term payments also cease if the individual dies before the end of the term.[12] There are different conversion factors for each payout option, i.e. the factor at which the accumulated pension capital is converted into a monthly payment. The conversion factor depends on assumptions about average life expectancy at each claiming age and the rate of return on the pension capital, but is independent of gender and marital status. The resulting monthly benefit is adjusted with the inflation rate. The occupational pension plan we study in this paper offer a life annuity payout, or fixed-term payouts over 5 to 20 years.

Individuals may receive occupational pension income from different companies and hence be required to make more than one payout choice. Individuals with multiple pensions have either used the possibility to invest their pension capital at different companies, or worked in different sectors and thereby got covered by more than one pension plan, or both.

2.3 The occupational pension plan for local government workers

The pension plan for local government workers is called KAP-KL. The universe of Swedish local government workers (around one million) belong to this plan. Typical professions are teachers, physicians, nurses and other medical or care giving personnel. KAP-KL has one defined contribution and one defined benefit component. The defined contribution component accounts for earnings up to 30 income base amounts[13] with a contribution rate of 4.5 percent. The defined benefit component replaces 27.5 – 55 percent of the earnings that exceed the income ceiling in the public pension system (7,5 income base amounts[14]) and 30 income base amounts. Around 15 per cent of local government workers has wages above the income ceiling in the public pension system.

Australia, where private pensions are mandatory or quasi-mandatory, and in countries such as Canada, United Kingdom and the US, where voluntary private pensions are more predominant.

[12] However, under both the life annuity and the fixed-term pension, the insured can buy a co-insurance which means that the survivor will receive the pension either as a life annuity or during a fixed period.

[13] 30 income base amounts equals a yearly income of approximately USD137,900 (1USD≈9 SEK).

[14] 7,5 income base amounts equals a yearly income of approximately USD34,465 (1USD≈9 SEK).

The defined contribution component can either be withdrawn as a lifelong annuity or as a fixed-term payout with a minimum of 5 years and a maximum of 20 years. In contrast, mandatory annuitization applies to pension income from the defined benefit component. The defined contribution pension can be withdrawn from the age of 55 while the defined benefit part can be withdrawn from the age of 61. If no action is taken, the defined contribution pension is paid out lifelong at the age of 65 and the defined benefit pension at the age of 67.

KPA is the default managing company of the occupational pension plan for local government workers. This means that they administrate pension contributions and pension payouts for all local government workers in Sweden who have not actively moved their pension capital to another company.

3 Application form change

Three months before they turn 65, local government workers who have not already claimed their defined contribution pension receive an application form that provides information on the payout decision and a possibility to opt out of the default. The default is a lifelong annuity paid out from the age of 65.

In June 2008, KPA, the default managing company of the pension plan KAP-KL, changed their application form so that the existence and the economic implications of the 5-year payout became more salient. The old application form stated the monthly benefit under the lifelong annuity. If the individual preferred to opt out, he or she could declare the desired number of years (5–20) on a separate sheet of paper that was enclosed in the letter. There was no information on the size of the benefit under the fixed-term payouts. To receive information about the monthly payout under a fixed term pension, the applicant had to contact customer services. In the new application form, however, a checkbox for the 5-year payout was added. The new form also informed the applicant about the size of the benefit under the life annuity and under the 5-year payout, respectively. Hence, the costs of choosing a 5-year payout decreased. An alternative payout length between 5–20 years could be specified on a separate sheet of paper, just like prior to the reform.

In 2011, KPA once again changed their application form. This time they highlighted the 10-year payout. They changed the checkbox from a 5- to a 10 year payout and now informed the applicant about the size of the benefit under the life annuity and under the 10-year payout (instead of the 5-year payout), respectively.

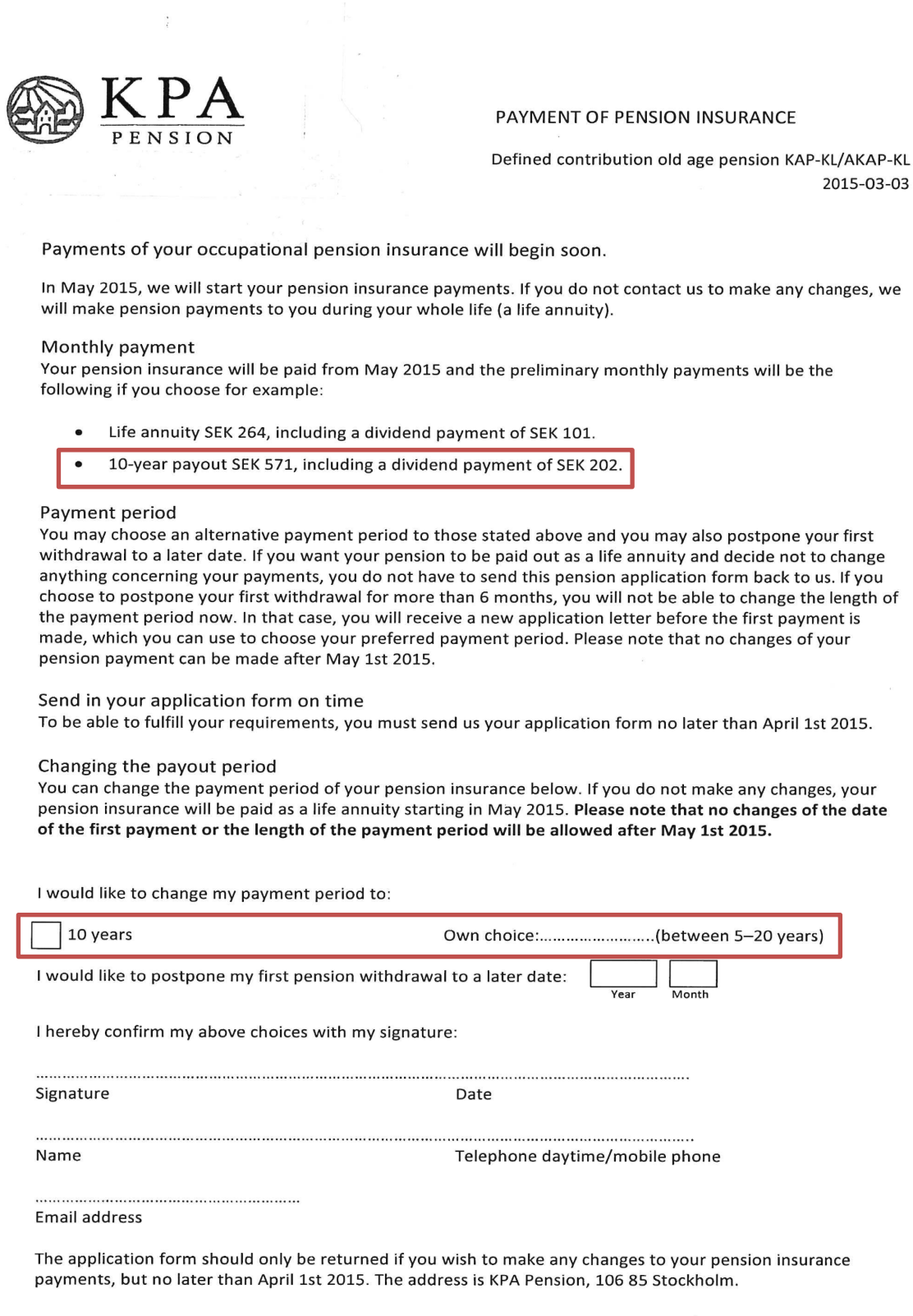
Figure **1** shows the application form from 2011 where the red boxes indicate the added information on 10-year payouts. The application form from the second half of 2008 was similar, but had the information on, and check-box for, a 5-year payout instead of a 10-year payout. Note that the application forms also contained a row where the beneficiary could fill in the year and month at which the pension payment should begin.

The objective behind the first application form change was, according to officials at KPA, to increase the awareness of the possibility to withdraw the pension during a shorter period and, thus, receive a higher monthly payment than under the annuity option. Before the new application form was introduced, many retirees with smaller pension payouts contacted customer support services and raised complaints about their small monthly amounts under the life annuity (ISF, 2015). As a result, KPA added information about the 5-year payment in the application, and added the check-box for 5-year payout. The second application form change was a result of that the huge increase of 5-year payouts became too expensive for KPA.

In our difference-in-differences analysis, we use a comparison group consisting of local government workers who had moved their pension capital from KPA to another pension company called AMF. AMFs customers also receive an application form a few months before their 65th birthday. AMF's application form was similar, but not identical, to the form given to the treatment group before the first application form change in 2008. However, importantly, AMF made no change to the application form for the cohorts that we study.

If the pension-managing company did not receive a signed application form from the beneficiary with the desired payout choice filled in, the payout commenced according to the default option, i.e., a life annuity from the month he or she turns 65 years of age. Once the payout has begun it is no longer possible to modify or alter the payout plan.

Figure 1. An example of KPA's application form after the change in 2011



KPA PENSION

PAYMENT OF PENSION INSURANCE

Defined contribution old age pension KAP-KL/AKAP-KL
2015-03-03

Payments of your occupational pension insurance will begin soon.

