

# PAPELES DE TRABAJO

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### Unemployment benefit duration and inflows into unemployment: the impact of a law change

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## Abstract

This article examines whether changes in the generosity of the unemployment benefits (in particular, the potential benefits duration) influence the entry of older workers into the unemployment benefits system. The analysis is based on a law change to the benefit rules which occurred in Spain in July 2012, when the eligible age for an extended benefit to older workers was raised from 52 to 55, and on data from the administrative records of the Spanish Public Employment Service. We analyse empirically the changes in the age pattern of unemployment benefit inflows before and after the reform, on the one hand, and the effect of the legal change on the age at the date of unemployment benefit admission, on the other hand. Our findings suggest that reducing the potential benefits duration affects the pattern of admissions, transferring entries to higher ages, and that the age at which older workers begin to receive benefits increases by six months for certain categories of workers.

*Keywords:* unemployment inflows, unemployment benefit, law change, difference-in-differences model.

*JEL Classification:* J64, J65.

## 1. INTRODUCTION

Academics who investigate the impact of reforms on the generosity of unemployment benefit systems (UBS) focus their attention almost exclusively on the effects of the level and duration of unemployment benefits (UB) on the numbers exiting from receipt of benefit. However, the UBS can affect not only the exits from unemployment and thus its duration, but also the inflows into unemployment. Both transitions are important in explaining aggregate unemployment rates. In fact, some works stress that changes in unemployment inflows are responsible for much of the change in unemployment rates (see Burgess and Turon, 2006; Lalive *et al.*, 2011). Strangely enough, the impact of UB on unemployment entry has been rarely studied. In contrast to outflow effects, empirical evidence on the impact of benefit generosity on the unemployment inflow is much more scarce. This paper contributes to filling this gap.

The UBS may affect unemployment via a higher inflow into unemployment. In the equilibrium search model with an endogenous job destruction rate, idiosyncratic shocks to workers' productivities make firms' optimal layoff rule depend on the wage rate, which in turn is affected by the prevailing UBS (Mortensen and Pissarides, 1999). If the UBS becomes more generous, newly established jobs become unprofitable more quickly, leading to an increase in the steady state flow from employment to unemployment. Likewise, benefits that are more generous might affect the behaviour of employers and workers, inducing separations, leading to individuals claiming UB and influencing the timing of layoffs. Implicit contract theory allows to examine the incentives for employers to change their hiring and firing decisions as a result of changes in the generosity of the UBS, attempting to remodel (temporary) layoffs, concentrating on the worker-firm relationship as an implicit contract and focusing on the potentially collusive behaviour of employees and employers when faced with uncertain fluctuating product demand (Feldstein, 1976; Topel, 1983; Burdett and Wright, 1989).

This behaviour may affect older workers more intensely, if they can take advantage from extended entitlement periods of UB and/or tailored early retirement schemes, so that unemployment-related benefits effectively provide a pathway to early withdrawal from the labour market, such as the measures devised by many European countries to reduce the effective supply of labour during the 1980s (Duval, 2003). Given these favourable terms, there are strong incentives for older workers dismissed before eligibility for a full pension to draw unemployment benefits and use the UBS as a pathway to retirement, especially those employed by companies with many older workers or firms facing economic difficulties. At the same time, for these firms, dismissing older workers first might appear more socially acceptable than placing the burden of job loss on other employees. There might even be a coincidence between the interests of employers, who wanted to reduce a costly segment of their workforce while avoiding social conflict, and the interests of older employees, who were keen to stop working before the legal retirement age<sup>1</sup>.

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<sup>1</sup> Generous social security benefits might act as a form of unemployment insurance and subsidize firms' own costs of financing premature retirement, thereby influencing their decisions on older workers' transitions into non-employment

The role of the UBS in the inflow into unemployment has been largely forgotten, or at least underestimated, and its statistical importance (especially for older workers) has not been well assessed. Yet, UBS rules and their changes may affect the incentives of employers and employees, influencing layoff decisions and their timing. In this piece of research, we test the hypothesis that changes in the generosity of the UB (in particular, the potential benefits duration, PBD) influence the entry of older workers into the UBS. If this is the case, it should be visible empirically: the age at which older workers may start drawing benefits should be consistent with the PBD in such a way to enable them to bridge the gap until eligible for full pension. Therefore, changing PBD should affect the age at which older workers begin to receive UB.

The analysis is based on a law change in benefit rules which occurred in Spain in July 2012. Until then, the unemployed who turned 52 during their PBD, having contributed for at least six years during their working life and fulfilling all the conditions (except the age) for receiving a Social Security pension, were allowed to collect UB up to the moment they become eligible for a normal old-age pension (65 years). These terms changed in 2012, when the age to become eligible for the extended UB of older workers was raised from 52 to 55. This reform reduced the unlimited entitlement period by three years for the group of individuals aged 52-54 years at the time of job loss, providing an ideal setting for a quasi-experimental evaluation of the influence of potential benefit duration on the inflow into unemployment. There are two dimensions to be identified: eligibility (age) and time (before and after the law change). The data used come from the administrative records of the Spanish Public Employment Service (PES), the agency in charge of unemployment benefits, which provides information about changes in UB over the period 2007-2017. This database enables us to study in detail the age pattern of inflow into UB.

The analysis carried out in this paper is of general interest for several reasons. First, it provides new evidence on the impact of UBS parameters on inflow into unemployment, a subject that has been studied substantially less than outflow in the literature on UB, with very few studies investigating unemployment entry effects arising from increased/reduced benefit duration. Second, it contributes to the literature on the interaction between institutions (in this case, UBS and the pension system) in shaping the behaviour of employers and employees. Third, it analyses an issue that is useful for public policy, since it highlights the role of UBS rules in explaining the level of participation in the labour force of older workers. Since many countries are debating (or have already implemented) reforms that reduce the generosity of early retirement schemes with the goal of increasing the employment rates of older workers, Spain is an interesting case study because these schemes were heavily used to mitigate labour market problems over the past decades (since the 1980s, when unemployment rates sky-rocketed and remained high for many years). While the Spanish early retirement system created particularly large incentives, the scheme is similar to those of other European countries. Therefore, our results may illustrate

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(Hutchens, 1999). Dorn and Sousa-Poza's work (2010) constitutes a very first attempt to expand the more standard analysis focused on labour supply decisions to take into account some labour demand factors. They conclude that generous early retirement provisions from the social security system not only make voluntary early retirement more attractive for individuals, but also induce firms to push more employees to retire early.

mechanisms of policies that are at work (or under debate) in many countries. Lastly, the richness of the administrative dataset used makes it possible to identify the factors at work and highlights not only the entitlement effect but also the importance of the distance to retirement as response types of behaviour to UBS rules. While the former corresponds to a propensity of the parties to a labour relationship (firms and workers) to schedule job termination so that the employee gains access to longer PBD, the latter concerns the tendency to schedule separations so that workers can receive unemployment benefits until they are eligible for a full pension. As our dataset allows to distinguish accessions to unemployment insurance (UI) and unemployment assistance (UA) by cause of entry into UB reciprocity, we can add to the literature on that particular point.

The structure of the article is as follows. Section 2 reviews the empirical literature on the effects of PBD on entries into UB. Section 3 provides a description of the UB regulations in Spain and the law changes adopted in 2012. Section 4 presents the administrative data and some descriptives. Section 5 provides an econometric analysis of the effect of the legal change on the age at the date of UB admission, while Section 6 does the same focusing on the age pattern of UB inflow before and after the reform. Finally, Section 7 concludes.

## 2. LITERATURE REVIEW

The role of UB in influencing unemployment has been the focus of much empirical work in labour economics. Research on UBS often focuses on unemployment outflow, with many studies examining the impact of PBD on unemployment duration, for the unemployed in general or for the specific group of older job seekers (for recent thorough reviews, see Krueger and Meyer, 2002; Fredriksson and Holmud, 2006; and Tatsiramos and van Ours, 2014)<sup>2</sup>. However, the empirical evidence on the transitions from employment to (covered) UB is rather limited. Only few studies focus their attention on this issue.

On the one hand, some studies examine the requirements concerning eligibility rules and their effects on entrance into UB. Here the question is how eligibility for entrance into the UBS affects employment duration and the decisions of employers and employees to dissolve the job match. Christofides and McKenna (1996) find for Canada a clear relationship between the eligibility requirements and the duration of employment: the hazard rates for unemployment entry increased once the eligibility criterion was reached. The results of Anderson and Meyer (1997) for the USA are rather similar. Furthermore, changes in eligibility rules have a significant impact on employment duration (Green and Riddell, 1997). In general, the main conclusion is that the exit rate from employment to unemployment increases as soon as workers satisfy the amount of time worked in order to qualify for UB and at the point at which they have qualified for the maximum possible PBD. Moreover, it seems that employers play a role in the adjustment of employment durations by altering the timing of layoffs as many employment spells that just qualified under the old system are extended to just qualify under the new system.

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<sup>2</sup> The partial equilibrium search model has been central in studying the effects of UB on the exit rate from unemployment. A comprehensive review of this modelling can be found in Rogerson *et al.* (2005) and Lalive *et al.* (2006).

Therefore, UB seems to favour worker turnover and the effects of the UBS on the labour market cannot be attributed only to employees' decisions but employers' behaviour also matters. In particular, the probability of layoff increases as workers qualify for UB. These are precisely the conclusions of the empirical literature that analyses the use of temporary layoffs, the timing of rehiring, and their relationship with UB (Anderson and Meyer, 2000; Fath and Fuest, 2005; Arranz and García-Serrano, 2014).

