



Does unemployment benefit duration affect inflows into unemployment? The impact of a law change for older workers



José M. Arranz*, Carlos García-Serrano

Department of Economics, University of Alcalá, Plaza de la Victoria 3, 28802 Alcalá de Henares, Madrid, Spain

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ABSTRACT

This article examines whether changes in the potential duration of unemployment benefits influence the entry of older workers into unemployment insurance. 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 inflows into unemployment insurance 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 unemployment insurance benefits increases by between one and three months for certain categories of workers.

Introduction

Academics who investigate the impact of reforms on the generosity of unemployment compensation systems (UCS) focus their attention almost exclusively on the effects of the level and duration of unemployment benefits on the numbers exiting from receipt of benefits. However, the UCS can affect not only the exits from benefit reciprocity and its duration, but also the inflows into reciprocity. 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 (2005), Lalive et al. (2011)). Strangely enough, the impact of unemployment benefits (and more specifically, unemployment insurance -UI- benefits) 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 scarcer. This paper contributes to filling this gap in the literature by examining how a law change for older workers (that modified the potential duration of their benefits) affected the inflows into UI.

The UCS 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 UI benefits (Mortensen and Pissarides, 1999). If the UI becomes more generous, newly established jobs become

unprofitable more quickly, leading to an increase in the steady state flow from employment to unemployment. Likewise, UI benefits that are more generous might affect the behaviour of employers and workers, inducing separations, leading to individuals claiming UI 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 UI, 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 UI 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 benefits and use the UCS 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

* Corresponding author.

E-mail addresses: josem.arranz@uah.es (J.M. Arranz), carlos.garcia@uah.es (C. García-Serrano).

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.¹

The role of the UCS in the inflow into UI has been largely forgotten, or at least underestimated, and its statistical importance (especially for older workers) has not been well assessed. Yet, UCS 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 UCS (the potential benefits duration, PBD) influence the entry of older workers into UI. 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 UI.

Our 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 to the Social Security for the risk of unemployment 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 unemployment benefits (UI, unemployment insurance, and/or UA, unemployment assistance, UA) 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 benefits of older workers was raised from 52 to 55. This reform reduced the unlimited potential 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 UB. There are two dimensions to be identified: eligibility (age) and time (before and after the law change). The data used come from the (universal) administrative records of the Spanish Public Employment Service (PES), the agency in charge of UBs, which provides information about changes in unemployment benefits over the period 2007–2017. This database enables us to study in detail the age pattern of inflow into UI.

The analysis carried out in this paper is of general interest for several reasons. First, it provides new evidence on the impact of UCS parameters on inflow into UI, a subject that has been studied substantially less than outflow in the literature on UCS, with a small amount of 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, the UCS and the pension system) in shaping the behaviour of employers and employees.

Third, the article examines an issue that is useful for public policy, since it highlights the role of UCS 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,

¹ 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 (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 consider 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.

the scheme is similar to those of other European countries. Therefore, our results may illustrate 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 UCS 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 identify accessions to UI by cause of entry, we can add to the literature on that point.

The structure of the article is as follows. Section "Literature review" reviews the empirical literature on the effects of PBD on entries into UI benefits. Section "Institutional setting: the UCS and the 2012 labour reform" provides a description of the UCS regulations in Spain and the law changes adopted in 2012. Section "Data and descriptive statistics" presents the administrative data and some descriptive statistics. Section 5 provides an econometric analysis of the effect of the legal change on the pattern of UI inflow before and after the reform (a "density analysis", where the dependent variable is the number of beneficiaries) and on the age of unemployed workers at admission into UI (an "age analysis", where the dependent variable is age), followed by several robustness checks. Finally, Section "Conclusions" concludes.

Literature review

The role of UI in influencing unemployment has been the focus of much empirical work in labour economics. Research on UCS often focuses on UI 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 Holmund (2006), and Tatsiramos and van Ours (2014)).² However, the empirical evidence on the transitions from employment to UI 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 UI. Here the question is how eligibility for entrance into unemployment benefits affects employment duration and the decisions of employers and employees to dissolve the job match. Christofides and McKenna (1996) for Canada and Anderson and Meyer (1997) for the USA find 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. More recently, Rebollo (2012), using Spanish data, finds a spike in the layoff hazard when an employee qualifies for unemployment benefits, while Albanese et al. (2019) exploit the peculiarity in the eligibility conditions of the Italian UI system to identify the impact of UB eligibility on the layoff transition intensity, finding that the layoff exit rate increases by 12% as soon as UI eligibility is attained. Furthermore, changes in eligibility rules have a significant impact on employment duration (Green and Riddell, 1997).

In general, the main conclusion of this literature 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 UI 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. Therefore, UI seems to favour worker turnover

² 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).

and the effects of the UCS 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 UI. These are precisely the conclusions of the empirical literature that analyses the use of temporary layoffs, the timing of rehiring, and their relationship with UI (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 UCS 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: Tuit and van Ours (2010) for the Netherlands and 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 UI 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 UI until the standard retirement age of 65. On 11 August 2003, extended UI were abolished, so the age-related discontinuity in maximum UI duration disappeared and for both groups the maximum UI 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 UI, 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 UB 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 UI duration; application for exemption from active job search; and continuous receipt of UI 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, these 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).