In May 2015, we will start your pension insurance payments. If you do not contact us to make any changes, we will make pension payments to you during your whole life (a life annuity).

Monthly payment
Your pension insurance will be paid from May 2015 and the preliminary monthly payments will be the following if you choose for example:

- Life annuity SEK 264, including a dividend payment of SEK 101.
- 10-year payout SEK 571, including a dividend payment of SEK 202.

Payment period
You may choose an alternative payment period to those stated above and you may also postpone your first withdrawal to a later date. If you want your pension to be paid out as a life annuity and decide not to change anything concerning your payments, you do not have to send this pension application form back to us. If you choose to postpone your first withdrawal for more than 6 months, you will not be able to change the length of the payment period now. In that case, you will receive a new application letter before the first payment is made, which you can use to choose your preferred payment period. Please note that no changes of your pension payment can be made after May 1st 2015.

Send in your application form on time
To be able to fulfill your requirements, you must send us your application form no later than April 1st 2015.

Changing the payout period
You can change the payment period of your pension insurance below. If you do not make any changes, your pension insurance will be paid as a life annuity starting in May 2015. **Please note that no changes of the date of the first payment or the length of the payment period will be allowed after May 1st 2015.**

I would like to change my payment period to:

☐ 10 years Own choice:.....(between 5–20 years)

I would like to postpone my first pension withdrawal to a later date: ☐ Year ☐ Month

I hereby confirm my above choices with my signature:

.....
Signature Date

.....
Name Telephone daytime/mobile phone

.....
Email address

The application form should only be returned if you wish to make any changes to your pension insurance payments, but no later than April 1st 2015. The address is KPA Pension, 106 85 Stockholm.

Note: This is a translated and cropped version of the original Swedish application form (see Appendix for the Swedish version of the 2011 application form change).

4 Data

4.1 Data on payout choices and housing allowances

We use data from two pension companies, KPA and AMF. AMF is the default managing company of the pension plan for blue-collar workers in the private sector. AMF is also one of the companies that local government workers can choose to move their capital to. The data consist of information on clients of KPA and AMF that belong to the pension plan for local government workers that claimed their occupational pension between 2008 and 2015. These data are merged to rich register data from Statistics Sweden. These include longitudinal information on incomes from e.g. pensions, work, and benefits. They also include background information on e.g. education and marital status.

We make some sample restrictions. First, because the new application form was introduced by KPA for the cohort born in September 1943, we sample all local government workers who turned 65 in 2008 (i.e. the 1943 cohort) for the analysis of the first application form change. For the analysis of the second application form, we sample those who turned 65 in 2011 (i.e. the 1946 cohort). In order to minimize cohort effects, older and younger cohorts are excluded. Second, we restrict our sample to individuals who start collecting their flexible pension at their 65th birthdate or later. The reason for this is that we want to focus on individuals who were exposed to the new application form, which is sent out three months prior to this date. This is not a major restriction since 81 per cent claimed their occupational pension at age 65 or later (82 per cent for the comparison group). Third, we select individuals that are classified as active in the labor market prior to the distribution of the application form, i.e., prior to the 65th birthday. Individuals that departed from the labor market earlier than that age are less interesting for our study as they are less relevant for the labor supply and retirement choices after age 65. We classify active workers as those with yearly wage income exceeding 2 price base amounts (about SEK 90,000 or USD 10,000) throughout age 61–64, who are not claiming any old age pension at age 64 and not receiving any type of disability pension between ages 55 and 64. Fourth, since AMF did not have any record of those that died before 2014 in their database, we had to drop all individuals that were deceased in 2014.[15]

The final sample consists of about 18,000 and about 22,000 individual-year

[15] This means that in general our samples are somewhat positively selected in terms of health status, and that the sample for birth cohort 1943 is somewhat more positively selected than that for birth cohort 1946.

observations for the 2008 and 2011 form changes, respectively, of whom 55 per cent belong to KPA. The company data are merged with register data from Statistics Sweden to obtain rich individual background information. The data are derived from the Longitudinal Integration Database for Health and Insurance and Labor Market Studies (LISA). We will focus on labor supply effects in the two years following the normal retirement age, i.e. 66–67 years of age, as employees only have the right to stay in employment until age 67 according to the Employment Protection Act.

4.2 Descriptive statistics

Table 1 shows descriptive statistics for pre- and post-reform cohorts for the treatment and comparison group of the 2008 application form change, respectively. Table 2 shows the same but for the 2011 application form change.

Table 1 and 2, first section, show that individuals in the treatment and comparison groups are very similar in terms of most background characteristics. Both groups are dominated by women (around 75 percent) and about two-thirds are married. Labor force attachment and income history prior to retirement and pension claiming behavior are also close to identical.

Differences with respect to two variables are worth pointing out. First, individuals in the treatment group are more likely to have completed at least three years of college. This could help explain the pre-reform differences in labor supply at ages 66 and 67. Second, the size of the pension capital that can be withdrawn as a fixed-term payout is larger in both comparison groups. Together with the fact that these individuals have actively moved their capital to AMF from the default company KPA, this suggests that the comparison group is more involved in, and informed about, their pension situation. Note, however, that all variables, including the size of the pension capital, exhibit similar changes across cohorts in the treatment and comparison groups.

The last two sections in Table 1 and 2 report descriptive statistics for our outcome variables: first and second pillar pension income and labor income (the payout decision is analyzed separately in Section 5.1). We average the outcome variables over the age interval 66–67, both because we are interested in measuring the immediate effect of the application form change on the retirement decision and labor supply, and because few local government workers work after the mandatory retirement age of 67. The income variables are expressed in 100s of SEK (1 USD $\approx$ SEK 9) and we study both the intensive and extensive margin of

labor supply, where an individual is defined as working if he or she has a yearly wage income exceeding 2 price base amounts (about SEK 90,000 or USD 10,000). [16]

There are some, although quite small, differences between the pre-reform cohorts in the treatment and comparison groups. First, we see that the yearly benefit from the flexible pension (i.e. the pension directly affected by the fixed-term payout option) is larger in the comparison group than in the treatment group. This is expected given the observed differences in pension capital. The two groups are, however, more similar in the pre-reform cohorts when it comes to total occupational pension income and public pension. The pre-reform cohorts in the treatment groups are more likely to work and, partially because of that, also have higher average labor income at ages 66–67.

Comparing the difference across cohorts between the treatment and comparison groups gives some indication of the effects of the application form change. The introduction of the 5-year nudge in 2008 raised the average flexible pension on a yearly basis from SEK 8,400 (USD 933) to SEK 11,400 (USD 1,267) for the treated group (an increase of 26 per cent). It is also interesting to note that these raw difference-in-differences estimates suggest that the increased demand of 5-year payouts decreased labor supply.[17] The increased demand of 10-year payouts on behalf of 5-year payouts in 2011 decreased the average yearly flexible pension from SEK 14,600 (USD 1,622) to SEK 10,900 (USD 1,211). The raw difference-in-difference estimates show that labor supply increase when the 10-year payouts increased on behalf of the 5-year payouts. These effects are quantified in more detail in the next section.

[16] The results regarding labor supply presented in the text are robust for alternative definitions (i.e., instead of 2 basic amounts we have also used 0.5, 1, and 3 basic amounts; approximately SEK 22,000, SEK 45,000, and SEK 135,000, respectively). See Table A2 in Appendix for details.

[17] One should note that incomes are measured by calendar year. Therefore birth-month effects will spill over systematically to the difference between pre-reform and post-reform cohorts in such a way that cohorts born later in the year will have higher labor incomes (and lower pension incomes) measured on a calendar year basis than cohorts born earlier in the year, on average. Meaningful inference must hence rely on comparing post-reform and pre-reform cohorts for KPA with the same cohorts for AMF (the double difference).

Table 1. Descriptive statistics for the cohort born in 1943 experiencing the 2008 application form change highlighting the 5-year payout

	KPA		AMF	
	Post	Pre	Post	Pre
Education level				
Compulsary	0.16	0.16	0.16	0.16
High school 1-2 yrs.	0.29	0.29	0.37	0.34
High school 3 yrs.	0.06	0.06	0.06	0.06
Collage 1-2 yrs.	0.16	0.15	0.13	0.14
Collage 3 yrs. or more	0.31	0.33	0.26	0.28
Doctoral (PhD)	0.02	0.02	0.02	0.02
Not married (y/n)	0.38	0.37	0.36	0.35
Female (y/n)	0.74	0.74	0.77	0.77
Sum household disposable income 55-64	39348.21	39204.59	38662.49	38719.36
Share labor income of total income 55-64	0.96	0.96	0.96	0.96
Share health insurance income of total income 55-64	0.01	0.01	0.01	0.01
Pensions capital ranking				
<p10	0.07	0.07	0.04	0.06
p10-p25	0.16	0.16	0.10	0.10
p25-p75	0.57	0.61	0.41	0.40
p75-p90	0.12	0.11	0.25	0.24
>p90	0.08	0.05	0.20	0.20
Outcomes 66-67 (yearly):				
Late claim (y/n)	0.28	0.26	0.22	0.20
5 yrs. (y/n)	0.54	0.26	0.18	0.17
10 yrs. (y/n)	0.09	0.12	0.11	0.11
Lifelong (y/n)	0.35	0.58	0.72	0.72
Flexible pension	113.73	83.84	89.43	93.87
Total Occ.pens	480.54	473.86	433.44	477.65
Publ. Pens>0 (y/n)	0.91	0.93	0.92	0.95
Publ. Pens	1241.70	1339.29	1260.16	1375.26
Labor income>2BA (y/n)	0.35	0.32	0.33	0.26
Labor income	1093.93	956.98	941.24	744.97
Obs	3454	6357	2758	5380

Note: The sample includes local government workers born in 1943 who claimed their occupational pension from either KPA (treatment group) or AMF (comparison group). The continuous income variables (e.g. labor income) are expressed in 100s of SEK (1 USD approximately equals 9 SEK) at an annual basis. 1 price base amount (BA) is equal to 44 800 SEK. All incomes are in 2016 price level.