On the other hand, very few studies have investigated how the parameters of the UBS affect the inflow into unemployment. Winter-Ebmer (2003) and Grogger and Wunsch (2013) analyse the effect of PBD on the exit rate from employment. Winter-Ebmer (2003) takes advantage of a change that occurred in Austria in June 1988, in which potential benefit duration was extended enormously (from 52 to 209 weeks) for elderly workers (aged 50 or above) in specific regions of the country. Applying a difference-in-differences setting (between groups of workers and across geographic areas), he finds that the unemployment entry of older workers rose by between 4 and 11 percentage points due to the new law. Grogger and Wunsch (2013) focus on a German reform (announced in mid-2004 which started in February 2006) that reduced the PBD of workers aged 45 and over. Although the reductions varied by age, they were substantial for older workers, amounting to 14 months for those aged 52 and over. The authors find that the exit rates from employment among older workers rose markedly just before the reform became effective (so an anticipatory response was observed) and fell substantially among the oldest workers (those close to retirement) after the reform took effect.

More specifically, there are only two studies that focus on the impact of changes in the PBD (as a result of law reforms) on the age patterns of the inflow into covered unemployment; a study by Tuit and van Ours (2010) for the Netherlands and that of Baguelin and Remillon (2014) for France. Tuit and van Ours (2010) analyse the effect of a reduction in PBD on inflow age patterns in the Dutch labour market. All individuals who started to receive UB before 11 August 2003, were also entitled to extended benefits, for which age was the only criterion. For individuals who became unemployed before the age of 57.5 this duration was equal to 2 years, while for older workers extended benefits could last up to 3.5 years. Since benefits could last up to 4 years (depending on the work history), there was a clear age-related discontinuity with a maximum benefit duration of 6 years for workers who became unemployed shortly before turning 57.5 and a maximum benefit duration of 7.5 years for workers who became unemployed shortly after turning 57.5. Workers who became unemployed from age 57.5 onwards would receive benefits until the standard retirement age of 65. On 11 August 2003, extended benefits were abolished, so the age-related discontinuity in maximum benefit duration disappeared and for both groups the maximum UB would be 4 years (implying that individuals aged more than 57.5 would have to rely on means-tested welfare benefits before becoming entitled to pension benefits). Using data on monthly inflows from the organization responsible for the payment of UB, the authors find a large spike in unemployment inflow for workers just above the age of 57.5 before the reform, when PBD was higher for workers aged 57.5 or more; this spike disappeared after the reform abolished extended benefits for older workers.

Baguelin and Remillon (2014) arrive at a similar outcome when they examine a change in UI rules which occurred in France on 1 January 2003. Until then the maximum benefit duration was 5 years for older workers with a continuous work history, including additional more generous specific provisions (available to specific entitlement groups with longer potential benefit duration; application for exemption from active job search; and continuous receipt of benefits until they reach the statutory retirement age if they were over 59.5 years of age). UI entitlement durations were reduced in January 2003 for new entrants, especially for those aged 50 and over (by 20 months on average). Before the reform, a worker who lost a job at age 55, who was entitled, could expect to receive UI benefits until age 60 and thereafter until entitlement to a full pension; this was no longer possible before age 57 after the reform. Using data from the UB records of the French Employment Agency, the authors find a displacement of the spike in unemployment inflow from age 55 before the reform to age 57 after. They also estimate a quantification of the effect of the PBD reduction on the average age at job termination of older workers eligible for UI and find a positive effect of about 4 months for those workers dismissed close to retirement (aged 55-59).

### 3. INSTITUTIONAL SETTING: THE UBS AND THE 2012 LABOUR REFORM

The Spanish UBS (like many others in Organisation for Economic Co-operation and Development [OECD] countries) comprises two schemes: unemployment insurance (UI) and unemployment assistance (UA). UI benefits are paid to employees (excluding civil servants, workers hired by households, and those without past work experience) who have lost their job or whose temporary contract has come to an end, who can and want to work, and who have paid a minimum number of contributions (at least 12 months during the past 72 months). UI benefits can be received for a maximum of 720 days (24 months) if the individual has worked for the whole reference period (six years in the last six years). The amount of UI paid is equal to a fraction of the average of the 'regulatory base' in the last six months prior to unemployment, where the 'regulatory base' is the gross wage used to calculate UI contributions. UI payments decline with the duration of the claim: the gross replacement rate is 70% during months 1-6 of UI receipt and 60% thereafter. Payments are subject to maximum and minimum amounts that also vary with the number of children the unemployed person has. This flattens the actual replacement rate for high-income earners and raises it for low-income earners.

Workers who are not eligible for UI (because they have not accumulated the minimum contribution period) or who have exhausted their benefits may qualify for flat-rate UA benefits. The UA benefit is means tested (income and wealth of the household is taken into consideration to determine eligibility) and flat rate (its level is about 50% of the average UI benefit). The entitlement duration of UA is at least six months and varies depending on the number of family dependents and the age of recipient.

Older job losers are not in principle subject to more generous UI benefit rules. There is, however, an exception in the previous system. The unemployed who turned 52 during their PBD (specifically, either at the time of exhausting their benefits or during their receipt), having contributed for at least six years during their working life and fulfilling all the conditions (except the age) for re-



ceiving a Social Security pension, could claim a ‘special income support’. This allowed them to collect UB up to the moment they became eligible for a normal old-age pension. Thus, the UB system (the regular UI and UA benefits followed by the ‘special income support’) potentially allowed older workers to withdraw from the labour market at a very early age, since an unemployed person aged 52 and over had an option to collect UB up to the entry into an old-age pension.

This situation somewhat changed on 13 July 2012 when, in the context of the labour market reform approved by the Spanish government, the age of eligibility for this extended UB was raised from 52 to 55<sup>3</sup>. Therefore, after July 2012 an unemployed person must be aged at least 53 at the beginning of the unemployment spell to have an option to collect UB up to the entry into the pension scheme. This change was adopted in line with what was happening in other European countries, where governments had passed measures to favour the active ageing of the labour force, to protect employment and increase the employment rates of older workers, and to reduce the financial burden of the public protection systems. The aim of the 2012 reform was allegedly to cut unemployment expenditures, to improve employment incentives among the unemployed, and to close certain loopholes in the system. This extended benefit for the older unemployed was perceived as a loophole, given that some (large) companies had exploited the existing system when downsizing and it had turned into a somewhat generally acceptable early retirement scheme since the 1980s.<sup>4</sup> Hence, the government wanted to phase the system out. Since there is no reason to believe that the age threshold was raised in response to a change in the relative labour market conditions for older workers, our analysis should not be subject to endogenous policy bias.

#### 4. DATA AND DESCRIPTIVE STATISTICS

The administrative dataset used is provided by the Spanish PES (Servicio Público de Empleo Estatal, SEPE). This is the institution responsible for the payment of UB. The dataset contains all UB spells that started monthly in the calendar years 2007-2017. Each individual observation contains sociodemographic information from the register of job seekers, including worker characteristics (gender, age, municipality and province of residence, and nationality) and attributes of the last job (wage, occupation and industry affiliation), as well as the corresponding category of job termination (individual layoff, economic redundancy, end of fixed-term contract, etc.). The dataset also provides information on whether each individual receives UI or UA, the level of benefits, the potential entitlement period at entry and current benefits duration. For the empirical analysis, we use the UB spells occurring between 1 January 2010 and 31 December 2014 of the entire population of workers aged between 46 and 59. The sample contains 1,925,974 (1,981,275) indi-

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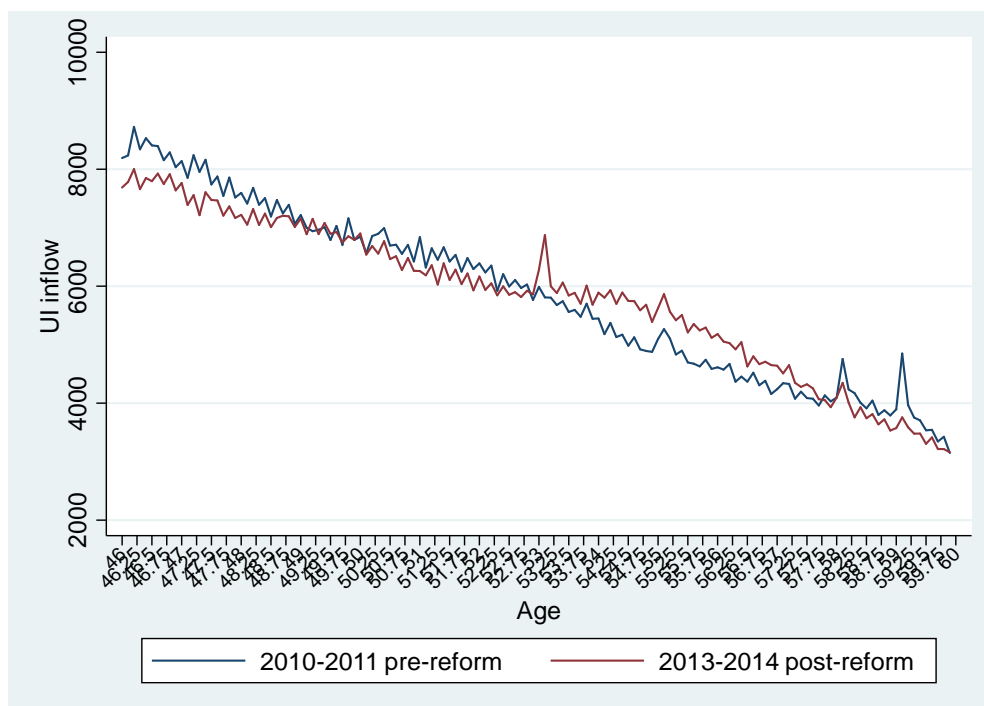
<sup>3</sup> Royal Decree-Law 20/2012, 13 July, on measures to guarantee budgetary stability and to encourage competitiveness.

