WORKING PAPER 2026:13

# Lowering the retirement age: Employment effects and mechanisms

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ISSN 1651-1166

# Lowering the retirement age: employment effects and mechanisms*

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June 3, 2026

**Abstract**

This paper examines a 1976 Swedish reform that lowered the normal retirement age (NRA) for public pensions from 67 to 65. The reform implied substantial increases in future pension benefits while leaving contribution rules unchanged. Using administrative data, I find sharp behavioral responses: employment at age 66 fell by 17 percentage points, or 47 percent relative to pre-reform levels, with little effect above the new NRA and modest effects below it. Exploiting variation across occupational pension schemes and reform timing, I use a set of back-of-the-envelope calculations to assess the relative importance of different mechanisms. The patterns are most consistent with behavioral responses and social norms playing a central role, while wealth effects appear to explain roughly one-fifth of the decline. I also provide suggestive evidence on employer-side factors, including automatic termination rules. The reform targeted an older age group than is typical in the literature on retirement ages, at a time when health and work capacity were more limited than today, making the findings relevant for contemporary policy settings in which increases in statutory retirement ages extend to older ages.

Keywords: Retirement, Retirement Policies, Social Security, Public Pensions.
JEL codes: H55, J260.

*I thank my supervisors, Lisa Laun and Olof Åslund, for their invaluable support throughout this project. I am grateful for valuable comments and discussions from Simon Rabaté, Håkan Selin, and Antoine Bozio, and for helpful input on institutional details from Klara Eklund. I also benefited from feedback received at the CREST–IFAU Workshop on Evaluating Labor Market Policies in Paris, the Pension Group at the Institut des Politiques Publiques in Paris, the Workshop on Pension Dashboards and Retirement Behavior in Jönköping, the Uppsala labor group, and internal IFAU seminars. I acknowledge financial support from the Swedish Research Council for Health, Working Life and Welfare (2026-00046). This project is covered by ethical approval from the Swedish Ethical Review Authority (dnr 2015/420).

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# 1 Introduction

Ensuring the long-term sustainability of welfare states in the face of rapid population aging is among the central policy dilemmas of our time. Governments have increasingly turned to raising statutory retirement ages (SRAs), including early and normal retirement ages, and this strategy is likely to remain central in the years ahead (OECD 2021; Coile, Milligan, and Wise 2018).[1] A substantial body of research has examined these reforms across OECD countries, consistently finding that increases in SRAs raise labor force participation among older workers, although the size of the effect varies considerably across institutional contexts. Clarifying the mechanisms that drive this variation is especially important as future SRA increases will increasingly affect workers at more advanced ages, raising new challenges for the design of effective and equitable pension policies.

This paper studies the effects on retirement behavior of a Swedish reform in 1976 that lowered the normal retirement age (NRA) for public pension claims from 67 to 65. The normal retirement age was framed as the first age at which it was possible to retire with full public pension benefits, and benefit payments commenced automatically at the NRA in the absence of an active choice by the individual. The full benefit remained the same after the reform, with limited changes to actuarial adjustments for early or late claims. This implied substantial benefit increases for claims starting at the same age. This reform provides an especially informative case for several reasons. First, it involved a substantial reduction in the NRA without an extended phase-in period, enabling credible identification. The magnitude of the shift may also have signaled higher stakes, prompting workers to re-optimize their retirement planning around the new NRA. Second, it took place at a time when age 65 was already the SRA in most occupational pension schemes. Heterogeneity across occupational pension schemes provides rich within-country variation in how the reform interacted with financial incentives, social norms, and employment protection, which I draw on to assess the relative importance of different mechanisms. Third, the reform targeted an older age group than is typical in the SRA literature, at a time when health and work capacity among older people were more limited than today. Life expectancy for men at age 67 in 1976 matched that at age 73 forty years later,[2] underscoring the relevance of these findings as future reforms extend to older cohorts.

I find substantial employment effects of the reform, primarily concentrated at ages between the old and new NRAs. Employment at age 66 fell by 17.0 percentage points, a 47.1 percent decline relative to pre-reform levels. The reform had no effect at ages above the old NRA, where financial incentives did not shift. Below the new NRA, employment effects are modest and, in contrast to most of the existing literature on early retirement ages, I find close to zero employment responses at the early retirement age (ERA), which was also lowered under the same reform. This difference between the NRA and ERA margins reflects the limited practical

[1] Following Seibold (2021), I use SRA as an umbrella term for salient focal ages in a pension system. Early retirement ages (ERAs) denote the earliest ages at which pension benefits can be claimed. Normal retirement ages (NRAs) denote the ages framed as the normal ages of retirement, or the earliest ages at which individuals can retire with what is framed as a full pension.

[2] Life expectancy is calculated as the expected number of remaining years of life, based on age-specific survival rates observed in the same year. Starting from a given age, the probability of surviving to each higher age is derived by multiplying the one-year survival rates for all intermediate ages, and life expectancy is obtained by summing these conditional survival probabilities.

role of early claiming in this setting, where the ERA was weakly emphasized and early and delayed claims were rare.

To assess potential mechanisms behind the response at age 66, I rely on a set of back-of-the-envelope calculations that exploit variation across occupational pension schemes and reform timing. These calculations indicate that behavioral responses and social norms account for the bulk of the employment effect. Changes in pension wealth also contribute, but can explain only around one fifth of the observed decline in employment just above the new NRA. I further find suggestive evidence of employer-driven effects, in line with Rabaté, Jongen, and Atav (2024), associated with the introduction of the blue-collar occupational pension scheme, which removed employment protection at age 65 and established 65 as the default termination age.

The first contribution of this paper is to the literature on the employment effects of changes in statutory retirement ages (SRAs). The effectiveness of such reforms has been demonstrated across numerous contexts, including the US, UK, France, Germany, the Netherlands, Switzerland, Austria, Australia, Norway, Denmark, and Finland.[3] More specifically, this paper contributes to the strand of literature examining how SRA reforms affect employment (Cribb, Emmerson, and Tetlow 2016; Rabaté and Rochut 2020; Rabaté, Jongen, and Atav 2024; Geyer et al. 2020; Staubli and Zweimüller 2013; Atalay and Barrett 2015; Coile et al. 2025; Johnsen, Vaage, and Willén 2022; Sæverud 2024). Reported effect sizes vary considerably across reforms. For instance, Cribb, Emmerson, and Tetlow (2016) find a modest 6.3 percentage point increase in employment after the ERA for British women was raised from 60 to 62. This result could potentially be explained by the relatively less generous public pension benefits in the UK. The largest reported effect size found in the literature comes from a Dutch NRA shift, where the NRA also represented the ERA (Rabaté, Jongen, and Atav 2024). They report a 21.2 percentage point increase in employment between the old and new SRA after it changed from 65 to 66. However, as Seibold (2024) notes, the literature does not find a consistent relationship between the type of retirement age targeted (ERA vs. NRA) and the size of employment effects.

Given the large heterogeneity in pension systems and underlying institutions, it is instructive to study and compare the role of SRAs in different settings. Within the Nordic countries, institutions are broadly similar but policy details vary. In Denmark, Sæverud (2024) analyzes the impact of a reduction in the social security eligibility age in a context where most workers hold substantial defined contribution pension accounts with flexible withdrawal options. In Finland, Gruber, Kanninen, and Ravaska (2022) study the effect on average claiming ages of a reform that merely introduced the regular retirement age as a new label for retirement at age 63, which was between the ERA and the NRA. In Norway, Vestad (2013) and Johnsen, Vaage, and Willén (2022) study a reform that introduced an early retirement option below age 67. In Sweden, changes in statutory retirement ages within occupational pension schemes have been used to study health outcomes (Hagen 2018; Hallberg, Johansson, and Josephson 2015) and partner spillovers (Selin 2017). However, there is limited Swedish evidence on the role of ERAs

[3]I include a list of studies by country: for the US (Mastrobuoni 2009; Behaghel and Blau 2012); UK (Cribb, Emmerson, and Tetlow 2016); France (Rabaté and Rochut 2020); Germany (Geyer et al. 2020; Dolls and Krolage 2023; Seibold 2021); the Netherlands (Rabaté, Jongen, and Atav 2024); Switzerland (Lalive, Magesan, and Staubli 2023); Austria (Staubli and Zweimüller 2013); Australia (Atalay and Barrett 2015); Norway (Johnsen, Vaage, and Willén 2022; Vestad 2013); Denmark (Sæverud 2024); and Finland (Gruber, Kanninen, and Ravaska 2022).

or NRAs within the public pension system.

With the exception of two reforms from the 1990s, most studied SRA reforms are concentrated in a narrow window between 2000 and 2015.[4] This study demonstrates that the findings from this literature extend back to 1970s Sweden, when earnings-related public pensions were still relatively new, strengthening the case that the behavioral relevance of NRAs is not confined to the contemporary context. Moreover, the 1976 reform occurred during a period of generally lower health and life expectancy, and involved a relatively high NRA by international standards. These features make it a particularly informative case for understanding how older workers respond to high retirement ages when average work capacity is more limited, an issue that is becoming increasingly important as retirement ages rise and policies affect individuals with more constrained health or functional ability.

In contrast to the extensive literature on increases in retirement ages, this study adds to the more limited research on statutory retirement age reductions. Vestad (2013) and Johnsen, Vaage, and Willén (2022) analyze a set of Norwegian reforms that introduced early claiming options and later reduced the ERA from 66 to 62, all while the NRA remained at 67. Johnsen, Vaage, and Willén (2022) report a 21.6 percentage point decrease in employment across these reforms, while Vestad (2013) document a sharper 33.2 percentage point drop from the last reform alone. Dolls and Krolage (2023) study a German reform that lowered both the NRA and ERA by up to two years for workers with long contribution histories, finding that a one-year decrease in the NRA led to a 0.3–0.4 year decrease in the average claiming age.

This paper also estimates employment effects at ages below the new lower NRA and above the old higher NRA. The literature sometimes refers to these effects outside of the interval between the old and the new SRA as upstream and downstream effects. Most studies report zero or near zero effects on upstream and downstream employment (Rabaté, Jongen, and Atav 2024; Staubli and Zweimüller 2013; Geyer and Welteke 2021; Mastrobuoni 2009). Rabaté, Jongen, and Atav (2024) note that the degree of bunching in retirement at the old SRA is a strong predictor of employment effects from retirement age shifts. They argue that most of the response to SRA shifts comes from people who always retire at the current SRA. In contrast, Carta and De Philippis (2024) find moderate positive upstream effects among Italian women following a large and unexpected increase in the combined NRA and ERA. Relatedly, Artmann, Fuchs-Schündeln, and Giupponi (2023) find sizable intensive-margin labor supply responses to a pension-wealth increase at ages far below pension eligibility, with little to no effect on employment.

Finally, this paper adds to the literature which strives to identify the relative importance of different mechanisms behind the effect of SRAs in different settings. This literature finds that financial incentives alone cannot explain the effect of SRAs. Bunching in retirement at ages with comparable kinks in marginal financial incentives, but without SRAs, is only a fraction of the size of bunching at SRAs (Seibold 2021). Gruber, Kanninen, and Ravaska (2022) find large

[4] Johnsen, Vaage, and Willén (2022) study a Norwegian reform that lowered the ERA from 67 to 62, leading to substantial substitution away from disability insurance. Bozio, Garrouste, and Perdrix (2021) examine mortality effects of a 1993 French reform that increased contribution years required for early retirement. Hairault, Sopraseuth, and Langot (2010) use the same reform to study upstream employment effects, i.e., employment effects at ages below the SRA, for treated individuals.

claiming responses to the introduction of a new retirement age label, without any associated changes to financial incentives. While wealth effects and, to a lesser extent, marginal financial incentives play a role in retirement behavior, they have not been the primary drivers of the success statutory retirement age policies have had in delaying retirement. Similar findings across settings with vastly different financial incentives and major bunching of retirement immediately after the SRA further reinforce this conclusion.

The exact mechanisms underlying these empirical patterns are still not well understood. Depending on the context, previous papers have found: relatively sizable wealth effects, i.e., labor supply responses to expected future pension benefit streams (Gelber, Isen, and Song 2016); modest impacts of marginal financial incentives, i.e., the implicit tax on future labor supply (Lalive, Magesan, and Staubli 2023; Rabaté, Jongen, and Atav 2024; Seibold 2021); moderate impact of demand or employer driven effects, which may be more important in some institutional settings (Rabaté 2019; Rabaté, Jongen, and Atav 2024; Coile et al. 2025; Lalive, Magesan, and Staubli 2023); tangible effects of credit constraints in the impact of ERAs (Rabaté, Jongen, and Atav 2024; Coile et al. 2025); and a major importance of behavioral effects and norms (see e.g., Seibold 2021, Behaghel and Blau 2012). I primarily add to the literature on wealth effects, employer effects and behavioral effects and norms.

This paper complements the mixed evidence on wealth effects in conjunction with SRA reforms (Atalay and Barrett 2015; Coile et al. 2025). Existing studies have compared employment effects under the ERA between later-born and earlier-born cohorts during the phase-in of reforms, where the earlier cohorts had a lower ERA and therefore a longer period of potential benefit receipt resulting in higher social security wealth (SSW). Larger employment effects for later cohorts are interpreted as evidence of wealth effects in these papers. This paper puts forth two alternative approaches to assess the role of wealth effects in the context of this reform. First, workers covered by the public sector occupational pension scheme are used as a comparison group. These workers were affected by the change to the NRA as a reference point and a normative anchor, but their pension wealth remained unchanged. Second, the sharp timing of the reform is used to compare earlier-born individuals who turned 67 before the reform and whose pension wealth was unaffected by the reform, with later-born individuals whose expected future pension wealth was affected at age 65, but who still reached age 65 in the year before the NRA was officially lowered.

For employer effects, this paper adds to the suggestive evidence in Rabaté, Jongen, and Atav (2024) on the importance of automatic separations in the context of SRAs. Specifically, I examine the introduction of the blue-collar occupational pension scheme, which removed employment protection at age 65 and established 65 as the default termination age. This institutional change produced an employment effect after age 65 that was roughly three times larger than the effect of the NRA reform on workers without occupational pension eligibility.

The rest of this paper is structured as follows. Section 2 outlines potential mechanisms behind the effects of statutory retirement ages and provides a summary of findings from other studies. Section 3 describes the institutional context including the Swedish public pension system, the occupational pension schemes, and the 1976 reform to the NRA. Section 4 covers data sources, sample restrictions, and the empirical strategy. Section 5 documents total effects

on employment and other outcomes related to retirement behavior from the reform. Section 6 investigates the relative role of different potential mechanisms and, finally, section 7 concludes.

# 2 Potential mechanisms

The literature proposes several mechanisms to explain the influence of statutory retirement ages (SRAs), including normal retirement ages (NRAs). In this section, I summarize key findings by organizing the discussion into five categories following Coile et al. (2025): wealth effects, marginal financial incentives, liquidity constraints, employer effects, and behavioral effects, including social norms.

## 2.1 Wealth effects

In the canonical life-cycle interpretation of retirement behaviour, assuming leisure is a normal good, an increase in wealth raises the marginal utility of leisure, making earlier retirement more desirable (see Burtless 1986). This logic extends naturally to pension wealth, which represents the present value of expected future pension benefits and constitutes a significant component of total wealth at older ages.

The most credible evidence on wealth effects in public pension systems comes from changes to pension benefit levels without associated changes to SRAs or marginal incentives. Gelber, Isen, and Song (2016) study the US social security "notch", which decreased Old age and survivors insurance (OASI) benefits by 5 percent, a $6,000 decrease in lifetime benefits. They estimate that the "notch" caused a 2.6 percent increase in employment at the NRA of 65, which implies a total elasticity of employment with respect to pension wealth of $\frac{2.6}{5} = 0.52$. The increase in employment did not start until individuals reached the eligibility age for OASI. Giupponi (2024) provides a broader discussion of the evidence on pension benefit level changes and labour supply, including basic-pension level shifts and forward-looking responses to anticipated benefit changes in the CEPR Press volume *Rethinking Pension Reform* (Giupponi and Seibold 2024). The evidence reviewed there indicates substantial income effects, with responses largest close to the statutory retirement age, while changes in pension wealth also induce forward-looking labour supply adjustments at younger ages.

Another exogenous source of wealth comes from lottery earnings late in life. For Sweden, Cesarini et al. (2017) document that a million SEK in lottery earnings between age 55 and 64 increased the incidence of early retirement (before age 65) by 6.43 percent. This implies an elasticity of early retirement with respect to lifetime wealth of 0.3, as the average lifetime wealth before lottery winnings was 4.7 million SEK (lifetime wealth is defined here as current wealth plus future earnings and pensions).[5] For the US, Golosov et al. (2024) find that lottery winners at age 62 to 64 were 11.3 percent less likely to be employed one year after a $100,000 win and 14 percent less likely to be employed five years after. They do not report data on lifetime earnings, which complicates the estimation of an employment elasticity. For the Netherlands, Picchio, Suetens, and van Ours (2017) find large but imprecise negative effects on old-age labor supply.

[5]The implicit elasticity is calculated as the percentage change in retirement by age 65 over the percentage change in pension wealth $\frac{0.0643}{\frac{1}{4.7}} \approx 0.3$.

Other papers have used inheritance shocks, unexpected gains on the stock market or house price shocks to estimate wealth effects on retirement behavior. Brown, Coile, and Weisbenner (2010) found that receiving a $100,000 inheritance increased the probability of retiring within two years by 2 percentage points, representing a 10 percent increase relative to the baseline. Disney and Gathergood (2018) present suggestive evidence that rising house prices are associated with increased retirement rates among older men, but not for older women. In contrast, Hurd, Reti, and Rohwedder (2009) found no significant effect of stock market windfalls on retirement behavior.

Only a small number of studies have examined the role of wealth effects in direct connection with SRA reforms. These studies typically exploit variation in reform exposure across early and late cohorts during the phased implementation of early retirement age (ERA) reforms. Later cohorts experienced larger reductions in pension wealth, as they lost access to a longer period of potential benefit receipt. Atalay and Barrett (2015) find that later cohorts of Australian women exhibited stronger employment responses, which they interpret as evidence of wealth effects. However, Morris (2022) argues that these findings may instead reflect underlying trends in female labor supply, calling into question the use of men as a control group. Coile et al. (2025) revisit the same approach without relying on male comparison groups and find no difference in employment responses to the ERA between early and late cohorts of UK women.

### 2.2 Marginal financial incentives

Marginal financial incentives reflect how continued work affects the present value of future revenue streams, including pension entitlements. The main determinants of marginal financial incentives include pension wealth accrual, gross wage, tax rates and actuarial adjustments for early or late pension claiming. When pension schemes provide actuarially fair or generous rewards for delayed retirement, the opportunity cost of retiring early increases, thereby encouraging longer labor market participation. Many systems introduce discontinuities in marginal incentives around the NRA. For instance, pension accrual often ceases at the NRA, limiting the financial returns to continued work.

Börsch-Supan and Coile (2019) identify marginal financial incentives as a key driver of the trend toward later labor force exit observed in most Western countries since the early to mid-1990s. They develop a measure of the implicit tax on continued work (ITAX), defined as the change in social security wealth from delaying retirement relative to net earnings from an additional year of work. They exploit policy-induced variation in ITAX across twelve OECD countries. However, these policy induced shifts in ITAX are also in many cases correlated with changed SRAs, and part of the estimated effect may therefore capture other mechanisms through which SRAs influence behavior.