Institutional setting: The UCS and the 2012 labour reform

The Spanish UCS (like many others in Organisation for Economic Co-operation and Development [OECD] countries) comprises two schemes: UI and 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). The length of UI entitlement varies between 4 and 24 months, depending on the number of months contributions were made; the maximum is 24 months if the individual has worked for the whole reference period (six years in the last six years).³ The amount of UI paid is equal to a fraction of the average of the gross wage used to calculate UI contributions in the last six months prior to unemployment. UI payments decline with the duration of the claim: the gross replacement rate is 70% during months 1–6 of UI receipt and 50% thereafter (60% before July 2012). 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 UI benefits may qualify for 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 80% of IPREM -430 euro in 2019-, which amounts to about 50% of the average UI benefit).⁴ The entitlement duration of UA is at least six months and varies depending on the number of family dependents and the age of recipient (the maximum is 36 months).⁵

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, having contributed to the Social Security for the risk of unemployment for at least six years during their working life and fulfilling all the conditions (except the age) for receiving a Social Security pension, could claim a special income support called 'subsidy for individuals older than 52' that is part of UA. As such, the entitlement conditions for receiving this subsidy and the level of benefits are the same as those for the general UA benefits. What the '52ys. subsidy' allowed those workers was to collect UB benefits up to the moment they became eligible for a normal old-age pension. Thus, the regular UI and UA benefits followed by this subsidy 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 UA up to the entry into an old-age pension.

This situation changed on 13 July 2012 when, in the context of the

³ The duration of entitlement is equal to twice the modulus of the number of contribution months divided by six (i.e. four, six, eight, etc.).

⁴ The Public Indicator of Multiple Effects Income (IPREM) is the benchmark in Spain for the allocation of benefits and subsidies based on income. It was introduced on July 1, 2004, replacing the Statutory Minimum Wage whose use was restricted to the scope of the labour market.

⁵ The reciprocity of UA allowance requires certain eligibility conditions: being registered for at least one month in some public employment office; not having rejected any suitable employment offer or participation in a training or professional qualification programme run by the PES; and having income of < 75% of the minimum wage.

labour market reform approved by the Spanish government, the age of eligibility for this subsidy was raised from 52 to 55.⁶ 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 UA 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. The '52ys. subsidy' 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. 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.

Another concern that may hinder the identification of the causal effect we intend to measure is related to other policy changes. First, regarding the comprehensive reform passed in February 2012, it altered some general instances of the labour market and their institutions (employment protection legislation, system of collective bargaining, etc.), but one can contend that these changes affected many groups of workers (or, at least, those aged, say, 46–51 and 52–55) in a similar way. As an example, it is very likely that eliminating the requirement of administrative authorization in the case of collective redundancies or giving more relevance to collective agreements at firm level could bring about similar effects, if any, on entries into UI of older (aged 52–55) and younger (aged 46–51) workers. Second, the policy reform used in the paper not only meant a reform on the age-threshold for the extended benefit system for older workers, but it also changed (slightly) the generosity for all new UI receivers whose entitlements were lengthier than six months. In particular, the UI replacement rate drop from 60% to 50% for unemployed workers after six months of unemployment. This law also affected the generosity of the system for the new unemployed individuals who were part-time workers. As previously, our point is that these other changes of the UI system need not have affected the two groups of workers we examine here differently. Therefore, our critical component of the identification assumption is not that the only change in the incentives to enter into unemployment is that attributable to the policy change (the reform affecting the extended benefits), but instead that the other (more general) policy changes did not produce heterogeneous impacts by age.

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 unemployment benefits. The dataset contains the universe of UI and UA 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), attributes of the last job (wage, occupation and industry affiliation) and the reasons for job termination. The dataset also provides information on whether an individual receives UI or UA, the level of benefits, the potential and elapsed benefit duration. For the empirical analysis, we use the UI spells occurring between 1 January 2010 and 31 December 2014 of the entire population of

workers aged between 46 and 59. The sample contains 2,475,926 individuals entering the UI and aged between 46 and 59 at the date of admission between 2010 and 2014.

Fig. 1 shows the age pattern of monthly UI inflows 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. 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.

Fig. 2 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. UI admissions under the new 2012 rules are distinguished in the figure by a black vertical line in July 2012.

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.

Regarding the reasons for job termination, these have been grouped into four categories: layoff (it comprises individual layoffs and economic redundancies); end of fixed-term contract; short-time work (STW, it refers to individuals in work sharing schemes receiving income support because of a shortened working week or temporary layoffs), and other reasons (this category includes mainly situations such as quits for fair cause, modification of working conditions or geographical mobility or termination of the activity of discontinued permanent workers).⁷ Fig. 2 shows that layoffs are relatively more important for the more mature workers (52–59) than for the younger ones (46–51), and for both age groups STW rose as an important cause of entry during the period 2011–2013. The composition of UI inflows did not change much after the 2012 reform and the reduction in the numbers of entries due to layoffs (signalling an improvement in labour market conditions since 2013) was similar for both groups. This finding would point to similar effects of economic conditions and other policy changes on both groups of workers.

One can also arrive to this result by looking at the evolution of monthly UI accessions by age groups that is displayed in Fig. 3, the descriptives of UI admissions of both age groups before and after the law change that are provided in Table A.1 of the Appendix, and the kernel densities of entitlement duration by cause of entry that are displayed in Fig. A.1 of the Appendix. Fig. 3 shows that monthly entries into UI changed in a similar fashion for both age groups either before or after the policy change, supporting the common trend assumption on which any difference-in-differences strategy would be based. At the same time, the double differences calculated in the last column of

⁶ Royal Decree-Law 20/2012, 13 July, on measures to guarantee budgetary stability and to encourage competitiveness.