<sup>4</sup> In fact, the previous government passed another Royal-Decree Law in August 2011 that established that firms with profits who carried out collective dismissals affecting workers aged 50 and over should pay certain amounts to the Exchequer (depending on the employer size, the level of profits, and the proportion of laid-off older workers over total laid-off workers) in order to compensate the UBS.

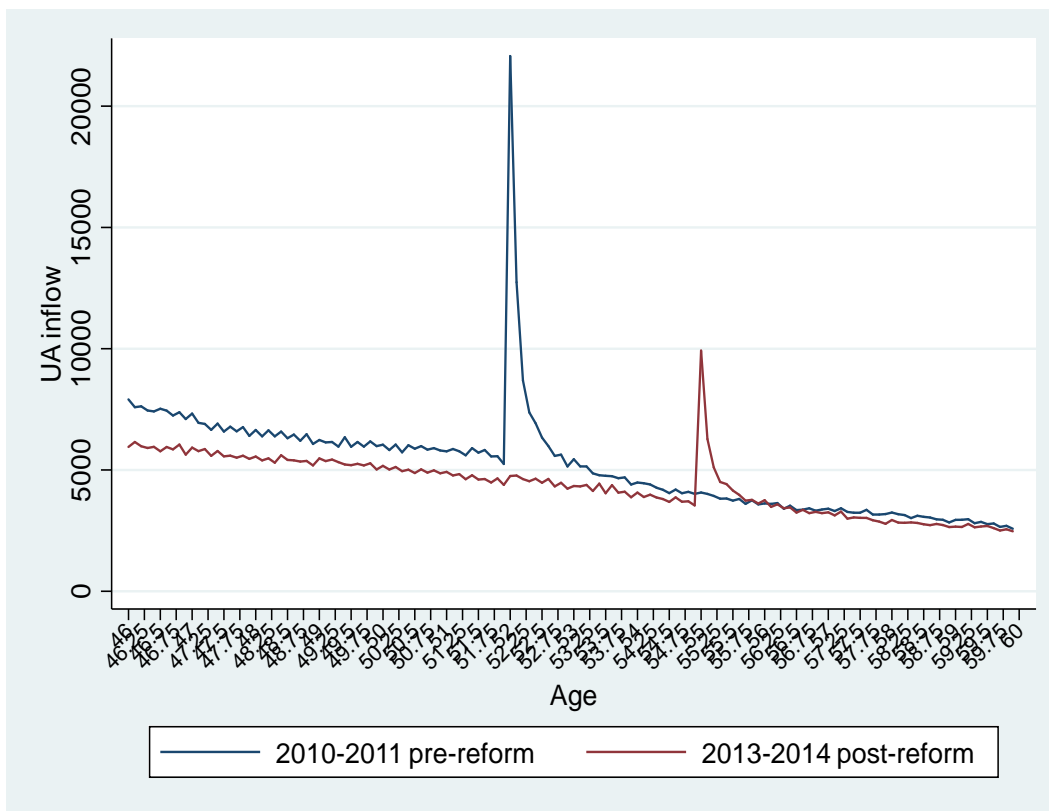
viduals entering the UI (UA) and aged between 46 and 59 at the date of admission between 2010 and 2015.

Figures 1 and 2 show the age pattern of monthly UI and UA inflows, respectively, before and after the law change in 2012. The period 2010-2011 before the reform is shown in blue and the period 2013-2014 in red. Regarding UI, the age profile of the inflows of both periods exhibits a decreasing trend with jumps of relatively different sizes at varying ages. Peaks at ages 50 (and around), 55 and, above all, 58 and 59 are especially marked in the first period, while those at ages 53, 55 and 58 are most prominent in the second. The peaks at 58 and 59 are related to the accession of workers to retirement schemes scheduled for ages 60-62. The level of the 2013-2014 inflows is lower than that corresponding to 2010-2011 before the age 53 and after the age 58 thresholds, while it is higher between 53 and 58. Before the law change, a sort of hunchback is observed for ages 50-53. 50 was the age at which older workers could start receiving UI benefits for the maximum PBD of two years, which enabled them to bridge the gap until their eligibility for UA, used as a very early retirement scheme. After the law change, this could have happened at the age of 53. Accordingly, the hunchback moved to ages 53-58.

**Figure 1**  
**UI INFLOW OF WORKERS AGED 46 TO 60 BEFORE AND AFTER THE 2012 REFORM. PES DATA FILES**  
**(JANUARY 2010-DECEMBER 2014)**



**Figure 2**  
**UA INFLOW OF WORKERS AGED 46 TO 60 BEFORE AND AFTER THE 2012 REFORM. PES DATA FILES**  
**(JANUARY 2010-DECEMBER 2014)**



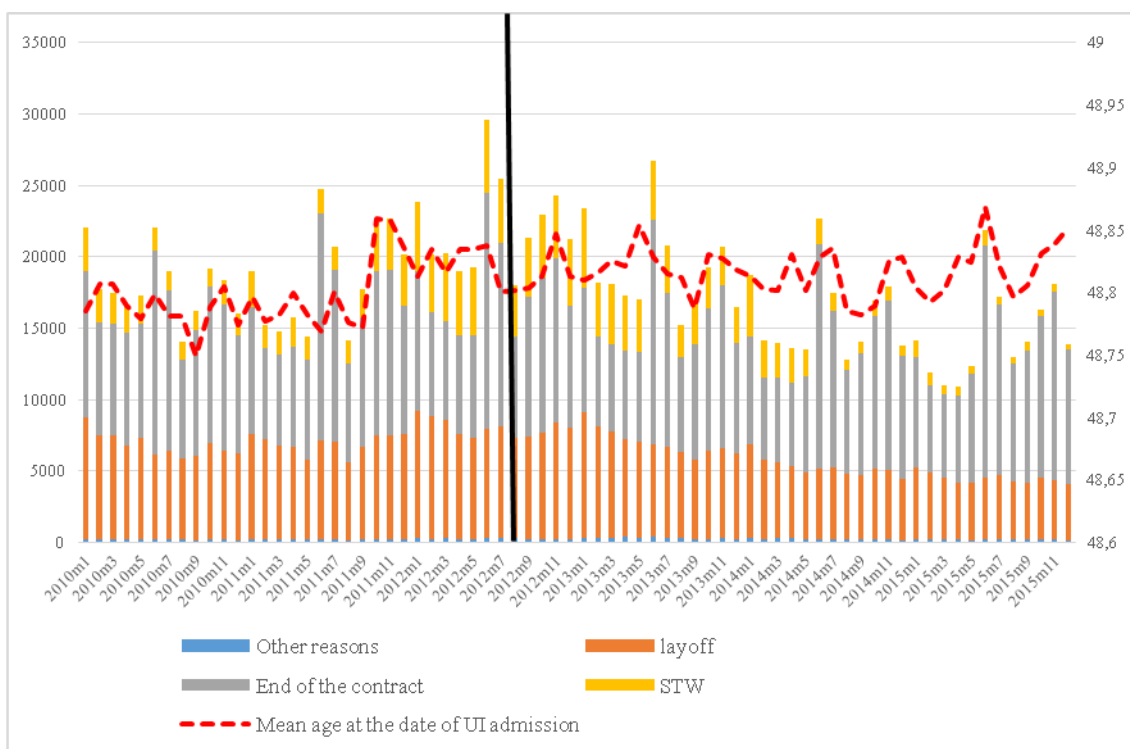
As for UA, the age profile of inflows exhibits a slight decreasing trend both below and above the huge jump observed at age 52 before the law change. During the post-reform period, the jump moved to the age of 55 and its magnitude diminished. 2010-2011 inflows are always larger than those of 2013-2014 below age 55. Beyond this threshold, admissions to UA have a similar slope in both periods.

Figure 3 displays the series of monthly UI inflow from 2010M1 to 2015M12 (disaggregating by cause of exit from the last job) as well as the corresponding series of mean age at admission for two age groups: 46-51 in panel A and 52-59 in panel B. The former group is far from retirement while the latter group is closer. Figure 4 displays the same information for the UA inflow. UI and UA admissions under the new 2012 rules are distinguished in both figures by a black vertical line in July 2012.

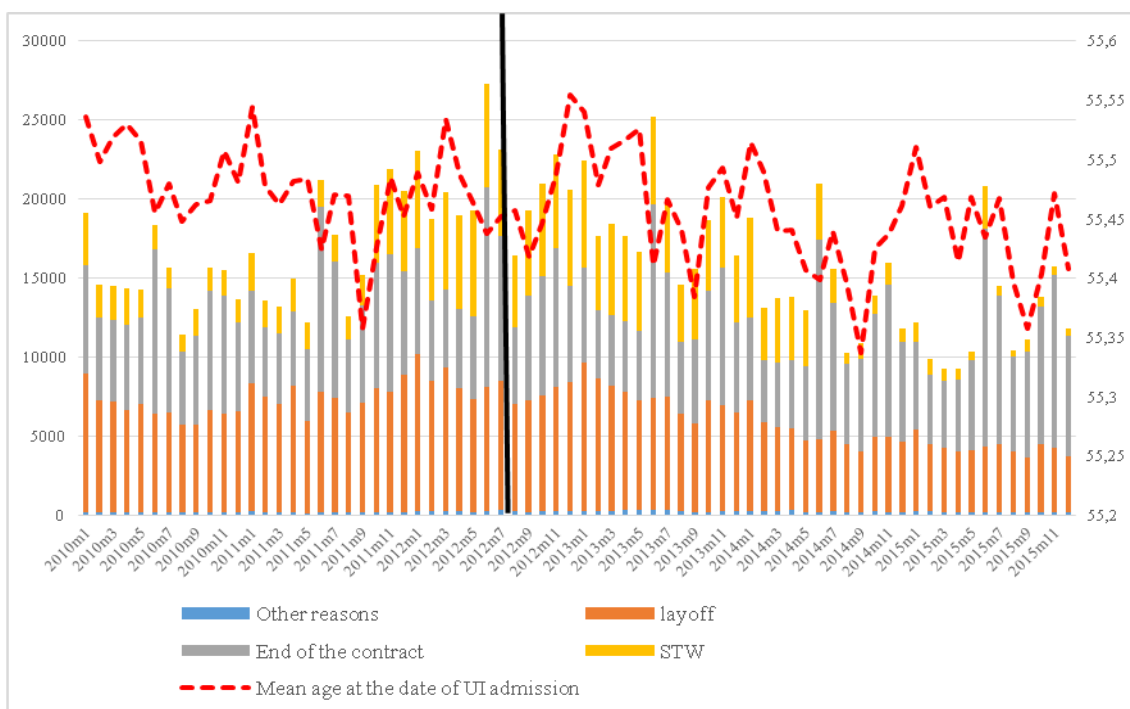
**Figure 3**  
**MONTHLY UI INFLOW AND MEAN AGE AT ADMISSION FOR TWO AGE GROUPS (46-51 AND 52-59),**  
**DISAGGREGATING BY CAUSE OF EXIT FROM THE LAST JOB. PES DATA FILES**