Micro evidence from policy variation suggests a more limited role for marginal financial incentives. Several studies find large changes in labor market exit at salient SRAs even when marginal incentives change little or not at all (Cribb, Emmerson, and Tetlow 2016; Gruber, Kanninen, and Ravaska 2022; Coile et al. 2025). Lalive, Magesan, and Staubli (2023) study a Swiss reform that first increased the NRA in two one-year steps while preserving the financial incentives to retire early at the old NRA, and later increased the early-claim penalty while

holding the NRA fixed. The NRA increase delayed retirement by about half a year, whereas doubling the early-claim penalty from 3.4 to 6.8 percent had no measurable effect on exit. Rabaté, Jongen, and Atav (2024) exploit variation in second-pillar pension incentives and show that workers in the health-care sector, who did not face a kink in incentives at the new NRA, did not respond differently at that age than workers in other sectors. Seibold (2021) analyzes over six hundred German pension discontinuities and shows that bunching is roughly seven times larger when a discontinuity is attached to a salient age threshold than when a discontinuity of similar size occurs without such a threshold.[6] Consistent with this, larger kinks have only modest effects on bunching: a 10 percent increase in marginal incentives increases bunching by 0.8 percent when accompanied by an SRA and by 0.5 percent when no SRA is present. In the same spirit, Manoli and Weber (2016) find very limited responses to kinks generated by Austrian severance payments that rise discretely with tenure, reporting participation elasticities with respect to marginal incentives of 0.01–0.03 and documenting that many individuals are unwilling to delay retirement even by a few weeks to claim a larger payment. Finally, Brown (2013) exploit an unexpected shift in the pension accrual kink for California teachers and estimate an elasticity of lifetime labor supply with respect to the return to work of 0.04.

### 2.3 Liquidity constraints

When individuals face liquidity constraints and there is a positive discontinuity in pension benefit levels at the SRA, the utility of early retirement declines due to limited ability to smooth consumption over time. Liquidity constraints are particularly relevant in the context of ERAs, as pension benefits cannot be accessed before the ERA.

Evidence on the role of credit constraints is mixed and largely descriptive. Rabaté, Jongen, and Atav (2024) find elevated bunching among individuals with low wealth in a Dutch setting where the NRA also acts as the ERA.[7] Coile et al. (2025) find an even larger role for credit constraints following an ERA reform for women in the UK, where the employment response among women in the bottom wealth quartile was twice that of women in the top quartile. Conversely, Seibold (2021) finds no evidence that individuals with higher lifetime earnings bunch less at SRAs.

### 2.4 Employer effects

The NRA is often linked to mandatory retirement, which is the age at which employers are allowed to terminate employment contracts, or in some cases where employment contracts automatically expire. Demand-side factors are therefore likely to influence employment outcomes around the NRA. They may also operate through the enforcement of workplace norms about when workers should retire.

Some of the most compelling evidence on employer effects comes from changes to employment protection that were independent from changes in SRAs. These studies find significant but

[6] Seibold (2021) defines marginal incentives as the marginal gain in lifetime consumption from delaying retirement another month relative to retiring in the current month.

[7] The retirement hazard at the SRA (both at the old and the new SRA) was above 0.6 for the least wealthy quartile and around 0.4 for the wealthiest quartile.

relatively small demand-side effects. Rabaté (2019) studies the disassociation of the mandatory retirement age from the NRA in France and finds that mandatory retirement explained 12 percent of the bunching in retirement at the NRA. In Sweden, Saez, Schoefer, and Seim (2023) study a change in the mandatory retirement age from 67 to 68, which was not tied to any SRA. They estimate that 8.4 percent of jobs at age 67 were lost due to loss of employment protection.

Employer effects may depend on the design of mandatory retirement provisions and the overall strength of employment protection. Rabaté, Jongen, and Atav (2024) emphasize their importance in the Netherlands, where mandatory retirement leads to automatic job separation and requires full renegotiation of contracts once a worker reaches the NRA. They interpret a retirement hazard three times higher for wage-earners than for the self-employed as evidence of strong employer effects. In contrast, Lalive, Magesan, and Staubli (2023) find no significant difference in the employment response to an NRA reform in Switzerland between wage-earners and the self-employed. They also find no difference between the public sector, where mandatory retirement contracts are common, and the private sector, where employment protection is governed by collective agreements. Similarly, Coile et al. (2025) find no evidence of employer effects in response to an ERA reform for women in the UK, where mandatory retirement contracts are prohibited. Moreover, they report precise zero effects on self-employment, highlighting limitations of using the self-employed as a control group for salaried workers. In the US, Deshpande, Fadlon, and Gray (2024) find greater retirement stickiness at the former NRA of 65 among workers who switch to firms with high observed stickiness. They interpret this as suggestive evidence that employer behavior contributes to bunching at the NRA. Finally, Seibold (2021) examine multiple sources of heterogeneity and finds no evidence that employer effects explain bunching at German SRAs.

### 2.5 Behavioral effects and norms

Behavioral explanations and social norms regarding the appropriate retirement age have received substantial attention as potential mechanisms behind the employment effects of SRAs. These explanations have in common that they offer plausible accounts for the large share of bunching at the SRA that cannot be explained by financial or institutional factors alone, but they are hard to test directly.

Several behavioral mechanisms may contribute to such responses. Reference dependence combined with loss aversion may contribute to bunching at SRAs if individuals perceive the pension level available at the SRA as a reference point for adequate retirement income. Retiring before the SRA may then be viewed as accepting a loss relative to this benchmark. Since such losses are weighted more heavily than equivalent gains, individuals may be more reluctant to retire before the SRA than they are attracted by the higher pension benefits from retiring after it (Kahneman and Tversky 1979; Behaghel and Blau 2012). In addition, retirement at the SRA may be driven by default bias and status quo effects, particularly in settings where pension benefits start automatically at the SRA or where claiming at the SRA constitutes the path of least resistance (Samuelson and Zeckhauser 1988; Madrian and Shea 2001). Limited attention and the complexity of pension systems may further lead individuals to rely on simple heuristics, with the SRA serving as a focal point (DellaVigna 2009). Finally, social norms and conformity

may reinforce clustering if retiring at the SRA is perceived as appropriate behavior within a cohort or workplace (Akerlof 1980; Bernheim 1994).

Only a few studies have attempted to unpack the behavioral mechanisms and social norms that may drive behavioral responses to SRAs. There is some evidence against the interpretation of SRAs as a form of official guidance on when to retire. If SRAs served this function, individuals with higher financial literacy or cognitive ability would be expected to respond less. However, Seibold (2021) finds that workers with higher education and those trained in economics do not bunch less at SRAs, and Behaghel and Blau (2012) find no evidence that individuals with higher cognitive ability exhibit weaker responses. Lalive, Magesan, and Staubli (2023) show that nearly all women in Switzerland treat pension claiming and retirement as a joint decision, despite the absence of a formal link between the two. Based on survey evidence, they interpret this as reflecting a strong preference for joint retirement and claiming, with claiming behavior influencing retirement decisions.

### 2.6 Summary and implications

Overall, the literature points to large employment responses at salient retirement ages that are difficult to reconcile with financial incentives alone. Wealth effects can matter, but existing estimates vary across settings and typically imply much smaller employment responses than those generated by shifts in SRAs. Evidence on marginal incentives suggests limited effects, with employment patterns largely driven by salient age thresholds rather than by the size of marginal gains from continued work. There is suggestive evidence that liquidity constraints can be an important channel for the employment effects of early eligibility ages in some settings. Employer behavior can also contribute, particularly in institutional environments where reaching the NRA triggers automatic job termination or a full renegotiation of employment contracts. Taken together, my reading is that in most settings the employment effects of SRAs operate primarily through behavioral responses and social norms, while wealth, liquidity, and employer channels have the potential to be important in some settings.

## 3 Institutional context

The 1976 normal retirement age reform occurred under the old Swedish pension system, in a setting where occupational pension schemes had important implications for retirement decisions. This section describes the public pension system and the reform, followed by the role of occupational pensions.

### 3.1 The public pension system

The public pension system that was in place in Sweden at the time of the normal retirement age reform was a defined benefit system implemented in 1960 that consisted of a basic component and an earnings-related component.[8] The basic pension corresponded to 0.95 basic amounts

[8]Individuals with limited earnings-related pension could have their basic part increased through a special supplement that was reduced 1:1 with the size of the earnings-related component. The special supplement became more generous over time, but remained irrelevant to most workers with a full work life.

for unmarried individuals and 0.775 basic amounts for married individuals in 1975.[9] Because inflation was high during the 1970s, indexing benefits to the basic amount was important for preserving the real value of pensions. The earnings-related pension amounted to 60 percent of the worker's average pensionable income over her 15 best contribution years, where pensionable income included annual labor earnings between 1 and 7.5 basic amounts. 30 contribution years secured a full earnings-related pension. Individuals with fewer contribution years had their earnings-related pension reduced in proportion to missing contribution years.

Pension contributions could be accrued from year 1960, between the calendar years of the individual's 16th and 65th birthday.[10] Hence, individuals born before 1924 could not earn pension points for the full 30 years. Cohorts born between 1914 and 1923 instead received an earnings-related pension relative to their maximum potential number of contribution years. Cohorts born before 1914 needed 20 years of pension contributions for a full earnings-related pension, with proportionate reductions for every missing contribution year. For instance, this meant that individuals born in 1911 – who were 65 in 1976 – could only qualify for $\frac{17}{20}th$ of a full public pension.

### 3.2 Retirement ages

This paper examines a 1976 reform that lowered the normal retirement age (NRA), reducing the age at which individuals could retire with what was framed as the full public pension benefit from 67 to 65. Before the reform, individuals were eligible for a full old-age pension from the month they turned 67, with the option to claim benefits as early as 63, subject to a life-long reduction of 0.6 percentage points per month of early claiming. Conversely, delayed claims were allowed until age 70, with an equivalent increase of 0.6 percentage points per month of delayed claiming. Both the reduction for early claiming and the increase for delayed claiming applied to the basic and the earnings-related components of the public pension. The reform was based on recommendations from a public inquiry on reduced retirement ages that was commissioned in 1970 and published its report in 1974 (Government of Sweden 1974).

The reform was developed over several years. A public inquiry on reduced retirement ages was commissioned in May 1970 and published its report in February 1974 (Government of Sweden 1974). Legislation was issued on December 6, 1974, and the reform came into force on July 1, 1976. The reform was thus announced well in advance of implementation. Figure A1 illustrates the timing of these events together with newspaper coverage. Mentions of pension age peaked around the commissioning of the inquiry, while mentions of pension reform peaked after the reports publication.

On the reform date, public pensions were recalculated under the new rules, with actuarial adjustments defined relative to the new NRA of 65.[11] The size of the NRA reduction depended

[9] The basic amount is used to index benefits in the Swedish social insurance system. It closely follows the consumer price index (CPI), with a few exceptions. One basic amount is 58,800 SEK or 6,143 USD in 2025. The basic pension benefit first increased from 0.9 and 0.7 in 1968 to 0.95 and 0.775 in January 1975 and then increased further to 0.96 and 0.78 in January 1984.

[10] The NRA reform in 1976 stipulated a change of the upper age limit from 65 to 64, but individuals born before 1928 were exempted.

[11] Until July 1, 1976, pensions were calculated under the pre-reform rules relative to the NRA of 67. On that date, individuals younger than 67 were moved to the post-reform actuarial schedule, while individuals older than 67

on the individual's age on the reform date. Individuals older than 67 retained the pre-reform NRA of 67, while for those aged 65 to 67 the NRA was set equal to their age in July 1976, implying a gradual phase-in.[12] Appendix A outlines the exact benefit formulas in the public pension scheme before and after the reform.

Beyond lowering the NRA, the reform introduced three measures to enhance flexibility within the pension system. First, the early retirement age (ERA) was reduced from 63 to 60, although the ERA was not a focal age in this setting.[13] Second, the penalty for early claims was lowered from 0.6 to 0.5 percentage points per month of early claiming, while the reward for late claims remained at 0.6 percentage points per month.[14] Third, a partial pension scheme was introduced for individuals aged between 60 and 65.[15]

During the period studied, the national mandatory retirement age in Sweden was 67.[16] Mandatory retirement is particularly relevant in this context because employment protection was strong at the individual level. In national legislation, mandatory retirement did not operate as an absolute prohibition on continued work. Instead, it provided employers with a right to terminate employment in connection with the 67th birthday, provided that notice was given one month in advance. However, unions and employers could set lower mandatory retirement ages through collective bargaining, and in practice most collective agreements stipulated mandatory retirement at age 65 or below.

### 3.3 Occupational pensions

At the time of the reform there existed four main collective agreements in Sweden that determined occupational pension schemes. In the private sector, separate schemes applied to blue-collar workers (STP) and white-collar workers (ITP). In the public sector, one agreement covered central government employees and another near identical scheme covered local government employees. In the analysis, the public sector schemes are combined into a single scheme, which I label as the public sector scheme.[17]

This institutional setting matters for the empirical analysis for three reasons. First, occupational pensions implied statutory retirement ages (SRAs) below 67 for a large share of workers already before the 1976 reform. Second, the interaction between occupational and public pensions differed sharply between the public and private sectors: in the public sector,

continued to receive benefits under the pre-reform adjustment rules.

[12] The phase-in rule is based on the age the individual turned during the month.

[13] The ERA was not emphasized in the report from the public inquiry and alternative, more popular exit routes were available through disability insurance and unemployment insurance.

[14] The new adjustment factor was also applied for early claims in the recalculation of pensions for people aged below 67 on the reform date.

[15] Under this scheme, individuals could receive a partial pension if they had at least 10 years of pension contributions after age 45. Weekly working hours could be reduced to between 17 and 35 hours, with the partial pension compensating for 65 percent of earnings losses. The scheme quickly gained popularity, covering nearly one-third of eligible individuals by 1980 (Sundén 1994). Initially, uptake was highest among private-sector blue-collar workers, but participation later expanded to other groups (Ginsburg 1985). Also see Glans (2010) on the labor supply responses to later changes in the generosity of the partial pension scheme.

[16] It was lowered to 65 in 1982.

[17] Unless another source is specified, I use the actual agreements as the source throughout this section. Local government occupational pension initially consisted of many different agreements, instead of which I have mostly relied on Westbratt (1995) as a source. I note his disclaimer here, that to an extent he has: *"reluctantly consulted his own memory as a source"*.

occupational pensions were offset against the public pension, while in the private sector they were paid on top of it. As a consequence, the 1976 NRA reform mechanically increased total pension wealth in the private-sector schemes but not in the public-sector schemes. Third, the agreements shaped other key margins: the white-collar scheme expanded claiming flexibility (relevant for liquidity constraints), while the blue-collar scheme linked pension eligibility to the loss of employment protection and later formalized separations at the pension age (relevant for employer effects).

Before the NRA reform in 1976, the majority of the labor market was already subject to SRAs below 67 through occupational pension schemes. All schemes built on the same basic principle that 65 percent of the worker's pensionable wage should be replaced after age 65 ("65 at 65"). However, the public sector schemes stipulated lower SRAs at 60 or 63 for some occupations and gender–occupation combinations. In these cases the replacement rate after the SRA was still 65 percent. Across all schemes, full benefits required 30 years of contributions and proportional reductions applied otherwise.

The schemes differed in how they implemented the "65 at 65" principle and in their claim flexibility. The public sector schemes implemented the principle through a defined benefit which was offset against the public pension. In contrast, the private sector schemes implemented it in two steps: first by providing a bridge between the SRA of 65 and the NRA of 67 with a 65 percent replacement rate; and, second, by supplementing the public pension after the NRA with 10 percent of the pensionable wage. Under certain circumstances, the public sector schemes permitted claims below the SRA, unlike the private sector schemes. However, private sector schemes were more generous in their rewards for delayed claims. Additional details on the specificities of the different schemes are provided in Appendix B, including rules on how pensionable wages are determined, actuarial adjustment rates, and exceptions from the 30 contribution year rule for full eligibility. Unlike the other schemes, the blue-collar scheme (STP) was introduced relatively late and phased in during 1973–74; Appendix B provides the coverage schedule by cohort.

Importantly, the schemes diverged in their interactions with the NRA reform in 1976. The occupational pension in public sector schemes remained more generous than the public pension which they were offset against. Hence the NRA reform did not affect total pension levels of people in the public sector schemes. By contrast, the structure of the private sector schemes, with occupational pensions as a defined benefit added on top of public pensions, meant that workers with white-collar or blue-collar occupational pensions initially received large increases to their total pensions after the introduction of the 1976 reform.

Following the reform, the two private schemes differed both in their default payout design and in the margins on which workers and employers could adjust. In the white-collar scheme, the default was to continue paying the bridge pension with a 65 percent replacement rate until age 67. In the blue-collar scheme, the default was instead to redistribute the bridge pension evenly across the remaining lifetime.[18] Importantly for the mechanisms studied in this paper, the subsequent revisions affected liquidity and claiming opportunities in the white-collar scheme.

[18] However, the beneficiary could still apply to continue to receive this part of the pension according to the old schedule.

In addition, the revised blue-collar agreement made explicit that separations at the pension age were the default unless otherwise agreed between worker and employer, which is relevant for employer-driven effects (see Appendix B). In both private schemes, employer-side bargaining subsequently reduced overall generosity in response to the increase in pension wealth induced by the reform.

In the blue-collar scheme, workers born before June 1911 remained covered by the old occupational pension, while workers born in June 1911 or later were placed under an updated scheme. For white-collar workers, an updated scheme was introduced at the start of 1977 that applied to cohorts born in 1912 or later. Both updated schemes removed the generous benefits between age 65 and 67 and implemented a constant 10 percent replacement rate after age 65. While benefit levels decreased drastically between age 65 and 67 in both schemes, this was in part offset by an increase in benefits after age 67. In the blue-collar sector this was achieved by changing contribution and eligibility requirements for the full benefit (see Appendix B), and in the white-collar scheme it was achieved by introducing a defined contribution component (ITPK), which typically generated yearly payments of 2.5 to 3 percent of the pensionable wage (Hammar 1988).

Beyond benefit levels, the revised schemes changed claiming rules and eligibility. Flexibility increased substantially in the white-collar scheme. Claims could start from age 55 with actuarially fair adjustments. The insurance fund covered missed contributions for workers who started claims at age 62 or later and the scheme made it possible to concentrate claims over shorter periods.[19] In the blue-collar scheme, eligibility rules were relaxed by allowing additional contribution years to count toward full benefits (Appendix B).

The collective agreements that governed occupational pension schemes also contained mandatory retirement clauses.[20] Mandatory retirement implied a loss of employment protection and typically coincided with the scheme-specific SRA. Its implications depend on whether it also serves as a default separation age, which Rabaté, Jongen, and Atav (2024) emphasize as an important interaction. In the Swedish setting, automatic separations appear to have been the default in the central government scheme,[21] and the revised blue-collar agreement made explicit that employment ended at the pension age unless otherwise agreed between worker and employer. These features are relevant for distinguishing worker-driven responses from employer-driven separation effects. Appendix B documents additional agreement language and supporting sources.

[19]The defined benefit component could be claimed from age 55, while the defined contribution component (ITPK) could be claimed from age 62, both against actuarially fair adjustments.

[20]Mandatory retirement clauses were explicitly included in the schemes for central government and blue-collar workers. For local government workers I rely on Westbratt (1995), as the original agreements are not available. In the white-collar scheme, all agreements before 1974 included a mandatory retirement clause, and thereafter the rule appears to have been moved elsewhere in the collective agreement. I follow the conclusions of the 1979 government-appointed committee (Äldrearbetskommittén), which found that virtually all workers covered by collective agreements at that time already faced a mandatory retirement age of 65, with some exceptions within the public sector (Government of Sweden 1981).

[21]The agreement stipulates specific conditions under which the employee may remain in employment after her mandatory retirement age.

# 4 Data and empirical strategy

This section describes the data, covering sources, definitions of key variables, sample selection, assignment to occupational pension schemes, and the calculation of social security wealth. It also outlines the empirical strategy.

## 4.1 Data sources

I construct a yearly panel covering the universe of Swedish residents from 1960 onward, using the Population Register, the Migration Register, and the Swedish census, all compiled by Statistics Sweden. The Population Register provides information on birth year and birth month, while the Migration Register contains data on immigration and emigration. Data on educational attainment, (self-) employment status, 1-digit occupation, and 3-digit industry are retrieved from the Swedish censuses (Folk- och Bostadsräkningen), which were conducted every fifth year between 1960 and 1990 and covered the entire resident population. Income information is drawn from the Income and Taxation Register, which contains data on total taxable income from 1968 onward.[22] From 1974, the register also includes separate data on labor earnings and total pension income.[23] Occupational pension payments by scheme are available in the tax records beginning in 1981. Between 1960 and 1966, I obtain data on total taxable income from the Income Statistics, a yearly panel of tax-paying individuals aged 16 or older who were born on the 5th, 15th, or 25th of each month. Annual contributions to the public pension system are obtained from records compiled by the Swedish Pension Agency. These data cover individuals born in 1910 or later who had not yet started claiming old-age pensions in 1976. For individual-year observations outside this coverage, I impute pension points using observed earnings from the data sources described above. When earnings are missing, in 1960–1967 for individuals not covered by the income statistics, I impute earnings using a panel regression estimated on the full earnings panel. Specifically, I estimate a log earnings model with age, year, and individual fixed effects, and use the fitted values as imputed earnings. I then combine observed and imputed earnings to construct pensionable earnings and pension points in years without observed pension records. Earnings below one basic amount are set to zero, consistent with the pension system rules. Appendix C provides full details on data sources and implementation.