⁷ The first group can be considered 'agreed' quits between workers and employers, while the second refer to layoffs of individuals who work intermittently but at the same time permanently for the same employer.

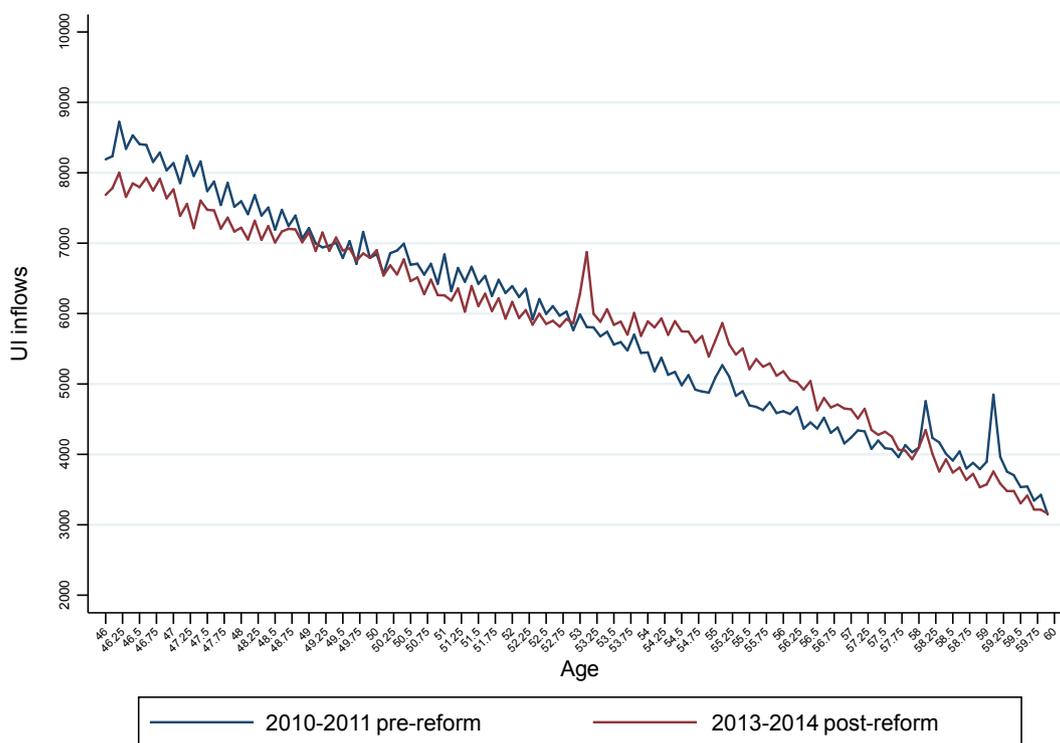


Fig. 1. UI inflow of workers aged 46–59 before and after the 2012 reform. PES data files (January 2010–December 2014).

Table 1A tend to be zero for nearly all the categories of workers. This would also validate our identification assumptions. Finally, as can be seen from Fig. A.1, UI entries due to the ending of temporary contracts concentrate on the shortest potential categories, while layoffs, STW and other reasons on the longest one. This feature seems to point out to relevant differences among groups of workers, as we will see below.

Econometric analysis

In this section, we investigate the potential impact of the 2012 reform by first assessing the changes in the number of beneficiaries of different age groups receiving UI, and then by analysing if there was a change in the ages of beneficiaries at entry into UI. Thus, we first examine the changes in the age patterns of UI inflows with the aim of disentangling what is due to the macroeconomic and labour market conditions; what is due to the UCS parameters before the reform; and what is due to the 2012 reform. The second 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 unemployed workers at admission into UI. Our approach follows the path of studies by Tuit and Van Ours (2010) for the Netherlands and Baguelin and Remillon (2014) for France. We extend the analysis by considering different age thresholds identified as critical and by distinguishing different cause of entry and entitlement duration categories.

The impact of the reform on the age patterns of UB inflows

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.