(JANUARY 2010-DECEMBER 2014)

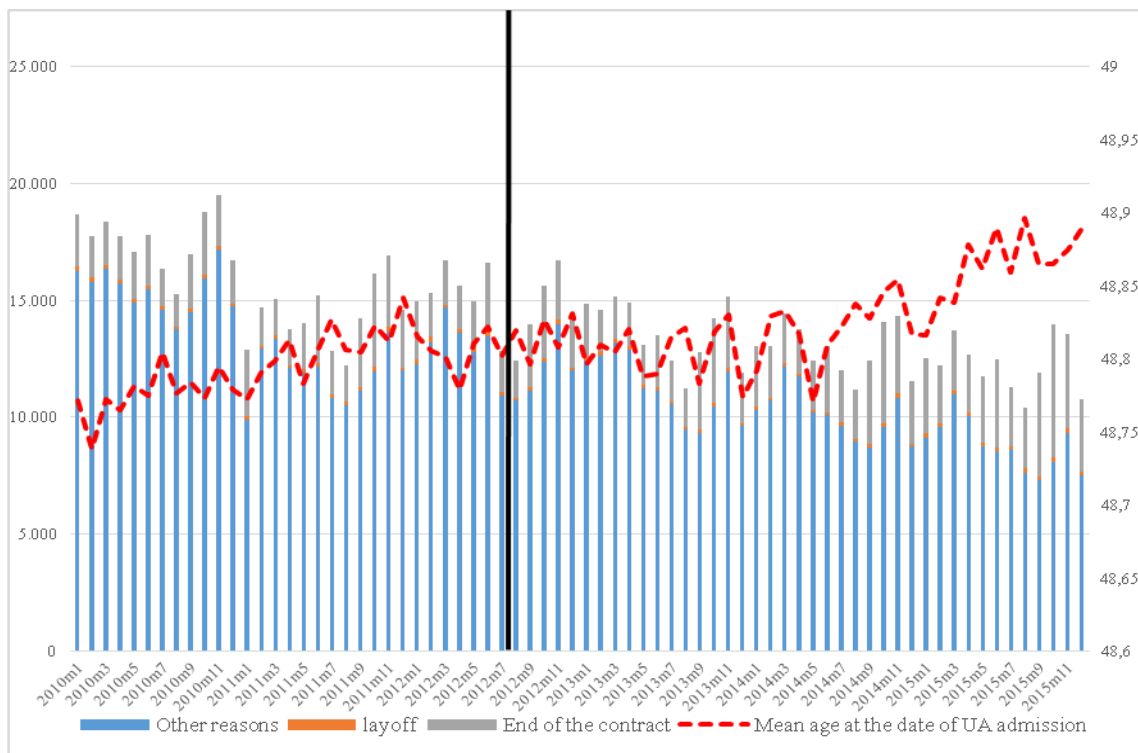
**PANEL A. 46-51, UI ADMISSIONS**



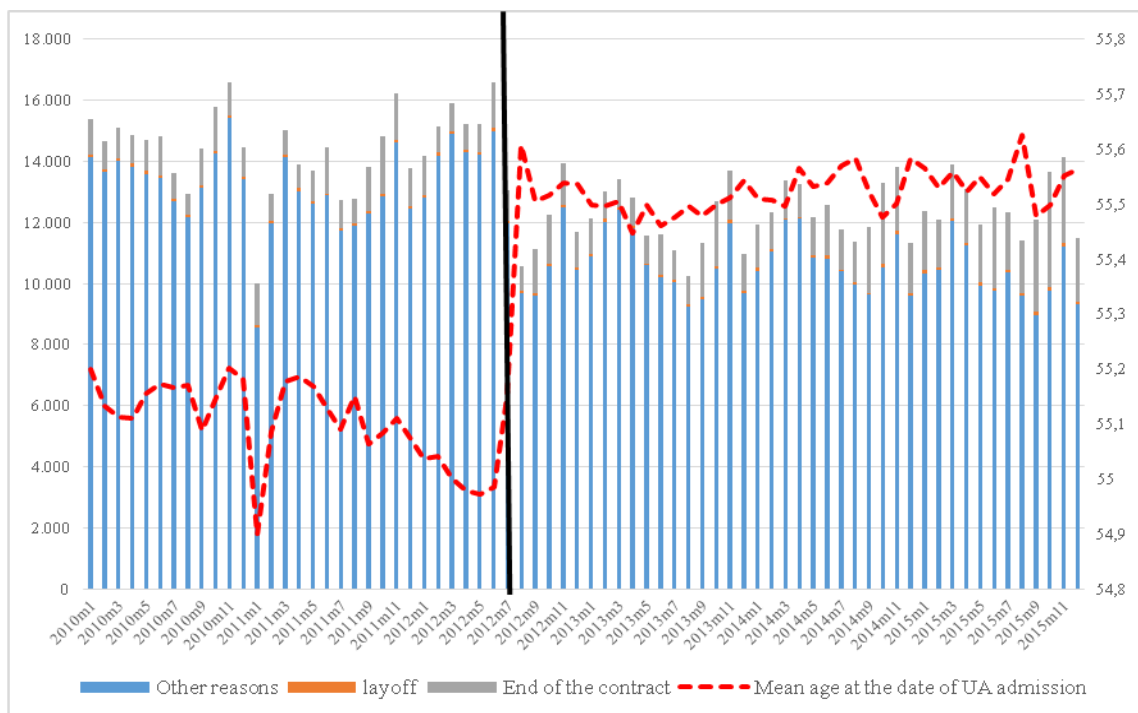
**PANEL B. 52-59, UI ADMISSIONS**



**Figure 4**  
**MONTHLY UA INFLOW AND MEAN AGE AT ADMISSION FOR TWO AGE GROUPS (46-51 AND 52-59),**  
**DISAGGREGATING BY CAUSE OF EXIT FROM THE LAST JOB. PES DATA FILES**  
**(JANUARY 2010-DECEMBER 2014)**  
**PANEL A. 46-51, UA ADMISSIONS**



**PANEL B. 52-59, UA ADMISSIONS**



In the case of UI entries, layoffs are relatively more important for the more mature workers (52-59) than for the younger ones (46-51), and for both age groups short-time work (STW) rose as an important cause of entry during the period 2011-2013. As for UA entries, the majority of them are due to 'Other reasons', which means that nearly all workers start receiving UA benefits because either they had not reached the minimum to receive UI benefits or had exhausted previous UI benefits or had fulfilled the criteria to receive the 52/55 benefit.

Focusing on the general pattern of the series of mean ages, it is quite different for workers aged 46-51 and those 52 and over in UI admissions. There is a stable trend (with fluctuations) between 2010M1 and 2012M7 for both age groups. After the reform, a slightly higher mean age for the 46-51 age group is observed, while age mean declined slightly for the 52 and over age group. Volatility is higher for the latter than for the former. For UA admissions, the general pattern for the 46-51 age group is quite different as compared to the 52 and over age group. The former exhibits a slightly positive trend across the whole period, in particular from the middle of 2014 onwards, while the latter shows a large jump just after the reform took place, so mean age, which was around 55 years in the months immediately before the legal change, rose to more than 55.5 years after 2012M7.

## 5. ECONOMETRIC ANALYSIS

### 5.1. The impact of the reform on the age of workers: a difference-in-differences approach

The first step of our analysis is to quantify the effect of the reform depending on the time-distance to retirement, i.e. to evaluate the impact, if any, on the age of workers entering UB (UI or UA) close to retirement. The duration of the employment record and the reason for job termination are two key variables to be considered here, since both can capture the potential incentives of workers, firms' behaviour and the balance of bargaining power between the worker and the employer. On the one hand, the length of previous employment is crucial since it determines PBD in UI, but also the entry into UA because it depends on either the exhaustion of UI entitlement duration or the fulfilment of the conditions to access a 52/55 subsidy. On the other hand, employment duration and job termination are not independent. Workers who lost their job due to either individual layoff or economic redundancy are most likely to be admitted to UI with long PBD and to influence their date of job termination in order to get better separation terms. The same occurs when employers use short-time work (STW) schemes to accommodate reductions in product demand: it is more likely that older workers with long employment records were chosen to participate in these arrangements, which may be the starting point for collective redundancies and early retirement exits (Arranz *et al.*, 2019). This is less so in the case of workers ending their (fixed-term) contracts, whose lack of bargaining power gives them less influence to determine their date of job termination. However, getting temporary contracts may be a way for older workers to gain eligibility and defer entry into UI long enough to reach age 52/55 in order to be entitled to longer unemployment protection.