Table 2. Descriptive statistics for the cohort born in 1946 experiencing the 2011 application form change highlighting the 10-year payout instead to the 5-year payout

	KPA		AMF	
	Post	Pre	Post	Pre
Education level				
Compulsary	0.12	0.11	0.14	0.13
High school 1-2 yrs.	0.28	0.29	0.38	0.35
High school 3 yrs.	0.06	0.07	0.06	0.07
Collage 1-2 yrs.	0.16	0.17	0.15	0.15
Collage 3 yrs. or more	0.35	0.35	0.27	0.29
Doctoral (PhD)	0.02	0.02	0.01	0.02
Not married (y/n)	0.38	0.40	0.34	0.36
Female (y/n)	0.72	0.74	0.78	0.75
Sum household disposable income 55-64	43496.19	43104.07	42458.68	42942.05
Share labor income of total income 55-64	0.96	0.96	0.96	0.96
Share health insurance income of total income 55-64	0.02	0.01	0.02	0.02
Pensions capital ranking				
<p10	0.09	0.09	0.06	0.07
p10-p25	0.14	0.14	0.13	0.11
p25-p75	0.53	0.57	0.47	0.47
p75-p90	0.16	0.14	0.20	0.21
>p90	0.08	0.06	0.14	0.15
Outcomes 66-67 (yearly):				
Late claim (y/n)	0.31	0.34	0.22	0.26
5 yrs. (y/n)	0.20	0.48	0.22	0.22
10 yrs. (y/n)	0.45	0.14	0.14	0.15
Lifelong (y/n)	0.32	0.34	0.64	0.63
Flexible pension	109.41	146.12	143.79	155.95
Total Occ.pens	495.88	606.13	486.54	547.73
Publ. Pens>0 (y/n)	0.88	0.91	0.93	0.93
Publ. Pens	1186.56	1301.36	1251.12	1319.37
Labor income>2BA (y/n)	0.42	0.37	0.33	0.30
Labor income	1340.83	1105.95	993.79	898.09
Obs	4947	7291	3844	5873

Note: The sample includes local government workers born in 1946 who claimed their occupational pension from either KPA (treatment group) or AMF (comparison group). The continuous income variables (e.g. labor income) are expressed in 100s of SEK (1 USD approximately equals 9 SEK) at an annual basis. 1 price base amount (BA) is equal to 44 800 SEK. All incomes are in 2016 price level.

5 Empirical strategy

The interest is first in estimating the effect of the nudges on payout choices. Second we are interested in estimating the spillover effects of the change in payout choices on labor supply and other retirement behavior. For the 2008 application form change, the sample population is local government workers born in 1943. KPA changed the application form for those born in September 1943 or later whereas AMF used the same form for all applicants in that cohort.

To estimate the effects on payout choices, labor supply and retirement choices from the 2011 application form change, we use workers born in 1946. Individuals born in August 1946 or later received the application form nudging 10-year payouts, while individuals born between January and July 1946 received the application form nudging 5-year-payouts. For both the 1943 and 1946 cohorts, individuals who had not claimed their flexible pension before the month they turn 65 years of age are exploited (see section 3). Thus, for individual i born in month m receiving pension from company c, the difference-in-difference equation is written as:

$$y_{i,m,c,a} = \alpha + \delta(KPA_c * Post_m) + \phi KPA_c + \psi Post_m + \beta X_{i,m,c} + u_{i,m,c,a} \quad (1)$$

where $y_{i,m,c,a}$ represents an outcome of interest (i.e., payout choice or a measure of labor supply) at age *a*. KPA_c is an indicator for being a client at KPA company, and 0 else. $Post_m$ signifies treatment assigned by month of birth cohort, i.e., 1 for born September–December for birth cohort 1943 and August–December for birth cohort 1946, and 0 else. $X_{i,m,c}$ is a vector of control variables which include gender, marital status at age 64, education level, labor market sector, various measures of historical incomes, e.g., sickness absence benefit income, and controls for pension capital (dummies for percentile ranking less than p10, p10–p25, p75–p90, and greater than p90). In the model general differences in outcome across the treatment and the comparison group are captured by ϕ while general differences across treatment assignment (i.e., birth month) are estimated by ψ.[18] The effect of the application form changes is measured by the difference-in-difference estimator δ. The identifying assumption of the effect of the application form changes is that in the absence of the reforms any trend in payout choice, labor supply and retirement choices should be the same for local government workers connected to KPA and to AMF, respectively.

We first show the impact of the application form changes on the payout decision in Section 5.1. The identifying assumption is discussed in Section 5.2. Our main results for labor supply and retirement choices are presented in Section 5.3. In Section 5.4 we discuss possible mechanisms.

5.1 The impact of the application form changes on payout choices

For the application form change in 2008, we know from the descriptive statistics that the yearly flexible pension benefit for individuals born in September 1943 or later in the

[18] We have also included single-monthly dummies to adjust for any general birth-month trend. Excluding these does not affect our effect-estimates, however.

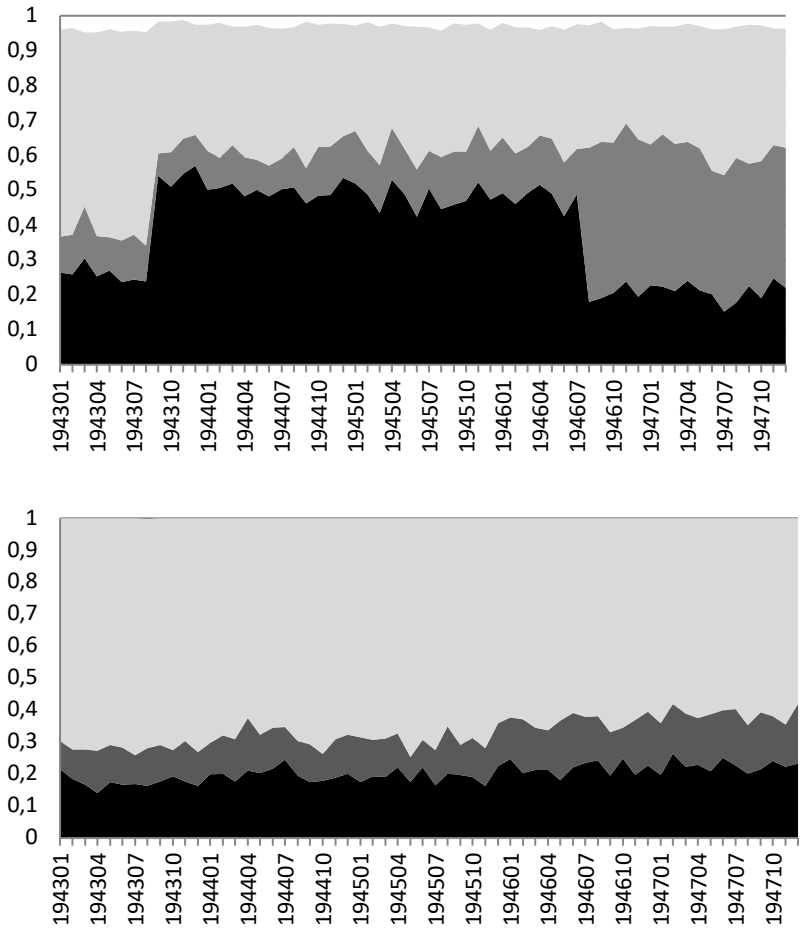
treatment group is larger than for the corresponding birth cohorts in the comparison group. For the application form change in 2011, the treatment group's yearly flexible pension benefit decreased as individuals were nudged to 10-year payouts instead of 5-year payouts. This section aims at quantifying the impact of the application form changes on the payout choices and occupational pension incomes in more detail.

The effects of the application form changes are best illustrated graphically. Figure 2 shows the fraction of individuals choosing the 5-year payout, the 10-year payout or the lifelong annuity for the cohorts 1943–1947. The remarkable trend shifts for cohorts born in September 1943 and August 1946 coincide with the application form changes, which made the 5-year payout and the 10-year payout more salient, respectively.

