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ABSTRACT

Old-Age Unemployment and Labor Supply: An Application to Belgium* **

Over the last two decades, most OECD countries have reformed their social security in order to make early departures from the labor market increasingly difficult. Despite the fiscal gains that are expected from these reforms, it is likely that these gains from longer careers will be partly offset by increasing expenses on other social security programs. This article sheds light on this issue by ex-ploring the consequences of postponing access to an old-age unemployment program from age 58 to 60. The program provides laid-off workers with a combination of unemployment benefits and a monthly supplement paid by the employer until the full retirement age. Exploiting a rich set of administrative data, we study the effect of this reform on workers' employment and various social security benefits (i.e. unemployment, disability, early retirement and compensated working time reductions), using a triple difference method as identification strategy. Our results show that, for men, the reform had a positive effect on employment, with a small positive effect on a program called Time-Credit, i.e., a social security program that facilitates working time reductions at the end of the career. For women, we find no significant effect on employment but instead a large spillover effect on unemployment. We find that gender differences in job characteristics can help to explain this difference, since women are more likely to work in part-time, low-wage and blue-collar occupations than men, and no significant employment effects are found for these groups of workers.

JEL Classification: J26, J65

Keywords: disability, old-age unemployment, early retirement, senior employment

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** All authors contributed equally to this work. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

1 Introduction

The conjunction of population ageing and increasing life expectancy over the last decades have put an important pressure on public finances in many developed economies. In front of this phenomenon, several OECD countries have reformed their social security with the aim to increase the age at which workers leave the labor market. In this context, supply side policies, playing on eligibility rules to old-age unemployment and early retirement programs or giving financial incentives to retire older have played a central role. However, it is also well documented that age-induced health impairments and a poor demand for an old labor force generate barriers for older workers to remain on the labor market. The fiscal and welfare gains of making these social security programs less accessible or less attractive could thus be partly offset by an increase in expenditures on other programs such as unemployment insurance (henceforth UI) and disability insurance (henceforth DI).

In this study, we shed light on this issue by focusing on a particular type of old-age unemployment program, called "unemployment with company supplement" (henceforth UCS), i.e., a Belgian insurance program that provides job search exemptions and higher replacement benefits to workers who have been laid-off above a certain age threshold. We study how an exogeneous increase in the eligibility age from 58 to 60 years old affects workers' employment but also social security benefits (i.e. unemployment, disability, early retirement and compensated working time reductions) over the remaining years of their career (between 58 and 63 years old). To do so, we exploit a nationwide reform, enforced in January 2008, which tightened the eligibility conditions to the program by increasing the number of required contribution years. As a result, the reform postponed eligibility by approximately two years for workers with intermediate contribution years. We identify the causal effect of the reform on the number of days in different statuses by exploiting variation across age, cohorts, and the number of contribution years in a triple difference framework. We also study heterogeneous effects across male and female workers and across job characteristics. Finally, we implement a fiscal analysis by estimating the budgetary effects of postponing access to UCS both at the individual and at the household level, accounting for potential spillovers on other social insurances.

Our benchmark results provide evidence that the decrease in the number of days spent on UCS led to an increase in worked days for men but not for women. Indeed, for men, the reform decreased the number of days on UCS by 71.0 days between age 58 and 63 while it increased the number of worked days by 46.1 days over the same age window. For women on the other hand, we find that, although the reform decreased the number of days on UCS by 93.5 days between

age 58 and 63, the estimated employment effects are small and non-statistically significant. We also find that the reform had spillover effects on other social insurance programs for both genders. For men, we observe an increase in the number of days on a program called Time-Credit (henceforth TC), i.e., a support program that facilitates working time reductions at the end of the career. For women, we find that the decrease in the number of days on UCS was entirely offset by an increase in the number of days on UI. We provide suggestive evidence that part of the gender difference in the employment responses to delaying access to UCS can be linked to gender differences in job characteristics. Indeed, we observe that women are more often employed in part-time and low-wage occupations than men. After running a heterogeneity analysis, we observe that in these occupations, the employment effects of the reform are not statistically significant neither for men, nor for women. Finally, we estimate for men that the reform increased cumulative labor earnings between age 58 and 63 (i.e., a six years period) by €13,622 (€2271 per year on average), while it reduced the value of transfers from the national employment agency (which is in charge of the payments from UCS but also unemployment and time-credit) by €2,384 (€397 per year on average). Dividing these fiscal effects by the number of forgone days on UCS due to the reform, we find that the reform increased labor earnings by €191.8 and decreased UCS transfers by €33.6 per forgone day on UCS, which suggests that the reform had positive earnings gains for workers. By contrast, we don't find any statistically significant fiscal effect for women, probably because the decrease in UCS transfers was offset by an increase in transfers from regular unemployment.

Our study is related to a large body of empirical literature that aims at understanding how workers' access to old-age social insurance programs affects labor supply at the end of the career. The programs that have been most studied can be classified into (1) early retirement (henceforth ER), which provide retirement benefits before the normal retirement age, (2) old-age unemployment benefits (henceforth old-age UB), which provide higher replacement rates or a longer benefit duration, (3) old-age disability benefits, which provide relaxed eligibility criteria for disability at older ages, and (4) programs that propose gradual retirement through a compensated decrease in the number of working hours. They all share the characteristic of being available after a certain age threshold (often coupled with conditions on the length of workers' contribution period) that is lower than the normal retirement age. Here below, we focus our discussion on early retirement and old-age unemployment programs as they are generally more comparable across countries and closest to the program we evaluate in this study.

In theory, postponing access to old-age UB can have different effects on labor supply than postponing access to ER for three main reasons. First, ER is accessible to eligible individuals, regardless of their position on the labor market, while old-age UB are only available to eligible workers after being laid-off. Therefore,

increasing the early retirement age can generate two kinds of substitution effects on other social security programs: 'passive substitution', i.e. individuals staying longer within other social security benefits as a result of postponing access to ER and 'active substitution', i.e. individuals switching from employment to other social security benefits as a result of postponing ER eligibility. By contrast, postponing access to old-age UB can only generate 'active substitution'[4] effects, since these programs only target laid-off workers, which makes the pool of individuals affected by reforms in ER smaller than the pool of individuals affected by reforms in old-age UB.

Second, in principle, the entry into ER is under the decision making of the individual himself or herself, while entry into old-age UB is an exogeneous event that is independent of his or her decision. However, the evidence largely contradicts this distinction. Indeed, the existence of moral hazard within old-age UB programs (i.e. the fact that eligibility to old-age UB increases the risk of being laid-off) has been well documented in the empirical literature[5] (Baguelin & Remillion 2014, Kyyrä & Pesola 2020, Tuit & Van Ours 2010). By making UI more acceptable for workers, old-age UB programs generate an additional incentive for employers to lay-off their costly older labor force, sometimes through mutual agreements with the workers themselves. As an old-age UB program, the Belgian UCS program is particularly exposed to such moral hazard effects. Indeed, in the UCS program, the employer pays a company supplement to the laid-off worker in addition to the unemployment benefits. As a result, the amount of the company supplement and the eligibility conditions have progressively become an integral part of the negotiations between labor unions and employers (Claes 2012) and it has progressively been recognized that the program was often used as an early retirement plan. Moreover, Vandenberghe et al. (2013) document a negative causal effect of ageing on individual productivity measures in Belgium, which occurs despite the fact that wages keep increasing with age. This leads to an increasing wage-productivity gap at the end of the career. The conjunction between high wage to productivity ratios for older workers and an early departure culture can be understood from the perspective of the implicit contract model developed by Lazear (1979). Indeed, Lazear (1979) develops a model where employers motivate and retain their workers by posting wages starting from a lower level than the marginal productivity but rising faster over time and ending above the marginal productivity at the end of the career.

[4] The only case where postponing access to old-age UB can generate passive substitution effects on social security programs occurs when workers for which eligibility is postponed are working while receiving social security benefits. We will explore this case when looking at the effect of postponing access to UCS on working time reduction benefits.

[5] For instance, in France, Baguelin & Remillion (2014) show that entries into extended unemployment benefits are often coordinated in such a way that laid-off workers can bridge the gap between the date of job separation and the date at which they can draw retirement benefits.

Generous departure plans partly financed by the employer at the end of the career can be part of these implicit contracts. From this perspective, the frontiers between old-age UB and ER are blurred and the effect of postponing access to one or the other program should have similar consequences on workers' labor supply.

Third, old-age UB programs are typically accessible at younger ages (typically 50-60 years old or younger) than ER programs (typically at 55-64 years old). One could therefore expect that workers in marginal occupations, or workers who are willing to retire early, are more likely to exit the labor market through old-age UB, thereby creating a selection process towards workers who are more attached to the labor market near the (early-)retirement age. If this selection effect more than compensates the negative effect of age on labor supply, one can expect that 'active substitution' effects will be greater when postponing access to old-age UB than when postponing access to ER programs.

Taking advantage of different reforms, a large body of empirical studies has assessed to what extent exogenous changes in the eligibility age to ER or old-age UB programs translate into a higher labor supply and to what extent these reforms impact the use of other social insurance programs through spillover effects. While most studies have focused on ER programs (see e.g., Geyer & Welteke 2021, Hernæs et al. 2016, Manoli & Weber 2016, Staubli & Zweimüller 2013, Vestad 2013), fewer studies have focused on old-age unemployment programs (Inderbitzin 2016, Kyyrä & Pesola 2020). Those focusing on increasing the early retirement age have found positive and economically meaningful effects on the employment rate. Moreover, even if spillover effects on unemployment and disability are often quantitatively important, they appear to be mostly driven by individuals staying longer in their former status (i.e. 'passive substitution') rather than switching across status (i.e. 'active substitution'). Staubli & Zweimüller (2013) were among the first to identify the effect of raising the early retirement age in a developed country in a quasi-experimental setting. They evaluate a reform that gradually increased the early retirement age from 55 to 58.25 for women and 60 to 62 for men in Austria. They document an increase in employment probabilities of 9.75 pp for men and 11 pp for women in the affected age window, with respectively large and small spillover effects on unemployment and disability probabilities. Looking at transition rates instead of probabilities (i.e. looking at the 'active substitution' effect), they find that the effect on transitions from employment to unemployment and disability are rather limited.

A lower number of studies have assessed the effect of increasing the eligibility age to old-age UB. Two exceptions are Inderbizin et al. (2016) and Kyyrä & Pesola (2020). Our study is closest to that of Kyyrä & Pesola (2020), who study a reform that increased the age at which workers can claim extended UB (i.e. extend the duration of UB until the full retirement age) from age 55 to 57 in Finland. Using a sample of workers who were employed prior to the reform, they observe a positive effect on worked days without any spillover effect on regular unemployment or disability benefits, suggesting that workers simply remained employed longer than before, without switching to other social insurance programs. In contrast, Inderbitzin et al. (2016) provide strong evidence for the existence of interactions between extended UB and old-age DI, by exploiting a policy reform in Austria that extended UB duration from one to four years in some regions. They find that extended UB can work either as complements or substitutes to DI benefits, depending on whether laid-off workers can use extended UB to bridge the gap until the early-retirement age or not. However, these strong interaction effects are likely due to the fact that in Austria, the DI eligibility rules above age 55 were strongly relaxed, making DI an attractive exit route from the labor market for older workers in Austria.

Overall, this literature review suggests that old-age unemployment programs often play the role of early retirement pathways for older workers. In that sense, postponing access to old-age UB or to ER are likely to have similar positive employment effects on workers' labor supply. Moreover, the institutional settings of each social security programs (the value of the replacement benefits, non-pecuniary elements such as the existence of ALMPs or the eligibility rules) are likely to be the most important determinants of the degree of substitution between these different social security programs. In Belgium, such substitution effects between different social security programs (in particular between unemployment and disability) have been documented in recent studies (De Brouwer and Tojerow 2018, De Brouwer et al. 2019, Leduc and Tojerow 2020).

We contribute to this literature in three ways. First, our paper assesses whether the employment response and spillover effects are comparable with those found for ER programs in previous studies. Indeed, the evidence about the effect of tightening access to old-age UB is scarce and it is still not clear whether the magnitude of the effects of postponing access to these programs is similar to the one that has been estimated when tightening access to ER programs. In terms of public policies, governments could be willing to provide better unemployment conditions in exchange for raising the early retirement age but moral hazard could be an important impediment to such policies. Second, while many previous studies focus on either men or women because of changes in gender-based eligibility rules, we are able to study the effects of postponing access to the UCS program for both men and women. We show that substantial gender differences appear, which implies that this dimension must be considered by policy makers when reforming old-age UB programs. Third, we explore other

substitution patterns than unemployment and disability, namely the "Time-Credit program", a program that provides benefits for reducing working time at the end of the career.