Coverage of pension contributions is high overall, and earnings imputation is required for only a limited share of observations, though more frequently for earlier cohorts. For 84 percent of contribution years between 1960 and age 65 for individuals in the main sample, I observe actual contributions from the pension register. Of the remaining 16 percent, 40 percent of imputed pension contributions are based on observed earnings rather than imputed earnings. Figure A5 provides a cohort-level assessment of the imputation. It compares mean pension points and mean social security wealth constructed using actual contributions when available to the same quantities computed using only imputed pension points. The two series track each other closely for cohorts born from 1910, for whom pension register coverage is complete in our sample. Imputed pension points are slightly lower on average, but mean social security wealth is

[22] Total taxable income includes labor earnings, self-employment income, pension income, sickness benefits and parental benefits.

[23] Total pension income includes both public and occupational pensions.

very similar, suggesting that any imputation error is small and unlikely to materially affect the results for earlier cohorts.

I define employment and the retirement hazard based on labor earnings. An individual is employed if her yearly labor earnings exceed 1 basic amount.[24] The retirement event, in the retirement hazard, is defined as the last year of employment. Unless otherwise noted, all monetary values are expressed in 2020 SEK prices.

Individuals are assigned to an occupational pension scheme using information on occupational pension payments from 1981. The small fraction of individuals who received payments from multiple or indeterminate sources are assigned to a distinct scheme based on 1) the source of their largest single pension payment and 2) a priority order between occupational pension schemes based on approximate generosity.[25] The match can be further improved by incorporating information that indicates whether the scheme belonged to the public or private sector. Appendix D provides a detailed description of the assignment procedure. Figure A3 shows that the relative distribution of occupational pension groups remained stable across birth cohorts, with a small but notable exception between the 1910 and 1912 cohorts. During this period, an increase in the share of blue-collar workers coincides with a decline in the group without occupational pensions. This compositional shift reflects the policy change in the blue-collar pension scheme, which applied to individuals born in June 1911 or later.[26] The group without an occupational pension also includes workers who exited covered employment before satisfying the scheme's eligibility requirements. This likely contributes to the somewhat lower employment rate at age 55 for this group relative to others in Figure 4.

### 4.2 Sample restrictions

The sample covers the period from 1974 to 1979 and includes individuals aged 55 to 70. It is restricted to previously employed individuals, defined as those with recorded employment in both the 1960 and 1965 censuses and total taxable income above one basic amount in 1968. Individuals who were self-employed, employed in the household or farming sectors, or on any form of leave during the census years are excluded.

Out of 9,165,212 observations within ages 55–70 in years 1974–1979, 3,648,160 are left in the main sample, where employment restrictions have been applied. Table 1 presents sample sizes for different subgroups after applying sequential restrictions. 66 percent of male observations meet the employment criterion, compared to just 24 percent of female observations. The additional requirement, for total earnings in 1968 to exceed one basic amount has a relatively minor effect on the sample size for both sexes. A potential concern is sample selection, since the main restriction requires individuals to be employed in both 1960 and 1965. This condition is imposed at different ages for different birth cohorts, so cohort composition could vary mechanically through differential employment histories. Figure A4 shows that this selection is strongest for older cohorts, for whom 1960 and 1965 correspond to later career ages, but it becomes much

[24] A basic amount is a price indexed amount that equaled 47,300 SEK in 2020.

[25] The priority order is 1) white-collar; 2) blue-collar; 3) public sector.

[26] The revised scheme reduced the contribution requirement in the final years before the SRA, lowering it from three full contribution years between ages 59 and 64 to three full years between ages 55 and 64.

less pronounced for cohorts who were below age 55 in 1965.[27]

**Table 1:** Observations by sequential sample restrictions

| | Sex | | Occupational pension plan | | | |
|---|---|---|---|---|---|---|
| | Women | Men | None | Blue-collar | White-collar | Public sector |
| Age 55–70, year 1974–1979 | 4,702,855 | 4,462,357 | 4,675,453 | 1,749,228 | 911,726 | 1,828,805 |
| Employed 1960 & 1965 | 0.24 | 0.66 | 0.25 | 0.69 | 0.70 | 0.58 |
| Taxable income 1968 $\geq$ 1 BA | **0.20** | **0.61** | 0.21 | 0.65 | 0.64 | 0.53 |
| Survival past 75 | 0.16 | 0.42 | 0.11 | 0.50 | 0.50 | 0.44 |
| Born after 1907 | 0.16 | 0.40 | **0.09** | **0.50** | **0.48** | **0.42** |

*Notes:* Beginning with "Employed 1960 & 1965," rows report the share of the initial sample remaining after imposing each sample restriction sequentially. Restrictions shaded in gray are imposed only for the analyses in the mechanism section.
* *This restriction also entails the other employment related restrictions with respect to census data, namely no self-employed workers, no farmers and no workers on temporary leave in either census.*

For the mechanism analysis I impose two additional sample restrictions to facilitate the comparison between occupational pension schemes. First, individuals who died before age 75 are excluded, as occupational pension data used for classification of workers into different occupational schemes is only available from 1981.[28] This restriction helps ensure a more balanced sample across birth cohorts. Second, individuals born before 1907 are dropped, as blue-collar workers born before November 1906 were not eligible for occupational pensions, making it impossible to distinguish them from other individuals without such coverage.[29] The sample restrictions mainly excludes individuals who are not assigned to an occupational pension scheme. The final sample for the heterogeneity analysis comprises 2,508,742 observations, distributed fairly evenly across the occupational pension groups. The group without occupational pensions is the smallest, with 439,840 observations.

Table 2 provides summary statistics for the full sample. The average total taxable income in 1968 was 249,600 (2020) SEK. At least 60 percent of the sample had at most primary school level education, and 75 percent were male. Women in the sample were less likely to be married, with 50 percent of women in marriage compared to 83 percent of men. Since the mechanism analysis is conditional on survival past 75, average age at death was higher in the mechanism analysis than in the main analysis. Blue-collar workers are characterized by the shortest life expectancy, the lowest average earnings, and the lowest levels of education. People in the white-collar scheme had the highest average earnings at 352,000 SEK compared to the full sample average of 250,000 SEK. The share of male observations ranges from 58 percent in the public sector schemes to 81 percent in the blue-collar scheme.[30]

[27]The main estimates of interest concern cohorts born in 1909 and later and compare cohorts born two years apart. For the 1909 cohort, 37.1 percent of the population is in the analysis sample, compared with 39.0 percent for the 1911 cohort. Given effect sizes around 17 percentage points, differential selection of this magnitude is unlikely to be an important driver.
[28]Individuals aged 68 in 1974 would have turned 75 in 1981.
[29]This condition prohibits the estimation of employment effects above age 68 since individuals born in 1907 turned 68 in the year before the reform.
[30]Table A3 reports summary statistics split by the local government scheme and the central government scheme.

**Table 2:** Summary statistics

| | Full sample | | Heterogeneity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All | | None | | Blue-collar | | White-collar | | Public sector | |
| | Mean | St.dev | Mean | St.dev | Mean | St.dev | Mean | St.dev | Mean | St.dev |
| Death age | 80.36 | 9.25 | 84.75 | 6.25 | 84.23 | 5.99 | 85.16 | 6.28 | 85.42 | 6.33 |
| Taxable Income 1968 (2020) SEK Thousands | 249.62 | 201.96 | 230.41 | 214.71 | 195.57 | 68.54 | 352.48 | 325.14 | 269.68 | 165.94 |
| Contribution years | 16.35 | 2.48 | 15.49 | 3.18 | 16.78 | 2.00 | 16.97 | 2.13 | 16.43 | 2.36 |
| Occupation 1970 census | | | | | | | | | | |
| Executive | 3% | | 5% | | 0% | | 9% | | 2% | |
| Technical/Clerical | 38% | | 35% | | 10% | | 74% | | 53% | |
| Industry/Transport | 41% | | 26% | | 79% | | 10% | | 23% | |
| Service | 7% | | 7% | | 5% | | 2% | | 12% | |
| Military | 1% | | 0% | | 0% | | 0% | | 2% | |
| Missing | 5% | | 11% | | 2% | | 3% | | 6% | |
| Other | 5% | | 15% | | 4% | | 2% | | 3% | |
| Max Education Level | | | | | | | | | | |
| Primary School | 60% | | 56% | | 74% | | 50% | | 52% | |
| Secondary School | 11% | | 10% | | 3% | | 18% | | 16% | |
| High School or above | 7% | | 5% | | 0% | | 15% | | 10% | |
| Unknown | 23% | | 29% | | 23% | | 17% | | 22% | |
| Male | 75% | | 63% | | 81% | | 79% | | 58% | |
| Married (Women) | 50% | | 49% | | 54% | | 46% | | 50% | |
| Married (Men) | 83% | | 79% | | 80% | | 90% | | 87% | |
| Observations | 3,648,160 | | 420,881 | | 876,715 | | 439,840 | | 771,306 | |
| Individuals | 800,462 | | 82,278 | | 172,588 | | 92,337 | | 156,896 | |

*Notes:* Summary statistics are based on the full sample of individuals aged 55 to 70 between years 1974 and 1979. Summary statistics for specific occupational pension plans also applies the mechanism sample restrictions of survival past 75 and year of birth after 1907. Education data is only available for people born after 1910.

### 4.3 Social Security Wealth

To understand the wealth effects of the normal retirement age reform (NRA reform), the first step is to assess how it changed the overall value of pension benefits people receive over their retirement, assuming they start claiming at the same age. To this end, Social Security Wealth (SSW) is calculated for all individuals in the sample, conditional on each potential claiming age between 60 and 70. An individual's SSW is defined as the expected present value of future pension benefits, where expectations account for the probability of survival at each claiming age. The calculations assume full and uninterrupted benefit receipt from the claiming age onward. Remaining life expectancy from age 60 is used, and a 3 percent discount rate is applied throughout.[31] For simplicity, the analysis excludes pension benefits based on earnings above

People in the central government scheme had higher earnings and reached a higher educational level.

[31] Life expectancy is estimated separately by gender in each year.

the 7.5 basic amount ceiling of the public pension system.[32] This simplification is justified, as earnings above the ceiling were relatively uncommon in Sweden's compressed wage distribution during the 1970s and as occupational pension schemes did not respond to the reform with major adjustments to replacement rates for higher wage levels.[33] Appendix E contains a full summary on how data limitations and missing information about the pension schemes are addressed in the calculation of SSW.

### 4.4 Empirical strategy

To analyze how the NRA reform affected labor market behavior, the empirical strategy exploits variation across years and age groups in the influence of the NRA and associated incentives. I limit the main analysis to ages 55 to 70 and focus on the last pre-reform year 1975 and the first post-reform year 1977, omitting the reform year 1976 since the treatment in 1976 was ambiguous, with the NRA shifting half-way through the year. For the main analysis, I estimate the following regression model:

$$y_{i,t} = \gamma_t + \mu_a + \sum_{a=56}^{70} \delta_a \times \mathbb{1}\left(\text{age}_{i,t} = a\right) \times \mathbb{1}(t = 1977) + X_i\beta + \varepsilon_{i,t} \tag{1}$$

for an individual $i$ in calendar year $t$. The model is used to study the average effect of the NRA decrease on an outcome $y_{it}$, by differencing out employment trends of younger age groups who are still too young to be influenced by the NRA. The model includes a set of calendar year fixed effects $\gamma_t$ and age fixed effects $\mu_a$. The coefficients of interest are the $\delta_a$ coefficients that captures the interactions between age dummies and the post reform dummy. Age is defined as the age at the end of the calendar year and age 55 is the omitted dummy variable, which acts as a reference age. Finally, the model includes an error term $\varepsilon_{i,t}$ and a vector of control variables $X_i$, including gender, log earnings in 1968 and 3-digit industry code in the 1965 census.

The identifying assumption is that, absent the NRA reform, outcomes at ages above 60 would have evolved in parallel to outcomes at the reference age, conditional on the year and age fixed effects and the covariate vector $X_i$. In other words, after controlling for common shocks through $\gamma_t$ and for lifecycle differences through $\mu_a$, there are no cohort-specific changes in retirement behavior that differentially affect older ages relative to age 55. This structure controls for economy-wide shocks, including those arising from the industrial crisis in the second half of the 1970s. A remaining concern is that retirement behavior may have been shifting across cohorts even absent the reform. I assess this concern in Figure 1 by examining whether outcomes display stable patterns across pre-reform years at all ages; the absence of systematic pre-trends supports the identifying assumption.

The coefficient of primary interest is the estimate at age 66. This age provides the cleanest comparison in terms of exposure to the NRA: the full cohort turning 66 in 1977 is above the NRA, whereas the full cohort turning 66 in 1975 is below it. It is also the age at which benefit

[32] For simplicity, I also disregard the minor adjustments to the basic pension introduced in 1975, when it increased from 0.9 to 0.95 basic amounts for singles and from 0.7 to 0.775 for couples.

[33] White-collar schemes gradually increased replacement rates for earnings above the ceiling (see Table A1) and introduced the defined contribution component ITPK.

generosity changes most, since the average NRA drops by 1.75 years between 1975 and 1977.[34] By comparison, the average NRA drops by around one year at ages 65 and 67. Estimates at ages 65 and 67 are also informative, but harder to interpret because employment is defined as having labor earnings above one basic amount. Under this annual-earnings definition, individuals born early in the year who retire at the NRA are often recorded as non-employed already in that year. As a result, estimates at age 67 understate behavioral responses for early-born individuals, while estimates at age 65 capture responses to being above the NRA only for early-born individuals. At ages 68 and above, treated cohorts are largely unaffected by the reform in 1977.[35] Below age 65, the NRA does not differ between treated and control cohorts, but control cohorts do not have their pensions recalculated under the new legislation until the reform date. Finally, estimates at ages 60 and 63 capture the effect of the lower eligibility age for early public pension claims.[36]

I expect to find near zero effects for age groups below age 60 who could still not claim a public old-age pension after the reform. Throughout the analysis, I assess heterogeneity by estimating separate regressions for each group of interest.

# 5 Main results

I begin the analysis by examining raw trends in retirement-related outcomes in the years surrounding the reform. Figure 1 presents mean outcomes for individuals aged 55 to 70 in each year from 1974 to 1979. In the reform year, the retirement hazard shows a sharp spike at age 65, rising from about 40 percent in earlier years to more than 60 percent. This pattern builds on an already elevated hazard at age 65 in the pre-reform years, reflecting that age 65 was the statutory retirement age in the occupational pension schemes. Employment shares were also stable prior to the reform and declined markedly afterward, particularly at ages between the new and old normal retirement age (NRA) of 65 and 67. Most of this decline occurred immediately following the reform, between 1976 and 1977. Similar patterns are observed in labor earnings and total pension income. At ages 66 and 67, labor earnings fell by roughly half between the year before the reform and the year after. The gradual adoption of the new flexible retirement option can explain why both income sources also changed noticeably at younger ages. Since the new normal retirement age applied only from the second half of 1976, these income measures show only a partial adjustment in that year.

Overall, retirement-related outcomes remain highly stable in the years preceding the NRA reform, which supports the identifying assumption of parallel trends across age groups. One exception is the pronounced decline in employment at age 66 in 1975, which raises potential concerns about the validity of this assumption. Figure A6, which excludes individuals in the blue-collar scheme, shows that this decline was entirely driven by the introduction of the blue-collar occupational pension plan. In this subsample, employment patterns from 1974 to 1976 remained stable across age groups, supporting the parallel trends assumption. A finer decomposition by

[34] Figure A2 shows the NRA by birth year and month.

[35] The NRA decreases marginally between workers turning 68 in 1975 and 1977, by an average of 0.125 years.

[36] At ages 60 and 63, these effects are only partly captured because of the annual-earnings definition of employment, analogously to the interpretation of estimates at ages 65 and 67.

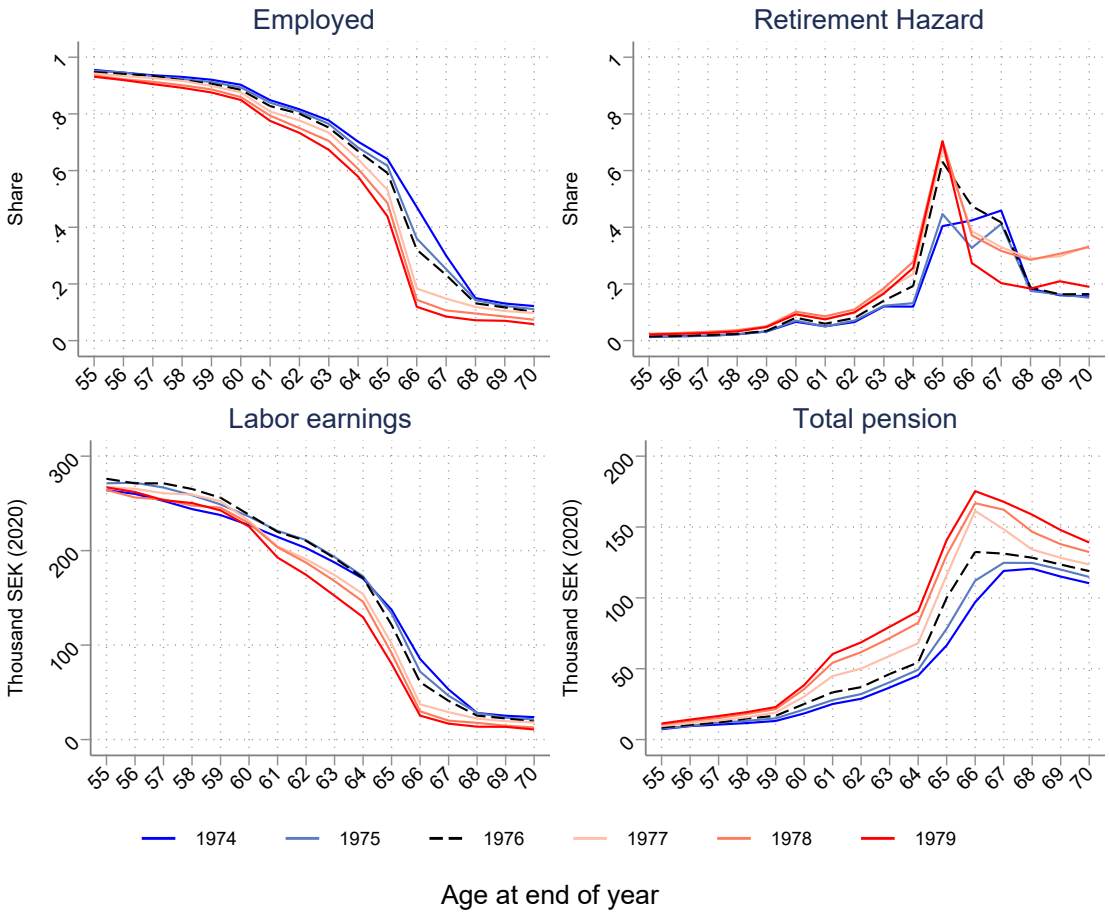


**Figure 1:** Average employment, retirement hazard, labor earnings and total pensions by year

*Notes:* The analysis uses the full sample.

birth month in Figure A7 shows that after the reform, labor earnings in the year individuals turned 65 rose linearly with later birth months, while pension income declined correspondingly, indicating close alignment of retirement and pension claims with the timing of the 65th birthday.