In the treatment group (KPA), about 25 percent of those who got the old application form choose the 5-year payout. This fraction jumps by more than 30 percentage points when the new application form is sent out to cohorts born in September 1943. There is no corresponding change in the comparison group (AMF); the 5-year payout is preferred in about 15 percent of the cases throughout the whole period. Figure 2 shows that the increase in the share of 5-year payouts corresponds to a decline of similar magnitude in the fraction of lifelong annuities. This means that many individuals were nudged out of the annuity option to the 5-year option because of the reform, and that the parallel trends assumption with respect to the payout decision holds.

In 2011, the application form changed once again. This time the 10-year payout became more salient. For cohorts born in August 1946 the fraction choosing 10-year payouts increased from about 15 to 45 percent. At the same time, the fraction choosing 5-year payouts decreased with the same magnitude.

Figure 2. Payout decisions in the treatment (upper panel) and comparison (lower panel) groups for cohorts 1943–1947.



Note: The black and dark grey areas represent the 5-, and 10-year payout options, respectively. The light grey area is made up of lifelong annuities. Pension claims at age 65. Some of KPA's clients chose other payouts than 5 or 10 years or lifelong payments which is shown by the white area in the upper panel.

Table 3 shows regression estimates of the effects of the application form changes on the demand for 5-year and 10-year payouts, respectively. We estimate equation (1) after replacing the left-hand side variable by a dummy variable that takes the value of one if the individual chooses the 5-year payout and zero otherwise as a linear probability model with robust standard errors. We repeat the procedure for the 10-year payout and the lifelong annuity. The upper part of the table gives the results for the 2008 form change while the lower part presents the 2011 form change. Each cell therefore represents the difference-in-differences estimate from a separate regression.[19]

[19] One may be worried that self-selection away from the default pension managing company KPA to AMF is driven by non-observables, that also drive our main outcomes. However, both in Table 3 and Table 4 below one can note that estimates are relatively robust for controls (compare "Average effect, no controls" and

Table 3. Average effect of the 2008 and 2011 application form changes on occupational pension withdrawal; age 66–67

	Shares:				Annual incomes (100s SEK):	
	Late claim (y/n)	5 yrs.	10 yrs.	Lifelong	Flexible pension	Total Occ.pens
2008						
Average effect, no controls	0.007	0.277***	-0.027**	-0.225***	34.340***	50.888**
Average effect, full set of controls	0.001	0.274***	-0.028**	-0.220***	34.595***	36.562*
Baseline (pre KPA)	0.258	0.259	0.116	0.582	83.843	473.856
2011						
Average effect, no controls	-0.005	-0.287***	0.310***	-0,022	-24.550***	-49.064**
Average effect, full set of controls	-0.015	-0.286***	0.305***	-0.017	-30.609***	-81.647***
Baseline (pre KPA)	0.342	0.482	0.144	0.342	146.122	606.125

*Note. Robust standard errors: *p<0.05; **p<0.01; ***p<0.001. The continues income variables (e.g., flexible pension) are expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis. Number of observations is 17,949 for the change in 2008 and 21,955 for the change in 2011. "Full set of controls" includes gender, marital status at age 64, education level, labor market sector, various measures of historical incomes, e.g., sickness absence benefit income, and controls for pension capital (dummies for percentile ranking less than p10, p10–p25, p75–p90, and greater than p90.*

The results show that the fraction choosing the 5-year payout increased by 28 percentage points when the 5-year nudge was implemented in 2008. The fraction choosing annuities decreased by about the same size. When, instead, 10-year payouts were nudged in 2011, the fraction choosing 10-year payouts increased by 31 percentage points. The fraction choosing 5-year payouts decreased by the same magnitude.

The first column, where the dependent variable is a dummy variable that equals one if the flexible pension is withdrawn after the 65th birthday, shows that neither of the reforms had any effect on postponing or advancing the payout.

To investigate the effect on pension income, Table 3 presents reform effects on the size of the flexible pension benefit at ages 66–67. The point estimate of the implementation of the 5-year nudge reflects an increase in the yearly flexible pension of SEK 3,600, which corresponds to 43 percent of the average flexible pension for the pre-reform cohorts. When nudging towards 10- instead of 5-year payouts, the point estimate shows a decrease in the

"Average effect, full set of controls"). This means that selection on non-observables is relatively unlikely and therefore less problematic (cf. Altonji et al. (2005)).

yearly flexible pension of SEK 3,100 or 21 percent of the average flexible pension for the pre-reform cohorts in 2011.

We also study the effects on other occupational pensions not directly affected by the application form changes. The application form changes that were implemented by KPA might have had spillover effects on their clients' payout decisions in other pension plans, particularly if they were unaware of, or had little knowledge about, fixed-term payouts. The last column in Table 3 shows that after the first reform in 2008, the increase in total occupational pension income is of the same magnitude as the increase in flexible pensions. This means that the change in information nudging 5-year payouts did not affect other occupational pensions much. However, when nudging 10- instead of 5-year payouts, the decrease in total occupational pensions is larger than that in flexible pensions. This spill-over effect should either reflect a lower likelihood of choosing shorter payout lengths in these plans and/or that individuals postpone their payout in these plans to a greater extent.

To sum up, the application form change resulted in a remarkable shift away from the life annuity to the 5-year payout, when 5-year payouts became more salient on the application form. The corresponding increase in total pension income is more modest since the payout decision only concerns pension capital accumulated from year 1998.[20] When the 10-year payout was highlighted, instead of the 5-year payout, this also resulted in a huge shift from 5- to 10-year payouts, and the average yearly total pension was affected negatively. We discuss potential mechanisms for these results in Section 5.4.

5.2 Identifying assumptions

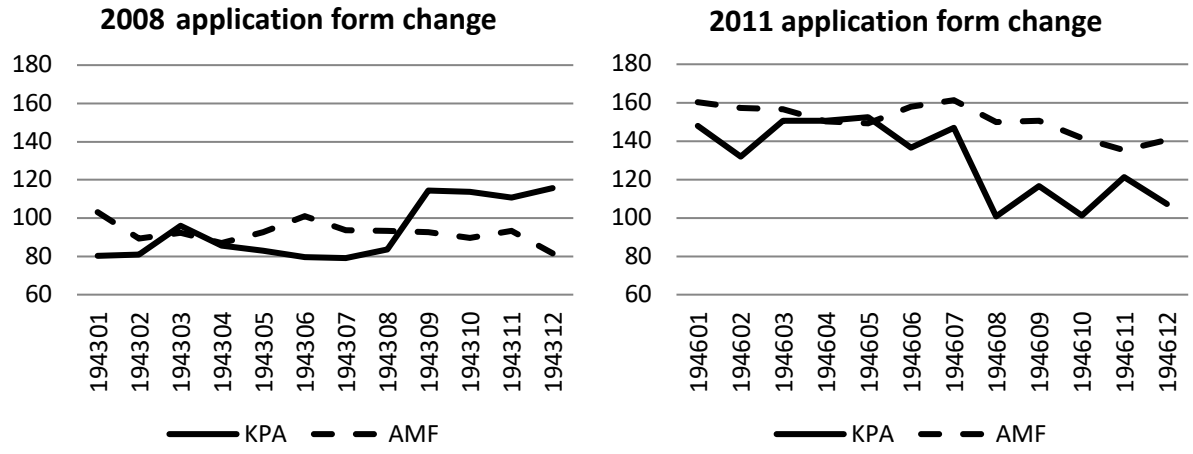
The parallel trends assumption implies that the outcome variable evolved in the same way in the treated group as in the comparison group in absence of the reform. We check for parallel trends for the pre-reform birth cohorts in the *level* of the flexible pension as well as of labor supply and public pension, of which the latter are our main outcome variables in the coming section. As will be clear from the graphical illustrations below, pre-reform trends in our main outcome variables *are* similar.[21]

[20] The economic significance of the pay-out decision in KAP-KL in 2008 can be illustrated by comparing the flexible pension benefit under the assumption that all individuals choose the 5-year pay-out versus the life annuity. The average difference amounts to SEK 10,100 per year which corresponds to about 25 percent of total occupational income.

[21] Furthermore, along with the graphical illustrations in this section, we have also tested formally (by a series of separate F-tests) whether pre-reform cohort trends in the studied outcomes are parallel for the treatment and comparison groups. For all our outcomes (presented in Table 1 and Table 2) we cannot reject the null that trends are parallel on the 5 percent level. See Appendix for details.

Figure 3 plots average outcomes for the treatment and comparison groups before and after the 2008 (left hand side panel) and 2011 (right hand side panel) application form changes, respectively, for flexible pension income. Despite some monthly fluctuations, these figures suggest that flexible pension patterns evolved similarly for pre-reform cohorts in the two groups. The gaps that opens up at the time of the application form changes in 2008 and 2011 reflects the increased demand of 5- and 10-year payouts, respectively, and the corresponding pension increase for 2008 and pension decrease for 2011 shown in Table 3.