In addition, our study is the first to credibly assess the causal effect of delaying access to the Belgian UCS scheme. Belgium is an interesting case study because of its particular position in the EU labor market. Historically, the country has been characterized by an "early retirement culture" due to the high labor costs of older workers and the multiplicity - and generosity – of old-age social insurance programs. This has often been pointed out as the main cause of low employment rates of the population aged 55-64 compared to many other EU countries, as can be seen on Figure 1. This figure also shows that the Belgian old-age employment rate has greatly increased between 2005 and 2019, which could indicate that past reforms that tightened the eligibility conditions to ER and old-age UB have been effective in raising labor supply among older workers. However, until today, macroeconomic evaluations found small and inconsistent effects of early 2000's labor market reforms on old-age labor supply (Dejemeppe et al. 2015). Moreover, Figure 2 shows that in addition to the increase in the employment rate, Belgium has experienced a concomitant decrease in UI, ER and UCS recipiency rates and an increase in Time-Credit and DI recipiency rates. Whether these trends are causally related to the changing Belgian legislative landscape has yet to be elucidated.

[Include Figure 1]

[Include Figure 2]

The paper is organized as follows. In section 2, we provide a brief description of the different social insurance programs that are available to older workers and describe the 2008 reform of the UCS scheme. In section 3, we describe our data source, the sample selection procedure and provide some descriptive statistics. Then, we detail the empirical strategy and discuss the identification issues in section 4. In section 5, we describe our benchmark results, provide robustness tests and a heterogeneity analysis. In section 6, we estimate the fiscal effects of the reform to assess its magnitude for workers and public spending. Finally, in section 8, we provide our conclusions about the UCS reform and discuss some areas of further research.

2 Institutional Background

2.1 The Belgian Social Security Landscape

In this section, we provide a broad overview of the different social security programs available to individuals aged 55-64 over the period of analysis (2003-2015). We start with a detailed description of the UCS program and then provide information on the alternative social security programs.

The UCS program is an old-age unemployment program that is available to any worker satisfying some age and contribution years requirements in case of lay-off[6]. Its main characteristics are the following. First, eligible workers are exempt from having to actively seek employment. Second, the replacement benefits consist of the sum of unemployment benefits and a monthly severance, called "company supplement" that is paid by the employer. Unemployment benefits amount to 60% of the last gross wage (capped at €1,832/month[7]), while the company supplement is negotiated between the employer and the worker (or the labor union), provided that its minimum must amount to half of the difference between the last net monthly wage (capped at €3,325/month[8]) and the unemployment allowance[9]. As a result, the replacement rate oscillates around 70% of the last net wage, which is greater than in any other social security program available to older workers. The worker remains entitled to the scheme until the full retirement age[10] and the company supplement is paid by the employer even if the worker finds a new job over this period. Finally, the worker is credited for a full contribution period for the computation of the pension benefits, based on his/her wage in the last month preceding UCS entry. On the employer side, two elements are worth mentioning. First, the employer has, in principle, the obligation to replace any redundant worker under the age of 60 with a younger full-time unemployed worker. However, due to numerous exception rules, this condition has been often circumvented by employers. Second, the notice period is not affected by the worker entering into UCS[11]. Until January 2014, this notice period was computed in the following way. For yearly wages under €32,254, the notice period is 3 months per period of 5 years of

[6] Eligibility conditions differ according to whether the layoff is individual or collective. In this paper we focus exclusively on individual layoffs.
[7] Amount at January 1st 2008.
[8] Amount at January 1st 2008.
[9] As an illustration, a worker whose net wage was €2500 (€3000) in 2008 had a minimum replacement rate of 72% (68%).
[10] In Belgium, the full retirement age is 65 for men. For women, it was 63 years old before 2006, 64 between 2006 and 2009 and 65 since 2009. This age will be raised to 66 years old in 2025 and 67 in 2030 for both sexes.
[11] However, during mass layoffs, this program has the advantage for the employer of reducing the notice period to a maximum of six months, which can substantially accelerate the departure of the worker in cases of long job tenure.

seniority started. For yearly wages above €32,254, the notice period is one month per year of seniority started. All these characteristics have made the UCS program very popular among workers and labor unions, who have considered the program a corner stone of their claims for workers' welfare (Claes 2012).

In addition to the UCS scheme, there are four main social security programs available to older workers[12]: regular unemployment benefits (henceforth regular UB), Time Credit (TC), early retirement (ER) and disability (DI). As substantial changes drastically tightened the eligibility rules in these programs since 2015, we limit our discussion to the legislative context before 2015.

Regular UB are paid to any worker satisfying some minimum contribution conditions without any limit on time. Moreover, workers above the age of 57 are exempted from job search requirements or mandatory activation programs. Benefits are also slightly more generous after 55 years old, as a supplement of ± €50/month is paid in addition to the replacement benefits. The benefits are not regressive over time, remaining at 60% of the last monthly wage and each day on UI is credited as a full contribution period for pension computation. Finally, the laid-off worker and the employer can also agree on a monthly severance payment paid to the worker, as in the UCS scheme[13]. However, these arrangements are informal and there is no quantitative evidence of either their frequency or the financial amounts implied.

The TC system offers a gradual retirement path to older workers by offering them the option to reduce their working time either completely or partially in exchange for a replacement benefit. The maximum duration and financial rules are complex since they depend on the motive for entry (without motive, with a motive for workers aged 50-54 or end-of-career for workers aged 55+). For workers aged at least 55, the scheme is accessible to workers who satisfy at least 25 contribution years, 5 years of job tenure at their current employer, and have been working full-time over the last year preceding entry into the program. In principle, any eligible worker has the right to ask his/her employer to reduce working-time through the program. The program allows the worker to reduce working-time by 20% or 50% with limited wage loss and potentially until the normal retirement age (i.e. 65 years old).

[12] For these programs, we adopt the English denomination that was already adopted by Jousten et al. 2011.
[13] This system has been named the "Canada dry" pension.

The ER system provides retirement benefits to workers from their 60th birthday given that they have 35 contribution years[14]. The formula for computing the amount of pension benefits is the same regardless of whether the age at entry is equal or lower than the full retirement age. The formula takes all the remuneration received during the career, divided by 45 and re-evaluated by a coefficient. Then, a percentage of 60% for multi-member households (75% for single household) is applied to this amount.

Finally, the DI program is available to any worker whose earning capacity has been reduced by at least 66% for health reasons. The disability must be certified by the physician of his/her public health insurance fund[15], who must submit a file to the national health insurance in cases where the disability spell exceeds one year. The replacement benefits amount to 60% of the gross wage (or to the UB in case the worker is unemployed) during the first year with floors and ceilings. After one year, the replacement rate is determined by the worker's position in the household and remains fixed over time, i.e. at 65% for households with dependents, 55% for single households without dependents and 40% for cohabitants.

2.2 The 2008 Reform of the UCS Program

The UCS program came into force in 1974, in a context of deindustrialization and high youth unemployment[16]. It was officially serving a double purpose: to ease the negative social consequences of layoffs for senior workers and to make space in the labor market for the young unemployed. The conjunction of lenient eligibility conditions and a series of plant closures in the manufacturing sector during the eighties and nineties fostered the number of entries into the program. The program was strongly supported by labor unions, who saw in it an improved version of what has been called the "unemployment tunnel" in other countries, i.e. a long period of unemployment between job loss and pension (Kyyrä & Pesola 2020). It also received support from most employers, who saw in it a way to address the high labor costs of older workers and preserve social peace during collective dismissals. However, the employers' position evolved in the late nineties as they began to fear that the program would end up weighing too heavily on social security contributions (Claes 2012). This fear

[14] Note that many periods of time such as unemployment, disability, parental leave, and sickness are considered contribution years.
[15] In Belgium, medical expenditures and sickness or disability periods are reimbursed by the National Institute for Health and Disability Insurance but payments are effectuated by the public health insurance funds called "mutualities", which are funded by the NIHDI and act as intermediaries.
[16] The program was called "Conventional Early Retirement" between 1974 and 2012, but was later renamed by the government. This confusion of terminology highlights the confusion about the real nature of the program, i.e., a hybrid program between early retirement and unemployment.

was shared by the government, who progressively imposed stricter access conditions and reduced the attractiveness of the program for employers[17]. While past reforms during the eighties and the nineties had already tightened the eligibility rules, the most dramatic changes came into force in January 2008 and were later followed by further restrictions in 2012 and 2015. The new eligibility rules enforced in January 2008 were ratified in May 2007 but were actually part of a global governmental plan that had been signed earlier, in December 2005, called Intergenerational Solidarity Pact (henceforth IST), whose aim was to increase the employment rate of workers above the age of 50 through a series of labor market reforms[18]. In the following paragraph, we restrict our description to the changes in eligibility rules enforced in January 2008 as they will be the focus of our empirical analysis.

Before 2008, eligibility rules were uniform across genders and required a contribution period of 25 (20) years to enter at age 58-59 (60-64)[19]. In 2008[20], the length of the required contribution period was increased for any worker whose layoff had been notified after January 1st 2008[21]. To avoid penalizing women, who have shorter contribution years than men on average, the reform provided distinct criteria by gender, and a gradual phase in of the new eligibility rules between 2008 and 2012.

[17] One important obligation imposed on employers in 1990 was to replace any pre-pensioned worker below the age of 60 with an unemployed worker. However, this obligation was rarely met in practice as many exemptions existed.

[18] In addition to the eligibility changes to the UCS, the most significant policies contained in the IST were: (1) more obligations for companies undergoing a collective dismissal in terms of outplacement offers (in 2006), (2) the introduction of reductions of employers' social contributions for workers above 50 (in 2007) and (3) the introduction of a pension bonus of EUR 2 per worked day over the age of 62 or 44 contribution years (in 2007). Even if these reforms applied to the population that is subject to our analysis, they do not threaten our identification strategy since they applied homogeneously to the comparison groups.

[19] More lenient eligibility rules were common in specific sectors involving a heavy work load (most generally metallurgy, construction and transport) and during collective dismissals.

[20] Besides the changes in eligibility rules, two reforms, in 2007 and 2010, modified the way in which employers' social contributions imposed on the company supplement were computed. Indeed, from 2007 these amounts (which were previously imposed as lump sums) were computed as decreasing percentages of the company supplement according to the age of entry. The aim was to provide financial disincentives for employers to separate from their workers through UCS before age 60. These percentages were increased in 2010 to make UCS less attractive for employers. However, these financial disincentives were very small for entries above the age of 60 (i.e. 6% in 2007 and 10% in 2010) and should therefore not play a significant role in our empirical analysis.

[21] In other words, any worker satisfying the old conditions and whose lay-off had been notified before that date could enter the UCS under the old conditions even if the notice period would expire after January 1st 2008.

Table 1 displays the old and new eligibility rules separately for males and females. For males the contribution period was raised to 35 years to enter at age 58 and 30 years to enter at age 60. Further increases in the required contribution years would be imposed in 2010 (37 years to enter at age 58) and 2012 (38 years to enter at age 58 and 35 years to enter at age 60 or older). For females the required contribution period was raised to 30 years to enter at age 58 and 26 years to enter at age 60. Further increases in the required contribution period would also be imposed in 2010 (33 years to enter at age 58) and in 2012 (35 years to enter at age 58 and 28 years to enter at age 60 or older).

[Include

Table 1]

The enforcement of the reform in January 2008 created a sharp eligibility threshold between workers of different birth years and identical contribution length. This is especially salient for individuals who turned 58 years old in 2007 and 2008 (i.e. individuals born in 1949 and 1950) with intermediate contribution years. For male workers turning 58 with 25-33 contribution years, those born in 1949 could enter UCS at age 58 in 2007, while those born in 1950 would become eligible at age 60 (for individuals with 28 and 33 contribution years) or later (respectively 61, 62 and 63 years old for 27, 26 and 25 contribution years). We can thus identify the effect of a postponement in UCS eligibility of at least two years by comparing outcomes across these two cohorts in these contribution years. We can do the same exercise for female workers; those born in 1949 with 25-28 contribution years (at age 58) became eligible at age 58, while those born in 1950 with identical contribution years became eligible at age 60. This comparison between the 1949 and 1950 cohorts for workers with intermediate contribution years forms the basis of our empirical analysis.

It must be emphasized that the old and new rules described in this section did not apply to all workers; more lenient eligibility rules were provided in two cases. First, the reform provided derogatory rules for workers employed in some sectors (metallurgy, construction and transport) or occupations (heavy work and night shifts). These workers remained eligible at 55-56 years old, provided that they had sufficient contribution years. Second, during collective dismissals, the minimum eligibility age could be lowered up to 50 years old[22], with a required contribution period of 20 years. The number of annual entries by source is displayed in the appendices (see Figure A. 1). It shows that over the period of analysis (2003-2015), the "general" scheme accounts for about 60% of all entries into UCS. To keep the analysis tractable, we will focus on the general scheme in the remainder of this paper and discuss the potential implications of our results for the other schemes in Section 4.2.5.

Finally, in spite of these stricter rules, the number of entries into the program remained high between 2007 and 2015. This can be explained by the conjunction of the 2008-2009 economic downturn and the numerous resorts to the exceptional rules. In 2012 and eventually in 2015, the government decided to put an

[22] During plant closures or firm downsizing events, departure plans are negotiated between the employer and worker representatives. The minimum eligibility age to UCS is negotiated between the two parties and submitted to the employment minister, which can either accept or refuse these exceptional rules. The minimum exceptional age was 50 years old, but was situated between 52 and 55 years old in the majority of cases.

end to the scheme in the long-term by phasing in stricter conditions on age and contribution length and by forcing UCS workers to remain available on the labor market (implying being registered as a job seeker and having to accept any suitable job offer), which made the program less attractive and drastically reduced the number of entries. Our empirical analysis does not assess the effects of these additional reforms.