Regression results based on equation 1 are presented in Figure 2. The estimates confirm the patterns from Figure 1 that retirement behavior was substantially affected by the new NRA. The effect of the reform was primarily concentrated between the old and new NRA. The reduction in the NRA lowered employment at age 66 by 17.0 percentage points, corresponding to a 47.1 percent decline relative to the pre-reform employment share. The estimate is precise, with a 95 percent confidence interval ranging from 16.3 to 17.6. At age 67, employment fell by 10.0 percentage points, a 43.2 percent decline. The 17 percentage point drop at age 66 is towards the upper end of estimates found in the literature on employment effects of SRA shifts, where estimates range from 6.3 to 21.2 percentage points.[37] The effect is smaller than, but comparable to, the findings of Johnsen, Vaage, and Willén (2022), who study the introduction of an early retirement scheme in Norway in 1998 that allowed workers to claim public pensions before the NRA of 67. Although a reduction of nearly half the baseline level is substantial, it remains smaller than effects documented in settings where employment shares approach zero after the

[37] Note that not all papers in this literature condition their sample on previous employment. For example, Rabaté, Jongen, and Atav (2024) report a 21.2 percentage point effect without conditioning on previous employment.

NRA, as in Rabaté, Jongen, and Atav (2024).


**Figure 2:** Regression results by age and gender

*Notes:* The regressions control for age fixed effects, a post-reform dummy (1977), gender, log earnings in 1968, and 3-digit industry codes from the 1965 census. Age 55 serves as the omitted category. Gender-specific estimates are obtained from separate regressions by sex. The estimation sample includes the full sample of individuals aged 55–70 observed in the calendar years 1975 and 1977. Vertical bars indicate 95 percent confidence intervals.

At ages above 67, where incentives remained largely unchanged by the reform,[38] employment declines are small and only occasionally statistically significant. Below age 65, the effects on employment are also much smaller than at ages around the new NRA. As anticipated, no significant effects are detected below age 60, when individuals were ineligible to claim benefits under either regime and financial incentives were unchanged. The largest decline below age 65 occurs at age 64, with a reduction of 3.4 percentage points. Although modest in absolute terms, this decline is sizable relative to the literature on statutory retirement age (SRA) increases, which typically finds limited or no responses below the former SRA (Rabaté, Jongen, and Atav 2024; Staubli and Zweimüller 2013; Geyer and Welteke 2021; Mastrobuoni 2009). At the same time, these effects are in line with recent empirical evidence documenting employment responses below the NRA (Carta and De Philippis 2024; Artmann, Fuchs-Schündeln, and Giupponi 2023). In this setting, however, expected pension wealth differs little between treated and control individuals at these ages, suggesting that the estimated effects below the NRA are unlikely to be driven

[38]With the exception of minor changes for individuals turning 68 late in the year.

by wealth effects and may instead reflect short-run constraints rather than forward-looking retirement behavior.

Focusing on the early retirement age (ERA) response alone, at ages 61–63 the estimated employment effects are very small, suggesting that the reduction in the ERA from 63 to 60 had little influence on retirement behavior in this age range. This pattern may appear surprising given that other studies (Staubli and Zweimüller 2013; Atalay and Barrett 2015; Coile et al. 2025) document substantial employment responses to ERA reforms. However, take-up of early old-age pension before reaching the NRA was limited in this setting. As shown in Table A4, in 1975 only about 4.1 percent of individuals aged 63–66 received early old-age pension, compared with roughly 19.0 percent of individuals aged 60–64 receiving disability pension or sickness benefit. Early exit prior to the NRA therefore predominantly occurred through alternative pathways, limiting the scope for an ERA-driven employment response. Consistent with the arguments in Seibold (2021), the ERA may also have been less influential because it was weakly salient and not strongly framed as a retirement age.[39]

Beyond employment effects, I estimate a 22.3 percentage point increase in the retirement hazard at age 65. Conversely, the hazard at age 67 dropped by 8.2 percentage points, suggesting that age 67 declined in importance as a retirement focal point. Figure 1 shows that the pronounced spike in the hazard at age 67 disappeared in the year after the reform. These hazard estimates should be interpreted with caution, since individuals remaining employed at older ages are a selected group and composition therefore changes across ages and cohorts. In line with the shift in employment, average labor earnings at age 66 declined by 34,600 SEK, or 12.4 percent of average earnings for 55-year-olds in 1975, a loss that was more than offset by higher total pensions. At ages 60 to 64, pensions and labor earnings responded more strongly than employment, reflecting the spread of partial pensions following their introduction in 1976 (Ginsburg 1985).

The main regression does not fully capture how employment effects are concentrated between the old and new NRAs. In particular, the estimated effect at age 65 combines retirements that occurred late in the previous calendar year, before individuals turned 65, with retirements early in the current year among individuals who exited before earning a basic amount.[40] Figure A9 presents estimates by quarter of birth. The age-65 effect is concentrated among first-quarter births, indicating that the marked employment drop at age 65 is driven by individuals who retired after reaching the NRA. Consistently, the effect is smaller in magnitude for first-quarter births at age 67, which helps explain why the estimated decline at age 67 is weaker than at age 66.

Figure 2 also shows results separately by gender. Since three-quarters of the sample are male, male effects closely mirror the aggregate, while female effects are broadly similar with some notable differences. Above the new NRA, employment effects were larger for males, yet the retirement hazard increased more for females because of their lower baseline employment at age 66 in 1975.[41] The employment effect remains larger for men after controlling for occupational

[39] This is reflected, for instance, in the report from the public inquiry on the reduction of the NRA (Government of Sweden 1974).

[40] A basic amount corresponded to roughly one fifth of average full-time annual labor earnings.

[41] Age profiles for average employment shares and other outcomes are shown by gender in Figure A8.

pension scheme coverage,[42] despite women being overrepresented in the public sector scheme, which was financially unaffected by the reform.

Under certain assumptions, the estimates in Figure 2 can be used to approximate the effect of the reduced NRA on total months of employment. This is done by summing the age-specific employment effects and multiplying by 12 (the number of months in a year). Similarly, the age-specific labor earnings coefficients are aggregated to capture the combined extensive- and intensive-margin labor supply response. To express this in terms of monthly salaries, I divide the total by the average annual labor earnings of 55-year-olds (after multiplying by 12).

**Table 3:** Labor market effects summed over age-specific effects

| | All | | Men | | Women | |
|---|---|---|---|---|---|---|
| | Employment (months) | Labor earnings (monthly salaries) | Employment (months) | Labor earnings (monthly salaries) | Employment (months) | Labor earnings (monthly salaries) |
| Age 65–67 | -4.05 | -3.23 | -4.30 | -3.05 | -3.27 | -3.72 |
| Age 61–70 | -5.54 | -5.92 | -5.86 | -5.22 | -4.38 | -7.78 |
| Age 61–64 | -1.17 | -2.64 | -1.25 | -2.44 | -0.79 | -2.98 |

*Notes:* Total employment effects (in months) are calculated by summing the relevant coefficients from the employment panel of Figure 2 and multiplying by 12. Labor earnings effects (in monthly salaries) are based on the sum of coefficients from the labor earnings panel of the same figure, divided by the average annual labor earnings of 55-year-olds, and multiplied by 12.

Table 3 reports aggregate effects on employment and monthly salaries for three age intervals and both genders. The extensive-margin results further demonstrate the concentration of effects between the old and new NRA. Employment fell by 4.1 months between ages 65 and 67, compared with 1.2 months between ages 61 and 64. In total, over ages 61 to 70, employment fell by 5.5 months, with estimates at ages 68 to 70 accounting for 6 percent of this effect. The labor earnings response over ages 65–67 corresponds to fewer monthly salaries, likely because the intensive margin labor supply was relatively low for individuals above age 65. By contrast, the labor earnings response at ages 61–64 is relatively large and reflects the intensive-margin response to the partial pension reform introduced along with the NRA reform.

# 6 Mechanisms

This section first describes how the reform interacted with the different occupational pension schemes and shows how the resulting heterogeneity in effects relates to distinct underlying mechanisms. Public-sector workers were largely insulated from wealth effects, white-collar workers gained substantial claim flexibility, and blue-collar workers experienced shifts in employment protection around the reform. The section then examines these potential mechanisms individually, using additional analysis to assess their importance.

[42] At age 66, the specification controlling for occupational pension scheme yields an effect of 22.9 percentage points for men and 14.2 percentage points for women. Note that this analysis also imposes the sample restrictions for the mechanism analysis.

### 6.1 Differences with respect to occupational pension schemes

People were affected differently by the reform depending on their occupational pension scheme. In the public sector, increases in public pension entitlements were almost fully offset by reductions in occupational benefits, so total pension wealth changed little. Private blue- and white-collar workers, in contrast, initially kept their occupational pensions while also receiving the more generous public pension.

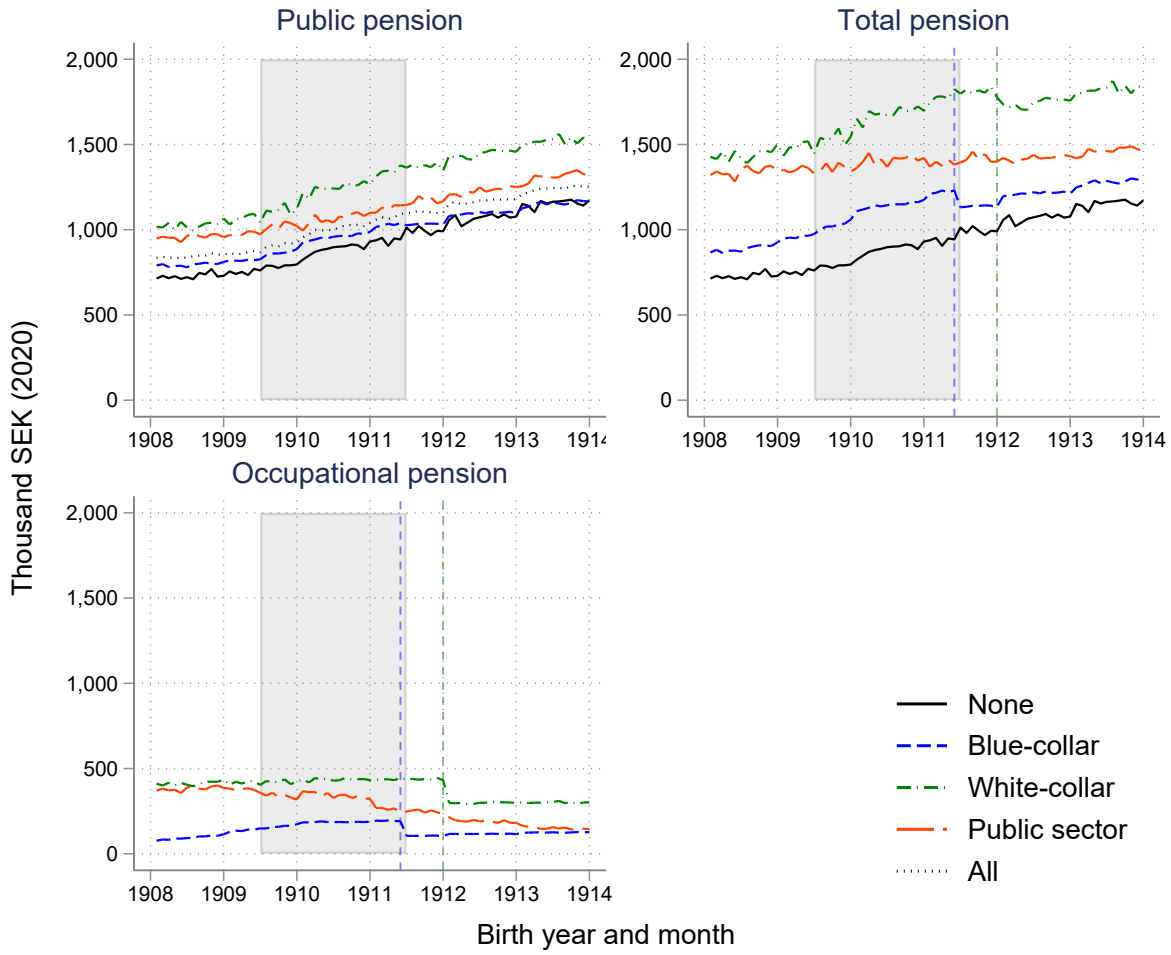


**Figure 3:** Social Security Wealth associated with retirement at age 65 by birth year and month

*Notes:* Shaded area: phase-in cohorts (NRAs 65–67). Blue/green dashed vertical lines: introduction of updated blue-/white-collar schemes. SSW based on the public sector occupational pension refers to the occupational pension after it has been offset against the public pension.

Figure 3 supports this interpretation. The figure is based on calculations of individual pension wealth (SSW) under the assumption that benefits are claimed starting at age 65. The top panel shows rising public pensions across cohorts, while the bottom panel shows that public-sector occupational benefits fall correspondingly, leaving total pension wealth essentially flat in the right panel. For blue- and white-collar workers, occupational pensions initially do not adjust, which appears in the right panel as clear increases in total pension wealth: between the June 1909 and May 1911 cohorts, gains averaged around 25 percent in all three groups outside the public sector. The continued upward trend in public pension wealth outside the shaded window reflects the phase-in of the earnings-related scheme.

The reform also interacted with occupational pension schemes to change employment protection and the flexibility of pension claims. With the update to the white-collar occupational pension scheme at the start of 1977, benefits became much more flexible with actuarially fair adjustments for claims starting from age 55 and with full compensation for forgone contributions for claims starting from age 63. This replaced a system in which occupational pensions could not be claimed before age 65. Changes in employment protection occurred only in the blue-collar scheme. Just before the reform, the blue-collar occupational pension was introduced together with an upper employment-protection age of 65. Under the updated blue-collar scheme in mid-1976, employment contracts automatically terminated at age 65. In practice, automatic terminations may already have been applied from the start of the scheme, although the initial agreement does not state this clearly.

These institutional differences are reflected in employment patterns. Figure 4 shows employment rates by occupational pension scheme from ages 55 to 70 around the reform. In all schemes except the blue-collar scheme, employment rates were stable between 1974 and the reform year, followed by a sharp decline between ages 65 and 67 in 1977, the first full year after the reform. The blue-collar scheme displays a different pattern: employment drops abruptly at age 66 between 1974 and 1975, from about 70 to 40 percent, coinciding with the introduction of the new occupational pension and the associated upper age limit. Among individuals without occupational pensions, who were not subject to a statutory retirement age at 65 before the reform, there is no sharp decline at age 65 prior to 1976.

Figure 5 presents regression estimates on employment by occupational pension scheme. The absence of effects at younger ages supports the identifying assumption of similar underlying employment trends across ages. Across all schemes, effects are concentrated between ages 65 and 67. Despite the absence of financial incentives, public-sector workers still responded, with employment at age 66 falling by 6.99 percentage points, more than one quarter of their baseline employment rate in 1975. This suggests that factors such as norms and behavioral responses may have played a role. Effects are larger in groups with stronger financial incentives, although relative to baseline employment, differences across groups are smaller. As an alternative explanation, the smaller response in the public sector could also reflect the use of forced exits at age 65, which would mechanically limit the scope for workers to respond to behavioral ques and norm changes associated with the reform.

The largest effect is found in the blue-collar group. Relative to their baseline employment share, employment at age 66 fell by 67 percent (26.2 percentage points), whereas all other groups experienced declines of less than 40 percent. The presence of automatic separations in the updated blue-collar scheme provides a natural explanation. However, it is unclear whether automatic terminations were already applied from the onset of the scheme. Figure 4 shows that the employment share of blue-collar workers at age 66 fell from 69 percent in 1974, when eligibility started during the year, to 11 percent in 1977.[43] Employer responses are the likely driver given that the drop is concentrated exactly at age 66 and occurred despite pension

[43]Table A2 shows the full phase-in schedule. For the 1908 cohort, turning 66 in 1974, eligibility applied throughout the year. Workers born early in the year could not earn a full basic amount before reaching eligibility. For those turning 66 in the later half of the year, employment fell from 76 percent in 1974 to 12 percent in 1977.

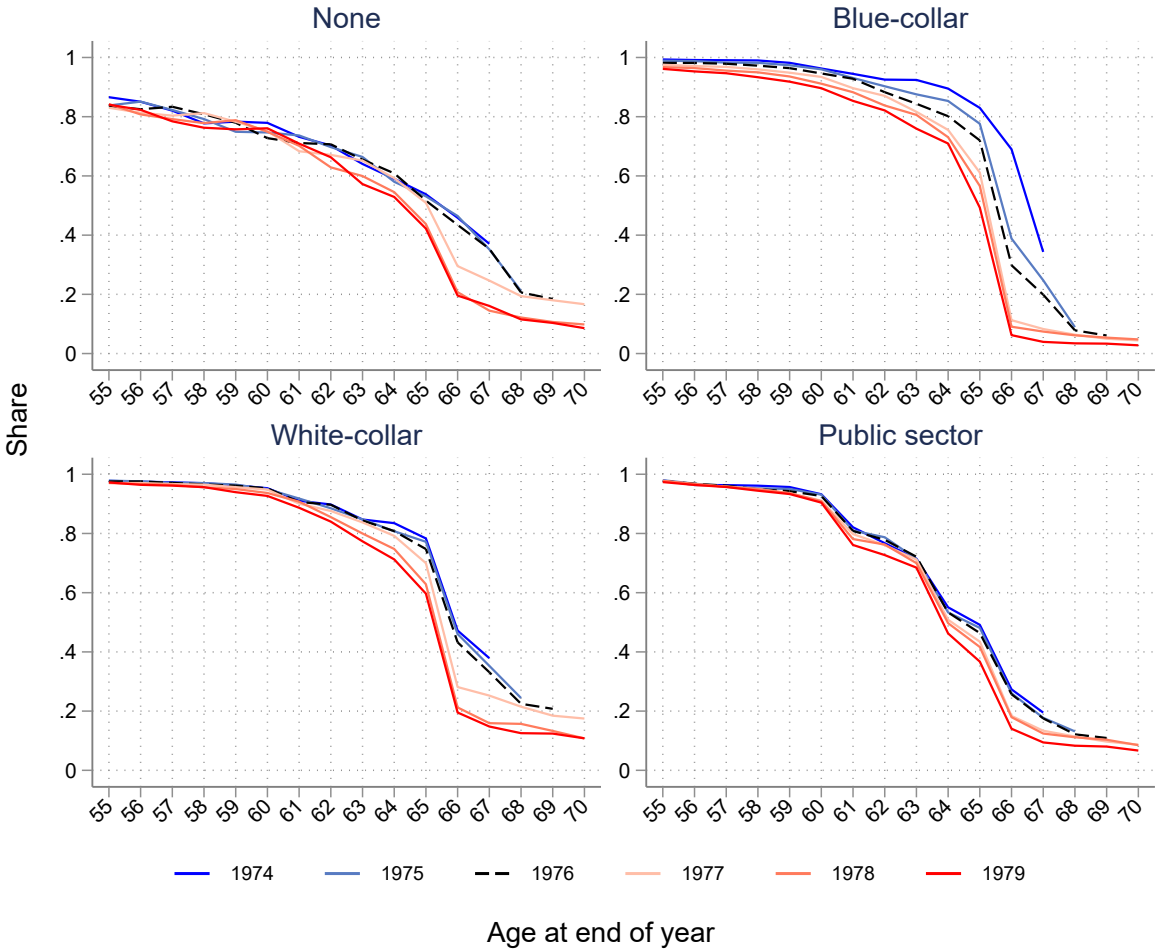


**Figure 4:** Average employment by year and occupational pension scheme

*Notes:* Heterogeneity sample

wealth rising by roughly the same amount as for workers without occupational pensions.[44] The blue-collar group also shows noticeable effects at ages 64 and 65. Although smaller than the effect at age 66, they remain larger than in the other schemes and may reflect greater sensitivity to wealth changes in this group or the contemporaneous industrial crisis that encouraged firms to offer early retirement options.[45]

The 1976 update to the blue-collar pension scheme extended eligibility to workers without recent pension contributions. This may have changed the composition of the blue-collar group and could bias estimated effects upward at ages 64 and 66, where treated cohorts were more likely than control cohorts to be covered by the updated scheme.[46] To assess this, I estimate employment effects for a predicted blue-collar group based on predetermined characteristics.[47]

[44]SSW increased by 35 percent for blue-collar workers aged 66 in 1974 vs. 1977, compared with 36 percent for those without occupational pensions.

[45]During this period, disability insurance on employment grounds was available from age 60.