Figure 3. Flexible pension income (in 100s of SEK) in the treatment and comparison group, ages 66–67

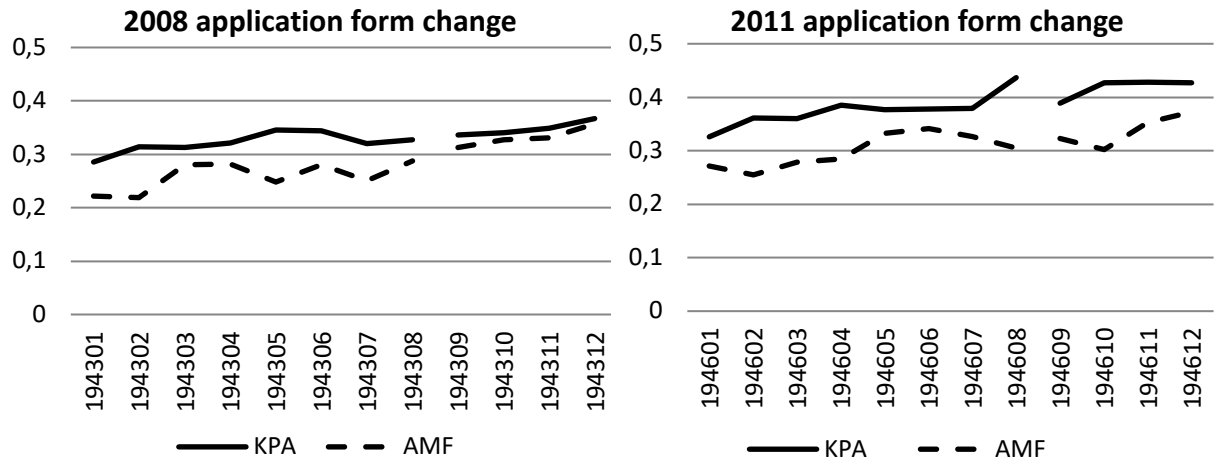


Note. Flexible pension income is expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis.

Next, Figure 4 and 5 plots average series for the extensive and intensive margin of labor supply, respectively, for the treatment and comparison group before and after the application form changes in 2008 and 2011, respectively. We again see that the pre-reform trends are similar, although there are some monthly variations. We also see that the gap that is prevalent between the pre-reform cohorts in 2008 almost vanishes for the post-reform cohorts, suggesting that nudging towards 5-year payouts reduced labor supply. For the application form change in 2011, we see that the gap in labor earnings increase for the post-reform cohorts. [22]

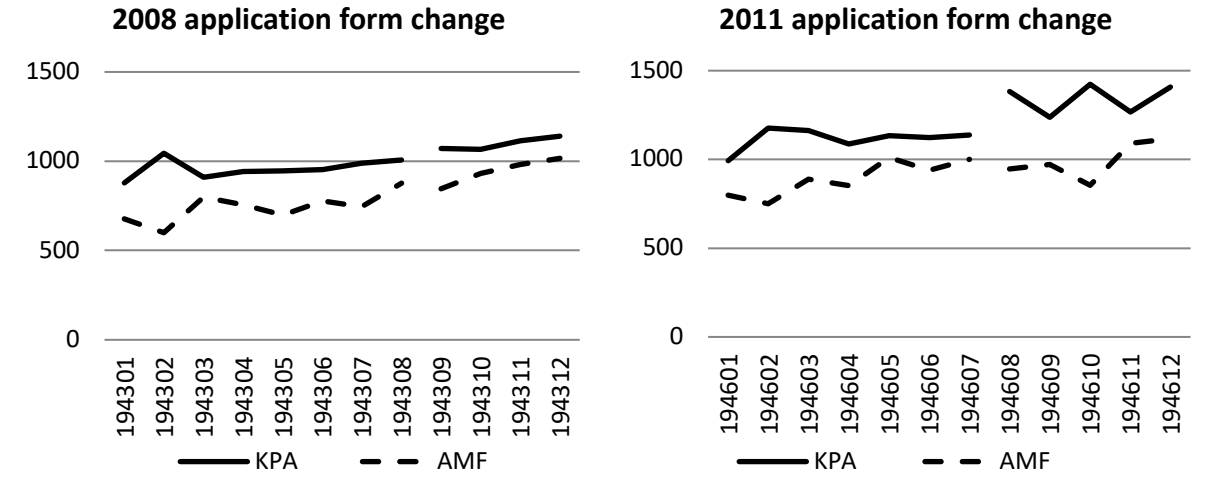
[22] As mentioned incomes are measured by calendar year. These plots therefore reveal general birth-month trends in such a way that cohorts born late in the year on average will have higher labor incomes (and on average lower pension incomes) measured on a calendar year basis, than cohorts born early in the year.

Figure 4. Share with labor earnings > 2 price base amounts in the treatment and comparison group, ages 66–67



Note. 1 price base amount (BA) is equal to 44 800 SEK (1 USD is approximately 9 SEK).

Figure 5. Labor earnings (in 100s of SEK) in the treatment and comparison groups, ages 66–67



Note. Labor income is expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis.

As for public pension take-up and average public pension, plotted in Figure 6 and 7, respectively, we again note relatively similar pre-reform trends between treatment and comparison groups. We also see that the gap in public pension take-up between the pre-reform cohorts in 2008 is reduced for the post-reform cohorts. For 2011, the pre-reform gap is instead expanded for the post-reform cohorts. This tendency is not as obvious when looking at average public pension, at least not for the 2008 application form change.

Figure 6. Share with public pension take-up in the treatment and comparison group, ages 66–67

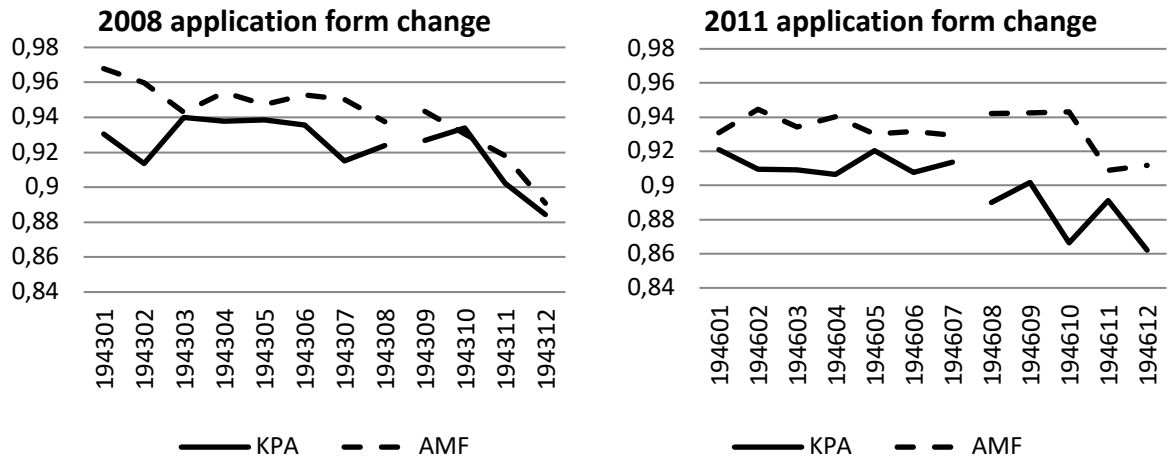
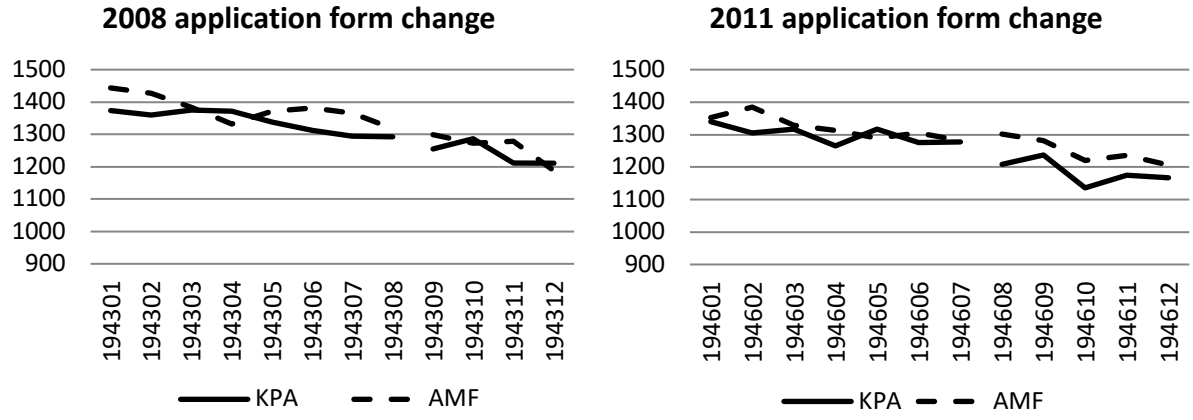


Figure 7. Public pension (in 100s of SEK) in the treatment and comparison group, ages 66–67



Note. Public pension income is expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis.

5.3 Main results

In this section, we analyze the spillover effects of the application form changes on retirement claiming and labor supply. The main results from estimating Equation (1) are presented in Table 4. The reported coefficients measure the application form change effects on each of the outcomes given in the column headings. The outcome variables of interest are extensive and intensive margin measures of labor supply (labor income) and public pension.