In this context, and to proceed empirically, we can estimate two independent linear trends, before and after the date of the reform, and compare the results for both age groups. The date of the reform is  $t^*$ : 13 July 2012. For any UB (UI or UA) admission  $i$ ,  $t_i$  is the corresponding date and  $Y_i$  the age of the worker at that date. The model used to estimate the independent trends before and after the reform can be written as follows<sup>5</sup>:

$$Y_i = \alpha + \beta_0 \tilde{t}_i + \rho T_i + \beta_1 T_i \tilde{t}_i \tag{1}$$

Where  $\tilde{t}_i = t_i - t^*$  and  $T_i = 1(t_i \geq t^*)$ . Parameters  $\beta_0$  and  $\beta_1$  capture the age trends before and after 13 July 2012, respectively; parameter  $\rho$  ensures that trends are measured independently; and  $\alpha$  captures the mean age of the worker ( $\bar{Y}$ ). Table 1 provides the OLS estimation of model (1) over the age groups for UI admissions, by cause of entry and entitlement duration. Table 2 offers the same information over the age groups for UA admissions, by cause of entry and type of benefit (52/55 benefit and others).

Table 1

LINEAR REGRESSION (OLS ESTIMATION) ON MEAN AGE WITH CHANGING TREND: UI ADMISSIONS. PES DATA FILES (JANUARY 2010-DECEMBER 2014)

PANEL A. ENTIRE SAMPLE

	(1) Entire sample	(2) 46-51	(3) 52-59
$\beta_0$	0.000272*** (0.0000135)	0.0000589*** (0.00000823)	-0.000182*** (0.0000115)
$\hat{\rho}$	0.0164* (0.00924)	-0.0162*** (0.00573)	0.0165** (0.00770)
$\beta_1$	-0.000447*** (0.0000162)	-0.0000501*** (0.00000990)	0.000216*** (0.0000138)
$\hat{\alpha}$	52.10*** (0.00692)	48.83*** (0.00430)	55.46*** (0.00579)
N	2475926	1298617	1177309
R2	0.000	0.000	0.000

PANEL B. 46-51 YEARS AND CAUSE OF ENTRY TO UI

	(4) Other reasons	(5) Layoffs	(6) End of contract
$\beta_0$	0.0000664 (0.0000759)	-0.00000806 (0.0000137)	0.0000333*** (0.0000119)
$\hat{\rho}$	-0.0589 (0.0513)	-0.0101 (0.00971)	-0.0170** (0.00841)
$\beta_1$	-0.000124 (0.0000895)	0.0000157 (0.0000169)	0.0000237* (0.0000140)
$\hat{\alpha}$	48.95*** (0.0400)	48.80*** (0.00726)	48.78*** (0.00631)
N	17547	446181	661909
R2	0.000	0.000	0.000

<sup>5</sup> Beguelin and Remillon (2014) use this methodology.

PANEL C. 52-59 AND CAUSE OF ENTRY TO UI

	(7) <i>Other reasons</i>	(8) <i>Layoffs</i>	(9) <i>End of contract</i>
$\hat{\beta}_0$	-0.0000741 (0.000102)	-0.000173*** (0.0000182)	-0.0000222 (0.0000185)
$\hat{\rho}$	0.158** (0.0675)	0.0232* (0.0127)	-0.0397*** (0.0129)
$\hat{\beta}_1$	0.000206* (0.000120)	0.000187*** (0.0000225)	0.0000822*** (0.0000216)
$\hat{\alpha}$	55.45*** (0.0523)	55.72*** (0.00943)	55.28*** (0.00971)
N	17385	457343	477568
R <sup>2</sup>	0.002	0.000	0.000

PANEL D. BY ENTITLEMENT DURATION

	(10)	(11)	(12)	(13)	(14)	(15)
	46-51 years			52-59 years		
	4-12 ms.	14-22 ms.	24 ms.	4-12 ms.	14-22 ms.	24 ms.
$\hat{\beta}_0$	0.0000110 (0.0000121)	0.0000207 (0.0000207)	0.000107*** (0.0000135)	-0.0000135 (0.0000189)	-0.0000168 (0.0000307)	-0.000467*** (0.0000164)
$\hat{\rho}$	-0.0176** (0.00845)	-0.0213 (0.0153)	-0.0296*** (0.00914)	-0.0477*** (0.0131)	-0.0369 (0.0225)	-0.0400*** (0.0106)
$\hat{\beta}_1$	0.0000499*** (0.0000142)	0.00000375 (0.0000258)	-0.000123*** (0.0000169)	0.0000487* (0.0000221)	0.000140*** (0.0000381)	0.000847*** (0.0000204)
$\hat{\alpha}$	48.77*** (0.00633)	48.79*** (0.0112)	48.92*** (0.00685)	55.29*** (0.00983)	55.39*** (0.0165)	55.58*** (0.00792)
N	656396	185842	456379	466005	146148	565156
R <sup>2</sup>	0.000	0.000	0.000	0.000	0.000	0.003

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



**Table 2**  
**LINEAR REGRESSION (OLS ESTIMATION) ON MEAN AGE WITH CHANGING TREND: UA ADMISSIONS. PES**  
**DATA FILES (JANUARY 2010-DECEMBER 2014)**

**PANEL A. ENTIRE SAMPLE**

	(1) Entire sample	(2) 46-51	(3) 52-59
$\widehat{\beta}_0$	0.000334*** (0.0000143)	0.0000608*** (0.00000912)	-0.000204*** (0.0000132)
$\widehat{\rho}$	-0.143*** (0.0108)	-0.0340*** (0.00678)	0.494*** (0.00957)
$\widehat{\beta}_1$	0.0000640*** (0.0000177)	0.00000137 (0.0000111)	0.000240*** (0.0000157)
$\widehat{\alpha}$	51.96*** (0.00776)	48.82*** (0.00503)	55.01*** (0.00711)
<i>N</i>	1981462	1030449	951013
<i>R</i> <sup>2</sup>	0.002	0.000	0.009

**PANEL B. 46-51 YEARS AND CAUSE OF ENTRY TO UA**

	(4) <i>Other reasons</i>	(5) <i>Layoffs</i>	(6) <i>End of contract</i>
$\widehat{\beta}_0$	0.0000742*** (0.00000984)	-0.0000403 (0.0000912)	0.00000854 (0.0000253)
$\widehat{\rho}$	-0.0359*** (0.00745)	-0.0271 (0.0653)	-0.0449*** (0.0172)
$\widehat{\beta}_1$	-0.00000115 (0.0000123)	0.000102 (0.000108)	0.0000714** (0.0000289)
$\widehat{\alpha}$	48.84*** (0.00547)	48.71*** (0.0489)	48.75*** (0.0132)
<i>N</i>	841114	11111	178224
<i>R</i> <sup>2</sup>	0.000	0.000	0.000

PANEL C. 52-59 AND CAUSE OF ENTRY TO UA

	(7)	(8)	(9)
	Other reasons	Layoffs	End of contract
$\widehat{\beta}_0$	-0.000215*** (0.0000138)	-0.0000661 (0.000165)	-0.0000716 (0.0000466)
$\widehat{\rho}$	0.542*** (0.0101)	0.0207 (0.117)	-0.164*** (0.0310)
$\widehat{\beta}_1$	0.000350*** (0.0000167)	-0.0000211 (0.000192)	0.0000362 (0.0000519)
$\widehat{\alpha}$	55.00*** (0.00745)	55.08*** (0.0898)	55.06*** (0.0244)
N	843750	6366	100897
R <sup>2</sup>	0.013	0.000	0.002

PANEL D. BY TYPE OF UA

	(10)	(11)	(12)	(13)
	46-51 years		52-59 years	
	52/55 benefit	Others	52/55 benefit	Others
$\widehat{\beta}_0$	-	0.0000610*** (0.00000912)	-0.000228*** (0.0000185)	-0.000179*** (0.0000189)
$\widehat{\rho}$	-	-0.0340*** (0.00678)	2.247*** (0.0124)	-0.336*** (0.0129)
$\widehat{\beta}_1$	-	0.00000115 (0.0000111)	-0.0000670*** (0.0000216)	0.000548*** (0.0000213)
$\widehat{\alpha}$	-	48.82*** (0.00503)	55.00*** (0.00956)	55.01*** (0.0106)
N		1030439	383257	567756
R <sup>2</sup>		0.000	0.162	0.004

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.0$

The results for UI and UA are qualitatively similar. The mean age at admission is around 48.8 for the 46-51 group and near 55.5 for the 52-59 group. Before the reform, the trends are significantly positive for the 46-51 group while significantly negative for the 52-59 group (see panel A). After the reform, the reverse is true: the trends of mean age at admission are null or slightly negative for the 46-51 group while significantly positive for the 52-59 group (see panel A).

Most importantly, in the case of dismissed workers these trends are statistically insignificant for UI and UA recipients and for both age groups before and after July 2012 (see panels B and C). The only exception are laid-off workers of the 52-59 group receiving UI benefits who show a negative trend before and a positive trend after the reform. By entitlement duration, the maximum category of 24 months corresponding to the 52-59 group exhibits this behaviour (see panel D of Table 1). For the other categories of workers aged 46-51 and 52-59, the trend is null before the reform and slightly positive after the reform.

After documenting the general pattern of the series of mean ages for workers age 46-51 and those age 52-59, we apply a difference-in-differences (DID) quantification strategy comparing both groups and focusing our attention on the category of dismissed workers.