[46]The 1911 cohort was split between the new and the old scheme, with the updated scheme applying to individuals born in June 1911 or later. The 1911 cohort is treated in the age 66 estimates and serves as a control in the age 64 estimates.

[47]Blue-collar status is predicted from cells defined by industry, occupation, and sector. Individuals are classified as predicted blue-collar workers if they belong to cells in which more than 75 percent of workers born in 1907 were blue-collar workers. Industry is measured at the 3-digit level in 1965, occupation in 1960, and sector in 1970

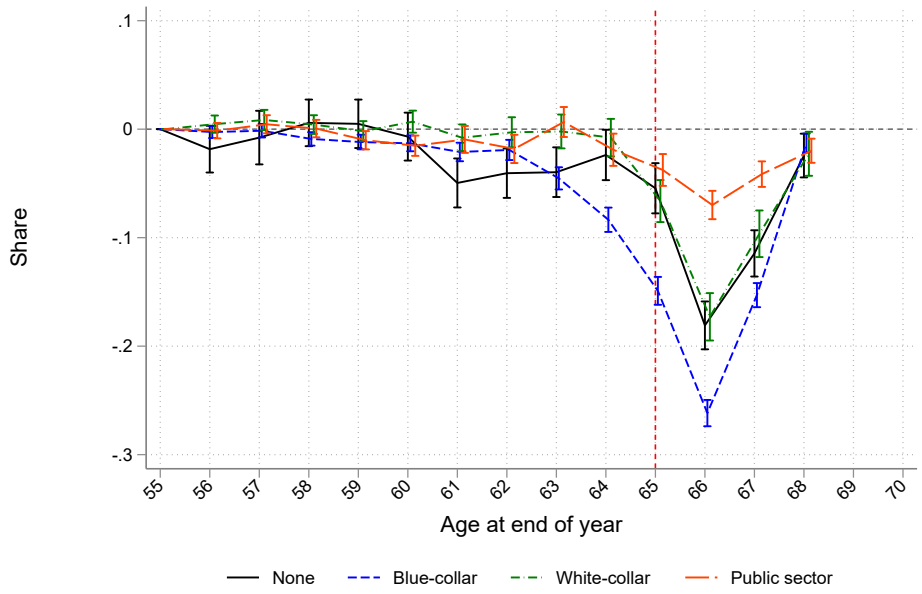


**Figure 5:** Regression results on employment by occupational pension scheme

*Notes:* The regressions control for age fixed effects, a post-reform dummy (1977), gender, log earnings in 1968, and 3-digit industry codes from the 1965 census. Age 55 serves as the omitted category. Pension-scheme-specific estimates are obtained from separate regressions by occupational pension scheme. The estimation sample includes the full heterogeneity sample of individuals aged 55–70 observed in the calendar years 1975 and 1977, born after 1907 and survival past 75. Vertical bars indicate 95 percent confidence intervals.

As shown in Figure A11, estimated effects for the predicted blue-collar group are generally slightly smaller than those for observed blue-collar workers. At age 66, the estimate is less than 3 percentage points smaller for the predicted group. Overall, this suggests that the blue-collar effects are unlikely to be driven by compositional changes. The difference is also consistent with attenuation from imperfect prediction, and it is similar in magnitude at age 67, where no compositional changes should occur.

Regarding the flexibility reform in the white-collar sector, which could have relaxed liquidity constraints, there is no sign of an immediate response after its introduction in 1977. Employment among white-collar workers below age 65 does not fall significantly. This finding is consistent with evidence that the reduction in the early retirement age (ERA) from 63 to 60 had modest effects on behavior, with individuals instead continuing to claim pensions from the default payment time.

## 6.2 Wealth effects

The results presented earlier in this paper show that employment effects arise even when financial incentives do not change, and that they are larger in schemes where the reform increased pension wealth. These patterns are consistent with substantial wealth effects, but they could also reflect other mechanisms. To assess the role of wealth more directly, I proceed in two steps.

First, I estimate how employment responded to increases in pension wealth in the period

(the first year with available sector data). Industries with fewer than 100 observations and cells with fewer than 50 individuals are merged. Occupational status distinguishes blue-collar, white-collar, service, and managerial roles.

before the reform date, when individuals turning 66 were still below the normal retirement age (NRA) at the start of the year but could anticipate higher pensions after the reform. Second, I compare observed employment effects to predicted effects obtained by combining the percentage increase in Social Security Wealth (SSW) with elasticities of employment with respect to wealth from previous studies. In both analyses, I exclude the blue-collar sector to avoid confounding from the introduction of their occupational pension scheme.

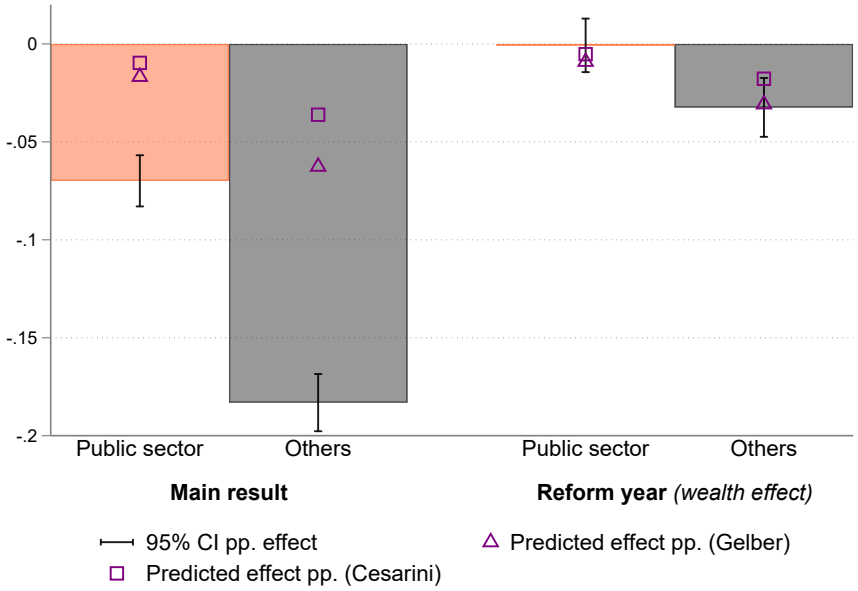


**Figure 6:** Estimated and Predicted Employment Effects from Wealth Changes at Age 66

*Notes:* Bars show estimated effects on employment at age 66 for public-sector workers and for all others (excluding blue-collar workers). The left panel reports estimates for 1977 and the right panel for 1976; in both cases, 1975 is the pre-reform year, and each estimate uses one pre- and one post-year. Hollow markers show predicted effects constructed by multiplying the percentage change in Social Security Wealth (SSW) between treated and control cohorts by elasticities of employment with respect to SSW inferred from Cesarini et al. (2017) and Gelber, Isen, and Song (2016), and then scaling by baseline employment in 1975. Error bars denote 95 percent confidence intervals.

Figure 6 compares employment effects at age 66 for public-sector workers and all others (excluding blue-collar workers). The bars on the left use the exact model from the the main results, using 1975 as the pre-reform year and 1977 as the post reform year. The bars on the right present analogous estimates for 1976 as the "post" reform year, again using 1975 as the control year. Because the reform took effect in mid-1976 and was enacted in December 1974, the 1976 estimates capture behavior just before the NRA was raised but after the reform was anticipated.[48] They therefore primarily reflect responses to anticipated wealth increases, rather than behavioral or normative changes associated with passing the NRA. In this specification, the public sector functions as a placebo group: if wealth increases drive the reform-year response, there should be no effect for this group, since their pension wealth did not change. This is what we find. For other workers, SSW for 66-year-olds rose by about 13 percent between 1975 and 1976, roughly half of the increase between 1975 and 1977. Over the same period, employment at age 66 declined by an estimated 3.2 percentage points, less than one-fifth of the main effect

[48] Newspaper coverage peaked in 1974, coinciding with the publication of the inquiry report and the legislative enactment of the reform; see Figure A1.

observed in 1977. Overall, the reform-year estimates imply that wealth effects are quantitatively important, yet fall well short of explaining the total effect.

Next, I compare the increase in pension wealth to estimates of employment responses to wealth changes from earlier studies. The hollow squares and triangles in Figure 6 show predicted effects obtained by multiplying the percentage increase in SSW between treated and control 66-year-olds with elasticities of employment with respect to SSW that I infer from published estimates in Cesarini et al. (2017) and Gelber, Isen, and Song (2016). Predicted effects are then scaled by baseline employment to obtain percentage-point changes.[49] The estimated employment effect in 1977 is almost six times larger than the predicted wealth effect based on Cesarini et al. (2017), and nearly three times larger than the prediction based on Gelber, Isen, and Song (2016). By contrast, in the reform year 1976, when employment responses should primarily reflect wealth effects, the estimated effect lies slightly below the prediction implied by the Gelber elasticity.

The comparison to Cesarini et al. (2017) and Gelber, Isen, and Song (2016) should be interpreted with caution. Both studies estimate wealth elasticities in settings that differ from the Swedish reform in the nature and composition of wealth shocks. Cesarini et al. (2017) identifies responses to changes in overall household wealth, rather than to Social Security Wealth specifically, while in Gelber, Isen, and Song (2016) Social Security Wealth represents a relatively small share of total resources. More generally, these estimates come from different institutional and labor-market environments, making external validity imperfect in a 1970s Swedish context.

### 6.3 Marginal financial incentives

Marginal financial incentives can be ruled out as a driver behind the employment effect since they were not altered by the NRA reform, except for a slight increase in incentives to retire early from lowering the actuarial adjustment rate before age 65 from 0.6 to 0.5 percent per month. Occupational pension schemes were similarly unaffected, with no changes to contributions or actuarial adjustments for early or late claims.[50]

However, marginal incentives could still help explain why effects are centered from age 66. Both before and after the reform, incentives to retire at age 65 were especially strong because this was the last age at which pension contributions could be made.[51] Individuals born early in the year were still credited with this contribution year if they worked until the beginning of their birth month.

### 6.4 Liquidity constraints

Liquidity constraints provide another potential mechanism. By lowering the ERA from 63 to 60, the reform may have enabled liquidity-constrained individuals to retire earlier than before. Liquidity constraints may also help explain the estimated employment effects at ages 64 and 65. When pensions were recalculated at the reform date, average public pensions increased by 17 percent for individuals who turned 64 in 1975 and retired at the start of the year, and by

[49] Lalive, Magesan, and Staubli (2023) conduct a similar exercise.

[50] I view the extended opportunity for early retirement with an actuarial adjustment as operating through liquidity constraints, not marginal financial incentives.

[51] An additional contribution year increased the public pension by 5 percent of the full pension. This applies only to cohorts born before 1914, which includes all cohorts used in my analysis of employment around age 65.

8 percent for those who turned 65. At older ages, however, liquidity constraints are unlikely to be relevant: individuals aged 66 in 1975 faced an NRA of 67 or just below and thus did not receive substantial liquidity boosts following the recalculation. Hence liquidity constraints cannot explain the large employment response at age 66.

On top of the changes to public pension liquidity, the white-collar scheme went even further to relax liquidity constraints through the flexibility reform, which allowed early claims from age 63 with full compensation for foregone pension contributions. This implied a larger potential increase in liquidity for white-collar workers. Nevertheless, Figure 5 shows no effect on employment below age 65 for this group. In the overall population, I estimate small employment effects at ages 61 to 64, between 2.3 and 3.4 percentage points. With heterogeneous responses, these effects could reflect liquidity constraints for some subgroups. However, their magnitude remains modest compared to previous studies that report employment responses of around or just below 10 percentage points when the ERA changes (Coile et al. 2025; Staubli and Zweimüller 2013; Geyer and Welteke 2021; Atalay and Barrett 2015). In particular, Coile et al. (2025) attribute a substantial share of the response to liquidity constraints. Liquidity constraints may therefore be less central in this setting. One potential reason is the availability of alternative exit pathways, such as generous disability insurance, which were accessible both before and after the reform. Another possibility is that the ERA component of the reform was not sufficiently salient to function as a binding liquidity threshold.

### 6.5 Employer effects

The large decline in employment at age 66 among blue-collar workers suggests an important role for employer behavior. As discussed above, the introduction of age 65 as an upper limit in employment protection, combined with automatic separations at that age, can account for a substantial part of this decline. Employment at age 66 fell from roughly 69 percent in 1974 to 11 percent in 1977. This magnitude is difficult to reconcile with individual incentives alone.

I next examine whether employer behavior also contributed to the reform effects more broadly. I follow Rabaté, Jongen, and Atav (2024) and Coile et al. (2025) and compare employment responses for the self-employed and employees. The self-employed are not directly exposed to employer decisions and therefore provide a natural benchmark. The institutional setting here differs from those studies in one important respect. The statutory upper age limit in employment protection did not change with the reform and remained at 67. This comparison both helps assess the validity of the self-employed as a control group and provides a test for more diffuse employer channels, such as employers using the new NRA to justify encouraging exits even in the absence of formal mandatory retirement.

Figure 7 compares employment effects for employees without occupational pensions to those for self-employed individuals without occupational pensions.[52] The estimated effects are very similar across the two groups, and the differences are not statistically significant. Taken together, these results provide little evidence of broader employer effects outside the blue-collar setting.

[52]Individuals are classified as self-employed if they are recorded as self-employed in both the 1960 and 1965 censuses. Individuals who are self-employed in only one of the two censuses are excluded from the main sample.

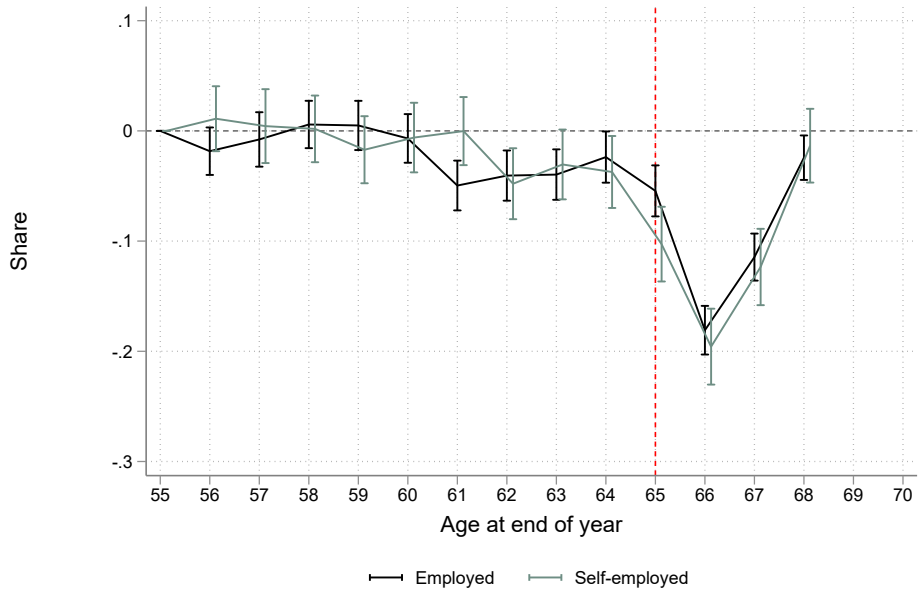


**Figure 7:** Employment effects by self-employment status

*Notes:* Individuals with occupational pensions are excluded. Vertical bars indicate 95 percent confidence intervals.

### 6.6 Behavioral effects and norms

While norms and mechanisms from behavioral economics, such as reference dependence and default bias, are widely believed to play an important role in the effects of NRAs on retirement behavior, these channels are notoriously hard to estimate directly. Following the existing literature, I therefore attribute the residual employment response, after accounting for financial incentives and institutional factors, to these behavioral channels and social norms. While this approach does not allow for a further decomposition of these mechanisms, claiming behavior in this setting is suggestive of a strong default effect. Table A4 shows that claiming is much more tightly concentrated at the NRA than retirement itself, and that early and deferred claims were very rare despite a constant actuarial adjustment rate before the reform. Taken together, the preceding analyses suggest that a major share of the overall employment effects remains unexplained by the proposed mechanisms, which motivates the use of back-of-the-envelope calculations in the next section to assess the relative importance of different channels.

## 7 Decomposition of mechanisms: Back-of-the-Envelope Calculations

This section uses back-of-the-envelope calculations to decompose the employment effect at age 66 into wealth, behavioral and norm-based, and employer components. I focus on age 66 because it is the first age at which individuals are clearly above the new normal retirement age (NRA), while marginal financial incentives and liquidity constraints should not factor in at all. The goal of the exercise is to provide an accounting decomposition that helps interpret the relative magnitude of different channels under transparent assumptions.

**A simple decomposition.** Let $\Delta e_g$ denote the estimated change in employment at age 66 (expressed in employment shares) for occupational pension group $g$, and let $e_{g,1975} \in [0,1]$ denote baseline employment for group $g$ in 1975. I decompose this reduced-form effect as

$$\Delta e_g \;=\; \Delta e_g^W \;+\; \Delta e_g^N \;+\; \mathbb{1}\{g = \text{blue-collar}\}\Delta e_g^E, \tag{2}$$

where $\Delta e_g^W$ is the component attributable to changes in pension wealth, $\Delta e_g^N$ captures behavioral and norm-based responses, and $\Delta e_g^E$ captures employer effects, which I allow only for the blue-collar group. When presenting results, I report components either in percentage points ($100 \cdot \Delta e_g^k$) or as a percent of baseline employment ($100 \cdot \Delta e_g^k / e_{g,1975}$), for $k \in \{W, N, E\}$.

**Wealth component.** The wealth component is constructed by mapping the group-specific percentage change in Social Security Wealth (SSW) into a predicted employment response using an elasticity of employment with respect to SSW:

$$\Delta e_g^W \;=\; e_{g,1975} \cdot \varepsilon \cdot \Delta\%\text{SSW}_g, \tag{3}$$

where $\Delta\%\text{SSW}_g$ is the percentage change in SSW for group $g$ between treated and control cohorts, and $\varepsilon$ is the elasticity of employment with respect to SSW.

I estimate $\varepsilon$ using the reform-year response among the group of *other* workers in Figure 6.[53] With an employment effect of $\Delta e_{\text{other}} = -0.032$ (in share units), baseline employment of $e_{\text{other},1975} = 0.463$, and a percentage increase in SSW of $\Delta\%\text{SSW}_{\text{other}} = 0.128$, the implied elasticity is

$$\varepsilon \;=\; \frac{\Delta e_{\text{other}} / e_{\text{other},1975}}{\Delta\%\text{SSW}_{\text{other}}} \;=\; -0.55 \tag{4}$$

I then apply this elasticity to each group's SSW change in (3) to obtain the predicted wealth component.

**Behavioral and norm-based component.** For non-blue-collar groups, the behavioral and norm-based component is defined residually as

$$\Delta e_g^N \;=\; \Delta e_g - \Delta e_g^W, \qquad \text{for } g \neq \text{blue-collar} \tag{5}$$

For blue-collar workers, I instead set

$$\Delta e_{\text{blue}}^N \;=\; \left(\frac{e_{\text{blue},1975}}{e_{\text{no-occ},1975}}\right) \Delta e_{\text{no-occ}}^N \tag{6}$$

that is, I assume that behavioral and norm-based effects equal those of workers without occupational pensions, scaled relative to baseline employment.

**Employer component in the blue-collar scheme.** The employer component for blue-collar workers is defined as the remaining residual after accounting for wealth and behavioral

[53] This group includes individuals without an occupational pension and individuals covered by the white-collar occupational pension scheme in the heterogeneity sample.

components:

$$\Delta e^{E}_{\text{blue}} \;=\; \Delta e_{\text{blue}} - \Delta e^{W}_{\text{blue}} - \Delta e^{N}_{\text{blue}}. \tag{7}$$

**Aggregation.** Aggregate effects are computed by estimating $\Delta e$ at age 66 for the full heterogeneity sample and applying the same decomposition. Aggregate employer effects are derived by multiplying the estimated employer component for blue-collar workers by their share among 66-year-olds in the heterogeneity sample in 1975.

## Results

Figure 8 presents the decomposition by occupational pension scheme, along with the aggregate decomposition for the full heterogeneity sample. The behavioral and norm-based component dominates in all schemes except the blue-collar scheme, where the employer component is somewhat larger. In the aggregate, the wealth component accounts for 19 percent (3.3 percentage points) of the total effect, the employer component accounts for 25 percent (4.5 percentage points), and the behavioral and norm-based component accounts for the remaining 56 percent (9.8 percentage points).