Table 4. Average effect of 2008 and 2011 form changes on labor income and public pension; age 66–67

	Labor income >2BA (y/n)	Labor income (100s SEK)	Public pension>0 (y/n)	Public pension (100s SEK)
2008				
Average effect, no controls	-0.045**	-59.32	0.012	17.51
Average effect, full set of controls	-0.051***	-79.627	0.012	11.918
Baseline (pre KPA)	0.322	956.983	0.930	1339.291
2011				
Average effect, no controls	0.026*	139.185**	-0.027***	-46.546**
Average effect, full set of controls	0.015	72.900	-0.022**	-60.386***
Baseline (pre KPA)	0.365	1105.945	0.914	1301.359

*Note: Robust standard errors: *p<0.05; **p<0.01; ***p<0.001. The continuous income variables (e.g., labor income) are expressed in 100s of SEK (1 USD is approximately 9 SEK) at an annual basis.1 price base amount (BA) is equal to 44 800 SEK (1 USD is approximately 9 SEK). Number of observations is 17,949 for the 2008 reform and 21955 for the 2011 reform. "Full set of controls" includes the same variables as in Table 3.*

The results for the extensive (labor income>2 BA) and intensive margin (amount received in 100s of SEK) measures of labor supply at ages 66–67 are reported in columns 1 and 2, respectively. The results show that the increased demand for 5-year payouts that was a result of the 2008 application change decreased labor supply on the extensive margin. Given an average probability of having wage income above two price base amounts of 32 percent, the point estimate of -0.051 is sizable (15.8 percent).[23] The intensive margin result (insignificant) reflects an average decrease in yearly wage income of SEK 8,000 (-8.3 percent). For public pension income, which only can be withdrawn as an annuity, we find, however, no effect from the increase of 5-year payouts that was caused by the 2008 application form change.

As for the 2011 application form change, which increased the demand of 10-year payouts, we see an indication of increased labor supply (the estimates are not statistically significant when we include our full set of controls) and a negative effect on the take-up of public pensions. The probability of having claimed the public pension by age 67 decreased by 2.2 percentage points, from a baseline of 91 percent. The intensive margin result shows that on average public pension decreased by SEK 6,400.

The conclusion so far is that the increase in 5-year payouts increased the level of the occupational pension and reduced income from labor. However, there is no effect on the

[23] The results are robust for alternative definitions of the extensive margin of labor supply, se Table A2 in Appendix.

timing of the pension claiming, nor on the average level of public pension. An increase in 10-year payouts, at the expense of 5-year payouts, decreased the level of both occupational pension and public pension and the fraction withdrawing public pension.

5.4 Mechanisms

In this section, we address the causal pathway of the application form changes on the individuals' payout and work decisions. How can a simple check box have such huge effects on the demand for different payout options, and what explains the subsequent effect on labor supply and the pension claiming?

We shed light on this issue by studying whether the application form changes differentially affected different types of workers. Although we cannot perfectly distinguish the relative importance of each of the possible mechanisms, the heterogeneity analysis provides insights along several interesting dimensions. Specifically, we study heterogeneous effects by gender, marital status, education level and flexible pension capital ranking. For each outcome of interest, we estimate Equation (1) after extending it by several triple-difference estimates, one for each sub-group of interest.[24] The difference-in-differences estimate thus captures the treatment effect for a "reference group" while each of the "added effects" represents the difference in treatment effects for the relevant sub-group vis-à-vis the reference group.[25] Table 5 and 6 report the results from the heterogeneity analysis for the outcomes in Table 3 and 4, respectively.

We begin by discussing the potential mechanisms and the heterogeneity results for payout choices. We then move on to labor supply and retirement decisions.

5.4.1 Payout choices

There are several potential explanations for the dramatic effects on payout choices. We believe that a primary – and perhaps most obvious – explanation, is that a new application form, such as the one issued in 2008, raised the awareness of the existence of the payout option in question. The increased demand for the 5- or 10-year payout may thus be a rational response to new information.

[24] Note that the triple-difference estimates include all levels and second-order interactions as controls, i.e., KPA_c, $Post_m$, $group_x$, KPA_c*Post_m, $Post_m*group_x$, and $KPA_c*group_x$, where $group_x$ is an indicator for a sub-group of interest.

[25] The reference group is defined as married men whose pension capital is between the 25th and the 75th percentile and who has no college degree.

We also believe that decision framing plays a key role. Before the first application form change individuals had to choose a *specific* payout length between 5 and 20 years to opt-out of the life annuity. Checking a box that marks a pre-specified payout period (5 or 10 years, respectively) requires less effort and may thus have encouraged some individuals to make an active choice who otherwise would have refrained from doing so. Another reason why more people actively chose the 5- or 10 year payout could be that the checkbox was perceived as the recommended choice or even the default choice.

The effect of the check box was probably amplified by writing out the (higher) monthly benefit amount under the highlighted fixed-term payout next to that of the life annuity. The new application forms may therefore have reduced information costs for individuals who already knew about the possibility to choose a fixed-term payout, but lacked the capacity or motivation to understand the financial consequences of different decumulation strategies.

Another possible explanation is that the large increase in the demand of 5-year payouts after the 2008 application form change is driven by individuals with present-biased preferences. It has been shown that individuals with present-biased preferences are more likely to opt for a short-term payout rather than a life annuity (Brown and Previtero, 2014). Such preferences are likely to be present in our sample given that it consists of individuals who, three months before their 65th birthday (i.e., three months before the age at which the pension is automatically paid out), had not yet made any active decision regarding their pension.[26]

However, the effects of the 2011 reform cast some doubt on the role of present-biased preferences. If people have present-biased preferences, a nudge towards a more long-term payout away from the 5-year payout, which is the shortest option available, should have less impact than a nudge towards a more short-term payout. What we see is the opposite: the increase in demand for 10-year payouts in 2011 was larger than the corresponding increase for 5-year payouts in 2008. That the 2011 nudge towards a longer payout should have less of an effect is of course only true if people could infer that there existed a more short-term payout option alongside the highlighted 10-year option. It may be that individuals with present-biased preferences may be less inclined to search for alternative options and, in addition, also more likely to follow what they perceive as the recommended choice.

[26] Brown and Previtero (2014) show that procrastination is a manifestation of present-biased preferences while Schreiber and Weber (2016) attribute the tendency of older people to be less likely to annuitize than younger people to hyperbolic discounting.

Table 5 shows that the average effect masks some heterogeneous effects with respect to the choice of payout length and the claiming of other occupational pensions. Some results are worth pointing out. The first is that women react more strongly to application form changes than men do; they were more likely to choose the 5-year payout after the first application form change but also more likely to choose the 10-year payout after the second application form change. This result is consistent with the evidence on gender differences in receptivity to informational interventions in other contexts (Bhargava and Manoli, 2015; Liebman and Luttmer, 2015) and financial literacy (Bucher-Koenen et al., 2012; Lusardi and Mitchell, 2011; Almenberg and Säve-Söderbergh, 2011 for gender differences in Sweden). If the check-box on the application form was perceived as the recommended choice, individuals who are less financial literate, i.e. women, might have a higher probability to believe this is the "best option" and hence chose this option to a larger extent.[27]

The second result is that individuals with high education (college degree) were more likely to opt for the fixed-term payout that was not highlighted in each of the new application forms. One interpretation of this result is that these individuals are more financially literate, and therefore have a greater awareness of the different payout options independently of the design of the application form. This is supported by earlier studies on financial literacy which show that education level is positively related to both financial literacy (Almenberg and Säve-Söderbergh, 2011) and knowledge about pensions (Gustman and Steinmeier, 2005). The observed differences with respect to education might also be explained by a relatively larger reduction in information costs for individuals with low education. Mastrobuoni (2011) argues that low-educated people have weaker incentives to gather information, because of higher mortality and higher disutility from work, and might therefore be more susceptible for salient payout information. An alternative explanation is that it was economically more unfavorable to choose a 5- instead of a 10-year payout because of a higher marginal tax.

Finally, two other groups are also less likely to choose the highlighted payout option, in other words, less likely to be affected by the nudges. These include unmarried and individuals with both low and high pension capital. However, while individuals with both high and low pension capital were more likely to stick with the default (the life anunity),

[27] Controlling for both financial literacy and risk aversion, Agnew et al. (2008) show that both men and women in the US have a lower probability to annuitize if presented with negative information about annuities, while only men's choice to annuitize were affected by negative information on cash-outs. Using Dutch data, Bockweg et al. (2017) show that both men and women respond to framing, but that they are responsive to different frames.

unmarried were only more likely to do so after the 2008 reform. In 2011, they instead opted for the 5-year payout to a greater extent than the reference group.