3 Data and Descriptive Analysis

To estimate the effect of the 2008 reform on employment and social security, we exploit register data from the Belgian Labor Market Data Warehouse (LMDW) of the Crossroad Bank for Social Security (CBSS), a federal structure that aggregates register data from all social security institutions. The data contain detailed longitudinal information between January 2003 and December 2015 on any individual who has been registered in Belgium over that period. Demographic information is provided by national registers, employment information is provided by the National Employment Office, information on social security use is provided by the different social security institutions and information on contribution years is provided by the National Pensions Office.

To construct our main sample, we select all male and female workers born in 1949 and 1950 who were registered in employment at the first quarter following their 55^{th} birthday. From this initial sample, we exclude civil servants and workers from the metallurgic, construction and transport sectors, since these individuals are subject to specific UCS eligibility rules. Among these two cohorts, we must identify workers for whom UCS eligibility has been postponed (the treatment group) from those who remained eligible at age 58 even after the reform (the control group). In section 2, we explained that for males, the 1949 (1950) cohort became eligible to UCS at age 58 if the worker satisfied 25 (35) contribution years, while for females the 1949 (1950) cohort became eligible to UCS at age 58 if the worker satisfied 25 (30) contribution years. Therefore, observing the contribution length at age 55 and assuming that individuals work full-time between age 55 and 58, we infer that UCS eligibility was postponed by at least two years for male (female) workers with 22-30 (22-25) contribution years if they were born in 1950.

One point to discuss here is that our data does not contain the length of the contribution period used to determine who is eligible to UCS. This variable is computed in a specific way by the federal employment agency that we reproduced for this study. Indeed, the federal employment agency assimilated some

inactivity periods (e.g. career interruptions or inactivity periods for raising a child) and part-time jobs as full-time working periods[23]. Since we use data on worked and assimilated days provided by the pension fund, we can only estimate the contribution period (as computed by the federal employment agency) with some imprecision. Another source of imprecision is due to the fact that we sample individuals at age 55, i.e. three years before the treatment. Indeed, it is likely that some individuals in the treatment group will not reach the sufficient amount of contribution years for eligibility at age 58 because they do not work full time between age 55 and 58.

Because these imprecisions can have consequences for the identification strategy, it is useful to check whether we can use our measure of the contribution length to assess the effect of the 2008 reform. Figure 3 displays the relationship between our measure of the contribution length and the average number of UCS days between age 55 and 63 included[24]. For males, we observe statistically significant differences in UCS days between 23 and 29 contribution years. This window is a bit narrower than the 22-30 contribution years window that was predicted by the reform, probably due to the imprecision of the measured contribution length. In order to obtain two groups that are as similar as possible, we split each cohort into two subgroups, according to whether individuals have 23-29 or 30-35[25] contribution years at age 55. Panel (b) of Figure 3 shows that our measure of the contribution length is less accurate for female workers. Differences in UCS days across cohorts are statistically significant for workers with 20, 22, 23 and 29 contribution years, which is quite different from the 22-25 window identified in section 2. This discrepancy is probably due to the fact that female workers more often have work interruptions during their career and more often hold part-time jobs, which makes it more difficult to accurately measure the contribution length with our data. In our empirical analysis, we therefore split each cohort of female workers in two subgroups according to whether they have 22-23 or 24-25 contribution years. In section 7, we check that our conclusions are robust when using alternative contribution length windows.

[23] The rules that govern which periods were assimilated and which weren't are complex and an extensive description is beyond the scope of this paper.

[24] A similar figure containing a comparison of UCS days between alternative birth cohorts (1948-1949 and 1950-1951) can be found in Figure A. 2. This figure can be seen as the basis for our placebo tests in the robustness analysis. As expected, these figures show no statistically significant differences between these cohorts for any contribution year (excepted for females with 16 contribution years for the 1948 vs 1949 cohorts and with 24 contribution years for the 1950 vs 1951 cohorts).

[25] We chose a window of 30-35 years instead of >30 years in order to maximize comparability between the two groups. In a robustness analysis, we show that the results are not affected when using this alternative window.

[Include Figure 3]

We end up with a sample of 26,126 male workers (6,778 individuals with 23-29 contribution years and 19,348 with 30 or more contribution years) and 2,557 female workers (1,222 individuals with 22-23 contribution years and 1,335 individuals with 24-25 contribution years) that we follow between age 55 and 63 included[26]. We display some basic descriptive statistics for both gender in

[26] We chose this age window mainly for data availability reasons. Indeed, since we can observe individuals' outcomes between 2003 and 2015, we could, in principle, follow the 1949 and 1950 cohorts over the age window [54;65[. However, because we ran two placebo tests using 1948 and 1951 cohorts and want to keep a homogeneous age window across all results, we kept the age window of [55-64[.

Table 2[27]. As expected, we can see that the differences in means are very small across cohorts but larger across contribution years. Focusing on male individuals with 23-29 contribution years, we can see that a majority of individuals are in a couple (80.8%), live in Flanders (57.4%), are occupied in white collar occupations (75.5%), and hold full-time jobs (78.8%). The four most important sectors are the manufacturing, distribution, finance, and health sectors, which constitute about 60% of the workers. Compared to their male counterparts, we see that women are more often living in a single household (30.1%), more often have a blue-collar occupation (31.7%), are mostly employed in part-time jobs (72.0%) with much lower gross daily salaries (€122 per day) and constitute a higher share of the workers in the health sector (29.9%).

[Include

[27] While occupation is observable for all workers of the 1950 cohort, it is not available for some workers of the 1949 cohort. This is due to the fact that workers' occupation in the non-profit sector is only observable beginning in 2005 in our data.

Table 2]

4 Empirical Strategy

4.1 Triple Difference Approach

We identify the effect of the reform on several outcomes by implementing a triple difference (DDD) approach, which exploits variation in workers' exposure to the 2008 reform across three dimensions: birth-cohort, age and the length of the contribution period. This DDD approach is more robust than the traditional DinD approach, which would typically exploit age and cohort variation in workers' exposure to the reform. Indeed, the DinD approach is exposed to the risk that differences in outcomes across cohorts over the lifecycle (e.g. due to calendar time effects) may occur in absence of the reform and thus invalidate the parallel trend assumption. Our DDD approach addresses this potential bias by exploiting the group of workers with a long contribution period (i.e. 30-35 years at age 55 for men and 24-25 years at age 55 for women), who are not affected by the reform. With this additional difference, any eventual time-cohort effect common to the two contribution length windows will vanish apart. This way of estimating the causal effect of delaying workers' access to UCS is close to Vestad (2013) and Riphahn & Shrader (2021) who both estimate the effect of changing the age limit to access ER on worker outcomes in a DDD setting. In our benchmark results, we systematically report both the DinD and DDD estimates. By doing so, we can check by how much the two coefficients differ and use the DinD coefficients for the group with a long contribution period as a placebo test.

The dependent variables are the cumulative number of days that each worker has spent on (1) UCS, (2) employment, (3) regular UI, (4) DI, (5) TC and (6) ER. For the fiscal analysis, we also use cumulative individual incomes from employment and the different Belgian social security institutions (federal UI, DI, pension and "other" institutions that are in charge of handicap, occupational disease and social welfare). We also report the DDD estimates using cumulative household incomes in the Appendices.

The triple difference coefficients are estimated separately for males and females with the following equation:

$$Y_{ik} = \alpha D_i + \beta C_i + \sum_{\tau=55}^{56} \gamma_\tau * I\{k = \tau\} + \gamma_{post}\, I\{k \geq 58\} + \sum_{\tau=55}^{56} \delta_\tau D_i * I\{k = \tau\} + \delta_{post} * D_i * I\{k \geq 58\} + \sum_{\tau=55}^{56} \mu_\tau C_i * I\{k = \tau\} + \mu_{post} * C_i * I\{k \geq 58\}$$
$$+ \rho D_i C_i + \sum_{\tau=55}^{56} \sigma_\tau D_i C_i * I\{k = \tau\} + \sigma_{post} * D_i C_i * I\{k \geq 58\} + \boldsymbol{\varphi}' \boldsymbol{X_i} + \varepsilon_{ik} \qquad (1)$$

Where i and k index respectively individual and age (we consider ages 55, 56, 57 and ≥58), D_i is a dummy for the 1950 cohort, C_i is a dummy for the contribution period being in the 23-29 (22-23) years window for males (females), $\boldsymbol{X_i}$ is a vector of individual characteristics observed at age 55 and ε_{ik} is an error term. Parameter α is a fixed cohort effect, parameter β is the effect of being in the 23-29 (22-23) contribution period window, while parameters γ_{55}, γ_{56} and γ_{post} are age fixed effects (taking age 57 as the baseline). Then, parameters δ_{55}, δ_{56} and δ_{post} are second-level interactions that control for cohort specific time effects, parameters $\mu_{55}, \mu_{56}, \mu_{post}$ are second-level interactions that control for contribution period window specific time effects and ρ controls for time invariant cohort-contribution year window effects. Finally, σ_{55}, σ_{56} and σ_{post} are the third level interaction effects which capture the effect of being jointly in the 1950 cohort, with a contribution period window of 23-29 (22-23) years and being aged 55 (resp. 56 or ≥58) for σ_{55} (resp. σ_{56} or σ_{post}) compared to the baseline age of 57. The parameter of interest here is σ_{post}, which is our triple difference parameter. The estimated values of σ_{55} and σ_{56} will be displayed graphically as a mean to check for any pre-reform effects. The dependent outcome Y_{ik} is the number of days (or income) in each status (UCS, employment, UI, DI, TC and ER) observed for individual i at age k. Note that these outcomes are cumulative, therefore, we sum the number of days in each status between age 58 and 63 and keep one observation per individual at age ≥58. We therefore work with a balanced panel of four observations (for ages 55,56,57 and ≥58) per individual.

Finally, we also provide a visual analysis of the dynamic effect of the reform, by showing the results of the DDD estimation, where taking a dummy equal to one if the worker has been observed in the given status in the year, for each year of age (from age 55 to 63). This analysis helps to understand how the effects are distributed over the age of the workers.

4.2 Issues of Identification

The complexity of the Belgian institutional landscape over this period has some implications for our identification strategy. First, it is important to say that our design is fuzzy due to the fact that our data does not allow us to perfectly assess the timing of eligibility to the UCS program for every worker. Indeed, a small share of workers in the control groups exit employment through UCS already from age 58, which means that our DDD design identifies an intention-to-treat (ITT) effect. In other words, our estimates will underestimate the true effect of postponing access to UCS and should therefore be seen as conservative. One way to circumvent this limitation is to systematically compare the estimated effects on employment, UI, DI, TC and ER days to the estimated effect on UCS days. This way of interpreting our results can show us the magnitude of the worker response relative to a decrease in one day on UCS over the course of his or her career. Second, the fact that the 2008 reform applied to all cohorts at the same moment, could result in biased estimates if the 1949 cohort anticipated the reform. Indeed, workers in the 1949 cohort who would not meet the new eligibility rules anymore at age 59 (i.e., in 2008) could have been induced by the reform to exit the labor market through UCS at age 58. This would thus lead us to overestimate the treatment effects. To see whether this concern is likely to occur, we run a placebo test, where we estimate equation (1) for workers in the 1949 and the 1948 cohorts. Observing no effects for any variable would suggest that the two cohorts behaved in similar ways before the reform, i.e. that the 1949 cohort did not anticipate the reform. Moreover, to check whether our DDD setting correctly controls for cohort effects other than the 2008 reform, we also provide a placebo test that runs the same DDD regression as in the benchmark but uses the 1950 and 1951 cohorts (instead of 1949-1950). We show in section 7 that the effects are both statistically non-significant and of low magnitude.

Another point to discuss is related to the exclusion of some individuals from our sample. Indeed, the UCS programs provides different exception rules that allow some workers to exit the labor market through the program before the official eligibility age. This is the case for workers in metallurgic, transport and construction sectors. The exclusion of these workers from our sample make it difficult to extend our results to these heavy sectors. In fact, UCS utilization has been historically higher in these sectors, which also employ higher shares of blue-collars, long job tenure and heavy occupations. We tackle these issues by running separate estimations across different groups of workers in a distinct section. In particular, since these sectors are characterized by high shares of blue collar workers, we can get an idea of the effects in these sectors, looking at the DDD coefficients for blue collar workers.

Finally, our analysis only covers individual layoffs, since eligibility rules are radically relaxed during collective dismissals. Collective dismissals may be less responsive to changes in UI eligibility rules because they are often dictated by imperative motives such as firm survival or a decision on the parent company (for foreign owned firms). We leave this dimension as an avenue for future research.