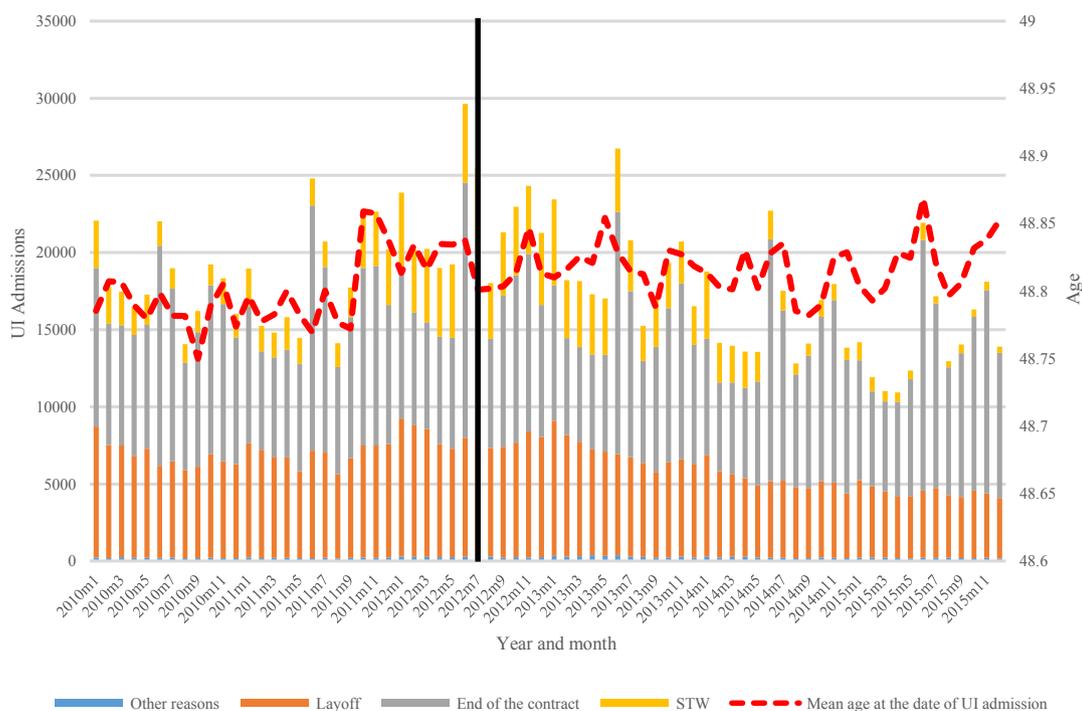
To conduct the analysis, and make the most of the database of UI recipients, the 46–59 age range is split into nearly monthly age groups (ten groups for each age year) in each UI and UA inflow, and each inflow age group is split again by calendar month from 2010M1 to 2014M12.⁸ This implies that the analysis is conducted over 8260 observations = 59 calendar months × 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 specific thresholds and is useful for conducting the analysis over subsamples broken down by job termination categories and employment records (proxied by PBD) which drive different age incentives.

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

⁸ We deleted 2012M7. This was the month when the Government enacted the reform.

Panel A. 46-51, UI admissions



Panel B. 52-59, UI admissions

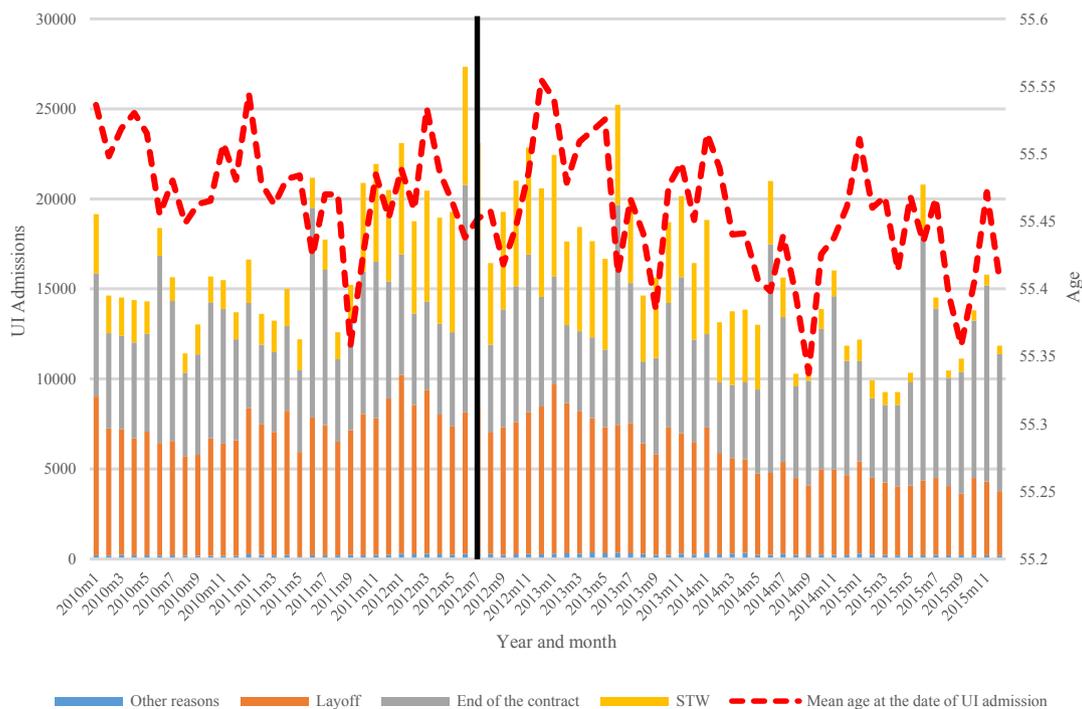


Fig. 2. Monthly UI inflow and mean age at admission for two age groups (46–51 and 52–59), disaggregating by cause of exit from the last job. PES data files (January 2010–December 2014). Panel A. 46–51, UI admissions. Panel B. 52–59, UI admissions.

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

where α_t capture the calendar monthly fixed effects ($t = 1, \dots, 59$), β_τ age group fixed effects and γ_τ the before-after difference for age group τ ($\tau = 1, \dots, 140$), and b refers to ‘before the reform measurement’, being

equal to 1 for observations before the reform and 0 otherwise. The error terms $\varepsilon_{t,\tau}$ are assumed to be independent and identically distributed. The reference is the 2014 M12 inflow of workers aged 59.90–59.99.