Table 5. Heterogeneous effects on pension claims, age 66–67

	Shares:				Annual incomes (100s of SEK):	
	Late claim (y/n)	5 yrs. (y/n)	10 yrs. (y/n)	Lifelong (y/n)	Flexible pension	Total occ.pens
2008						
Average effect. no controls (repeated from Table 3)	0.007	0.277***	-0.027**	-0.225***	34.340***	50.888**
Average effect. full set of controls (repeated from Table 3)	0.001	0.274***	-0.028**	-0.220***	34.595***	36.562*
Reference group	0.013	0.303***	-0.022	-0.251***	20.299*	-15.497
Added effects:						
Women	0.015	0.063*	-0.023	-0.046	12.929	95.56
Not married at 64	0.041	-0.097***	0.025	0.073*	-4.767	-43.017
High education	-0.024	-0.060*	0.048*	0.013	11.006	4.286
Pensions capital ranking:						
<p10	0.064	-0.07	-0.051	0.118*	-23.632**	-132.785*
p10-p25	-0.004	-0.07	-0.069*	0.143**	-28.262***	-54.185
p75-p90	0.071	-0.116**	0.065*	0.086*	-10.536	-38.684
>p90	0.119*	-0.195***	0.022	0.199***	-34.757*	-312.343**
2011						
Average effect. no controls (repeated from Table 3)	-0.005	-0.287***	0.310***	-0.022	-24.550***	-49.064**
Average effect full set of controls (repeated from Table 3)	-0.015	-0.286***	0.305***	-0.017	-30.609***	-81.647***
Reference group	0.043	-0.325***	0.340***	-0.016	-35.657***	59.012
Added effects:						
Women	-0.058*	-0.042	0.060*	-0.018	-6.613	-116.550**
Not married at 64	-0.003	0.082***	-0.056*	-0.02	7.46	-23.95
High education	0.045	0.073**	-0.018	-0.046	18.288**	-46.614
Pensions capital ranking:						
<p10	0.063	0.061	-0.098**	0.016	28.597***	-81.253
p10-p25	-0.078*	-0.027	-0.065*	0.080*	16.706**	31.59
p75-p90	-0.136***	-0.047	-0.064*	0.102**	-29.187**	-94.061**
>p90	-0.011	0.053	-0.170***	0.116*	-43.929	-243.668*

*Note: Robust standard errors: *p<0.05; **p<0.01; ***p<0.001. "Full set of controls" include the same variables as in Table 3. The continuous income variables (e.g., pension income) are expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis. Number of observations is 17,949 for 2008 and 21,955 for 2011. The "reference group"-estimate is a double difference estimate (KPA_c*$Post_m$=1) and "added effects"-estimate on group x is a triple difference estimate (KPA_c*$Post_m$*$group_x$=1). The latter thus represents the difference in reform effect vis-à-vis the reference group. All levels and second-order interactions are included as controls.*

5.4.2 Labor supply and retirement

There are several potential reasons why individuals' work and retirement decisions might be affected by the application form changes. It could be the case that individuals are myopic. Myopic individuals will not consider their future private economy when the fixed-term pension has ceased and hence prefer to retire "as soon as possible". They are also likely to have undersaved during their working career, meaning that they cannot retire as early as planned. (Findley and Caliendo, 2015; Zhang, 2013). Thus, the nudge towards the 5-year option, and the resulting prospect of a higher pension income in the early years of retirement, may shove these individuals over the tipping point to stop working. Fixed-term payouts might also enable credit-constrained individuals or "target savers" to retire earlier.

Turning to Table 6 and our labor supply and retirement outcomes, the most compelling result is that the extensive margin effect on labor supply of the increased demand of 5-year payouts is entirely driven by high-educated individuals. The point estimate reflects an increased probability of exiting the labor force of about 7 percentage points. The interesting thing to note, however, is that none of the other characteristics help explain the reduction in labor supply once education is controlled for. We also notice that the negative effect on public pension of the increased demand for 10-year payouts in 2011 is also entirely driven by the highly educated. We interpret this as high-educated having more flexibility to choose retirement or continued work, both in terms of health and in the type of jobs they perform. To the extent that high-educated have higher incomes and less present-bias, the reduction in labor supply after the 5-year nudge is not likely accounted for by myopia or credit-constraints.

Table 6. Heterogeneous effects on public pension and labor supply, age 66–67

	Public Pension>0 (y/n)	Public Pension (100s SEK)	Labor inc.>2BA (y/n)	Labor income (100s SEK)
2008				
Average effect, no controls (repeated from Table 4)	0.012	17.510	-0.045**	-59.320
Average effect, full set of controls (repeated from Table 4)	0.012	11.918	-0.051***	-79.627
Reference group	-0.023	-24.518	-0.023	106.384
Added effects:				
Women	0.022	21.776	0.016	-68.077
Not married at 64	0.022	14.173	0.011	-92.583
High education	0.012	-33.015	-0.074*	-128.967
Pensions capital ranking:				
<p10	-0.001	-1.27	-0.083	-218.627
p10-p25	-0.016	38.141	-0.023	-113.896
p75-p90	-0.029	-76.781	-0.001	56.284
>p90	-0.017	-57.725	0.017	-344.458
2011				
Average effect, no controls (repeated from Table 4)	-0.027***	-46.546**	0.026*	139.185**
Average effect, full set of controls (repeated from Table 4)	-0.022**	-60.386***	0.015	7.900
Reference group	-0.022	-37.893	0.031	180.639
Added effects:				
Women	0.006	0.581	-0.006	-98.766
Not married at 64	0.008	13.413	-0.043	-61.888
High education	-0.024	-101.884***	0.049	116.475
Pensions capital ranking:				
<p10	-0.038	45.104	-0.076	-327.384*
p10-p25	0.042*	98.776*	-0.02	-75.69
p75-p90	-0.009	-14.893	-0.056	-230.141*
>p90	0.022	71.77	-0.008	-5.135

*Note: Robust standard errors: *p<0.05; **p<0.01; ***p<0.001. "Full set of controls" include the same variables as in Table 3. The continuous income variables (e.g., labor income) are expressed in 100s of SEK (1 USD approximately 9 SEK) at an annual basis.1 price base amount (BA) is equal to 44 800 SEK (1 USD is approximately 9 SEK). Number of observations is 17,949 in 2008 and 21,955 in 2011. The "reference group"-estimate is a double difference estimate ($KPA_c*Post_m=1$) and "added effects"-estimate on group x is a triple difference estimate ($KPA_c*Post_m*group_x=1$). The latter thus represents the difference in reform effect vis a vis the reference group. All levels and second-order interactions are included as controls.*

6 Conclusion

Our study is the first to show that the effects of nudging interventions may extend beyond the actual decision-making context and have implications for real behavior in other markets. We refer to such – from the choice architecht's point of view – *unintended* effects as nudge spillovers.

Specifically, we study the effects of two exogenous information changes in the Swedish pension system that nudged individuals towards a certain payout length. We examine both the (intended) effects on individuals' payout decisions and the (uninteded) spillover effects on labor supply and other retirement related behavior. We have access to unique administrative data on actual payout decisions from two large pension companies, handling pensions for workers from one of the largest labor market sectors in Sweden, matched with rich background data from Statistics Sweden's longitudinal registers.

The first application form change, which happened in 2008, implied that applicants were nudged towards 5-year pension payouts instead of life annuities. The new application form in 2008 made the existence of the 5-year payout option more salient by adding a checkbox for this option to the front page. The new application form also added the monthly benefit amount of the 5-year option. The 2011 application form change made the 10-year payout more salient: the 5-year check-box and monthly benefit amount was replaced by a 10-year check box and a 10-year monthly benefit amount. The effects of the two information changes are evaluated in a differences-in-differences framework. The comparison group is made up of local government workers of the same age who belonged to the same pension plan but had chosen another pension company and, therefore, experienced no change in their application form.

The first application form change more than doubled the share choosing 5-year payouts while the second application form change as much as tripled the share choosing 10-year payouts. We believe that a key explanation for these dramatic effects is decision-framing. Checking a box that marks a pre-specified payout period (5 or 10 years, respectively) requires very little effort. Moreover, the fact that the second nudge towards a longer payout was as at least as powerful as the first nudge strongly suggests that many people interpret the highlighted option as the recommended choice.

We then show that this remarkable change in demand for 5-year payouts had negative and significant spillover effects on individuals' labor supply after the normal retirement age, at ages 66–67. Cashing-out pension might mean that individuals can afford retirement: a

higher pension benefit, although for a limited number of years, raises the opportunity cost of working and makes the decision to leave the labor market more attractive. The second application form change nudging 10-year payouts had, more or less, the opposite effects of the first change. It *delayed* claiming of public pension and other occupational pensions not directly linked to the information change. In both cases, the changes in labor supply are driven by high-educated workers. We interpret this as high-educated having more flexibility to choose between retirement and continued work, as they typically have better health and perform other types of jobs than low-educated, and that myopia or credit-constraints are unlikely to be key factors.

Our study makes several important contributions to the existing literature. First, it provides quasi-experimental evidence of the effect of nudging on real life annuity decisions. Second, it shows that nudging interventions may affect other behaviors beyond the choice architect's intentions of the nudge. Third, it contributes directly to the strand of the nudge literature that focuses on retirement by switching focus to decisions close to retirement. Fourth, this study contributes to the literature on the annuity market participation puzzle. We propose that individuals choose to withdraw their pensions during a short period of time instead of annuitizing to be able to reduce labor supply and retire early.