5 Empirical Results

5.1 Benchmark Results

To get a sense of the dynamic effects of the 2008 reform, Figure 4 displays the DinD and DDD coefficients for each year of age, taking age 57 as the baseline. For both genders, we see in Panels (a.1) and (b.1) that the reform not only postponed the claiming of UCS benefits but also reduced the number of days on UCS until age 63. This effect beyond age 60 can be explained by the fact that eligibility was postponed by more than two years for some individuals in the treatment group (i.e. those with the lowest contribution years) but also perhaps because firms became more and more reluctant to lay-off their workers through the UCS scheme. For men, we observe a statistically significant increase in the number of worked days in Panel (a.2), starting at age 58-59. This increase amounts to about 10 days at age 59, i.e., about two thirds of the effect of the reform on the number of UCS days at the same age. We also observe in Panel (a.5) a slightly significant increase in the number of days on TC at age 59 of about 7 days. By contrast, we can see in Panels (a.3), (a.4) and (a.6) that the effects on UI, DI and ER are not statistically significant at any age. For women, Panel (a.2) shows no statistically significant increase in the number of worked days at any age. In contrast, it seems that the effect of the negative effect of the 2008 reform on UCS days observed in Panel (b.1) led to an increase in the number of days on UI. In Panels (b.3), (b.4) and (b.6), we can also observe no statistically significant effects on the probabilities to be on DI, TC or ER at any age.

[Include Figure 4]

Table 3 displays our benchmark results, taking as dependent variables the cumulative number of days in each status between age 58 and 63. This table displays the DinD coefficients for both contribution year windows in columns (3) and (6) and the DDD coefficients in column (7). A general observation we can make is that, even if the magnitude of the effects is lower in the DDD than in the DinD setting, the main conclusions are the same regardless of the model that we use.

Table 3 confirms the graphical evidence shown in Figure 4. Looking at the DDD coefficients for men, we see that the reform decreased UCS days by 71.7 days while it increased the number of worked days by 48.0 days and the number of TC days by 24.5 days. In contrast, we don't observe any statistically significant effect on the number of days on UI, DI or ER. The positive effects on employment and TC raise two questions. First, are treated workers working longer at the same employer or at a different employer? Second, is the positive effect on TC driven by 'passive substitution', i.e., individuals remaining longer on TC as a result of postponing UCS or 'active substitution', i.e., individuals entering in TC as a response of postponing UCS? To answer the first question, we run two additional regressions, where the dependent variable is either the number of days worked at the same employer where the worker was observed at the moment of selection (i.e., at age 55) or the number of days worked at another employer. The results are displayed graphically in the Appendices (see Figure A. 3) and show that the effect is entirely driven by an increase in the number of days worked at the same employer. To answer the second question, we re-estimate equation (1) by excluding individuals who are already on TC at age 55 (i.e. the moment of selection). We can see that while the effect on employment is almost unchanged, the effect of on TC becomes small and statistically non-significant, which implies that 'passive substitution' is driving the effect of the reform on TC days in our benchmark results.

The results for women displayed in

Table 3 depict a different story. Looking directly at the DDD coefficients in column 7, we see a negative effect of the reform of -71.9 days on the number of UCS days but no statistically significant effect on worked days (the DDD coefficient is even negative). In contrast, we see a statistically significant coefficient of +79.4 days for the number of days on UI.

[Include

Table 3]

Overall, our results have some similarities and some differences with previous empirical studies. For men, our results are close to those of Kyyrä and Pesola (2020), who analyze the effect of postponing access to extended UB from age 55 to 57 in Finland. The authors find that the reform increased employment over the remaining years of the career by seven months, with no spillover effects on UI or DI. Our result that about two thirds of the decrease in days on UCS is compensated by additional employment gives thus additional support to the hypothesis that postponing access to old-age unemployment programs for male workers has positive effects on older workers' employment, with limited spillover effects on other social security programs. However, the discrepancy between the effects obtained for men and women is new to the literature and seems puzzling at first sight. Indeed, previous studies focusing on the employment effects of postponing access to ER for female workers observe a positive employment response (Geyer & Welteke 2021, Staubli & Zweimüller 2013). We interpret this result as the fact that the moral hazard component of the UCS program is smaller for women than for men. In other terms, the layoff rate is more exogeneous for women, in the sense that it doesn't depend on whether women are eligible or not to the UCS program. One possible explanation for this could be related to gender differences in job attachment that we observed in our data. Indeed, the descriptive statistics displayed in

Table 2 showed that women are more likely to hold a part-time job, to be in blue-collar occupations and have much lower daily salaries than men. This difference in characteristics suggests that women are more often employed in marginal jobs, where separation costs are lower for employers. One way to pin down whether job characteristics can explain the gender difference in our results consists in estimating heterogeneous effects along several job characteristics for both men and women and see whether the effect of the 2008 reform is identical for men and women within each subgroup of the population[28].

5.2 Heterogeneous Effects

To see whether job characteristics can explain the gender differences observed in the benchmark results, we re-estimate equation (1) separately along different types of workers (part-time, full-time, low-wage and high-wage) by pooling men and women together and introducing an additional interaction term (a dummy for being a woman) in the regression. By this mean, we can see whether the effects vary across gender within each category of workers. The results of this exercise are displayed visually in Figure 5. The findings displayed in this figure can be summarized as follows. First, we note that among the group of part-time workers the effect of a decrease in UCS days on worked days is not statistically significant either for men or for women. Among men, the decrease in UCS days is compensated by an increase in days on TC, while among women, the decrease in UCS days is compensated by an increase in days on UI. One way to explain the use of TC for men instead of unemployment could be that severance payments are greater on average for men because they have higher wages and greater job attachment than women. We can also observe similar effects on DI days for both genders, which suggest that disability is a margin of adjustment for part-time workers regardless of their gender. When looking at effects for full-time workers, we observe a positive and statistically significant effect on worked days only for men, with no effect on other social insurance programs, while it is even negative (but highly imprecise due to the low number of observations) for women. Basically, the same observations can be made when separating individuals according to whether they are above or below the median daily wage. Indeed, we see that low-wage men adjust to the decrease in days on UCS by increasing days on TC and DI, while high-wage men respond by increasing worked days. In contrast, low-wage women respond to the decrease in UCS days by increasing the number of days on UI (and probably DI even

[28] Note that even if we are aware that this approach doesn't allow us to see whether job characteristics causally drive the difference in results for men and women, we claim that it can help to shed light on whether this difference is linked, either directly or indirectly to gender differences in job characteristics.

if the effect is imprecise). Again, the effects for high-wage female workers are difficult to interpret since they display very large standard errors, but do not show evidence of a positive effect on employment.

[Include Figure 5]

From this heterogeneity analysis, we can conclude that men and women with a lower job attachment (proxied by part-time work and daily wages) do not respond to the decrease in UCS days by increasing worked days, but rather increase the number of days on TC for men, UI for women and DI for both genders. By contrast, while the results suggest that men with a higher labor attachment compensate for the decrease in days on UCS by increasing worked days, we have no evidence of such an effect for women with a higher labor attachment although the results are highly imprecise for this group. Heterogeneous effects of postponing access to old-age UB and ER have also been documented in past studies. For instance, Staubli & Zweimuller (2013) find that, while the effects of raising the ERA on the unemployment rate is similar to that of the employment rate for healthy workers, it is three times larger for unhealthy workers. They also find that employment effects of raising the ERA are also higher for high wage workers than low wage workers.

6 Fiscal Implications

Our benchmark results suggest that the decrease in the number of days on UCS have generated fiscal savings through a decrease in UCS transfers and additional tax payments for men but not for women. However, we also find non-negligible spillover effects on the number of days on TC for men and UI for women, which could have mitigated the net positive fiscal savings for the Government. This section thus analyses the effect of the 2008 reform on individual income from employment and the different social security institutions in Belgium by running the same DDD estimations as in the benchmark section, where the dependent variables are the cumulative income from different sources[29]. Before describing the results, it is important to mention that because unemployment, TC and UCS are part of the same federal institution, we cannot estimate effects on transfers from these programs separately. We must therefore understand the coefficients related to this institution as the effect on UCS transfers, net of spillovers on TC and unemployment.

[29] All incomes are deflated in 2013 value.

The results of this exercise are displayed in Table 4. Looking at the DDD coefficients on column (7) for males reveals a positive (although weakly statistically significant) effect of +€13,622.8 on cumulated labor earnings and a negative effect of -€2384.1 on the sum of UI, UCS and TC transfers. To gain a better insight of the magnitude of these effects, we can simply divide them by the effect of the reform on the number of days on UCS found in

Table 3 (equal to 71 days). We obtain an effect of +€191.9 from work and -€33.57 from UCS per forgone day on UCS. The other coefficients are not statistically significant.

[Include Table 4]

These fiscal effects could be amplified by spousal's behavioral responses. Indeed, there is large evidence that retirement decisions are coordinated among spouses and that an exogeneous increase in the age at which workers exit the labor market has positive spillovers on the labor supply of their partner (see e.g. Bloemen et al. 2019 and Lalive and Parotta 2017). To study the fiscal effects of the 2008 reform at the household level, we re-estimate equation (1) taking household earnings and transfers as outcomes. The results can be found in Table A. 2. We can see that the effect on employment income for men becomes slightly larger (+€14,679.9) and statistically significant at 95%, while the effect on the sum of UI, UCS and TC transfers is slightly reduced (-€2232.4 euros). We conclude that in our context, spillover effects on spouses are not sufficiently important to have a significant economic impact on overall incomes and transfers. Finally, when looking at the coefficients for women, we observe no statistically significant effect on any outcome, which is not surprising given that we didn't observe any positive employment effect for women in the benchmark results.

7 Robustness Tests

The validity of our empirical framework crucially depends on two assumptions. First, we assume that individuals in the treatment group do not react to the postponement of UCS eligibility by reducing labor supply before age 58. In our setting, such anticipation effect would materialize through a decrease in the number of days on employment or an increase in the number of days on other statuses before age 58. We have checked that this was not the case by looking at Figure 4, which exhibits no statistically significant coefficients before age 57 for any outcome.

Second, as we discussed in Section 4.2, individuals born in 1949 with 23-29 contribution years at age 55 could have an incentive to enter UCS as soon as they become eligible, i.e., at age 58, since the 2008 reform applied to all cohorts uniformly, so that this group lost UCS eligibility at age 59. Under such anticipation effect, the 1949 cohort would not be a good control group since individuals in this cohort would react to the reform by decreasing labor supply and increasing the number of days on UCS at age 58. We can check whether this is likely to occur by running a placebo test, which estimates the dynamic DinD and DDD

coefficients for the 1948 and 1949 cohorts. Indeed, individuals in the 1948 cohort kept being eligible at age 58 and 59 and therefore anticipation effects at age 58 are not likely to occur for this cohort. Observing no effects would indicate that individuals in the 1949 cohort did not decrease labor supply in anticipation of the reform.

Figure 6 graphically displays the dynamic DinD and DDD coefficients, comparing the 1948 and 1949 cohorts. We can see no significant DinD or DDD coefficient associated with the age of 58, which rules out the concern that individuals in the 1949 cohort anticipated the reform by entering into UCS as soon as they became eligible for the scheme at 58.

[Include

Figure 6]

In addition, to show that the effects we found by comparing the 1949 and 1950 cohorts are not confounded with effects other than the postponement of UCS eligibility, we provide placebo tests that estimate equation (1) for other cohorts: the 1948-1949 and 1950-1951 cohorts. Table 5 displays the DinD and DDD coefficients for the 1948-1949 cohorts (col 2 and 3) and the 1950-1951 cohorts (col 4 and 5). Looking at the DDD coefficients, we see that the estimated coefficients are both low in magnitude and non-statistically significant for all variables, with only one exception for DI days (in column 2), for which the coefficient is statistically significant at 10% but of small magnitude.

[Include Table 5]

Finally, we check the robustness of our results with alternative specifications of the DDD model. To do so, we check whether the results are robust when using a different contribution years window for the control group (i.e. the group with a high number of contribution years). For men, instead of taking a window of 30-35 years, we take a larger window of 30 years or more, while for women, we take a window of 24 contribution years or more instead of 24-25 years. The results displayed in Table 6, show that the choice of the contribution years window has very few consequences for the size of the DDD coefficients.

[Include Table 6]

8 Conclusion and Discussion :

Focusing on a Belgian old-age unemployment program called Unemployment with Company Supplement (UCS), this study provides novel insights on the effects of postponing workers' access to old-age social insurance programs on employment and other social insurance programs. We exploit a nationwide reform in Belgium implemented in 2008, that increased workers' eligibility age for the program by at least two years (from age 58 to at least 60) for workers with intermediate contribution years. Our identification strategy relies on variation in exposure to the reform across age, cohorts and the length of workers' contribution period in order to set up a triple difference (DDD) model. We exploit register data on the universe of individuals working in Belgium, providing extensive information on workers personal characteristics, job characteristics and reliance on different social insurance programs between 2003 and 2015. While we find strong evidence that male workers mostly respond to the decrease in UCS days by increasing working days, with a small effect on a support program offering gradual working-time reductions, it appears that female workers do not increase working days

but rather increase the number of days on unemployment. We explored the possibility that this gender difference could be due to differences in labor attachment, proxied by the share of part-time workers and the daily wage. We indeed find no effect of the reform on working days among part-time and low-wage workers (who are overrepresented among women) irrespective of their gender. For these categories of workers, we instead find that the decrease in the number of days on UCS results in an increase in the number of days on UI (for women), TC (for men) and DI (for both men and women). Among full-time and high wage workers, a positive and statistically significant effect of the reform on worked days is observed only for men. These effects are new to the literature and call for more research on the unequal gender consequences of closing workers' access to old-age social insurance programs.