Fig. 4 provides the parameter estimates of β and γ of Eq. (1) by OLS. The β estimates offer the average pattern of UI inflows by age. They

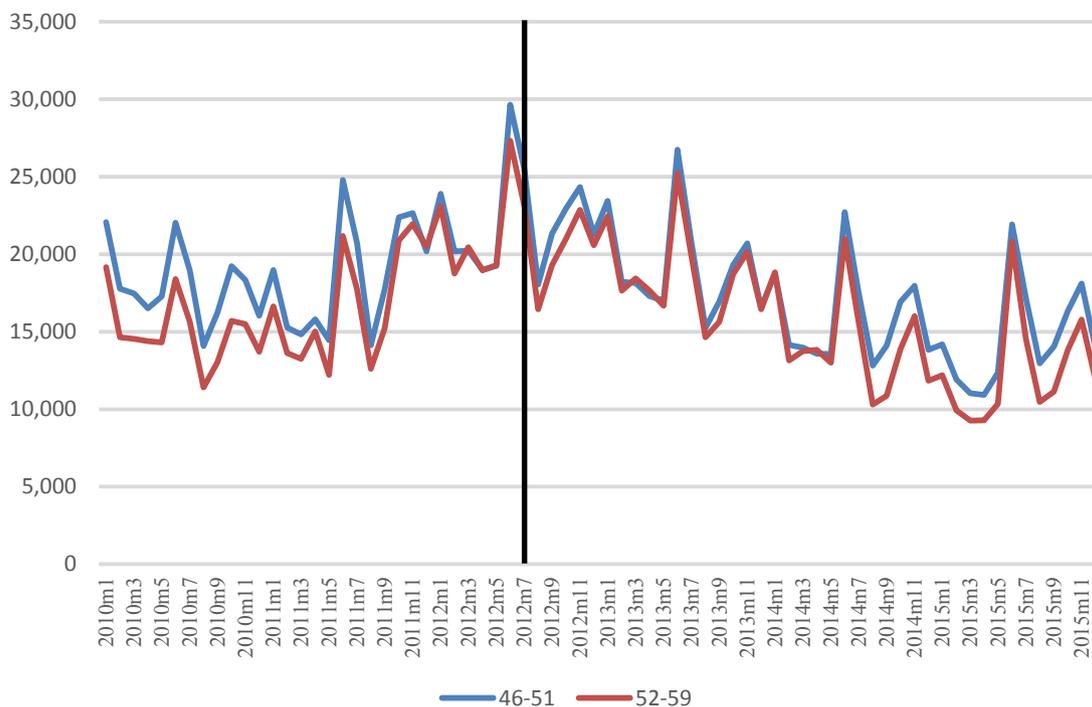


Fig. 3. Monthly UI inflow for age groups 46–51 and 52–59. PES data files (January 2010–December 2015).

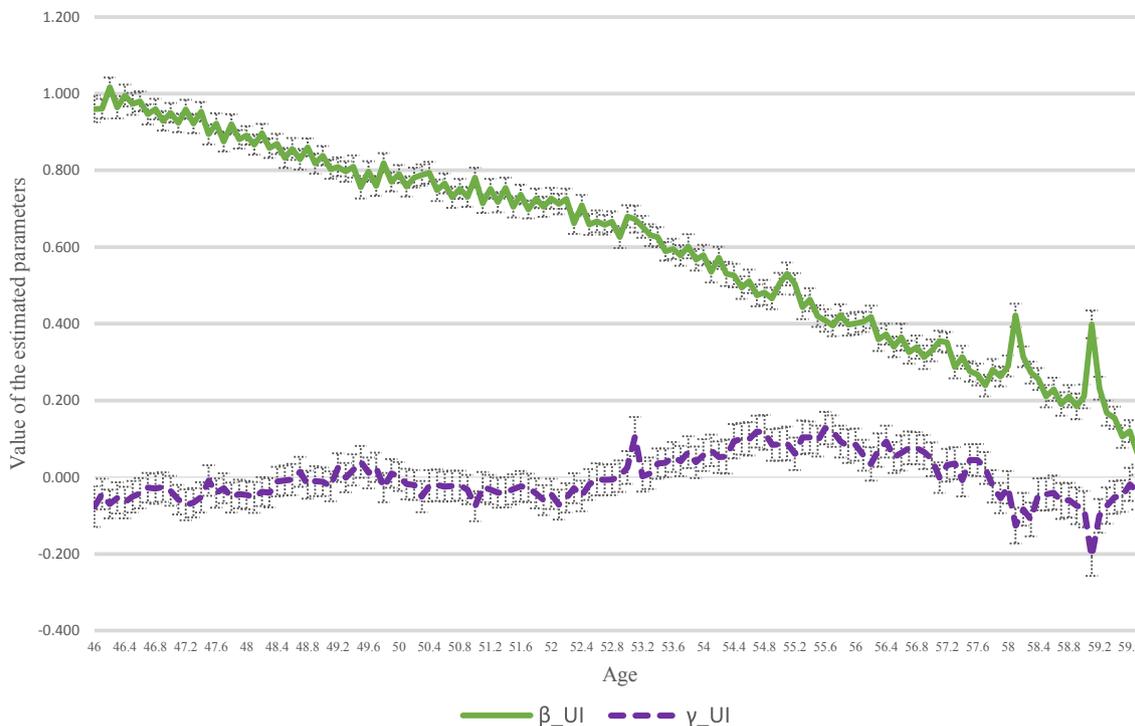


Fig. 4. OLS parameter estimates: β (age pattern of UI inflow with no reform) and γ (before/after change imputable to the policy change). UI admissions. PES data files (January 2010–December 2014). Note: The dashed lines show the standard error of the parameters.

confirm the descriptive analysis shown previously. Focusing on the age interval 51–57, most significant deviations from the reference are consistent with the before-the-reform age-related UI 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.