The DID can be estimated within a regression analysis. In particular, the estimation equation could be specified as follows:

$$Y_i = \beta_0 + \beta_1 S_i + \beta_2 R_i + \beta_3 S_i R_i + \beta_4 X_i + \varepsilon_i \quad (2)$$

In this specification,  $Y_i$  is the variable measuring the outcome of interest (the age of the worker at entry into the UB system) for individual  $i$ .  $S_i$  is a dummy variable indicating the policy change adopted on 13 July 2012: it takes the value of 1 for all individuals after the reform took place and 0 before the reform.  $R_i$  is a dummy variable that takes value 1 for workers aged 52 and over at the date of UI or UA admissions, and 0 otherwise.  $X_i$  represents a vector of exogenous control variables for the individuals and  $\varepsilon_i$  is the error term in the model.

Results are provided in Table 3 for UI and UA admissions for the entire sample and broken down by cause of entry into UI or UA, UI entitlement duration and type of UA.  $\beta_0$  is the mean age of workers age 46-51 admitted under the pre-2012 rules, while  $\beta_0 + \beta_2$  is the mean age of workers age 52 and over: in all the models the former is estimated around 48.8, while the latter just above 55.  $\beta_1$  is meant to capture the impact of the change in rules that is common to all older workers. It is statistically significantly positive for both UI and UA, suggesting that some underlying common impact of the legal change is at work. However, it is not found to be statistically significant for laid-off workers and for those with medium and long UI potential entitlements (14-22 months and 24 months).

The DID effect ( $\beta_3$ ) is significantly negative but very small (-0.06 years, i.e. less than one month) in the case of UI admissions, and similar for those accessing UI due to either a layoff or the ending of a contract and those with short and very long entitlement durations. However, it is positive and relatively large (+0.27, i.e. three months) when the cause of entry is 'other'. This reason captures mainly entries due to temporary layoffs and reductions of the working time in the context of a

collective STW arrangement. This result may indicate that firms were more active in putting older workers (aged 52 and over) in STW after the reform, which subsequently translated into layoffs and unemployment with increased likelihood for participants (Arranz et al., 2018).

In the case of UA admissions, the DID effect is significantly positive and large (+0.39 years, i.e. nearly five months), being even larger (+0.49 years, i.e. six months) for those accessing due to other reasons (coming from the exhaustion of UI benefits and many fulfilling all the conditions to receive the 52/55 benefit). This result could be interpreted in the sense that the companies retained some of the workers who, having turned between 52 and 55 years, would have been fired in the absence of the reform.

**Table 3**  
**DID ESTIMATE OF THE EFFECT OF A REDUCTION IN ENTITLEMENT DURATION. PES DATA FILES**  
**(JANUARY 2010-DECEMBER 2014).**  
**PANEL A. UI ADMISSIONS**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	Cause of entry in UI			UI entitlement duration		
		Other reasons	Layoffs	End of contract	4-12 months	14-22 months	24 months
$\beta_1$	0.0151*** (0.00305)	-0.0638** (0.0268)	-0.00945* (0.00518)	0.0349*** (0.00427)	0.0271*** (0.00430)	0.00186 (0.00801)	0.00759 (0.00517)
$\beta_2$	6.738*** (0.00390)	6.562*** (0.0350)	6.991*** (0.00620)	6.523*** (0.00599)	6.534*** (0.00608)	6.619*** (0.0101)	6.900*** (0.00595)
$\beta_3$	-0.0573*** (0.00520)	0.268*** (0.0446)	-0.0377*** (0.00858)	-0.0450*** (0.00783)	-0.0575*** (0.00793)	0.0239* (0.0143)	-0.0566*** (0.00797)
Const	48.80*** (0.00227)	48.92*** (0.0209)	48.80*** (0.00377)	48.77*** (0.00323)	48.76*** (0.00327)	48.78*** (0.00563)	48.87*** (0.00382)
<i>N</i>	2475926	34932	903524	1139477	1122401	331990	1021535
<i>R</i> <sup>2</sup>	0.737	0.734	0.744	0.730	0.730	0.735	0.736

PANEL B. UA ADMISSIONS

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Cause of entry in UA			Type of UA	
		Other reasons	Layoffs	End of contract	52/55 benefit	Others
$\beta_1$	0.0331*** (0.00342)	0.0431*** (0.00378)	-0.00531 (0.0332)	0.0145* (0.00848)	-	0.0332*** (0.00342)
$\beta_2$	6.306*** (0.00439)	6.299*** (0.00466)	6.379*** (0.0518)	6.346*** (0.0141)	-	6.308*** (0.00571)
$\beta_3$	0.391*** (0.00587)	0.485*** (0.00632)	-0.0615 (0.0667)	-0.237*** (0.0171)	-	-0.216*** (0.00713)
Const	48.79*** (0.00250)	48.80*** (0.00270)	48.73*** (0.0251)	48.75*** (0.00674)	-	48.79*** (0.00250)
<i>N</i>	1981462	1684864	17477	279121		1598195
<i>R</i> <sup>2</sup>	0.720	0.720	0.713	0.710		0.704

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5.2. The impact of the reform on the age patterns of UB inflows

What are the changes in the age patterns of UB inflows behind the previous results? In this section, we analyse these patterns with the aim of disentangling what is due to the macroeconomic and labour market conditions; what is due to the UBS parameters before the reform; and what is due to the 2012 reform. Our approach follows that of Tuit and van Ours (2010) and Baguelin and Remillon (2014) and makes the most of the database of UB recipients.

To conduct the analysis, the 46-60 age range is split into nearly monthly age groups (ten groups for each age year) in each UI and UA inflow, and each inflow age group is split again by calendar month from 2010M1 to 2014M12.<sup>6</sup> This implies that the analysis is conducted over 8,260 observations = 59 calendar months x 140 age groups.

Two complementary analyses are carried out. The first one makes no assumption as to the monthly age groups involving discontinuities. This is equivalent to a descriptive analysis and is conducted in order to detect at which age thresholds some traces of employers' behaviour and specific workforce management practices can be observed, so it is particularly useful for detecting relevant age thresholds. The second analysis focuses on particular age thresholds and is useful for conducting the analysis over subsamples broken down by job termination categories and

<sup>6</sup> We deleted 2012M7. This was the month when the Government enacted the reform.

employment records (proxied by PBD), which drive different age incentives and makes an interpretation based on ‘insiders’ and ‘outsiders’ possible.

In our first analysis, the dependent variable of the empirical model is the number of workers  $Y$  (in log) in a monthly age category  $\tau$  who enter unemployment in a particular calendar month  $t$ :

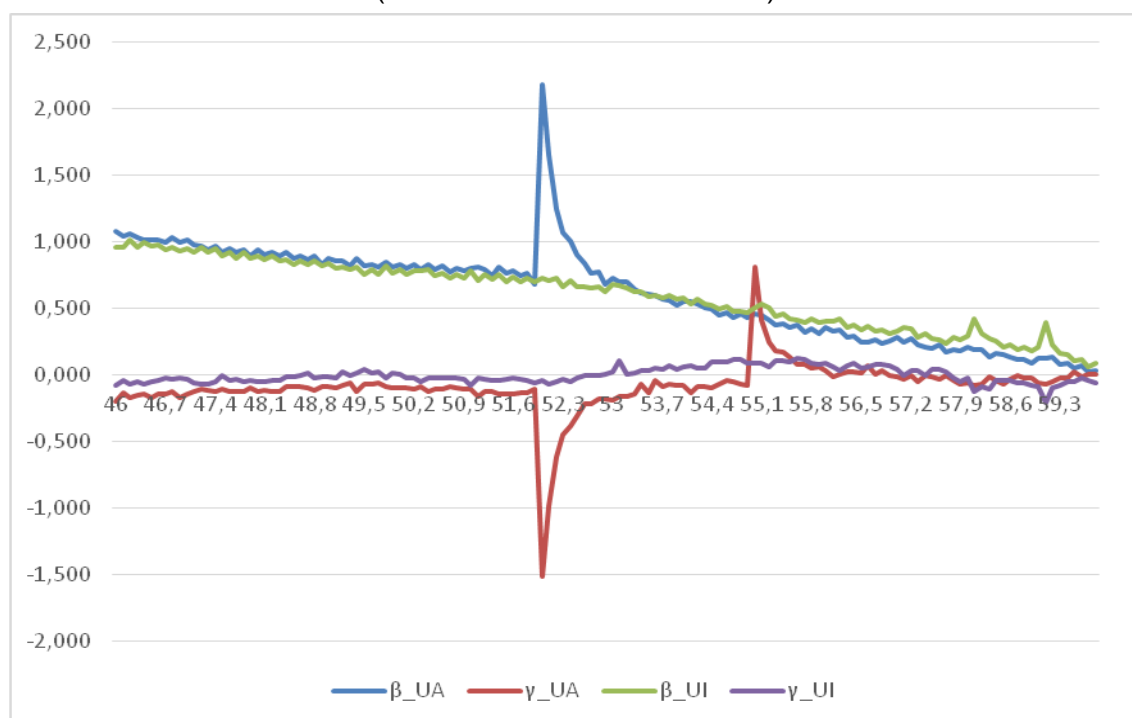
$$\log Y_{t,\tau} = \alpha_t + \beta_\tau + \gamma_\tau(1 - b_t) + \varepsilon_{t,\tau} \tag{3}$$

Where  $\alpha_t$  capture the calendar monthly fixed effects ( $t = 1, \dots, 59$ ),  $\beta_\tau$  group fixed effects and  $\gamma_\tau$  the before-after difference for age group  $\tau$  ( $\tau = 1, \dots, 140$ ). The error terms  $\varepsilon_{t,\tau}$  are assumed to be independent and identically distributed. The reference is the 2014M12 inflow of workers aged 59.90-59.99. The model is estimated by OLS.