The study also provides important lessons for policy. First, it demonstrates that more liquid payout options could have negative effects on the actual retirement age. Although Sweden no longer has any official retirement age, several features of foremost the occupational pension systems set age 65 as the norm for claiming pension. How to increase labor supply among individuals older than 65 years of age is thus interesting for policies that aim at raising the overall retirement age. Our results are relevant for such policies as we examine labor market and pension choices of workers beyond the normal pension-claiming age of 65. Second, it shows that easily implemented nudges in application forms may work towards affecting working careers. Such application forms and choice platforms are, as in our study, in many cases designed by actors in the private pension managing industry with, perhaps, other goals than prolonging working life. As demonstrated here, choice architecture gives actors powerful tools.

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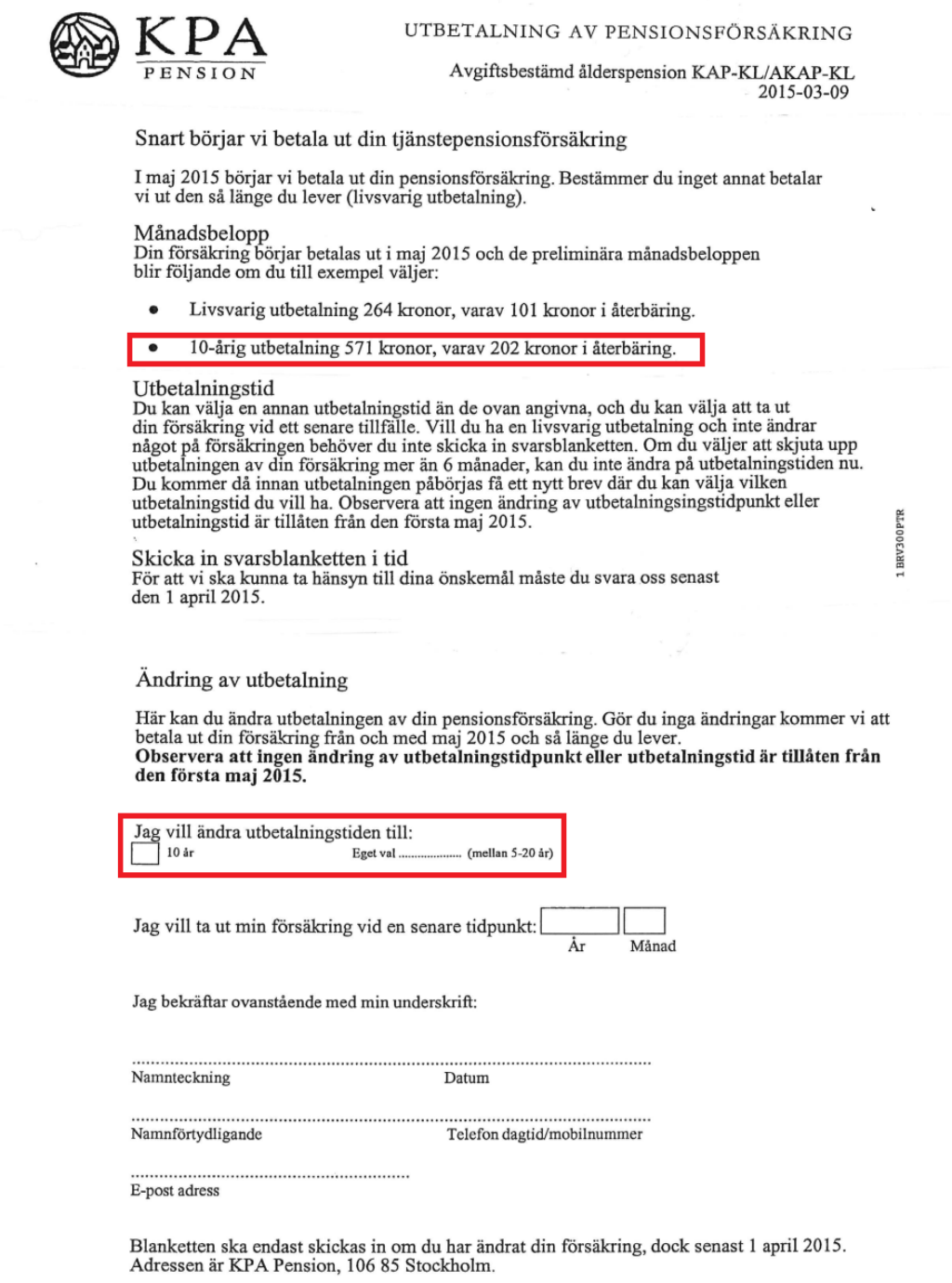
APPENDIX

Figure A1. Original application form (in Swedish) after the change in 2011. Cropped version.



KPA PENSION

UTBETALNING AV PENSIONSFÖRSÄKRING

Avgiftsbestämd ålderspension KAP-KL/AKAP-KL
2015-03-09

Snart börjar vi betala ut din tjänstepensionsförsäkring

I maj 2015 börjar vi betala ut din pensionsförsäkring. Bestämmer du inget annat betalar vi ut den så länge du lever (livsvarig utbetalning).

Månadsbelopp
Din försäkring börjar betalas ut i maj 2015 och de preliminära månadsbeloppen blir följande om du till exempel väljer:

- Livsvarig utbetalning 264 kronor, varav 101 kronor i återbäring.
- 10-årig utbetalning 571 kronor, varav 202 kronor i återbäring.

Utbetalningstid
Du kan välja en annan utbetalningstid än de ovan angivna, och du kan välja att ta ut din försäkring vid ett senare tillfälle. Vill du ha en livsvarig utbetalning och inte ändrar något på försäkringen behöver du inte skicka in svarsblanketten. Om du väljer att skjuta upp utbetalningen av din försäkring mer än 6 månader, kan du inte ändra på utbetalningstiden nu. Du kommer då innan utbetalningen påbörjas få ett nytt brev där du kan välja vilken utbetalningstid du vill ha. Observera att ingen ändring av utbetalningsingstidpunkt eller utbetalningstid är tillåten från den första maj 2015.

1 BRV300PTR

Skicka in svarsblanketten i tid
För att vi ska kunna ta hänsyn till dina önskemål måste du svara oss senast den 1 april 2015.

Ändring av utbetalning

Här kan du ändra utbetalningen av din pensionsförsäkring. Gör du inga ändringar kommer vi att betala ut din försäkring från och med maj 2015 och så länge du lever.
Observera att ingen ändring av utbetalningstidpunkt eller utbetalningstid är tillåten från den första maj 2015.

Jag vill ändra utbetalningstiden till:
☐ 10 år Eget val ..... (mellan 5-20 år)

Jag vill ta ut min försäkring vid en senare tidpunkt: ☐☐
År Månad

Jag bekräftar ovanstående med min underskrift:

.....
Namnteckning Datum

.....
Namnförtydligande Telefon dagtid/mobilnummer

.....
E-post adress

Blanketten ska endast skickas in om du har ändrat din försäkring, dock senast 1 april 2015.
Adressen är KPA Pension, 106 85 Stockholm.

Table A1. P-values from separate F-tests of the null hypothesis that cohort trends are parallel for the pre-reform cohorts.

Outcomes 66-67 (yearly):	2008 application form change (cohorts 1943:1-1943:8)	2011 application form change (cohorts 1946:1-1946:7)
Late claim (y/n)	0.8136	0.0553
5 yrs. (y/n)	0.7944	0.5501
10 yrs. (y/n)	0.2417	0.0723
Lifelong (y/n)	0.3772	0.0833
Flexible pension	0.4088	0.8563
Total Occ.pens	0.3068	0.8492
Publ. Pens>0 (y/n)	0.3630	0.8245
Publ. Pens	0.8600	0.2597
Labor income>2BA (y/n)	0.7898	0.0981
Labor income	0.3157	0.0579

Table A2. Alternative definitions of labor supply; average effect of 2008 and 2011 application form changes on labor income and public pension including descriptive statistics (averages); age 66–67.

	Labor income >2BA (y/n) (repeated from Table 4)	Labor income >0.5BA (y/n)	Labor income >1BA (y/n)	Labor income >3BA (y/n)
2008				
Average effect, no controls	-0.045**	-0.050**	-0.048**	-0.041**
Average effect, full set of controls	-0.051***	-0.058***	-0.055***	-0.047***
Averages by group:				
KPA Post	0.347	0.478	0.423	0.300
KPA Pre	0.322	0.460	0.403	0.266
AMF Post	0.331	0.458	0.400	0.279
AMF Pre	0.261	0.390	0.332	0.204
2011				
Average effect, no controls	0.026*	0.028*	0.026	0.037**
Average effect, full set of controls	0.015	0.020	0.018	0.025*
Averages by group:				
KPA Post	0.421	0.554	0.497	0.362
KPA Pre	0.365	0.495	0.441	0.298
AMF Post	0.330	0.470	0.411	0.272
AMF Pre	0.301	0.439	0.381	0.245

*Note: Robust standard errors: *p<0.05; **p<0.01; ***p<0.001. 1 price base amount (BA) is equal to 44 800 SEK (1 USD is approximately 9 SEK). Number of observations is 17,949 for the 2008 reform and 21,955 for the 2011 reform. "Full set of controls" includes the same variables as in Table 3.*