What was the impact of the July 2012 reform on the age patterns of UI admissions? The γ 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 remained relatively high (about 10% higher) for those aged between 54 and 57. In sum, we observe no significant change in the number of UI admissions from age 46 to 53. 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 UI 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 from 50 to 58. In order to measure deviations from the age trend at these threshold ages, we estimate the following equation:

$$\log Y_{i,t} = \alpha_t + \beta_\tau + \sum_{age} [(\gamma_{age}^b m_{<age} + \eta_{age}^b m_{\geq age})(b_t) + (\gamma_{age}^a m_{<age} + \eta_{age}^a m_{\geq age})(1 - b_t)] + \varepsilon_{i,t} \quad (2)$$

where the dependent variable is the same as in Eq. (1); α_t captures again the calendar monthly fixed effects; β_τ is an age trend, so estimated deviations are compared to this trend; and b refers to ‘before the reform measurement’, being equal to 1 for observations before the reform and 0 otherwise. The parameters of interest are those associated with $m_{<age}$, which takes value 1 for the three month-age groups just below the threshold age, and 0 otherwise; and $m_{>age}$, which takes value 1 for the three month-age groups just above the threshold age, and 0 otherwise. Therefore, parameters γ_{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 η_{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 age range 46–59.

Overall results are presented in Table 1, while Table 2 provides the results for UI admissions broken down by cause of entry and

Table 1
Analysis of Eq. (2): UI admissions. OLS estimates. PES data files (January 2010–December 2014).

| | | Before | After |
|----------------|----------|------------------------|------------------------|
| 50 years | γ | 0.00198 (0.00882) | 0.0198*** (0.00709) |
| | η | 0.0141* (0.00820) | 0.0169* (0.00950) |
| 51 years | γ | 0.0189** (0.00923) | 0.00817 (0.00820) |
| | η | 0.0488*** (0.00878) | 0.0193** (0.00903) |
| 52 years | γ | 0.0533*** (0.00812) | 0.0248*** (0.00845) |
| | η | 0.0833*** (0.00938) | 0.0417*** (0.00803) |
| 53 years | γ | 0.0554*** (0.00961) | 0.0667*** (0.00999) |
| | η | 0.0926*** (0.0129) | 0.152*** (0.0132) |
| 54 years | γ | 0.0493*** (0.0113) | 0.113*** (0.00897) |
| | η | 0.0480*** (0.0105) | 0.123*** (0.0104) |
| 55 years | γ | 0.00344 (0.0121) | 0.125*** (0.0103) |
| | η | 0.0611*** (0.0112) | 0.154*** (0.0118) |
| 56 years | γ | -0.00332 (0.0107) | 0.109*** (0.0114) |
| | η | 0.0178 (0.0111) | 0.0914*** (0.0108) |
| 57 years | γ | -0.0207* (0.0125) | 0.0668*** (0.0109) |
| | η | 0.0180* (0.0104) | 0.0585*** (0.0119) |
| 58 years | γ | -0.0240** (0.0105) | -0.0272** (0.0110) |
| | η | 0.0760*** (0.0126) | 0.0122 (0.0135) |
| N | | 8260 | |
| R ² | | 0.903 | |

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

entitlement duration. According to Table 1, the relatively higher number of entries observed before the age of 54 (with small peaks at ages 52 and 53, and a smaller one at age 51) before the reform moved to 53 and above (showing a large peak at age 53, large values at age 54 and another peak at age 55) after the reform. The increasing number of entries declines clearly after the age of 55 before the reform and after the age of 57 after the reform. These findings are consistent with those obtained in the previous analysis.

After the reform, the large peak at 53 is clearly observed for admissions of workers due to layoffs, among an otherwise depressed level of entries until age 55, and workers with the maximum UI entitlement of 24 months, maintaining relatively high level of entries until age 57 (see Table 2). For both groups, another peak exists at 55. However, before the reform, small peaks are only observed at ages 53 and 55 among the former and at ages 52, 53 and, above all, 55 among the latter.

In the case of entries due to STW and with medium UI potential entitlements (14–22 months), the after-reform peaks at 53 and 55 are less visible (there is only one at 53 for the former and one at 55 for the latter). Moreover, there are some indications that the higher admissions until 54 (at ages 52–53) before the reform have moved to 54 and above (at ages 54, 55 and 56) after the reform for those entering due to STW.

Finally, those after-reform peaks are not visible at all for entries due to the ending of temporary contracts and with shorter potential durations (4–12 months). These categories are made up of workers who have less attachment to companies and shorter employment records, which makes them the group of workers that the reform should not have affected.

In sum, the number of UI entries increased significantly at the age of 53 and remained relatively high (about 10–15% higher) for those aged between 54 and 57 after the reform, especially for certain categories of workers. These findings suggest 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.

The impact of the reform on the age of workers at admission

In order to proceed empirically to quantify the impact of the reform on the age of unemployed workers at entry into UI, we can estimate two independent linear trends, before and after the date of the reform, and compare the results for both age groups considered previously (46–51 and 52–59). The date of the reform is t^* : 13 July 2012. For any UI 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:

$$Y_i = \alpha + \beta_0 t_i + \rho T_i + \beta_1 T_i t_i \quad (3)$$

Where $t_i = t_i - t^*$ and $T_i = 1(t_i \geq t^*)$. Parameters β_0 and capture the age trends before and after 13 July 2012, respectively; parameter ρ ensures that trends are measured independently; and α captures the mean age of the worker (\bar{Y}).