Finally, one should bear two points in mind. First, we estimate the effect of postponing UCS eligibility for individual layoffs within the general scheme, which constitute about 60% of all entries into the UCS program over the period 2003-2015. The 40% remaining entries into UCS were composed of workers from heavy sectors (construction, metallurgy and transport) and workers who were laid-off during collective dismissals. Individuals employed in heavy sectors often have longer careers and face greater health limitations at the end of their career, which makes them more prone to exit the labor market through DI when shutting down UCS channel. Our results indeed suggest that the employment effect might be lower for workers employed in tasks with a greater physical strain, since our heterogeneity analysis showed that blue-collar workers do not significantly increase worked days when postponing UCS eligibility. Moreover, since collective dismissals are often driven by imperative economic conditions, it is less likely that employers will retain their workers for a longer period if UCS is postponed. Therefore, individuals in downsizing or closing firms might face a higher risk of entering unemployment if the UCS option is not accessible anymore. Note that this increased risk of unemployment could be mitigated if employers invest more in outplacement programs when the UCS option is not available anymore. This question is left as an avenue for future research.

Second, it is likely that the effects observed in this study are influenced by eligibility rules and financial conditions in other social security programs. More generally, many countries -including Belgium- often experience mixes of reforms during short time periods, which change financial incentives and entry conditions to many programs at the same time. In particular, over the last decade, the Belgian Government has implemented a wide number of reforms in all social security programs in order to increase the employment rate among older workers. Since our results only focus on postponing access to one program, it would be interesting to see how the effects on employment and social security vary as a response to a simultaneous tightening of benefits in different social security programs.

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Tables

Table 1 : Old and new eligibility rules

Year	60 years old		58 years old	
	Men	Women	Men	Women
Before 2008	20	20	25	25
2008	30	26	35	30
2010	30	26	37	33
2011	30	26	37	33
2012	35	28	38	35

Notes: This table describes the eligibility rules for the Unemployment with Company Supplement (UCS) program before and after the 2008 reform. Each cell provides the number of contribution years required for eligibility. This table doesn't cover the rules in specific sectors such as metallurgy, construction and transport, nor does it cover firms that are engaging in a collective dismissal.

Table 2: Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Men				Women			
	23-29 Contrib. Years		30-35 Contrib. Years		22-23 Contrib. Years		24-25 Contrib.Years	
	Born in 1949	Born in 1950	Born in 1949	Born in 1950	Born in 1949	Born in 1950	Born in 1949	Born in 1950
Household information								
Couple	80.8	79.7	84.0	82.8	66.9	66.3	67.8	65.5
	(39.4)	(40.2)	(36.7)	(37.7)	(47.1)	(47.3)	(46.7)	(47.6)
Single	15.8	16.2	12.3	13.4	30.1	31.3	28.2	31.4
	(36.5)	(36.9)	(32.8)	(34.1)	(45.9)	(46.4)	(45.0)	(46.4)
Brussels	12.2	11.7	5.6	5.5	11.0	8.8	12.4	8.6
	(32.7)	(32.1)	(23.0)	(22.7)	(31.3)	(28.3)	(33.0)	(28.0)
Flanders	57.4	55.6	66.6	67.4	54.1	57.3	52.0	59.3
	(49.5)	(49.7)	(47.1)	(46.9)	(49.9)	(49.5)	(50.0)	(49.2)
Wallonia	30.0	32.3	27.5	26.9	34.7	33.9	34.7	31.8
	(45.8)	(46.8)	(44.7)	(44.3)	(47.6)	(47.4)	(47.7)	(46.6)
Job characteristics								
Blue Collar	18.6	20.5	25.5	28.3	31.7	36.0	28.4	34.6
	(38.9)	(40.4)	(43.6)	(45.1)	(46.6)	(48.0)	(45.1)	(47.6)
White Collar	75.5	79.5	71.0	71.7	53.8	64.0	57.5	65.4
	(43.0)	(40.4)	(45.4)	(45.1)	(49.9)	(48.0)	(49.5)	(47.6)
Unknown occupation	5.8	0.0	3.5	0.0	14.5	0.0	14.1	0.0
	(23.5)	(0.0)	(18.4)	(0.0)	(35.2)	(0.0)	(34.8)	(0.0)
Part-time	22.2	18.2	21.7	19.8	72.0	66.9	71.2	71.3
	(41.6)	(38.6)	(41.2)	(39.8)	(44.9)	(47.1)	(45.3)	(45.3)
Daily gross salary	228.0	233.9	189.3	186.9	127.8	125.5	128.4	127.3
	(161.9)	(193.2)	(103.2)	(88.7)	(59.5)	(56.9)	(68.2)	(61.9)
Firm size								
>500 employees	38.0	38.0	44.5	44.4	36.8	36.2	39.5	36.1
	(48.5)	(48.5)	(49.7)	(49.7)	(48.3)	(48.1)	(48.9)	(48.1)
< 500 employees	62.0	62.0	55.5	55.6	63.2	63.8	60.5	63.9
	(48.5)	(48.5)	(49.7)	(49.7)	(48.3)	(48.1)	(48.9)	(48.1)
Sector								
Manufacture	21.8	20.6	30.9	29.6	8.1	5.2	5.5	7.4
	(41.3)	(40.5)	(46.2)	(45.6)	(27.2)	(22.2)	(22.7)	(26.2)
Distribution	16.4	16.4	17.5	17.3	13.8	17.1	15.9	18.0
	(37.0)	(37.0)	(38.0)	(37.8)	(34.5)	(37.7)	(36.6)	(38.5)
Finance	11.7	11.4	16.0	15.2	2.6	2.8	3.6	5.3
	(32.2)	(31.8)	(36.6)	(35.9)	(16.0)	(16.4)	(18.7)	(22.5)
Health	9.3	10.5	5.2	6.6	29.9	28.0	27.0	26.8
	(29.1)	(30.7)	(22.1)	(24.7)	(45.8)	(44.9)	(44.4)	(44.3)
Other	40.8	41.0	30.5	31.4	45.6	46.9	48.0	42.5
	(49.2)	(49.2)	(46.1)	(46.4)	(49.8)	(49.9)	(50.0)	(49.5)
Health								
Past DI	6.7	6.7	8.9	9.5	11.5	12.7	12.6	11.4
	(24.9)	(25.0)	(28.5)	(29.3)	(31.9)	(33.3)	(33.2)	(31.8)
Number of individuals	3473	3305	9457	9891	608	614	659	676

Notes: This table summarizes key information about our sample. All proportions are expressed in percent. Each column displays the mean value of a variable in a specific group of workers at the date of selection, i.e., at age 55. Part-time workers are workers whose full-time equivalent is strictly lower than 0.9. Past DI displays the share of individuals that have been on DI during the year before selection, i.e. at age 54.

Table 3: Benchmark results

Men	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	23-29 Contribution years			30-35 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
UCS	358.8	265.9	-85.4***	550.9	531.7	-14.4	-71.0***
	(10.5)	(9.0)	(13.9)	(7.4)	(7.1)	(10.4)	(17.3)
Employment	866.5	941.6	66.5***	636.5	665.9	20.4**	46.1**
	(11.3)	(11.3)	(16.2)	(6.2)	(6.1)	(8.8)	(18.5)
Unemployment	114.9	117.7	6.9	99.4	90.4	-6.4	13.4
	(6.6)	(6.7)	(9.5)	(3.6)	(3.3)	(5.0)	(10.7)
Time-Credit	125.4	152.8	27.5***	154.6	157.3	4.1	23.4**
	(5.9)	(6.9)	(9.3)	(3.6)	(3.6)	(5.3)	(10.7)
Disability	71.2	80.1	8.5	73.3	70.3	-1.1	9.6
	(4.9)	(5.3)	(7.2)	(3.0)	(2.9)	(4.2)	(8.4)
Early Retirement	207.4	201.6	-11.9	316.0	316.5	-2.3	-9.6
	(6.9)	(7.1)	(10.0)	(4.8)	(4.6)	(6.7)	(12.0)
# Observations	13892	13220	27112	37828	39564	77392	104504
# Individuals	3473	3305	6778	9457	9891	19348	26126
Controls			YES			YES	YES
Women	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	22-23 Contribution years			24-25 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
UCS	290.4	185.3	-98.4***	298.0	290.5	-4.9	-93.5**
	(22.3)	(17.0)	(27.8)	(21.8)	(20.9)	(30.1)	(41.1)
Employment	657.4	658.8	5.6	606.0	634.0	12.2	-6.6
	(23.1)	(22.7)	(32.9)	(21.2)	(21.0)	(30.2)	(44.8)
Unemployment	137.4	207.5	70.2**	171.7	136.4	-24.8	95.1**
	(17.2)	(21.0)	(27.4)	(18.7)	(16.6)	(25.2)	(37.3)
Time-Credit	133.0	172.1	32.3	137.2	154.2	10.5	21.8
	(16.6)	(18.4)	(25.0)	(15.6)	(16.8)	(23.3)	(34.2)
Disability	134.5	192.8	56.2**	131.2	149.2	24.3	31.9
	(15.8)	(19.5)	(25.3)	(15.4)	(16.0)	(22.4)	(33.8)
Early Retirement	151.1	126.5	-35.3	182.8	166.5	-25.6	-9.7
	(15.5)	(14.4)	(21.6)	(15.8)	(15.1)	(22.2)	(31.0)
# Observations	2432	2456	4888	2636	2704	5340	10228
# Individuals	608	614	1222	659	676	1335	2557
Controls			YES			YES	YES

Notes: This table displays our benchmark results for males and females, i.e. the effect of the 2008 reform on the number of days in UCS, employment and alternative social insurance programs (UI, TC, DI and ER). Columns (1), (2), (4) and (5) display the predicted number of days in each status between age 58 and 63 (included). Column (3) provides the DinD estimates for the group of males (females) with 23-29 (22-23) contribution years. Column (4) provides the DinD estimates for the group of males (females) with 30-35 (24-25) contribution years. Finally, Column (7) provides the DDD estimates. *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.

Table 4: Effect on income and transfers

Males	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	23-29 Contribution years			30-35 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
Labour Income	209583.7	223401.1	14975.5**	123497.3	126813.0	1352.6	13622.8*
	(5258.5)	(3915.4)	(6627.8)	(1679.1)	(1818.4)	(2524.8)	(7092.4)
Total Transfers	81849.1	68301.7	-10970.5*	87361.6	84868.3	-2432.3	-8538.2
	(4926.6)	(4294.6)	(6610.5)	(1796.9)	(1637.1)	(2484.3)	(7085.3)
UI+CER+TC transfers	23734.8	20597.1	-2539.8***	32340.5	31802.4	-155.7	-2384.1***
	(507.8)	(479.8)	(703.5)	(329.5)	(324.4)	(467.8)	(844.0)
DI Transfers	4251.6	4553.7	291.4	4286.1	4217.4	12.4	279.0
	(301.8)	(295.2)	(426.0)	(176.3)	(173.6)	(251.0)	(495.4)
Pension Transfers	109573.4	102415.1	-5367.2	93522.8	93246.1	-1126.8	-4240.4
	(4817.4)	(4144.3)	(6435.3)	(1737.6)	(1582.8)	(2408.0)	(6885.3)
Other Transfers	383.2	514.6	111.6	522.6	548.9	-2.5	114.1
	(56.7)	(77.2)	(98.2)	(42.2)	(46.0)	(63.9)	(117.3)
# Observations	13892	13220	27112	37828	38764	76592	103704
# Individuals	3473	3305	6778	9457	9691	19148	25926
Controls			YES			YES	YES

Females	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	22-23 Contribution years			24-25 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
Labour Income	81149	83423	1717	78377	78561	-1179	2896
	(3464)	(3339)	(4875)	(3467)	(2991)	(4640)	(6744)
Total Transfers	15644	15509	-260	22820	20011	-2458	2198
	(2291)	(2336)	(3334)	(2581)	(2376)	(3585)	(4911)
UI+CER+TC transfers	23535	22072	-1158	24595	23498	-656	-501
	(1093)	(1085)	(1546)	(1097)	(1068)	(1536)	(2184)
DI Transfers	5447	7466	1894*	5375	6372	1231	663
	(629)	(780)	(1010)	(630)	(697)	(942)	(1384)
Pension Transfers	15775	15540	-849	20805	18651	-3039	2190
	(1360)	(1652)	(2212)	(2133)	(1815)	(2888)	(3651)
Other Transfers	424	453	18	379	474	98	-80
	(108)	(105)	(157)	(124)	(141)	(184)	(242)
# Observations	2432	2456	4888	2636	2704	5340	10228
# Individuals	608	614	1222	659	676	1335	2557
Controls			YES			YES	YES

Notes: This table displays the DinD and DDD results for individual labor earnings and transfer receipts. All values are expressed in 2013 Euros. Total transfers are the sum of transfers from UI, DI, Pension and Other transfers. Columns (1), (2), (4) and (5) display the predicted amounts received from each institution between age 58 and 63 (included). Column (3) provides the DinD estimates for the group of males (females) with 23-29 (22-23) contribution years. Column (4) provides the DinD estimates for the group of males (females) with 30-35 (24-25) contribution years. Finally, Column (7) provides the DDD estimates. *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.