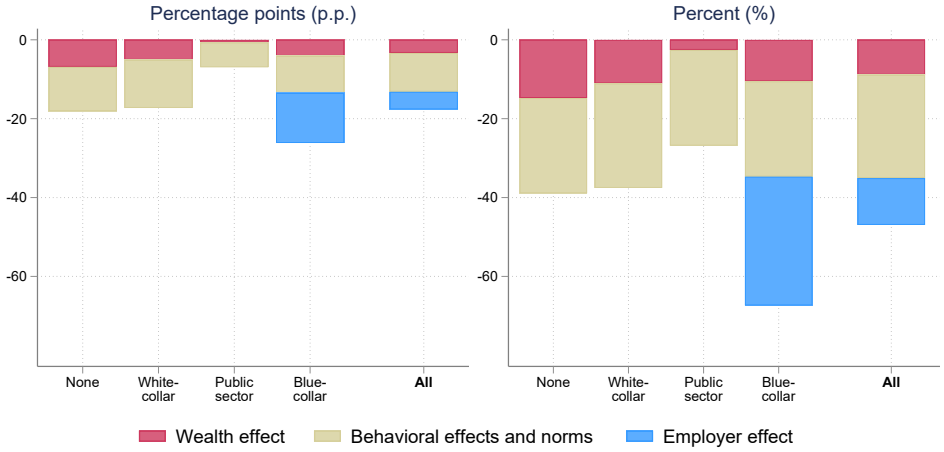


**Figure 8:** Decomposition of percentage effect size into mechanisms by occupational pension scheme

*Notes:* Results from the decomposition exercise of employment effects at age 66. Results are estimated separately for each occupational pension scheme. The wealth effect assumes an elasticity of employment with respect to SSW of $-0.47$. Behavioral effects and norms are calculated as the residual after subtracting the wealth effect. For the blue-collar group, behavioral effects are assumed to equal those of the group without occupational pensions. Employer effects are the remaining effect for the blue-collar group after accounting for wealth and behavioral effects.

The behavioral and norm-based component is relatively similar across schemes, ranging from 27 to 39 percent of the baseline employment share.[54] This similarity is somewhat surprising, since it is not obvious how the behavioral effects of the new NRA should interact with influential statutory retirement ages (SRAs) at the same age in other pension schemes. It is striking that behavioral mechanisms and norms were important even in schemes that already featured strong retirement-age focal points through collective agreements.

The decomposition relies on strong assumptions: it uses workers without occupational pensions to infer the behavioral component for blue-collar workers when isolating employer

[54]The effects for blue-collar workers and for workers without an occupational pension are identical by construction.

effects, it assumes a common elasticity of employment with respect to SSW across groups, and it attributes all residual effects after accounting for wealth and employer components to behavioral mechanisms and norms. Under this framework, the interpretation for the public-sector group is comparatively robust, since the NRA reform did not change financial incentives or employment protection in this subgroup. Comparisons across other schemes are more tentative, as unobserved heterogeneity may matter. For instance, workplace size could shape retirement norms: larger workplaces, more common in the blue-collar and public sectors, may sustain stronger norms than the smaller workplaces typical among workers without occupational pensions. Nevertheless, the decomposition is highly suggestive that behavioral responses and retirement norms were the dominant mechanisms behind the reform's impact on employment.

# 8 Conclusion

This paper examines the effects of a 1976 Swedish reform that lowered the normal retirement age (NRA) from 67 to 65, contributing to the literature on statutory retirement age (SRA) changes. Using variation in economic incentives and institutional features across occupational pension schemes, along with the reform's sharp timing, the study estimates the employment effects of the policy change and investigates the underlying mechanisms. The results show that employment fell sharply at the new NRA, with modest spillovers to younger ages. These effects are shaped by both behavioral responses and institutional factors in the form of employer practices and wealth effects.

The main result is a sharp decline in employment at ages between the old and new NRA. Among individuals with a history of salaried work, employment at age 66 fell by 17 percentage points, or 47 percent relative to pre-reform levels. No significant changes were found at ages above the old NRA. Modest decreases in employment appeared below age 65. While the effects below the NRA contrast with much of the earlier literature, which generally finds limited or zero responses before the statutory retirement age (Rabaté, Jongen, and Atav 2024; Staubli and Zweimüller 2013; Geyer and Welteke 2021; Mastrobuoni 2009), they are in line with recent empirical evidence documenting employment responses below the NRA (Carta and De Philippis 2024; Artmann, Fuchs-Schündeln, and Giupponi 2023). In this setting, these below-NRA effects are unlikely to be driven by pension wealth and may instead reflect liquidity constraints. By contrast, and relative to much of the existing literature on early retirement ages, I find close to zero employment responses at the early retirement age (ERA). This underscores the limited practical relevance of early claiming in this setting, shaped by generous disability insurance, strong default behavior in pension claiming, and possibly the limited salience of the ERA at the time.

Extensive research has identified increases in statutory retirement ages as a major factor behind the widespread rise in labor supply among older workers across developed countries since the late 1990s (Börsch-Supan and Coile 2021; Seibold 2024). This study extends the evidence on employment responses to SRA changes back to 1970s Sweden, a context with a high NRA but lower life expectancy and work capacity among older workers compared to modern developed countries. Employment effects in this setting were substantial even for workers already covered

by occupational pension schemes intended to facilitate retirement at age 65. These results offer important historical validation of more recent findings and show that statutory retirement ages can strongly influence behavior, even when health constraints are greater and alternative forms of social insurance are available. This is particularly relevant for future reforms, which are likely to target people at higher ages and more limited functional capacity.

The reform did not alter marginal financial incentives, as actuarial adjustment rates, pension accrual rules, and tax incentives remained unchanged.[55] Nor did individuals respond strongly to substantial relaxations of liquidity constraints at ages just below the new NRA, suggesting that these mechanisms were not important drivers of the reform's effects.

In line with recent evidence by, for example, Gruber, Kanninen, and Ravaska (2022) and Seibold (2021), I find that people responded to the NRA reform even in the absence of financial incentives. Members of public sector occupational pension schemes, who were financially unaffected by the reform, decreased their employment above the new NRA, although less than other workers. To isolate potential wealth effects, I focus on 66-year-olds in early 1976, who could react to higher pension wealth while they were still below their NRA.[56] Their employment status thus reflects wealth effects without the behavioral effects associated with crossing the NRA. Relating this effect to the change in SSW between 66-year-olds in 1975 and 1976 yields an elasticity of employment with respect to SSW of –0.55, which is just above the value implied by Gelber, Isen, and Song (2016) for employment at age 65 placing it at the upper end of estimates from the wealth-shock literature. Given the increase in SSW for 66-year-olds between 1975 and 1977, this elasticity accounts for about one-fifth of the total employment effect at age 66.

I also contribute to the mixed evidence on demand-driven employment responses to statutory retirement ages. Employer-side factors appear to have played a major role in the sharp decline in employment among blue-collar workers, from 69 percent to 11 percent, following the NRA reform and the introduction of their occupational pension scheme. During this period, blue-collar workers lost employment protection at age 65 and became subject to automatic contract expiry at the same age. In a simple decomposition exercise, I attribute nearly half of the reform effect for blue-collar workers to changes in automatic separation practices. This provides suggestive evidence in line with Rabaté, Jongen, and Atav (2024) that mandatory retirement effects can be substantially larger when they entail automatic separations, complementing recent findings of smaller or more moderate employment gains from higher age ceilings in employment protection (Rabaté 2019; Saez, Schoefer, and Seim 2023). However, given the strong assumptions underlying the decomposition and the uncertainty surrounding the timing of the introduction of automatic separation in the blue-collar scheme, these results should be interpreted with caution.

Even after accounting for both wealth effects and employer behavior, the majority of the employment decline remains unexplained. This highlights the importance of behavioral and normative channels, as emphasized in prior research. It is particularly notable that these were the major mechanisms driving the effect also within this group of relatively old people who were likely in worse health than workers of similar age today, and who were already covered by pension

[55]The exception is a minor increase in incentives to retire early, due to a reduction in the actuarial adjustment rate for early claims from 0.6 to 0.5 percent per month.

[56]They reached the NRA on the reform date in July 1976. Two to three months of full-time work typically generated labor earnings exceeding one price basic amount, qualifying them as employed under my definition.

schemes that encouraged retirement at age 65. This reinforces the view that statutory retirement ages do not merely reflect financial incentives or institutional rules, they also shape expectations and behavior through default bias, social norms, and other behavioral mechanisms. Further research is needed to clarify the relative importance of these channels in different institutional settings.

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# Appendix A Public pension benefit formula around the 1976 reform

This appendix summarizes the benefit formula for the public old-age pension system in place around the 1976 NRA reform. Total annual benefits are the sum of a basic component and an earnings-related component, multiplied by a claiming-age adjustment factor that differs before and after July 1, 1976:

$$P_i^{\text{pre}}(a) = A^{\text{pre}}(a)\,(B_i + E_i), \qquad \text{for benefits computed under the pre-reform rules,} \tag{8}$$

$$P_i^{\text{post}}(a) = A^{\text{post}}(a)\,(B_i + E_i), \qquad \text{for benefits computed under the post-reform rules.} \tag{9}$$

In both regimes, the adjustment factor applies to both the basic and the earnings-related components.

**Claiming-age adjustment.** Before the reform, actuarial adjustments were defined relative to the old NRA of 67 and were symmetric in early and late claiming:

$$A^{\text{pre}}(a) = 1 + 0.006\,(a - a^{NRA,\text{pre}}), \qquad a^{NRA,\text{pre}} = 67 \times 12. \tag{10}$$

After the reform, actuarial adjustments were defined relative to the new NRA. The adjustment rate for delayed claiming remained 0.6 percentage points per month, while the reduction for early claiming was 0.5 percentage points per month:

$$A^{\text{post}}(a) = \begin{cases} 1 + 0.005\,(a - a_i^{NRA,\text{post}}), & a < a_i^{NRA,\text{post}}, \\ 1 + 0.006\,(a - a_i^{NRA,\text{post}}), & a \geq a_i^{NRA,\text{post}}. \end{cases} \tag{11}$$

The reform was implemented on July 1, 1976. For individuals younger than 67 on the reform date, pensions were recalculated under the post-reform rules with actuarial adjustments defined relative to an individual-specific NRA

$$a_i^{NRA,\text{post}} = \max\{a_i^R,\, 65 \times 12\},$$

where $a_i^R$ denotes individual $i$'s age in months on July 1, 1976 (based on the age the individual turned during the month). Individuals older than 67 on the reform date continued to receive benefits computed under the pre-reform adjustment rules (relative to the NRA of 67).

**Basic pension.** The basic pension is proportional to the basic amount $BA_t$ in year $t$,

$$B_i = \beta_{m_i}\, BA_t, \tag{12}$$

where $\beta_{m_i} = 0.95$ for unmarried individuals and $\beta_{m_i} = 0.775$ for married individuals in 1975.

**Earnings-related pension (ATP).** Let $\tilde{y}_{it}$ denote pensionable income in year $t$, defined as annual labor earnings between 1 and 7.5 basic amounts. Let $\mathcal{T}_i^{15}$ index the 15 contribution years

with the highest pensionable income for individual $i$. The earnings-related pension is

$$E_i = 0.60 \cdot \left( \frac{1}{15} \sum_{t \in \mathcal{T}_i^{15}} \tilde{y}_{it} \right) \cdot \min \left\{ \frac{N_i}{N_i^{\max}}, 1 \right\}, \tag{13}$$

where $N_i$ is the number of contribution years and $N_i^{\max}$ is the number required for a full earnings-related pension. For most cohorts $N_i^{\max} = 30$. For cohorts born before 1914, $N_i^{\max} = 20$. For cohorts born 1914–1923, $N_i^{\max}$ equals the maximum feasible number of contribution years given that contributions could only be accrued from 1960.

# Appendix B Details on occupational pension schemes

This appendix provides additional institutional detail on the occupational pension schemes. It documents how pensionable wages were constructed, the rules governing early and delayed claims (including actuarial adjustment rates), contribution requirements and eligibility rules for full benefits, the introduction and phase-in of the blue-collar scheme (STP), and mandatory retirement provisions and their implications for employment protection and separations.

## B.1 Pensionable wages

Pensionable wages across all occupational pension schemes were defined relative to late-career earnings. Blue-collar workers used the average of the three highest-earning years in a five-year window, while white-collar workers relied on final salary, adjusted for late-career wage increases.[57] Public sector workers' pensionable wages were calculated as an average over the final five years.

Occupational pensions generally only replaced pensionable wages up to the public pension ceiling of 7.5 basic amounts. Pensionable wages above the ceiling were only replaced in the white-collar scheme (ITP) and the central government scheme. Earnings above the ceiling were uncommon, so replacement above the ceiling applied to relatively few workers.

For the central government scheme, replacement above the public pension ceiling is summarized in Cronert et al. (2025), Table 4. The ceiling for the 65 percent replacement rate was 12.5 basic amounts before 1977 and 20 basic amounts from 1977 onward. Above the ceiling, a replacement rate of 32.5 percent applied.

For the white-collar scheme, Table A1 reports the percentage of pensionable income paid out as annual occupational pension benefits by income interval (in basic amounts). Numbers in parentheses indicate that benefit rates differed between ages 65 and 67.

## B.2 Claiming rules and actuarial adjustments

Before the 1976 reform private sector schemes did not allow for occupational pension claims before the SRA. Under special circumstances early pension claims were allowed in the public sector schemes. In the central government scheme, early claims yielded a 0.5 percentage point decrease in the yearly benefit for each four months of early claims. In the local government

[57] The window for blue-collar workers was initially between age 59 and 63. In conjunction with the 1976 reform it shifted to 55–59.

**Table A1:** Occupational pension replacement rates above the public pension ceiling in the white-collar scheme (ITP)

| Year | 0–7.5 | 7.5–10 | 10–12.5 | 12.5–15 | 15–20 | 20–30 |
|---|---|---|---|---|---|---|
| 1974 | 10(65) | 65 | 39 | 32.5 | 6.5 | 0 |
| 1975 | 10(65) | 65 | 45.5 | 32.5 | 13.5 | 0 |
| 1976 | 10(65) | 65 | 52 | 32.5 | 19.5 | 0 |
| 1977 | 10 | 65 | 58.5 | 39 | 32.5 | 6.5 |
| 1978 | 10 | 65 | 65 | 45.5 | 45.5 | 13 |
| 1979 | 10 | 65 | 65 | 52 | 52 | 19.5 |
| 1980 | 10 | 65 | 65 | 58.5 | 58.5 | 26 |
| 1981 | 10 | 65 | 65 | 65 | 65 | 32.5 |

*Notes:* Entries report the percentage of pensionable income paid out as annual occupational pension benefits by income interval (in basic amounts). Numbers in parentheses indicate a different benefit between ages 65 and 67.

scheme, early claims resulted in a penalty of 0.6 percentage points of the full benefit per month of early withdrawal.

The private sector schemes were more generous in their rewards for delayed pension claims. The central government scheme made no actuarial adjustments for delayed claims while the local government scheme rewarded one month of delayed claims with a 0.1 percentage point increase. In contrast, the actuarial adjustment rate in the blue-collar scheme was 0.6 percentage points per month of delayed claims. For the white-collar scheme, the insurance fund explicitly intended for actuarial adjustments to be fair, although the exact value of this adjustment rate is unknown.

The revised white-collar scheme introduced substantial improvements in flexibility. The defined benefit component could be claimed from age 55, while the defined contribution component (ITPK) could be claimed from age 62, both against actuarially fair adjustments. The insurance fund covered missed contributions for workers who started claims at age 62 or later. The revised scheme also made it possible to concentrate claims over a shorter period.

Under the revised white-collar scheme, the defined benefit component could be claimed from age 55 and the defined contribution component (ITPK) from age 62. Both components were subject to actuarially fair adjustments. The insurance fund covered missed contributions for workers who initiated claims at age 62 or later. The scheme also allowed claims to be concentrated over shorter periods.

The revised blue-collar scheme relaxed eligibility requirements for full benefits. Workers in the old scheme required three full contribution years from age 59 to age 64 (or partial contributions at both age 63 and age 64). Under the updated scheme, workers were additionally allowed to count contribution years between age 55 and 59.

### B.3 Pension contributions

The rule across all schemes was that 30 contribution years were required in order to receive a full occupational pension. Since STP was established relatively late (see the phase-in description below), contributions could not be made before 1970. Several different arrangements were made in order to still be able to provide acceptable conditions for retirement at age 65. For the part of the blue-collar pension that replaced earnings between the SRA and the NRA, work years from

1960 could be credited as contribution years and the maximum number of contribution years between 1960 and age 65 sufficed to receive the full benefit, with reductions made in proportion to the number of contribution years missing from the maximal number. No special arrangements were made for the second part of the pension benefit, given after the NRA. Under the updated blue-collar occupational pension scheme, which applied to individuals born after May 1911, special provisions were made such that workers with a full work history between 1965 and age 64 were eligible for the full benefit (early cohorts were credited with contributions back to 1965 under the updated STP scheme).

## B.4 Introduction and phase-in of the blue-collar scheme (STP)

**Table A2:** Pension age schedule for phase in of blue-collar pension

| For employees born | Pension starts from | | Pension age | Age end of year |
|---|---|---|---|---|
| 1906 Nov, (Dec) | 1973 | July | 66 years 7 (6) months | 67 |
| 1907 Jan, (Feb) | | Aug | 66 years 6 (5) months | 66 |
| 1907 Mar, (Apr) | | Sept | 66 years 5 (4) months | 66 |
| 1907 May, (June) | | Oct | 66 years 4 (3) months | 66 |
| 1907 July, (Aug) | | Nov | 66 years 3 (2) months | 66 |
| 1907 Sept, (Oct) | | Dec | 66 years 2 (1) months | 66 |
| 1907 Nov, (Dec) | 1974 | Jan | 66 years 1 (0) months | 67 |
| 1908 Jan, (Feb) | | Feb | 65 years 12 (11) months | 66 |
| 1908 Mar, (Apr) | | Mar | 65 years 11 (10) months | 66 |
| 1908 May, (June) | | Apr | 65 years 10 (9) months | 66 |
| 1908 July, (Aug) | | May | 65 years 9 (8) months | 66 |
| 1908 Sept, (Oct) | | June | 65 years 8 (7) months | 66 |
| 1908 Nov, (Dec) | | July | 65 years 7 (6) months | 66 |
| 1909 Jan, (Feb) | | Aug | 65 years 6 (5) months | 65 |
| 1909 Mar, (Apr) | | Sept | 65 years 5 (4) months | 65 |
| 1909 May, (June) | | Oct | 65 years 4 (3) months | 65 |
| 1909 July, (Aug) | | Nov | 65 years 3 (2) months | 65 |
| 1909 Sept,(Oct) | | Dec | 65 years 2 (1) months | 65 |
| 1909 Nov, (Dec) | 1975 | Jan | 65 years 1 (0) months | 66 |

Unlike the other occupational pension schemes, which were firmly established by the start of the 1970s, the blue-collar scheme (STP) was introduced relatively late and phased in between July 1973 and December 1974. Table A2 reports the exact schedule for when STP could first be claimed by cohort (birth month).

By the start of 1975 all individuals could claim STP from the month of their 65th birthday. The phase-in implies that some cohorts eligible for retirement in 1974 were covered for only part of the calendar year, depending on birth cohort and month.

## B.5 Mandatory retirement clauses and employment protection

The collective agreements that governed occupational pension schemes also contained mandatory retirement clauses. Mandatory retirement clauses were explicitly included in the schemes for central government and blue-collar workers. For local government workers I rely on Westbratt (1995), as the original agreements are not available. In the white-collar scheme, all agreements before 1974 included a mandatory retirement clause, and thereafter the rule appears to have been

moved elsewhere in the collective agreement. I follow the conclusions of the 1979 government-appointed committee (Äldrearbetskommittén), which found that virtually all workers covered by collective agreements at that time already faced a mandatory retirement age of 65, with some exceptions within the public sector (Government of Sweden 1981).