Table 3 provides the OLS estimation of model (3) over the age groups for UI admissions, by cause of entry and entitlement duration. The mean age at admission is 48.8 for the 46–51 group and 55.5 for the 52–59 group. Before the reform, the trend is significantly positive for the 46–51 group while significantly negative for the 52–59 group; after the reform, the reverse is true: the trend of mean age at admission is significantly negative for the 46–51 group while significantly positive for the 52–59 group (see panel A). This behaviour reflects what happened to the category of 24 months of entitlement duration in the 46–51 group, and is clearly visible for nearly all categories of workers in the 52–59 group, but especially those with the maximum duration of 24 months, dismissed workers and those in STW (see panels B and C).

Table 2
Analysis of equation (2): 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

| | | Layoff | | End of contract | | STW | | Other reasons | |
|----------------|----------|------------------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|----------------------|---------------------|
| | | Before | After | Before | After | Before | After | Before | After |
| | | 50 years | γ | -0.0468*** (0.0129) | 0.00811 (0.0116) | 0.0499*** (0.0110) | 0.0686*** (0.00989) | 0.000568 (0.0209) | -0.0251 (0.0197) |
| | η | -0.0523*** (0.0120) | -0.0142 (0.0140) | 0.0827*** (0.0121) | 0.0775*** (0.0117) | 0.0175 (0.0198) | -0.0155 (0.0212) | 0.0656 (0.0562) | 0.0473 (0.0670) |
| 51 years | γ | -0.0354*** (0.0132) | -0.0386*** (0.0125) | 0.0711*** (0.0112) | 0.0830*** (0.0115) | 0.0459** (0.0222) | -0.0454** (0.0223) | 0.115* (0.0612) | -0.0272 (0.0618) |
| | η | -0.0198 (0.0127) | -0.0571*** (0.0146) | 0.109*** (0.0118) | 0.110*** (0.0114) | 0.0987*** (0.0201) | 0.0102 (0.0217) | 0.107* (0.0627) | 0.0271 (0.0599) |
| 52 years | γ | -0.0211* (0.0121) | -0.0548*** (0.0120) | 0.113*** (0.0109) | 0.105*** (0.0122) | 0.120*** (0.0191) | 0.0290 (0.0233) | 0.173*** (0.0627) | 0.0144 (0.0619) |
| | η | 0.0110 (0.0126) | -0.0483*** (0.0141) | 0.141*** (0.0124) | 0.126*** (0.0123) | 0.149*** (0.0234) | 0.0844*** (0.0197) | 0.204*** (0.0631) | -0.0512 (0.0610) |
| 53 years | γ | -0.0299** (0.0144) | -0.0641*** (0.0134) | 0.0957*** (0.0128) | 0.143*** (0.0115) | 0.186*** (0.0233) | 0.188*** (0.0225) | 0.0387 (0.0671) | -0.0668 (0.0659) |
| | η | 0.0383** (0.0180) | 0.135*** (0.0284) | 0.121*** (0.0146) | 0.135*** (0.0139) | 0.204*** (0.0233) | 0.225*** (0.0247) | 0.140*** (0.0512) | -0.0617 (0.0614) |
| 54 years | γ | -0.0121 (0.0153) | -0.0410*** (0.0122) | 0.109*** (0.0138) | 0.133*** (0.0148) | 0.102*** (0.0251) | 0.342*** (0.0216) | -0.00817 (0.0631) | -0.0286 (0.0645) |
| | η | -0.0269** (0.0125) | -0.0120 (0.0139) | 0.115*** (0.0133) | 0.114*** (0.0143) | 0.134*** (0.0255) | 0.404*** (0.0210) | 0.110* (0.0610) | 0.0878 (0.0628) |
| 55 years | γ | -0.0766*** (0.0166) | -0.0420*** (0.0135) | 0.0490*** (0.0140) | 0.133*** (0.0151) | 0.162*** (0.0209) | 0.411*** (0.0200) | 0.0453 (0.0651) | 0.0593 (0.0641) |
| | η | 0.0552*** (0.0171) | 0.0574** (0.0163) | 0.0611*** (0.0131) | 0.143*** (0.0137) | 0.130*** (0.0240) | 0.408*** (0.0234) | 0.0253 (0.0667) | 0.0625 (0.0621) |
| 56 years | γ | -0.0487*** (0.0138) | -0.00253 (0.0156) | 0.0338** (0.0139) | 0.0929*** (0.0153) | 0.0410 (0.0329) | 0.370*** (0.0205) | -0.0122 (0.0636) | 0.0489 (0.0582) |
| | η | 0.00502 (0.0139) | 0.0137 (0.0146) | 0.0223 (0.0154) | 0.0546*** (0.0154) | 0.0698*** (0.0258) | 0.321*** (0.0238) | -0.0503 (0.0616) | 0.0177 (0.0642) |
| 57 years | γ | -0.0300* (0.0154) | -0.0335** (0.0153) | -0.0105 (0.0164) | 0.0241 (0.0169) | -0.0271 (0.0320) | 0.334*** (0.0222) | 0.00256 (0.0710) | 0.0682 (0.0603) |
| | η | 0.0346*** (0.0134) | -0.0160 (0.0152) | 0.0200 (0.0162) | -0.00350 (0.0173) | 0.0121 (0.0252) | 0.299*** (0.0242) | -0.0501 (0.0691) | -0.0144 (0.0719) |
| 58 years | γ | -0.0260* (0.0154) | -0.0747*** (0.0174) | -0.0155 (0.0176) | -0.0351** (0.0171) | -0.0303 (0.0311) | 0.103*** (0.0255) | -0.0985 (0.0644) | 0.0562 (0.0628) |
| | η | 0.138*** (0.0174) | 0.0853*** (0.0210) | -0.0192 (0.0142) | -0.0504** (0.0201) | 0.107*** (0.0304) | -0.0213 (0.0314) | -0.0599 (0.0669) | 0.0107 (0.0638) |
| N | | 8,260 | | 8,260 | | 8,260 | | 8,260 | |
| R ² | | 0.770 | | 0.927 | | 0.842 | | 0.167 | |