Figure 5 provides the parameter estimates of  $\beta$  and  $\gamma$  for UI and UA. The  $\beta$  estimates offer the age pattern of UB inflow that would have been observed if no reform had occurred over the period of analysis. They confirm the descriptive analysis shown in previous sections. Focusing on the age interval 51-56, most significant deviations from the reference are consistent with the before-the-reform age-related UB incentives. For UI recipients, very small peaks and troughs (around 53, 55 and, above all, 58 and 59) are observed in a continuously age-decreasing trend of admissions. In the case of UA, the number of entries is significantly greater once workers turn 52: they more than double at that age point and remain high for the next few months, within an otherwise age-declining trend.

Figure 5

OLS PARAMETER ESTIMATES:  $\beta$  (AGE PATTERN OF UB INFLOW WITH NO REFORM) AND  $\gamma$  (BEFORE/AFTER CHANGE IMPUTABLE TO THE CHANGE IN RULES). UI AND UA ADMISSIONS. PES DATA FILES (JANUARY 2010-DECEMBER 2014)



What was the impact of the July 2012 reform on the age patterns of UB admissions? The  $\gamma$  parameters capture the before/after change that is strictly imputable to the change in rules. The number of UI entries increased significantly at the age of 53 and, after declining a bit, remained relatively high (about 10% higher) for those aged between 54 and 57. At the same time, a significant decline occurred before the age of 54.5 for UA entries. The number of admissions was 10-15% lower after the reform than before for those aged 51, more than 20% lower for those aged 52 (in particular when they turned 52), 10-15% lower for those aged 53, and 5-10% lower for those aged 54. However, these admissions were significantly much higher for those aged 55 just immediately after they turn this age and during the subsequent months.

In sum, we observe no significant change in the number of UI admissions from age 46 to 53 and a reduction in the number of UA admissions from age 46 to just below 55. At the same time, there are entries of UI recipients occurring until age 53 before the reform that seem to have displaced to above age 53 (until age 57) after the reform.

The previous analysis provides some evidence of seemingly behavioural responses at ages consistent with UB incentives. We now further investigate which groups of the workforce drive these responses. For that, we focus our attention on the set of age thresholds that has been identified as potentially critical, in particular 52, 53 and 55 (we have added age 54 to take account of the varying level of UI inflows between 53 and 55). In order to measure deviations from the age trend at these threshold ages, we estimate the following equation:

$$\log Y_{t,\tau} = \alpha_t + \beta \tau + \sum [ (\gamma_{age}^b m_{<age} + \eta_{age}^b m_{\geq age})(b_t) + (\gamma_{age}^a m_{<age} + \eta_{age}^a m_{\geq age})(1 - b_t) ] + \varepsilon_{t,\tau} \quad (4)$$

Where  $\alpha_t$  capture again the calendar monthly fixed effects and  $\beta$  an age trend, so estimated deviations are compared to this trend. The parameters of interest are those associated with  $m_{<age}$ , which takes value 1 for the three age groups just below the threshold age, and 0 otherwise, and  $m_{>age}$ , which takes value 1 for the three age groups just above the threshold age, and 0 otherwise. Therefore, parameters  $\gamma_{age}$  allow to verify whether there is a deviation from the trend for the quarterly age groups just below the age thresholds identified above, while  $\eta_{age}$  do the same just above the same threshold (one quarter after it). Parameters with superscripts ‘b’ provide ‘before the reform’ measurements, while parameters with superscripts ‘a’ provide ‘after the reform’ measurements. The model is estimated by OLS over the more restricted age range 50-57 to limit the impact of extreme age groups on the estimated age trend.

Results are presented in Table 4 for UI and UA inflows. Table 5 provides the results for UI admissions broken down by cause of entry and entitlement duration, while Table 6 does the same for UA admissions distinguishing by cause of entry and type of benefit.

**Table 4**  
**ANALYSIS OF EQUATION (4): UI AND UA ADMISSIONS. OLS ESTIMATES. PES DATA FILES**  
**(JANUARY 2010-DECEMBER 2014)**

		UI		UA	
		Before	After	Before	After
52 years	$\gamma$	0.0321*** (0.00830)	-0.0370*** (0.00933)	0.0136 (0.0128)	-0.0531*** (0.0122)
	$\eta$	0.0625*** (0.00925)	-0.0197** (0.00855)	0.997*** (0.0433)	0.0159 (0.0107)
53 years	$\gamma$	0.0357*** (0.00921)	0.00640 (0.0102)	0.104*** (0.0113)	-0.0278** (0.0117)
	$\eta$	0.0733*** (0.0113)	0.0921*** (0.0125)	0.0996*** (0.0117)	-0.0146 (0.0100)
54 years	$\gamma$	0.0311*** (0.0104)	0.0542*** (0.00891)	-0.000295 (0.0118)	-0.0212** (0.00954)
	$\eta$	0.0303*** (0.00880)	0.0644*** (0.00976)	0.0162 (0.0118)	-0.0250** (0.0123)
55 years	$\gamma$	-0.0132 (0.0109)	0.0675*** (0.0101)	-0.0294*** (0.0114)	-0.0359*** (0.0110)
	$\eta$	0.0449*** (0.0100)	0.0973*** (0.0114)	-0.00592 (0.0128)	0.541*** (0.0349)
<i>N</i>		4661		4661	
<i>R</i> <sup>2</sup>		0.880		0.798	

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In the case of UI (see Table 4), the relatively higher number of entries observed before the age of 54 (with small peaks at ages 52 and 53) before the reform moved to 53 and above, showing a large peak at age 53 and another one at 55, after the reform. These findings are consistent with those obtained in the previous analysis. The large peak at 53 among an otherwise depressed level of entries until age 55 is clearly observed for admissions of workers with a UI entitlement of 24 months and due to layoffs after the reform (see Table 5). This suggests that companies altered their dismissal behaviour by way of retaining some long-tenured workers aged 50-53, who benefited from the maximum UI potential duration (and whom companies would have laid-off before the reform), until they fulfilled the conditions for receiving the corresponding benefits until retirement. This is less visible in the case of entries due to the ending of temporary contracts and with shorter potential durations (4-12 months), although there are some indications that the higher admissions until 54 before the reform have moved to 53 and above after the reform. The entries that comprise the group of medium UI potential entitlements (14-22 months) behave in a way that falls in between the previous two categories.



**Table 5**  
**ANALYSIS OF EQUATION (4): UI ADMISSIONS BY CAUSE OF ENTRY AND ENTITLEMENT DURATION. OLS ESTIMATES. PES DATA FILES (JANUARY 2010-DECEMBER 2014)**  
**PANEL A. UI INFLOWS BY CAUSE OF ENTRY**

		Other reasons		Layoffs		End of contract	
		Before	After	Before	After	Before	After
52 years	γ	0.115*	-0.0419	0.00511	-0.0274**	0.0264**	-0.00281
		(0.0635)	(0.0633)	(0.0129)	(0.0125)	(0.0113)	(0.0124)
	η	0.150**	-0.102	0.0367***	-0.0214	0.0583***	0.0227*
		(0.0644)	(0.0624)	(0.0132)	(0.0144)	(0.0127)	(0.0125)
53 years	γ	-0.00918	-0.110	-0.00533	-0.0383***	0.0235*	0.0496***
		(0.0678)	(0.0671)	(0.0151)	(0.0137)	(0.0129)	(0.0116)
	η	0.0981*	-0.101	0.0623***	0.161***	0.0531***	0.0458***
		(0.0520)	(0.0625)	(0.0175)	(0.0281)	(0.0147)	(0.0139)
54 years	γ	-0.0423	-0.0601	0.0108	-0.0168	0.0512***	0.0548***
		(0.0637)	(0.0651)	(0.0147)	(0.0122)	(0.0138)	(0.0146)
	η	0.0788	0.0602	-0.00449	0.0117	0.0619***	0.0401***
		(0.0607)	(0.0637)	(0.0119)	(0.0139)	(0.0133)	(0.0140)
55 years	γ	0.0235	0.0400	-0.0554***	-0.0195	0.00599	0.0692***
		(0.0653)	(0.0643)	(0.0163)	(0.0135)	(0.0139)	(0.0149)
	η	0.00585	0.0458	0.0760***	0.0794***	0.0224*	0.0833***
		(0.0678)	(0.0631)	(0.0162)	(0.0164)	(0.0132)	(0.0137)
N		4464		4661		4661	
R <sup>2</sup>		0.137		0.727		0.905	

**PANEL B. UI INFLOWS BY ENTITLEMENT DURATION**

		4-12 months		14-22 months		24 months	
		Before	After	Before	After	Before	After
52 years	γ	0.0277**	0.000361	0.0494***	-0.0575***	0.0244**	-0.0527***
		(0.0126)	(0.0120)	(0.0172)	(0.0187)	(0.0107)	(0.0123)
	η	0.0540***	0.0399***	0.0532**	-0.0486**	0.0803***	-0.0484***
		(0.0131)	(0.0122)	(0.0214)	(0.0230)	(0.0138)	(0.0131)
53 years	γ	0.0179	0.0469***	0.0328*	0.00662	0.0537***	-0.0175
		(0.0131)	(0.0126)	(0.0196)	(0.0197)	(0.0121)	(0.0134)
	η	0.0338**	0.0405***	0.0785***	0.0230	0.108***	0.139***
		(0.0142)	(0.0145)	(0.0176)	(0.0243)	(0.0164)	(0.0234)
54 years	γ	0.0272**	0.0564***	0.0822***	0.0558**	0.0195	0.0546***
		(0.0126)	(0.0138)	(0.0197)	(0.0228)	(0.0161)	(0.0138)
	η	0.0549***	0.0430***	0.0705***	0.0157	0.0127	0.0996***
		(0.0128)	(0.0137)	(0.0203)	(0.0242)	(0.0125)	(0.0145)
55 years	γ	0.000641	0.0639***	0.00966	0.0363	-0.0171	0.0852***
		(0.0133)	(0.0153)	(0.0203)	(0.0256)	(0.0147)	(0.0109)
	η	0.0184	0.0683***	0.0642***	0.0885***	0.0752***	0.142***
		(0.0120)	(0.0144)	(0.0164)	(0.0257)	(0.0161)	(0.0149)
N		4661		4661		4661	
R <sup>2</sup>		0.900		0.705		0.873	