Mandatory retirement always implied the loss of employment protection, but it varied in whether it also served as a default termination age. In all cases except the central government scheme, the mandatory retirement age coincided with the SRA. In the central government scheme, a two-year retirement window was specified, after which employment protection expired. The agreement stipulates specific conditions under which the employee may remain in employment after the mandatory retirement age.

For blue-collar workers, the revised agreement made explicit that employment ended at the pension age unless otherwise agreed between worker and employer. Before 1976 the blue-collar agreement stated:

> *An employee who, by agreement with the employer, remains in service beyond the lower limit for pension withdrawal ... has the right to defer the withdrawal of STP.*

From 1976 the agreement instead stated:

> *When the employee reaches his pension age, his employment ends without termination unless otherwise is agreed between him and the employer.*

# Appendix C Imputation of pension points

This appendix describes the procedure used to impute pension points for individual-year observations that are not covered by administrative records from the Swedish Pension Agency.

## C.1 Earnings panel and data sources

The imputation is based on a large earnings panel covering cohorts born between 1893 and 1953, observed at ages 16 to 74 over the period 1960–1990. Annual earnings are drawn from multiple sources. For 1960–1966, I use total taxable income from the Income Statistics, a yearly panel of tax-paying individuals aged 16 or older who were born on the 5th, 15th, or 25th of each month. From 1968 onward, earnings are taken from the Income and Taxation Register, which covers the universe of Swedish residents. Beginning in 1974, I use labor earnings rather than total taxable income, reflecting the availability of separate labor-income information in the register.

Because earnings below one basic amount do not generate pension points, I treat earnings below one basic amount as zero throughout the imputation procedure.

## C.2 Estimation model for predicted earnings

I predict missing earnings 1960–1967 using a panel regression estimated on the full earnings panel 1960–1990. Let $y_{it}$ denote annual earnings for individual $i$ in year $t$, after applying the minimum threshold rule described above. The regression model is

$$\log(y_{it}) = \alpha_i + \delta_a + \gamma_t + \varepsilon_{it}, \tag{14}$$

where $\alpha_i$ are individual fixed effects, $\delta_a$ are age fixed effects, and $\gamma_t$ are calendar year fixed effects. The model is estimated on individual-year observations with positive earnings after thresholding. Individuals with positive earnings in only a single year are excluded, since individual fixed effects are not identified for them.

The fitted values from this regression are used to generate predicted earnings for individual-year observations without pension agency records. Predicted earnings are then mapped into pensionable earnings and pension points using the statutory rules, including the minimum earnings threshold of one basic amount.

### C.3 Administrative pension records and construction of pension points

Observed public pension contributions and pension points are obtained from records compiled by the Swedish Pension Agency. These data cover individuals born in 1910 or later who had not yet started claiming old-age pensions in 1976. For observations covered by these records, I use the administrative values. For observations outside coverage, I use imputed pension points derived from actual earnings when available, and predicted earnings, in 1960-1967 for individuals outside of the Income statistics.

### C.4 Validation

Figure A5 provides a cohort-level assessment of the imputation. It compares mean pension points and mean social security wealth constructed using the baseline measure to the same quantities computed using only imputed pension points. The close correspondence between the two series for cohorts with substantial overlap in observed pension-point coverage suggests that the imputation captures the relevant earnings variation and that reliance on imputed pension points for earlier cohorts is unlikely to materially affect the results.

## Appendix D Assignment to Occupational Pension Schemes

Individuals receiving occupational pension income from multiple sources are assigned to a single pension scheme based on the largest single occupational pension payment. In cases where two or more payments are of equal value, the scheme is selected according to a fixed priority order reflecting approximate generosity: white-collar, blue-collar, central government, and local government.

When the scheme associated with the largest payment cannot be identified, available information on whether the payment originated in the private or public sector is used to guide classification. If the payment is from an unknown private sector scheme, the individual is reassigned based on the largest payment traceable to either the white-collar or blue-collar scheme; if no such payment exists, the individual is assigned to the white-collar scheme. If the payment is from an unknown public sector scheme, the same logic is applied using the central government and local government schemes; if neither is identifiable, the individual is assigned to the central government scheme.

If the largest payment cannot be linked to any identifiable scheme or sector, the assignment is based on the largest fully traceable occupational pension payment. If no payments are traceable,

the individual is assigned to the white-collar scheme, with the original priority order used in case of ties.

161,317 out of 2,100,902 observations in the sample employed in the mechanism analysis had multiple or indeterminate sources of occupational pension payments. After applying the assignment method described above, 48,136 observations were assigned to the blue-collar group; 46,206 observations to the white-collar group; 25,115 observations to the local government group and 41,860 observations to the central government group.

# Appendix E Additional Assumptions in the Calculations of SSW

This appendix outlines how data limitations and missing information are addressed in the calculation of Social Security Wealth (SSW).

Pensionable wages in occupational schemes are proxied using observed earnings. When the pensionable wage is based on the wage rather than earnings – as was the case in all schemes except for the blue-collar scheme – this approach may underestimate pensionable income if individuals reduce labor supply just prior to retirement. To address this, the pensionable wage in the white-collar scheme and public sector scheme is proxied using the average of the three highest labor income years between ages 55 and 64.

Pension benefit calculations are based on realized pension contributions up to the pension claiming age. No imputations are made for counterfactual contributions for claiming ages above the individuals real retirement age. Since the reform increased incentives for early retirement, a decline in contributions is expected.

For occupational pension schemes that permitted accreditation of contribution years before 1960 – when public pension points were introduced – contribution years are assumed to be credited at the same rate between age 28 and 1959 as observed between 1960 and age 64.[58] This applies to all occupational pension schemes except the blue-collar scheme, where contribution years before 1960 could never be accredited.

Due to limitations in occupational data individual pension ages under public sector schemes are not observed. Instead, a uniform occupational pension age of 65 is assumed for all public sector workers. This assumption leads to an underestimation of SSW for public sector workers with SRAs below 65 who also retired before 65, though this is unlikely to introduce bias, given the absence of systematic shifts in occupational retirement ages following the reform. Moreover, the paper mainly focuses on SSW calculated for claims starting at age 65.

For white-collar workers, actuarial adjustments for early or late retirement were set by a collective pension fund (SPP). While exact adjustment rates are not available, it is assumed that they were actuarially fair at the applied discount rate. As a result, SSW is assumed to be invariant to claiming age, conditional on pensionable income and contribution years.[59]

Data on the defined contribution component of the blue-collar occupational pension scheme (ITPK) are not available. Based on Hammar (1988), ITPK is assumed to provide an annual

[58] The same assumption is applied when calculating SSW for claiming ages below 65.

[59] Although actuarial fairness equalizes SSW across claiming ages, pensionable income and contribution years may still vary by age of retirement.

benefit equal to 3 percent of the pensionable wage for individuals with 30 contribution years. This amount is scaled proportionally for those with fewer contribution years.

# Appendix F Figures

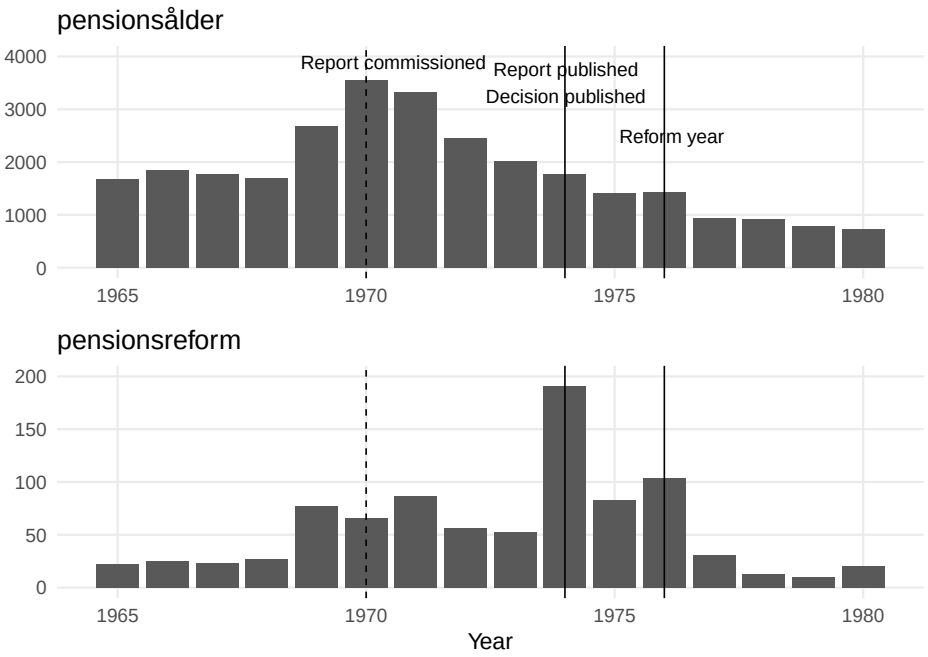


**Figure A1:** Newspaper mentions around the reform period

*Notes:* The figure reports annual counts of newspaper pages containing the terms pensionsålder and pensionsreform, based on searches in KB Svenska tidningar. The underlying material is OCR-processed and coverage varies over time Vertical lines mark key reform events: the investigation was commissioned in May 1970, the report was published in February 1974, legislation was issued on 6 December 1974, and the reform came into force in July 1976.

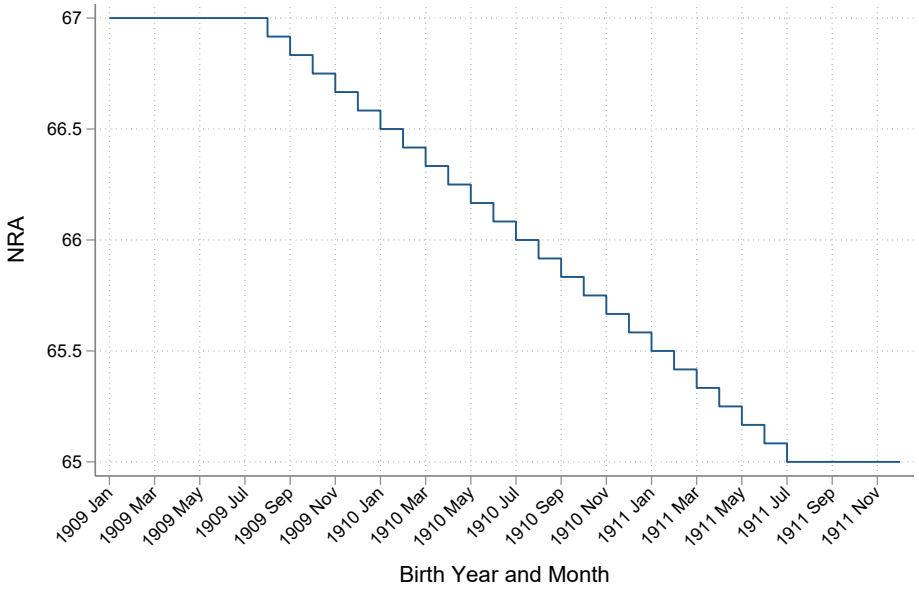


**Figure A2:** Normal retirement age by birth year and month

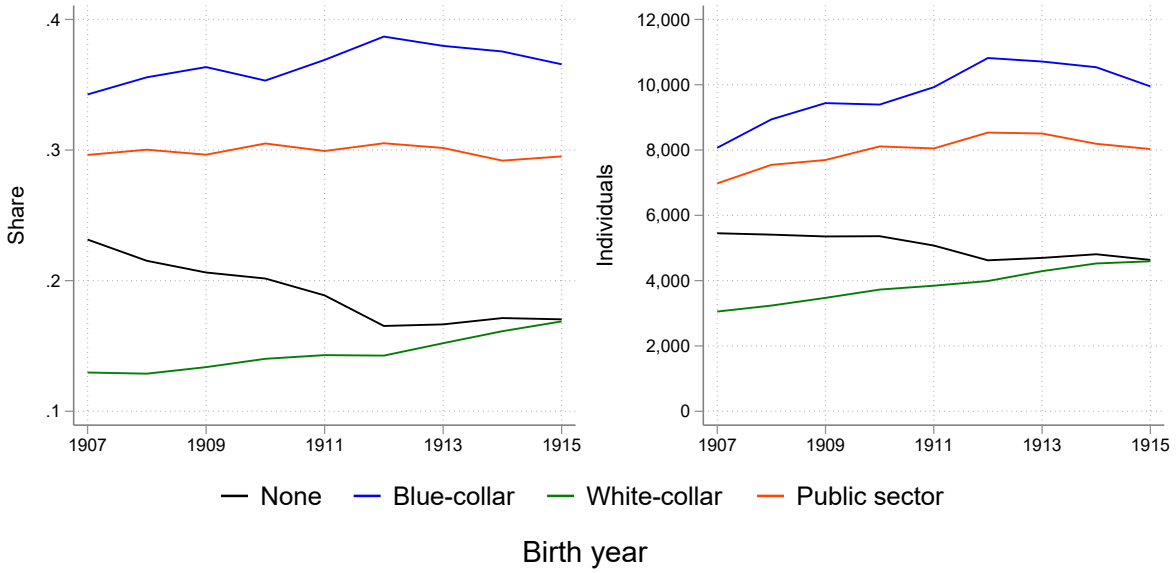


**Figure A3:** Number and share of individuals by occupational pension agreement and birth year

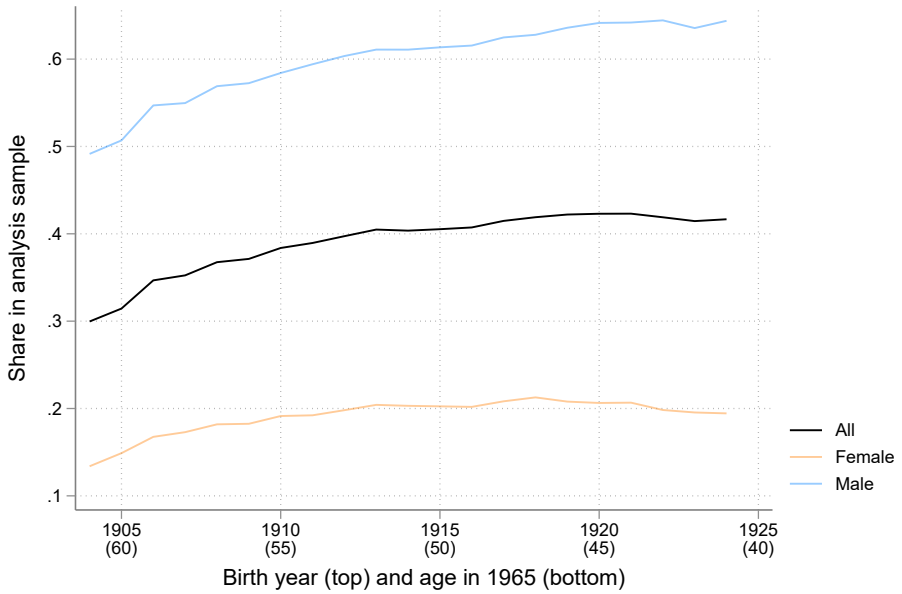


**Figure A4:** Share of full population in analysis sample by birth year

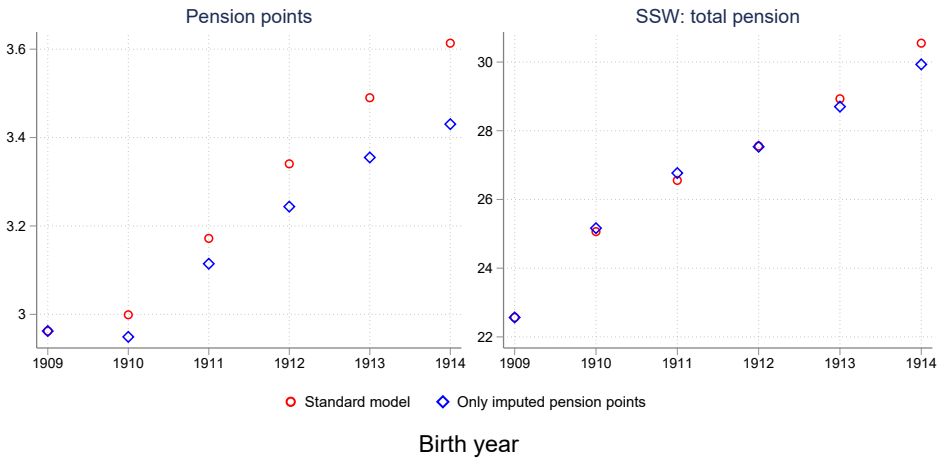


**Figure A5:** Pension points and social security wealth at age 65, by birth cohort

*Notes:* The figure plots cohort means by birth year. The left panel shows average pension points; the right panel shows average social security wealth (SSW) computed from total lifetime pension and evaluated at age 65. Circles ("Standard model") use the baseline measure employed in the analysis, which uses observed pension points when available and imputed pension points otherwise. Diamonds ("Only imputed pension points") recompute the same outcomes using imputed pension points for all individuals.

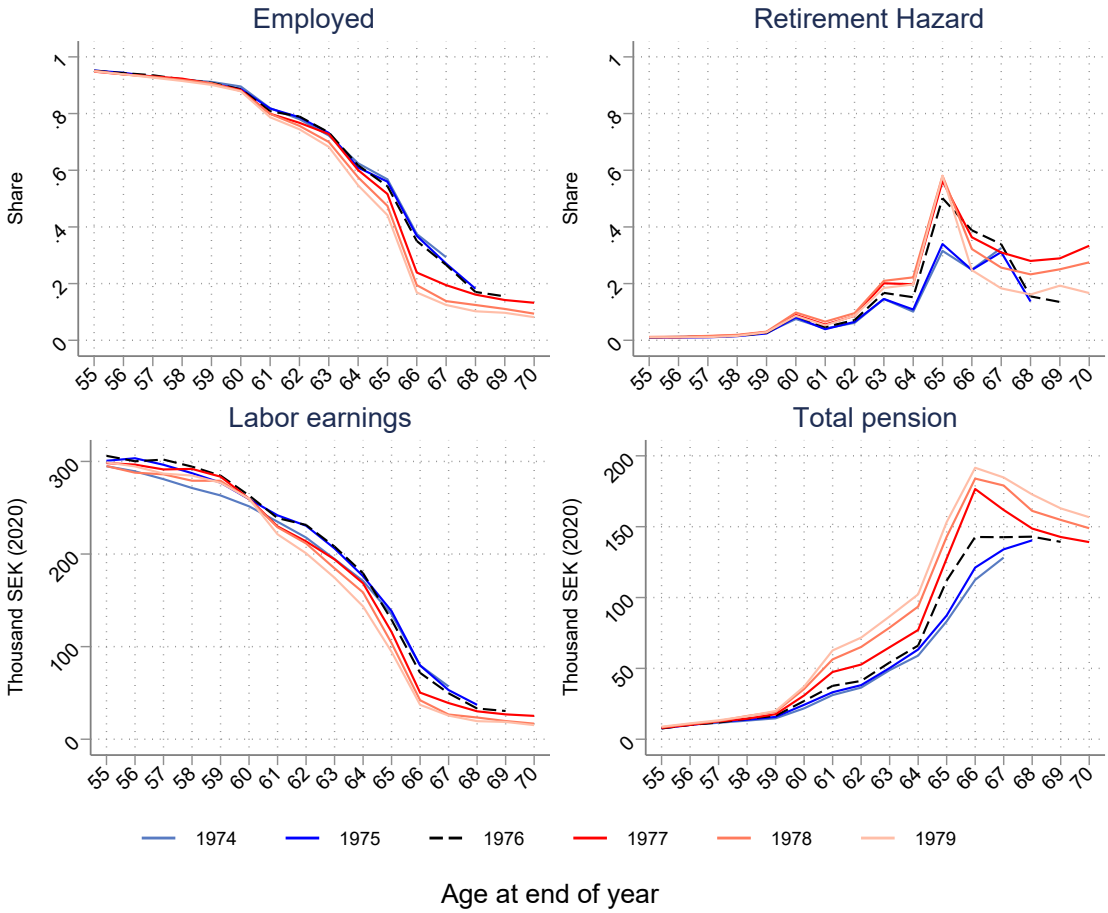


**Figure A6:** Average employment, retirement hazard, labor earnings and total pensions by year. Excluding individuals from the blue-collar pension plan

*Notes:* Based on the full sample of individuals.