Table 5: Placebo tests

	(1)	(2)	(3)	(4)
Men	1948-1949 Cohorts		1950-1951 Cohorts	
	DinD	DDD	DinD	DDD
UCS	16.4	12.6	-25.5**	-16.2
	(14.8)	(18.1)	(12.7)	(16.3)
Employment	0.9	-22.8	30.2*	19.7
	(16.4)	(18.7)	(16.4)	(18.6)
Unemployment	-12.0	-11.0	1.4	2.6
	(9.7)	(11.0)	(9.7)	(10.8)
Time-Credit	9.7	10.1	0.4	-7.4
	(8.4)	(9.9)	(9.9)	(11.3)
Disability	-8.3	-15.7*	0.2	-7.7
	(7.4)	(8.5)	(7.6)	(8.8)
Early Retirement	-12.6	16.0	-16.0	-13.5
	(10.1)	(12.3)	(9.8)	(11.8)
# Observations	27584	102424	25868	105084
#Individuals	6896	25606	6467	26271
Controls	Yes	Yes	Yes	Yes
	(1)	(2)	(3)	(4)
Women	1948-1949 Cohorts		1950-1951 Cohorts	
	DinD	DDD	DinD	DDD
UCS	36.0	70.8	-36.0	45.2
	(30.1)	(43.4)	(22.3)	(35.2)
Employment	41.6	6.2	-1.1	-34.5
	(32.7)	(44.9)	(31.2)	(43.0)
Unemployment	-55.7**	-38.0	-48.8*	-67.6*
	(26.6)	(38.3)	(27.5)	(36.9)
Time-Credit	7.5	-14.0	-11.9	-50.5
	(22.3)	(31.2)	(25.2)	(35.6)
Disability	-17.7	-10.8	-37.6	-63.7*
	(23.3)	(32.2)	(25.6)	(34.9)
Early Retirement	-19.2	-28.2	14.7	-3.7
	(23.0)	(32.3)	(20.3)	(29.5)
# Observations	5024	10248	5056	10636
#Individuals	1256	2562	1264	2659
Controls	Yes	Yes	Yes	Yes

This table displays the results of estimating DinD and DDD regressions for alternative birth cohorts. The DinD estimations have been made with men (women) with 23-29 (22-23) contribution years at the selection date. Columns (1) and (2) show the DinD and DDD estimates for the 1948 vs 1949 cohort (where the placebo treatment is the 1949 cohort), while columns (3) and (4) show the DinD and DDD estimates for the 1950 vs 1951 cohort (where the placebo treatment is the 1951 cohort). *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.

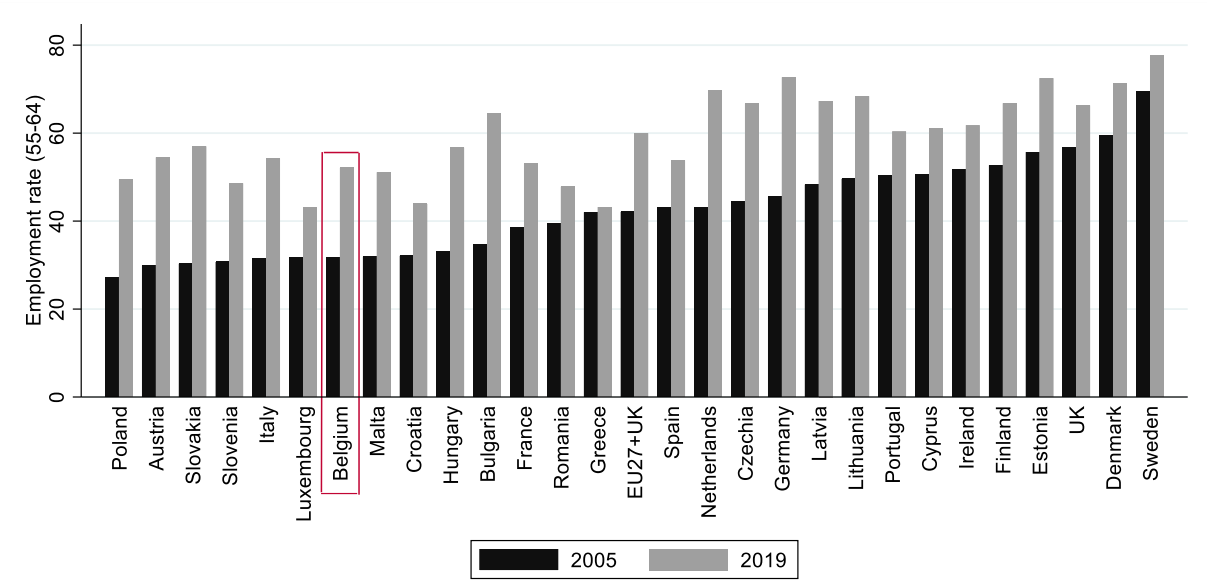
Table 6: Robustness tests

	(1)	(2)	(3)	(4)
Men	Benchmark		≥ 30 Contribution years as control	
	DinD	DDD	DinD	DDD
UCS	-85.4***	-71.0***	-85.4***	-71.7***
	(13.9)	(17.3)	(13.9)	(16.5)
Employment	66.5***	46.1**	66.5***	48.0***
	(16.2)	(18.5)	(16.2)	(17.8)
Unemployment	6.9	13.4	6.9	12.3
	(9.5)	(10.7)	(9.5)	(10.4)
Time-Credit	27.5***	23.4**	27.5***	24.5**
	(9.3)	(10.7)	(9.3)	(10.2)
Disability	8.5	9.6	8.5	9.3
	(7.2)	(8.4)	(7.2)	(8.2)
Early Retirement	-11.9	-9.6	-11.9	-9.2
	(10.0)	(12.0)	(10.0)	(11.5)
# Observations	26988	104180	26988	135332
#Individuals	6747	26045	6747	33833
Controls	Yes	Yes	Yes	Yes
	(1)	(2)	(3)	(4)
Women	Benchmark		≥ 24 Contribution years as control	
	DinD	DDD	DinD	DDD
UCS	-98.4***	-93.5**	-98.4***	-73.8**
	(27.8)	(41.1)	(27.8)	(29.3)
Employment	5.6	-6.6	5.6	-19.4
	(32.9)	(44.8)	(32.9)	(33.8)
Unemployment	70.2**	95.1**	70.2**	80.5***
	(27.4)	(37.3)	(27.4)	(28.0)
Time-Credit	32.3	21.8	32.3	16.0
	(25.0)	(34.2)	(25.0)	(25.8)
Disability	56.2**	31.9	56.2**	42.2
	(25.3)	(33.8)	(25.3)	(25.9)
Early Retirement	-35.3	-9.7	-35.3	-25.4
	(21.6)	(31.0)	(21.6)	(22.8)
# Observations	4884	10196	4884	89052
#Individuals	1221	2549	1221	22263
Controls	Yes	Yes	Yes	Yes

Notes: This table displays the results of estimating DinD and DDD estimations for alternative control and treatment groups. Columns (1) and (2) display the coefficients of the benchmark estimation as a mean of comparison. Columns (3) and (4) display the DinD and DDD coefficients when we expand the control group (used for the DDD estimation) to workers with 30 contribution years or more and 24 contribution years or more for females. Columns (5) and (6) display the coefficients when using individuals born in 1948 and 1949 as controls and individuals born in 1950 and 1951 as treatments. Columns (7) and (8) display the coefficients when using individuals born in 1948 as controls and individuals born in 1950 as treatments. Finally, columns (9) and (10) display the results when using individuals born in 1949 as controls and individuals born in 1951 as treatments. *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.

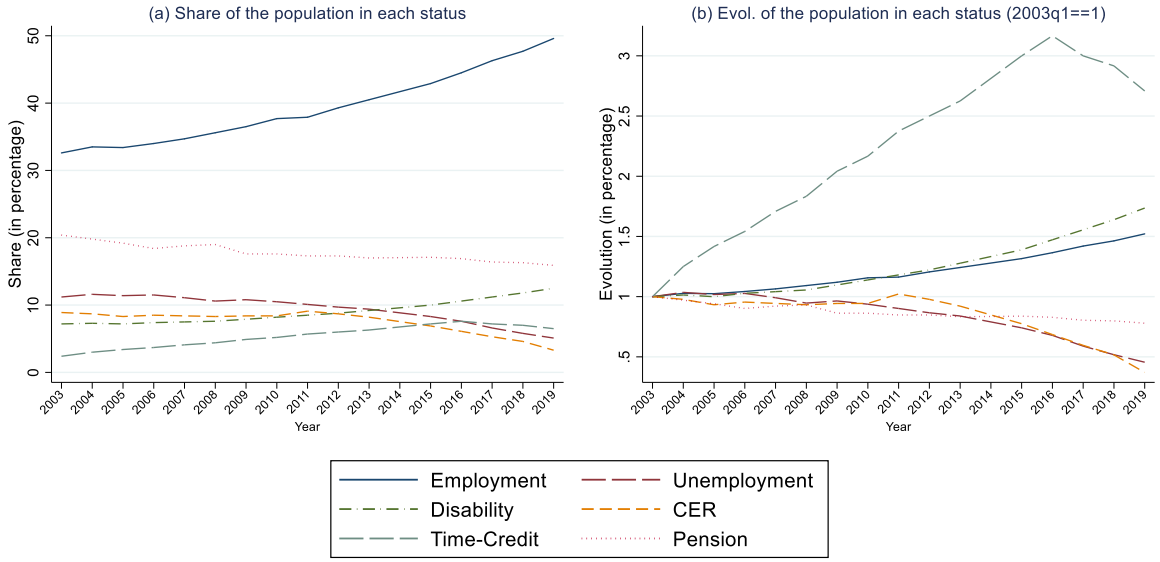
Figures

Figure 1: Old-age employment rates in the EU



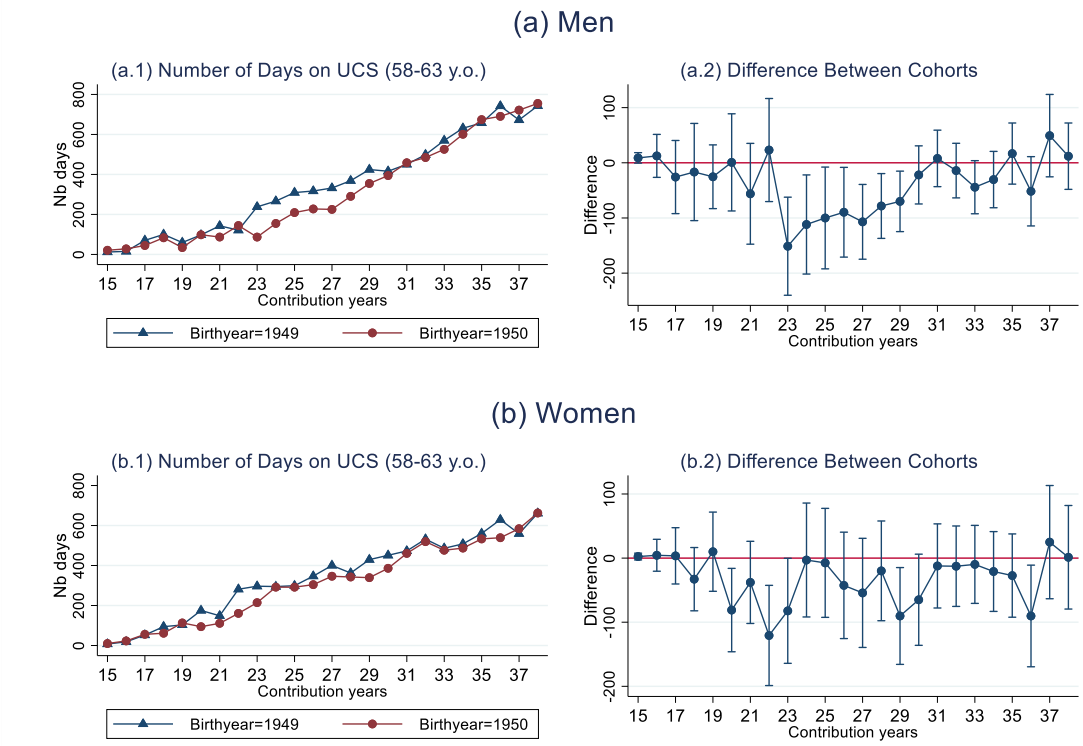
Notes: This figure depicts the levels of the employment rate for workers aged 55-63 in the different EU countries, the UK and the EU27+UK in 2005 and 2019. Source: Eurostat.