For UA inflows as a whole (see Table 4), before the reform, the biggest positive jump occurred at 52, while the admissions remained relatively high at 53 and declined at 54 and just below 55. After the reform, the jump (which is largely attenuated) located at 55, when a sort of hole-below/peak-above pattern was observed. At the same time, the admissions declined just below the ages of 52, 53 and 54, with no peak after these thresholds. All this is consistent again with our previous findings, thus confirming that UA entries were displaced from ages below 55 (in particular, at 52 and 53) to ages above 55. This aggregate behaviour reflects what happens with two categories of admissions (see Table 6). On the one hand, the entries into the 52/55 subsidy and, to a lesser extent, those due to reasons different from layoffs and contract endings: they show a big jump at 52 and relatively large inflows subsequently before the reform that translate into lower inflows before 55 and a big jump at 55 after the reform. On the other hand, the entries into other subsidies different from the 52/55 subsidy and, to a lesser extent, those due to the ending of contracts: they show large inflows around 52 and substantially lower admissions after that age before the reform that transform into sustained higher inflows for age 53 and above.

**Table 6**  
**ANALYSIS OF EQUATION (4): UA ADMISSIONS BY CAUSE OF ENTRY AND TYPE OF SUBSIDY. OLS ESTIMATES. PES DATA FILES (JANUARY 2010-DECEMBER 2014)**

**PANEL A. UA INFLOW BY CAUSE OF ENTRY**

		Other reasons		Layoffs		End of contract	
		Before	After	Before	After	Before	After
52 years	$\gamma$	0.000807 (0.0134)	-0.0718*** (0.0127)	0.119* (0.0646)	-0.0207 (0.0638)	0.130*** (0.0235)	0.0514** (0.0217)
	$\eta$	1.081*** (0.0452)	0.00181 (0.0120)	0.106 (0.0694)	0.0823 (0.0624)	0.173*** (0.0277)	0.103*** (0.0232)
53 years	$\gamma$	0.132*** (0.0118)	-0.0553*** (0.0128)	-0.0303 (0.0716)	-0.0407 (0.0593)	-0.0499** (0.0239)	-0.0499** (0.0239)
	$\eta$	0.127*** (0.0117)	-0.0354*** (0.0107)	-0.0799 (0.0652)	-0.0178 (0.0659)	-0.106*** (0.0343)	-0.106*** (0.0343)
54 years	$\gamma$	0.0154 (0.0121)	-0.0356*** (0.00980)	-0.119** (0.0551)	-0.0395 (0.0618)	-0.0927*** (0.0306)	0.0995*** (0.0277)
	$\eta$	0.0337*** (0.0119)	-0.0352*** (0.0125)	-0.0752 (0.0577)	0.108* (0.0648)	-0.112*** (0.0316)	0.0678** (0.0271)
55 years	$\gamma$	-0.0202* (0.0116)	-0.0495*** (0.0112)	-0.0923* (0.0531)	-0.0342 (0.0631)	-0.0882*** (0.0303)	0.112*** (0.0287)
	$\eta$	-0.00628 (0.0128)	0.597*** (0.0374)	-0.0644 (0.0694)	0.0279 (0.0672)	0.0107 (0.0307)	0.124*** (0.0352)
<i>N</i>		4661		3339		4660	
<i>R</i> <sup>2</sup>		0.770		0.146		0.777	

PANEL B. UA BY TYPE OF SUBSIDY

		52/55 benefit		Others	
		Before	After	Before	After
52 years	$\gamma$	-3.919*** (0.0866)	0 (.)	0.263*** (0.0136)	-0.00107 (0.0159)
	$\eta$	1.949*** (0.0938)	-2.995*** (0.241)	0.253*** (0.0349)	0.103*** (0.0152)
53 years	$\gamma$	0.677*** (0.0665)	-2.869*** (0.198)	-0.244*** (0.0144)	0.139*** (0.0140)
	$\eta$	0.576*** (0.0605)	-2.882*** (0.181)	-0.179*** (0.0158)	0.187*** (0.0121)
54 years	$\gamma$	0.330*** (0.0472)	-3.102*** (0.126)	-0.205*** (0.0167)	0.260*** (0.0111)
	$\eta$	0.279*** (0.0417)	-3.110*** (0.119)	-0.146*** (0.0151)	0.290*** (0.0137)
55 years	$\gamma$	0.119*** (0.0294)	-3.263*** (0.0933)	-0.141*** (0.0155)	0.360*** (0.0136)
	$\eta$	0.0750*** (0.0261)	1.299*** (0.0697)	-0.0825*** (0.0171)	0.227*** (0.0362)
<i>N</i>		2925		4661	
<i>R</i> <sup>2</sup>		0.654		0.874	

6. CONCLUSIONS

This paper has investigated one feature of the incentive effects of UB that has been rarely studied in the past. In contrast to the influence on unemployment duration and the outflow effects, empirical evidence on the impact of benefit generosity on the inflow into the UBS is much more scarce. However, this is a promising avenue for research because it relates to the potential influence of UB rules on employers' human resources practices and older workers' incentives to retire early. In this sense, we examine whether the age thresholds that determine potential benefit duration make a difference as regards the age pattern of UB inflow.

In Spain, the existence of a 'special income support' benefit after age 52 provided incentives for firms to shed workers and for elderly workers to enter unemployment after that age and consequently receive benefits until age 65, the legal retirement age. When the incentive to retire so early was translated to age 55 in July 2012, not only the age-specific inflow spike of UA moved immediately from age 52 to age 55 (diminishing consequently the number of admissions from age 46 to just below 55) but also the pattern of UA and UI admissions altered. For the former,

accessions to other subsidies (different from the 52/55 subsidy) moved from below 52 to ages 53 and above; for the latter, they moved from ages below 53 to ages 53-57. Furthermore, this latter behaviour seems to be explained by admissions of workers with the maximum UI entitlement (24 months) and who enter the UBS due to a layoff. These findings, based on regressions on the number of workers grouped in monthly age categories who enter unemployment each calendar month, provide evidence that employers and workers have some influence on the timing of the beginning of the unemployment spells covered by benefits and, when possible, use their knowledge of the UBS parameters to their advantage.

These changes in the UB inflows have had an influence on the age of older workers entering the UBS. When we estimate the impact of the 2012 reform on the average age at UB entry of older workers, a significantly positive effect of six months is found in the case of UA admissions for those coming from the exhaustion of UI benefits who in many cases fulfil all the conditions to receive the 52/55 benefit. We take this result as an indication that companies, who would have fired a certain share of the group of workers aged between 52 and 55 years in the absence of the reform, retained many of them. One way to do this is by putting them in short-time work and use collective redundancies to shed labour. Our estimations that show a significantly positive impact of three months for UI entries due to 'other reasons' support this view. In general, our estimated effects are similar to those obtained by Baguelin and Remillon (2014) for France, who found that a PBD reduction of 20 months increased by 4 months the average age at job termination of dismissed older workers eligible for UI (aged 55-59). As they stressed too, this impact is large compared to the changes associated with other policy reforms regarding older workers.

Our results, thus, suggest that the UBS brings about behavioural effects on workers and employers alike. They are in line with the findings of the empirical literature that point to reduced employment and increased unemployment and inactivity of older workers affected by programmes of extended benefits. Since these schemes essentially secure the income for an unemployed person until retirement (so they can be regarded as early retirement measures), they can be very costly. Some studies have tried to estimate the fiscal impact of these schemes and their changes. Inderbitzin *et al.* (2016) arrive at the result that the fiscal costs amounted to over 13,000 euros per worker aged 50-54 and 9,500 euros per worker aged 55-57 eligible for the 'regional extended benefits programme' in Austria, while Kyyrä and Pesola (2017) estimate that the 2005 reform in Finland that raised the age limit for receiving extended benefits by two years increased net income transfers to the State by 15,000 euros over a 10-year period for an average individual. Grogger and Wunsch (2013) estimate steady-state savings of nearly 5,000 million euros yearly. Much of this effect was mechanical, due to truncating at 18 months spells that could have lasted up to 32 months prior to the reform applied in 2006 in Germany. However, roughly 30% was behavioural, attributable to reductions in the exit rate from employment among workers who prior to the reform would have exited employment for UI prior to drawing a pension.

Therefore, the existence of 'special income support' (or extended) benefits and their changes may induce responses by firms and workers resulting in varying unemployment inflows, with effects that appear to be quantitatively significant and may result in large costs/savings for the UBS. Policy reforms aimed to increase the age at which older workers may gain access to these

schemes and raise the effective retirement age seem to be beneficial for the society as a whole, although particular care should be taken to consider the entire set of welfare programmes that affect the early retirement decisions of workers. Potential benefit duration may be an instrument to increase the employment rate and the stability of older workers: if PBD is shortened, companies may become more reluctant to destroy jobs and workers less prone to move into non-employment (Lalive *et al.*, 2011). Combining the UB and pension systems may enhance the job search of older unemployed workers, by taxing pensions in proportion to the length of the unemployment spell (Hairault *et al.*, 2010). At the same time, if labour demand is important in this context, reducing the UB duration may affect negatively the most vulnerable older workers. Measures that induce firms to retain these workers (i.e. employment subsidies) should be carefully considered.

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