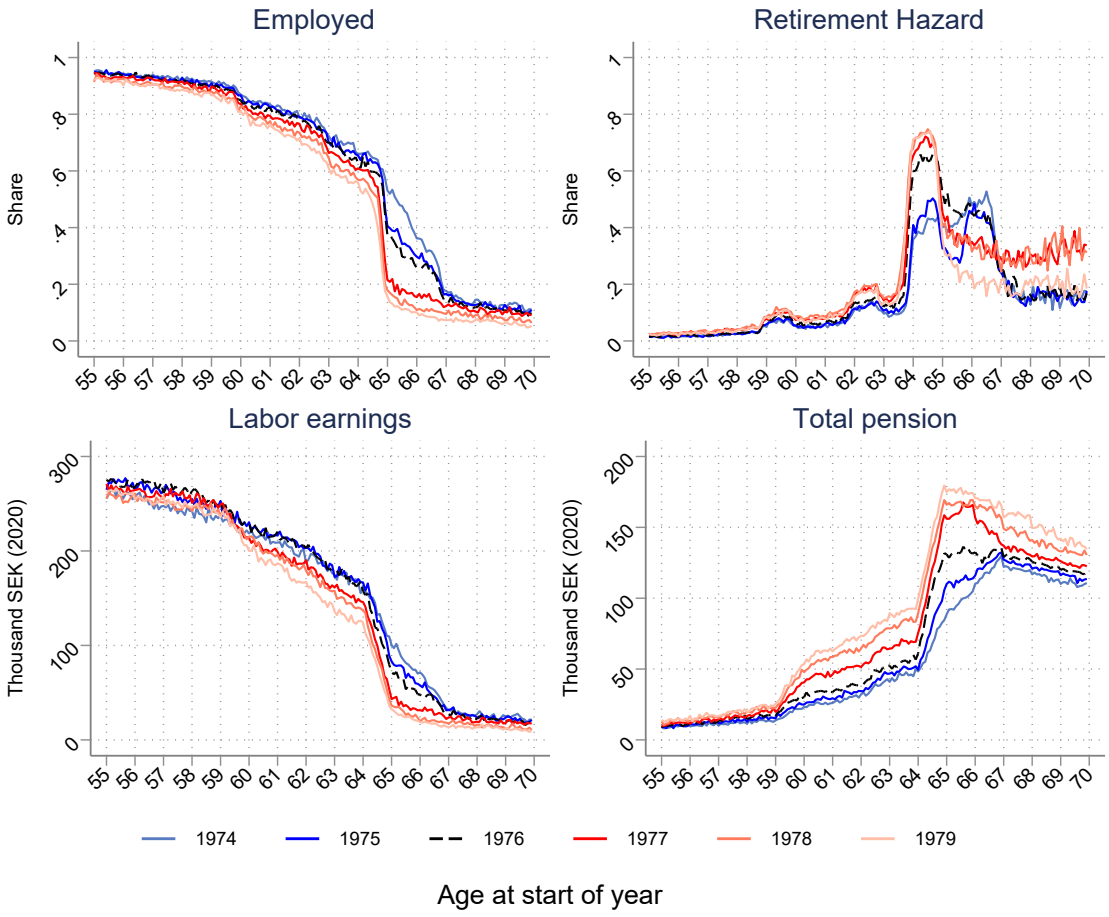


**Figure A7:** Average employment, retirement hazard, labor earnings and total pensions by year and month of birth

*Notes:* Based on the full sample of individuals. Age is at the year and month level.

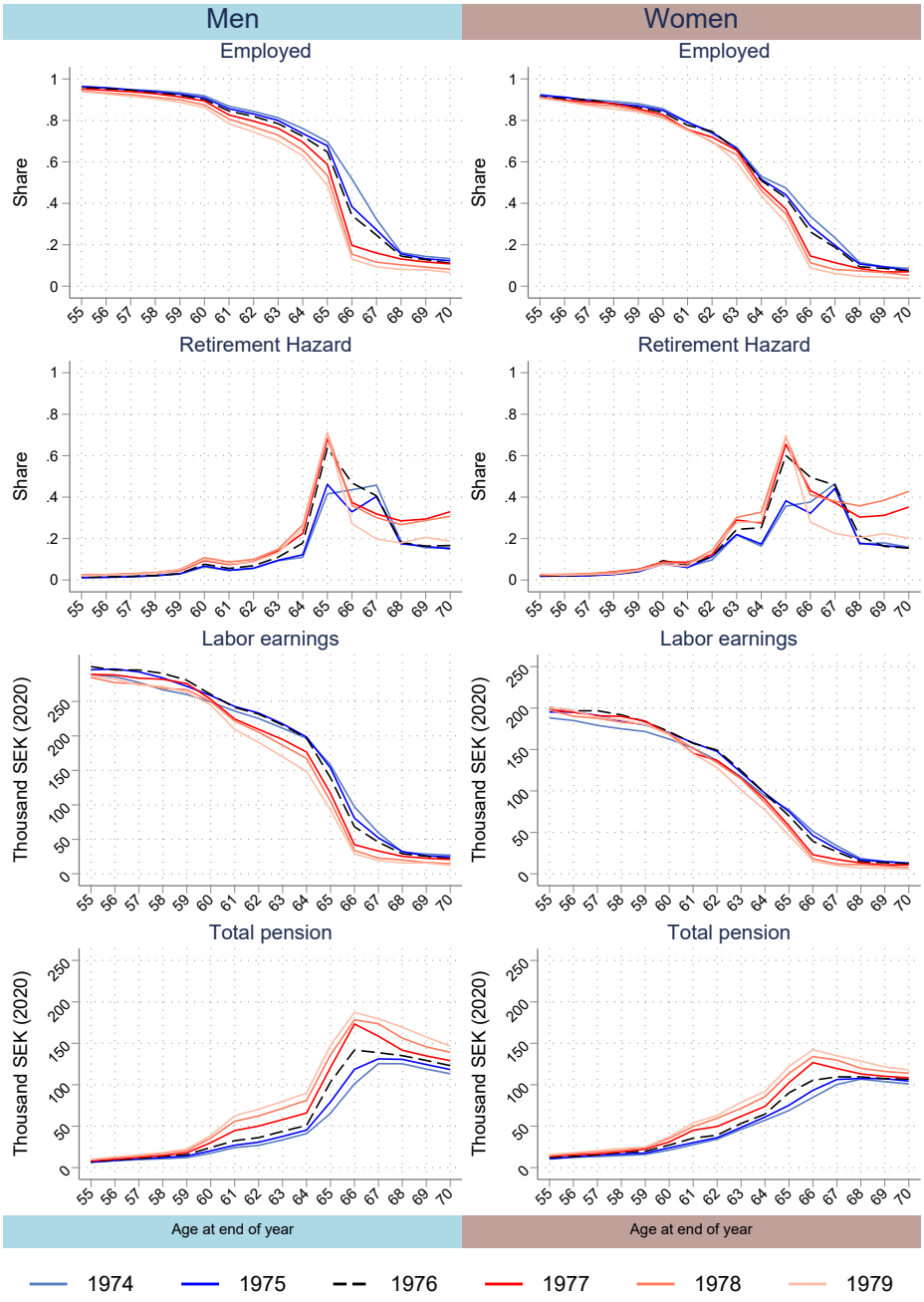


**Figure A8:** Average employment, retirement hazard, labor earnings and total pensions by year and gender

*Notes:* Based on the full sample of individuals.

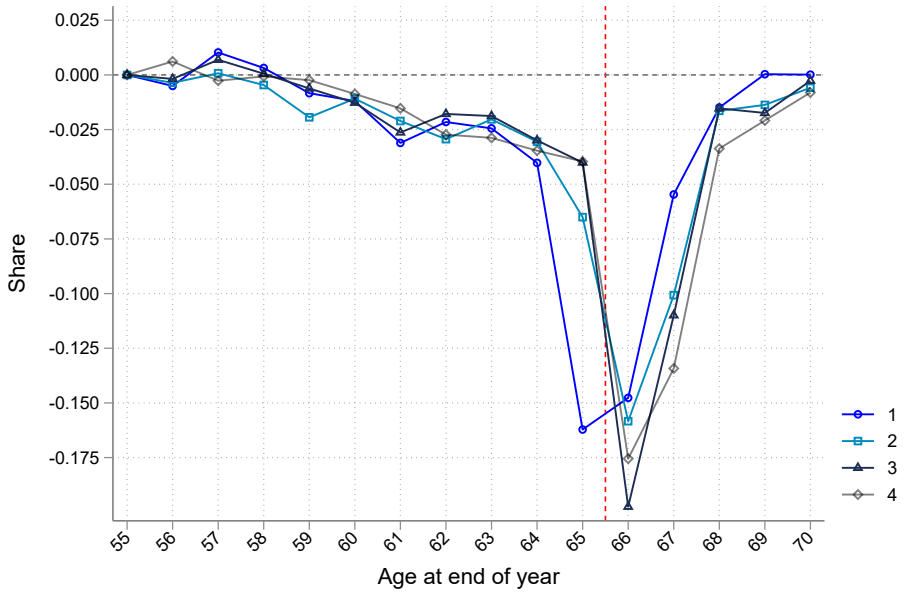


**Figure A9:** Regression estimates on employment by quarter of birth

*Notes:* The regressions control for age fixed effects, a post-reform dummy (1977), gender, log earnings in 1968, and 3-digit industry codes from the 1965 census. Age 55 serves as the omitted category. Quarter of birth specific estimates are obtained from separate regressions by quarter of birth. The estimation sample includes individuals aged 55-70 observed in the calendar years 1975 and 1977.

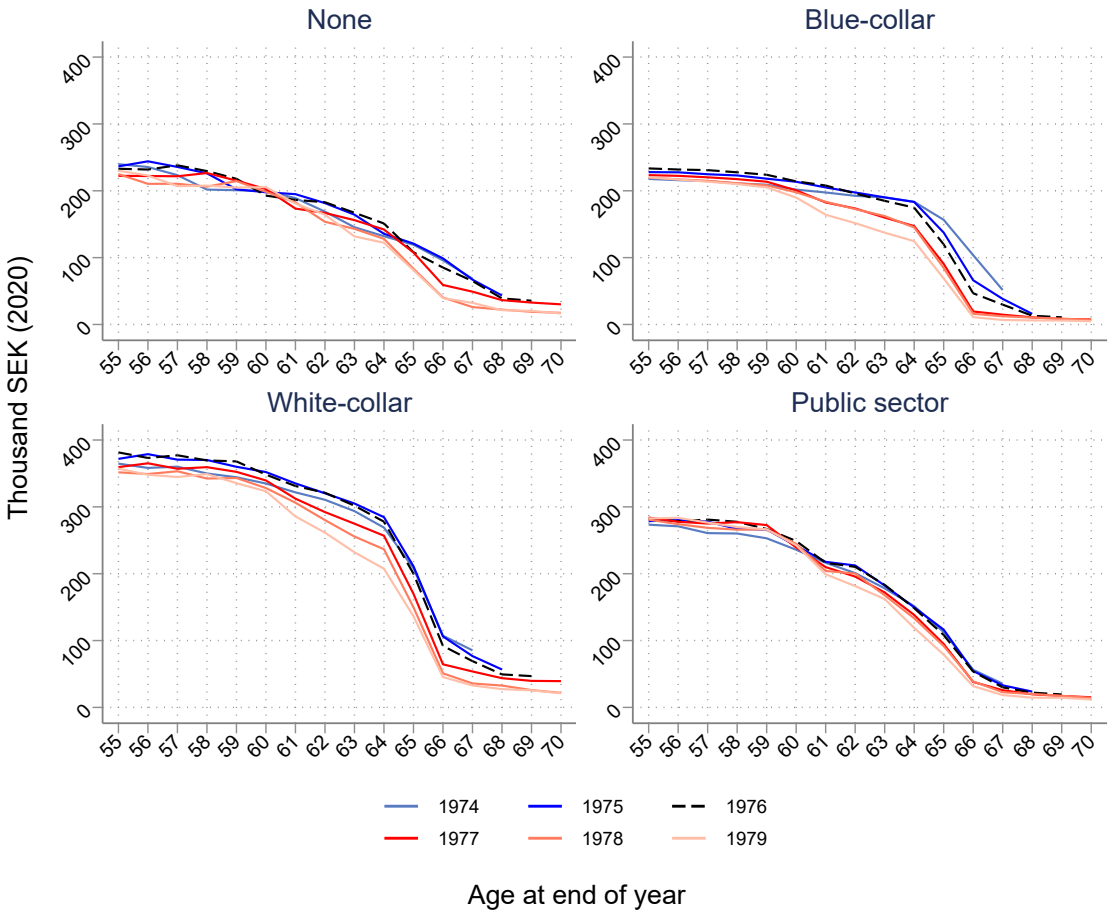


**Figure A10:** Average labor earnings: heterogeneity by occupational pension agreement and year over age at the end of the year

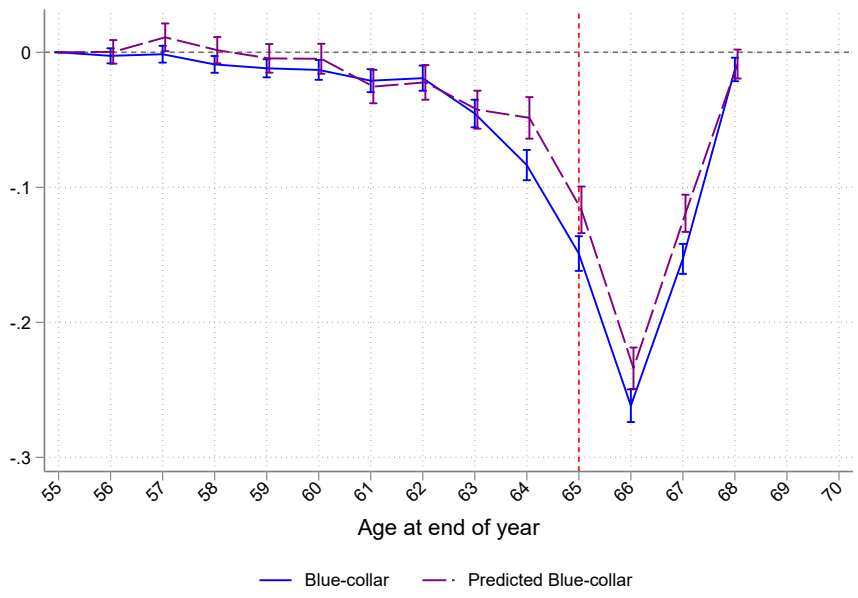


**Figure A11:** Employment effect blue-collar group vs predicted blue-collar group: observed blue-collar workers vs predicted blue-collar workers

*Notes:* Predicted blue-collar status is based on workers born in 1907, grouped by 3-digit industry (1960), occupational status (1960), and sector (1970). Industries with fewer than 100 observations and cells with fewer than 50 individuals are combined. Occupational status distinguishes blue-collar, white-collar, service, and managerial roles. Cells with $> 75\%$ blue-collar workers are coded as blue-collar. The regressions control for age fixed effects, a post-reform dummy (1977), gender, log earnings in 1968, and 3-digit industry codes from the 1965 census. Age 55 serves as the omitted category. The estimation sample includes individuals aged 55 to 70 observed in the calendar years 1975 and 1977. Vertical bars indicate 95 percent confidence intervals.

# Appendix G Tables

**Table A3:** Summary statistics split by local and central government

| | Full sample | | Heterogeneity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | None | | Blue-collar | | White-collar | | Local Government | | Central Government | |
| | Mean | St.dev | Mean | St.dev | Mean | St.dev | Mean | St.dev | Mean | St.dev | Mean | St.dev |
| Death age | 80.36 | 9.25 | 84.75 | 6.25 | 84.23 | 5.99 | 85.16 | 6.28 | 85.63 | 6.30 | 85.28 | 6.35 |
| Taxable Income 1968 (2020) SEK Thousands | 249.62 | 201.96 | 230.41 | 214.71 | 195.57 | 68.54 | 352.48 | 325.14 | 230.00 | 160.70 | 295.10 | 164.26 |
| Contribution years | 16.35 | 2.48 | 15.49 | 3.18 | 16.78 | 2.00 | 16.97 | 2.13 | 16.50 | 2.31 | 16.39 | 2.39 |
| Occupation 1970 census | | | | | | | | | | | | |
| Executive | 3% | | 5% | | 0% | | 9% | | 2% | | 2% | |
| Technical/Clerical | 38% | | 35% | | 10% | | 74% | | 47% | | 57% | |
| Industry/Transport | 41% | | 26% | | 79% | | 10% | | 21% | | 25% | |
| Service | 7% | | 7% | | 5% | | 2% | | 24% | | 4% | |
| Military | 1% | | 0% | | 0% | | 0% | | 0% | | 3% | |
| Missing | 5% | | 11% | | 2% | | 3% | | 3% | | 7% | |
| Other | 5% | | 15% | | 4% | | 2% | | 3% | | 2% | |
| Max Education Level | | | | | | | | | | | | |
| Primary School | 60% | | 56% | | 74% | | 50% | | 61% | | 47% | |
| Secondary School | 11% | | 10% | | 3% | | 18% | | 14% | | 17% | |
| High School or above | 7% | | 5% | | 0% | | 15% | | 5% | | 13% | |
| Unknown | 23% | | 29% | | 23% | | 17% | | 20% | | 23% | |
| Male | 75% | | 63% | | 81% | | 79% | | 42% | | 69% | |
| Married (Women) | 50% | | 49% | | 54% | | 46% | | 51% | | 49% | |
| Married (Men) | 83% | | 79% | | 80% | | 90% | | 87% | | 87% | |
| Observations | 3,648,160 | | 420,881 | | 876,715 | | 439,840 | | 301,182 | | 470,124 | |
| Individuals | 800,462 | | 82,278 | | 172,588 | | 92,337 | | 61,587 | | 95,309 | |

*Notes:* Summary statistics are based on the full sample of individuals aged 55 to 70 between years 1974 and 1979. Summary statistics for specific occupational pension plans also applies heterogeneity restrictions of survival past 75 and year of birth after 1907.

**Table A4:** Stocks of recipients of early old-age pension, disability pension, and deferred retirement in Sweden, 1971–1979, and age-specific population shares

| Year | Early old-age pension (ages 63–66 / 60–64) | | Disability pension / sickness benefit (ages 60–64) | | Deferred old-age pension (ages 67–69 / 65–69) | |
|---|---|---|---|---|---|---|
| | Individuals | Share (%) | Individuals | Share (%) | Individuals | Share (%) |
| 1971 | 17 662 | 4.92 | 66 500 | 13.75 | 415 | 0.18 |
| 1972 | 16 797 | 4.57 | 74 000 | 15.18 | 465 | 0.20 |
| 1973 | 17 048 | 4.58 | 82 100 | 16.82 | 478 | 0.20 |
| 1974 | 16 821 | 4.49 | 87 900 | 18.09 | 502 | 0.20 |
| 1975 | 15 257 | 4.05 | 91 700 | 19.04 | 590 | 0.23 |
| 1976 | 12 638 | 3.37 | 95 200 | 19.96 | 595 | 0.23 |
| 1977 | 8 303 | 1.76 | 101 300 | 21.46 | 3 165 | 0.71 |
| 1978 | 10 484 | 2.25 | 105 800 | 22.68 | 6 879 | 1.53 |
| 1979 | 11 472 | 2.49 | 108 100 | 23.45 | 9 240 | 2.07 |

*Notes:* The table reports point-in-time stock measures of individuals receiving early old-age pension, disability pension or sickness benefit, and deferred old-age pension. Early old-age pension take-up refers to individuals drawing old-age pension before reaching their normal retirement age (NRA) and is measured in January; the relevant age range varies over time (ages 63–66 or 60–64). Disability pension and sickness benefit refer to individuals aged 6064 and are measured in December. Deferred old-age pension refers to individuals who postponed claiming old-age pension beyond the statutory retirement age and is measured in January (ages 67–69 or 65–69). Levels are measured as the number of recipients at a given point in time, and shares are expressed as percentages of the population in the corresponding age range. Pension data are from Government of Sweden (1989), Tables 4.1, 4.2, and 4.10. Population denominators are from Statistics Sweden (SCB).