Figure 2: Share of the population aged 55-64 in each status (2003-2015)



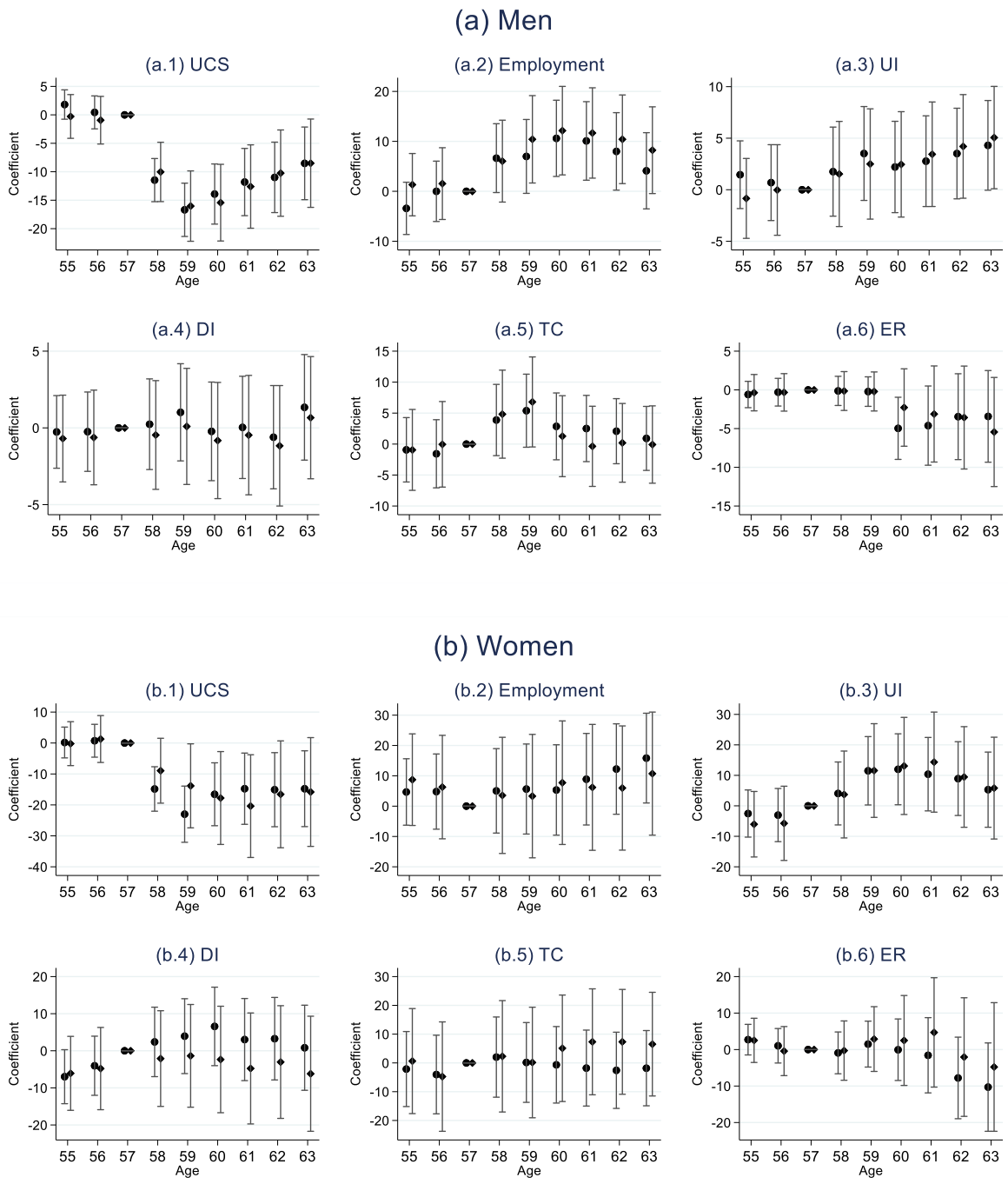
This figure depicts the share of workers aged 55-64 in employment and in the main Belgian social insurance programs observed on December 31 of each year between 2003 and 2015. Source: CBSS and authors' computation.

Figure 3: Number of UCS days (55-63) by contribution years for the 1949 and 1950 cohorts



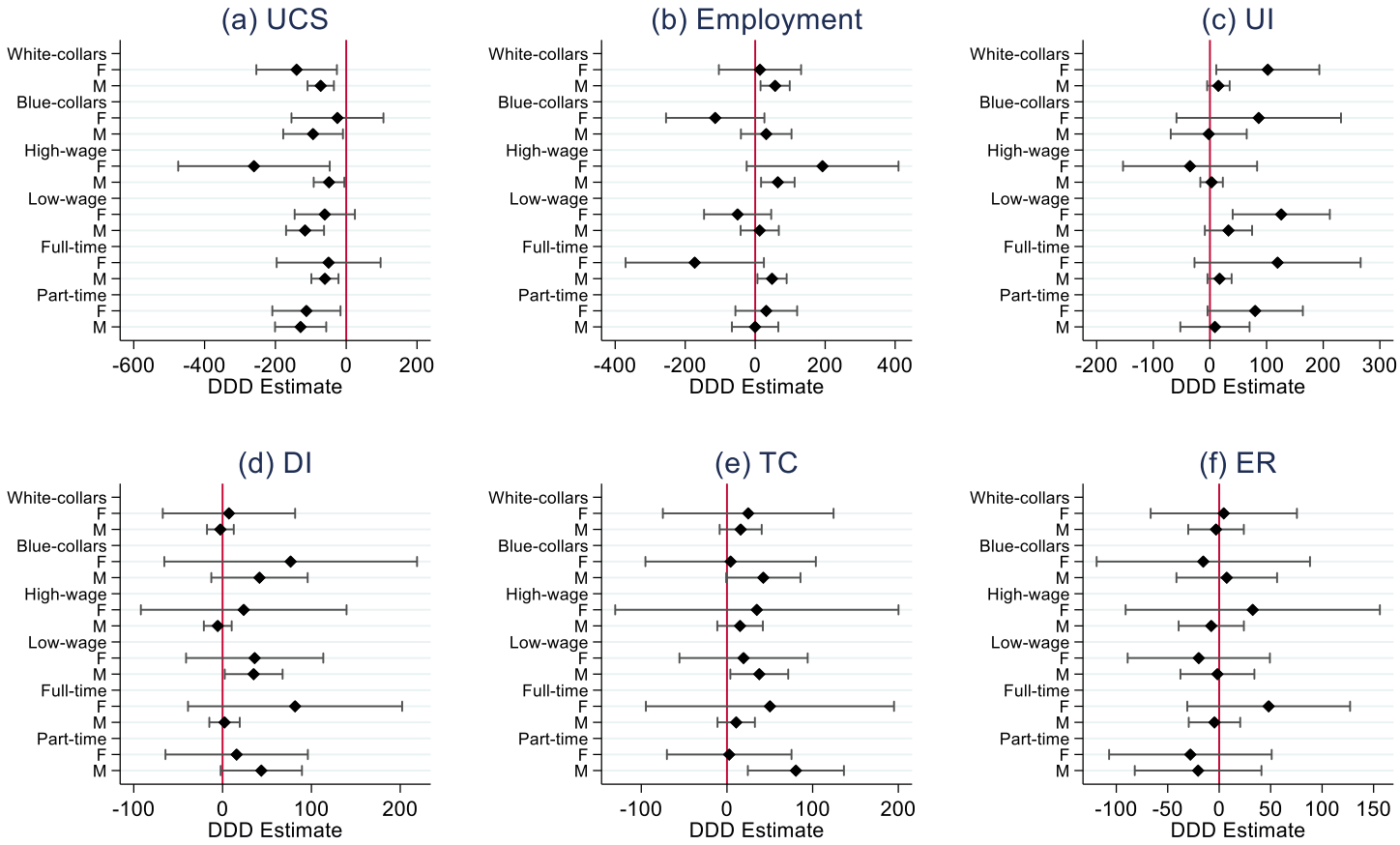
This figure depicts the average cumulative number of days on UCS between age 58 and 63 as a function of the number of contribution years at age 55 for males (panel a) and females (panel b). In each panel, the left graph displays the values of the 1949 cohort (in blue) and the 1950 cohort (in red), while the right graph displays the difference between the two curves with 95% confidence intervals.

Figure 4: DinD and DDD estimates by year of age



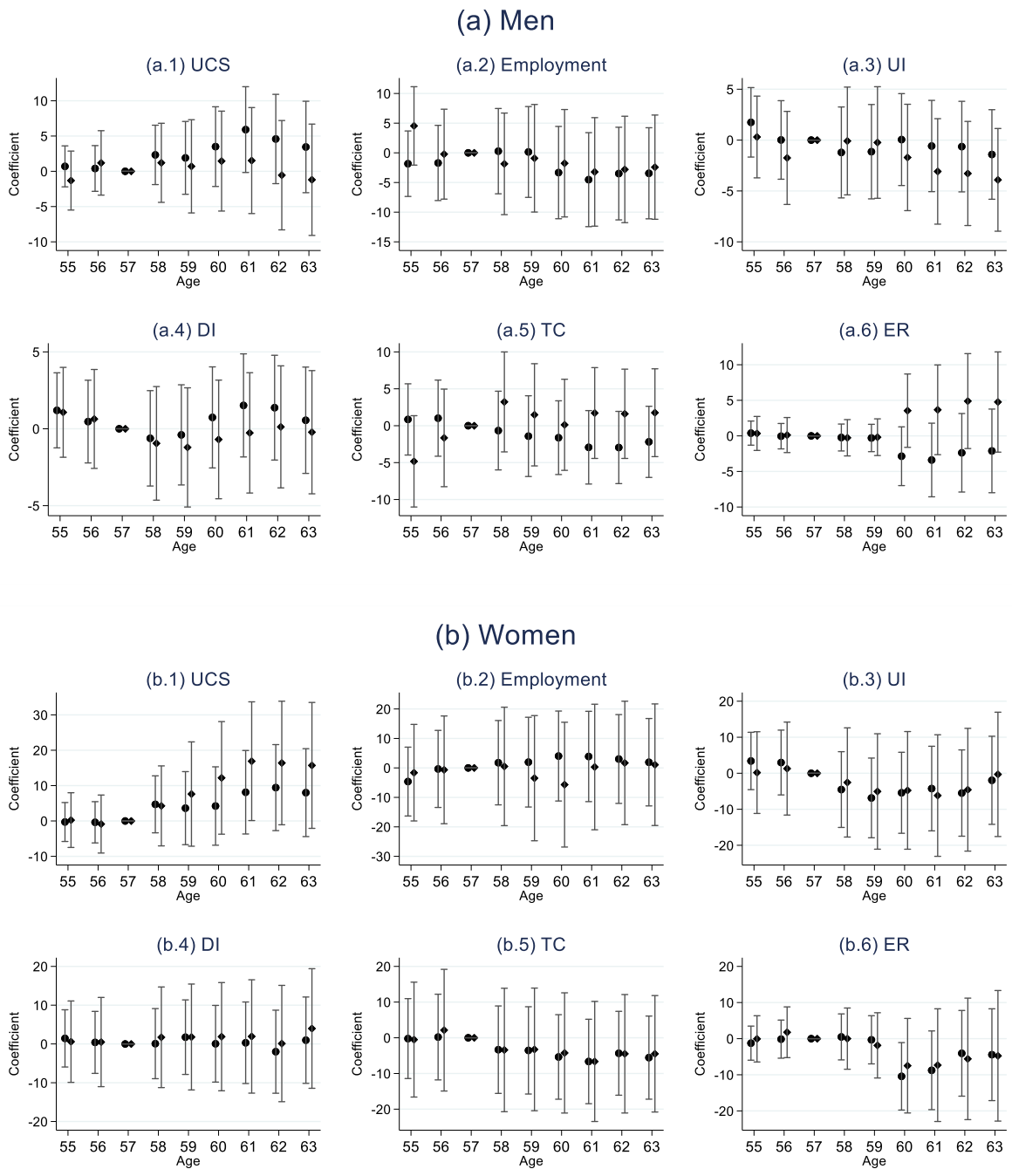
Note: This figure depicts the DinD and DDD coefficients (where the baseline is set at age 57) when the dependent variable is a dummy for having been observed in a given status over a given age. In each panel, we report the DinD coefficients (small circles) and the DDD coefficients (small squares), along with 95% confidence intervals.

Figure 5: Heterogeneous effects



Notes: This figure displays the DDD coefficients with 95% CI of estimating equation (1) by pooling males and females and adding an interaction term for gender. Workers are characterized as "High-wage" or "Low-wage" according to whether they are above or below the median wage in the sample.

Figure 6: DinD and DDD estimates by age (Cohort 1948-1949)



Notes: This figure displays the dynamic DinD and DDD coefficients when comparing outcomes in the 1948 and 1949 cohorts.

Annexes:

Figure A. 1: Number of entries by source:

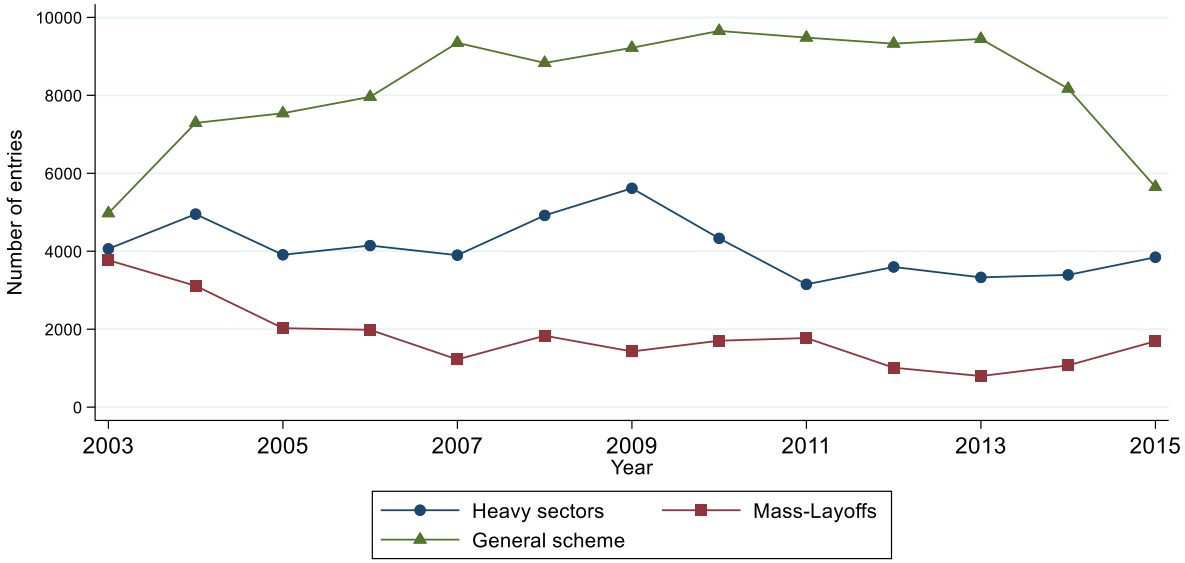
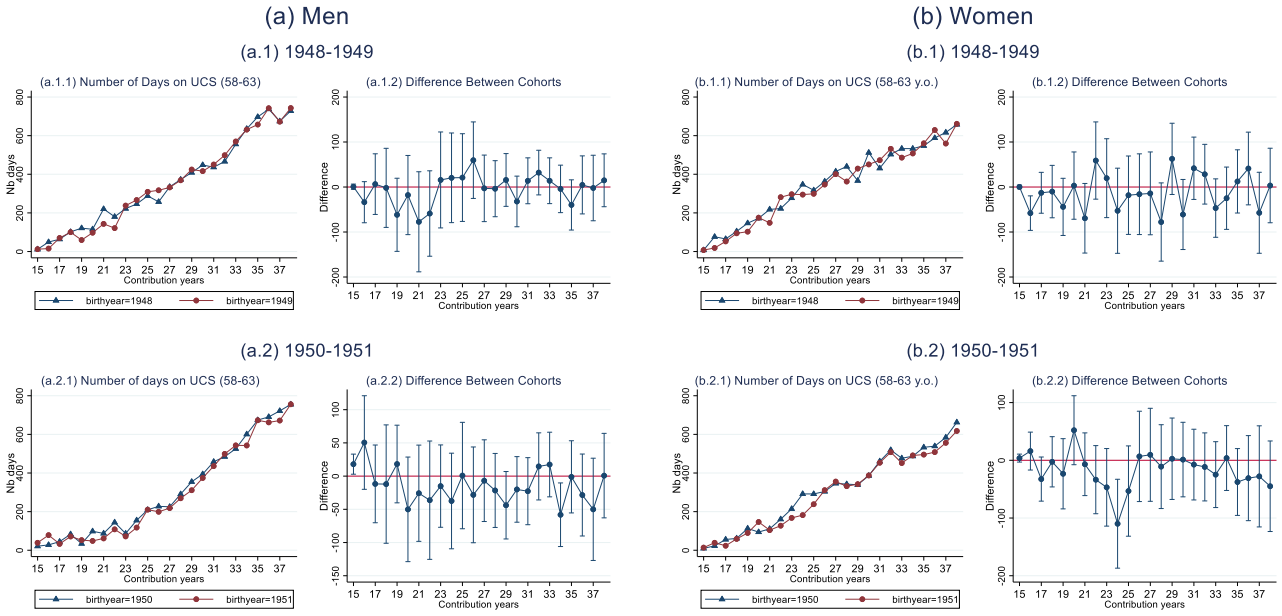
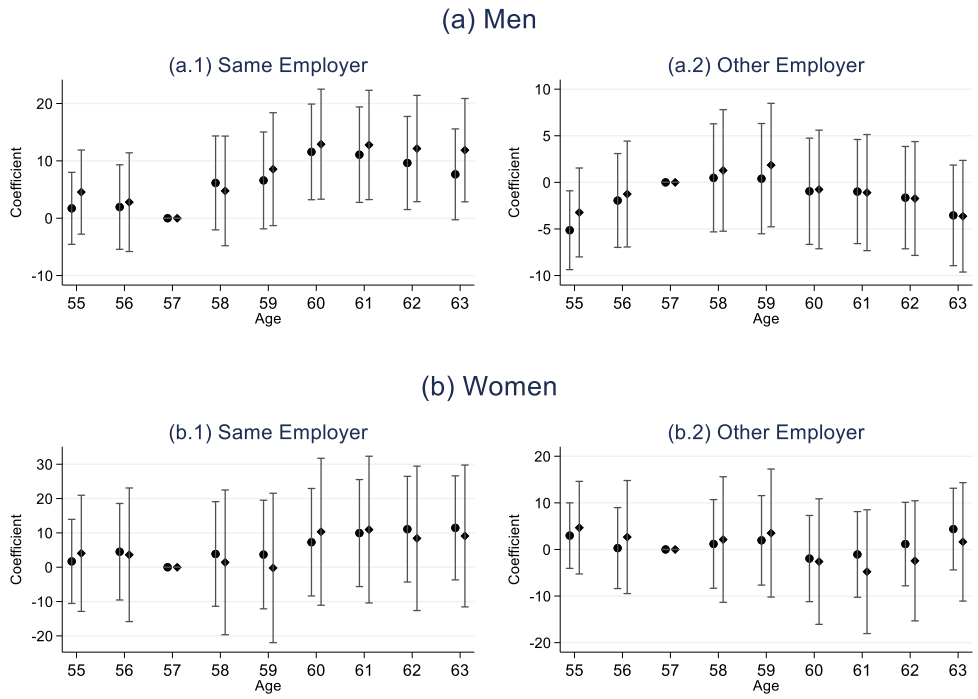


Figure A. 2: Comparison of UCS days between other cohorts



Notes: This figure displays the number of days on UCS (between 58 and 63 years old) as a function of the number of contribution years at age 55. In panels a.1 and b.1 (resp. a.2 and b.2), the left graph displays the values of the 1948 (resp. 1950) cohort (in blue) and the 1949 (resp. 1951) cohort (in red), while the right graph displays the difference between the two curves with 95% confidence intervals.

Figure A. 3: Effect of the 2008 Reform on the Number of Worked Days (Same vs Other Employer)



Notes: This figure displays the DinD and DDD coefficients for men and women, where the dependent variable is a dummy for working at the same employer as on the selection date (panels a.1 and b.1) or a dummy for working at a different employer than on the selection date (panels a.2 and b.2).

Table A. 1: Benchmark Results Conditional on not Being on TC at Age 55:

Men	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	23-29 Contribution years			30-35 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
UCS	335.3	244.8	-83.4***	525.7	491.2	-30.4***	-53.0***
	(10.5)	(9.1)	(13.9)	(7.9)	(7.5)	(11.0)	(17.7)
Employment	904.1	975.7	64.6***	696.5	725.0	20.5**	44.1**
	(11.9)	(11.9)	(17.0)	(7.0)	(6.8)	(9.9)	(19.7)
Unemployment	118.6	120.4	5.6	107.8	96.6	-8.5	14.1
	(6.9)	(7.0)	(10.0)	(4.0)	(3.6)	(5.5)	(11.4)
Time-Credit	88.8	105.0	15.7**	95.3	103.4	7.0	8.8
	(5.2)	(5.9)	(7.9)	(3.2)	(3.2)	(4.6)	(9.2)
Disability	70.8	79.2	7.7	76.2	72.9	-1.6	9.3
	(5.0)	(5.4)	(7.5)	(3.2)	(3.1)	(4.6)	(8.8)
Early Retirement	193.8	198.3	-1.8	282.7	300.5	16.8**	-18.7
	(7.0)	(7.3)	(10.2)	(5.0)	(4.9)	(7.1)	(12.4)
# Observations			25020			66123	91143
# Individuals			2780			7347	10127
Controls			YES			YES	YES

Women	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	22-23 Contribution years			24-25 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
UCS	252.2	163.5	-81.1***	272.1	260.8	-7.7	-73.4*
	(21.8)	(16.8)	(27.3)	(21.5)	(21.3)	(30.2)	(40.7)
Employment	675.4	666.7	-2.2	616.4	656.3	22.1	-24.3
	(24.2)	(24.2)	(34.7)	(22.2)	(22.4)	(32.0)	(47.3)
Unemployment	136.8	219.1	81.7***	183.3	139.7	-33.4	115.1***
	(17.7)	(22.5)	(28.9)	(20.0)	(17.5)	(26.7)	(39.4)
Time-Credit	80.9	81.2	-2.4	90.4	79.0	-15.1	12.7
	(13.7)	(12.8)	(18.7)	(13.2)	(13.0)	(18.6)	(26.4)
Disability	138.4	186.6	48.9*	133.8	135.8	7.5	41.4
	(16.7)	(20.1)	(26.3)	(16.1)	(15.8)	(22.7)	(34.8)
Early Retirement	157.2	130.4	-39.6*	182.9	170.7	-22.2	-17.3
	(16.5)	(15.4)	(23.0)	(16.5)	(16.2)	(23.5)	(32.9)
# Observations			4473			4869	9342
# Individuals			497			541	1038
Controls			YES			YES	YES

Notes: This table displays the results of estimating the DinD and DDD coefficients on the number of days in each status, conditional upon not being observed on TC during the selection period (i.e. at age 55). *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.

Table A. 2: Fiscal Effects at the Household Level

Men	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	23-29 Contribution years			30-35 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
Labour Income	233216	251565	17086***	147701	152414	2407	14679**
	(4256)	(4346)	(6227)	(1889)	(2039)	(2838)	(6893)
Total Transfers	84230	69120	-13287**	95767	92742	-2963	-10324
	(4975)	(4345)	(6680)	(1897)	(1722)	(2620)	(7193)
UI+UCS+TC transfers	25409	2245	-2597***	36372	35756	-365	-2232**
	(579)	(536)	(796)	(400)	(391)	(567)	(975)
DI Transfers	5720	6401	522	6926	6787	-69	592
	(347)	(351)	(499)	(217)	(213)	(309)	(588)
Pension Transfers	118730	110564	-7122	103801	103422	-1263	-5858
	(4844)	(4167)	(6470)	(1815)	(1644)	(2509)	(6953)
Other Transfers	542	654	79	553	630	33	45
	(76)	(80)	(113)	(44)	(49)	(67)	(132)
# Observations	10233	10008	20241	29394	28503	57897	78138
# Individuals	1137	1112	2249	3266	3167	6433	8682
Controls			YES			YES	YES

Women	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	22-23 Contribution years			24-25 Contribution years			
	Number of days		DinD	Number of days		DinD	DDD
	1949	1950	Estimate	1949	1950	Estimate	
Labour Income	99080	99831	549	96695	99039	3165	-2616
	(5737)	(6084)	(8560)	(6517)	(5210)	(8408)	(12025)
Total Transfers	64483	63757	-510	64133	62422	-1464	953
	(6474)	(5049)	(8587)	(4294)	(4625)	(6444)	(10756)
UI+UCS+TC transfers	25776	22678	-2557	27656	25973	-1536	-1021
	(1444)	(1327)	(1979)	(1409)	(1347)	(1970)	(2794)
DI Transfers	5916	7210	1015	4589	5871	1403	-388
	(830)	(798)	(1170)	(617)	(743)	(972)	(1524)
Pension Transfers	66411	67499	747	63559	65527	1279	-532
	(6021)	(4728)	(8044)	(3736)	(4155)	(5716)	(9879)
Other Transfers	442	647	191	657	476	-228	419
	(108)	(178)	(218)	(171)	(233)	(289)	(363)
# Observations	2529	2358	4887	2700	2610	5310	10197
# Individuals	281	262	543	300	290	590	1133
Controls			YES			YES	YES

Notes: This table displays the results of the fiscal analysis, taking household revenues instead of individual revenues. *Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.