Panel B. UI inflows by entitlement duration

| | | 4–12 months | | 14–22 months | | 24 months | |
|----------|----------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| | | Before | After | Before | After | Before | After |
| | | 50 years | γ | 0.0495*** (0.0106) | 0.0655*** (0.0105) | 0.0144 (0.0171) | 0.0228 (0.0182) |
| | η | 0.0702*** (0.0120) | 0.0757*** (0.0113) | 0.0573*** (0.0159) | 0.0257 (0.0209) | -0.0489*** (0.0122) | -0.0171 (0.0139) |
| 51 years | γ | 0.0684*** (0.0131) | 0.0875*** (0.0121) | 0.0596*** (0.0159) | 0.0338* (0.0204) | -0.0294*** (0.0114) | -0.0579*** (0.0122) |
| | η | 0.0964*** (0.0117) | 0.103*** (0.0120) | 0.113*** (0.0160) | 0.0428** (0.0203) | -0.000108 (0.0131) | -0.0378*** (0.0128) |
| 52 years | γ | 0.113*** (0.0123) | 0.102*** (0.0117) | 0.107*** (0.0166) | 0.0176 (0.0180) | -0.000162 (0.0117) | -0.0205* (0.0112) |
| | η | 0.135*** (0.0127) | 0.137*** (0.0118) | 0.108*** (0.0209) | 0.0239 (0.0228) | 0.0591*** (0.0144) | -0.0129 (0.0124) |
| 53 years | γ | 0.0876*** (0.0130) | 0.133*** (0.0124) | 0.0818*** (0.0194) | 0.0731*** (0.0193) | 0.0402*** (0.0141) | 0.0258* (0.0140) |
| | η | 0.0989*** (0.0141) | 0.122*** (0.0145) | 0.125*** (0.0178) | 0.0868*** (0.0242) | 0.0979*** (0.0195) | 0.186*** (0.0252) |
| 54 years | γ | 0.0815*** (0.0126) | 0.127*** (0.0141) | 0.123*** (0.0196) | 0.114*** (0.0222) | 0.0172 (0.0185) | 0.109*** (0.0156) |
| | η | 0.105*** (0.0127) | 0.109*** (0.0139) | 0.108*** (0.0205) | 0.0709*** (0.0243) | 0.0137 (0.0150) | 0.157*** (0.0162) |
| 55 years | γ | 0.0395*** (0.0134) | 0.119*** (0.0157) | 0.0413** (0.0201) | 0.0854*** (0.0257) | -0.00832 (0.0169) | 0.151*** (0.0118) |
| | η | 0.0526*** (0.0118) | 0.119*** (0.0145) | 0.0932*** (0.0164) | 0.135*** (0.0258) | 0.0873*** (0.0181) | 0.211*** (0.0152) |
| 56 years | γ | 0.0351** (0.0141) | 0.0679*** (0.0154) | -0.00862 (0.0218) | 0.109*** (0.0228) | -0.00663 (0.0140) | 0.146*** (0.0158) |
| | η | 0.0440*** (0.0118) | 0.0507*** (0.0145) | -0.0236 (0.0218) | 0.0337 (0.0228) | 0.0343** (0.0140) | 0.141*** (0.0158) |

(continued on next page)

Table 2 (continued)

| | | 4–12 months | | 14–22 months | | 24 months | |
|----------------|----------|-------------|------------|--------------|----------|-----------|----------|
| | | Before | After | Before | After | Before | After |
| 57 years | γ | (0.0154) | (0.0143) | (0.0214) | (0.0253) | (0.0149) | (0.0141) |
| | | –0.0158 | 0.0110 | –0.0152 | 0.0448* | –0.00817 | 0.106*** |
| | η | (0.0160) | (0.0173) | (0.0237) | (0.0257) | (0.0167) | (0.0150) |
| | | 0.0151 | –0.0105 | 0.0220 | –0.00785 | 0.0427*** | 0.112*** |
| 58 years | γ | (0.0158) | (0.0177) | (0.0233) | (0.0285) | (0.0127) | (0.0146) |
| | | –0.0387** | –0.0491*** | 0.00646 | 0.00759 | –0.0185 | –0.0247 |
| | η | (0.0169) | (0.0167) | (0.0272) | (0.0284) | (0.0151) | (0.0152) |
| | | –0.00804 | –0.0350* | –0.0232 | –0.0383 | 0.158*** | 0.0462** |
| | | (0.0140) | (0.0207) | (0.0268) | (0.0317) | (0.0185) | (0.0209) |
| N | | 8,260 | | 8,260 | | 8,260 | |
| R ² | | 0.927 | | 0.803 | | 0.832 | |

Most importantly, ρ measures the effect of the reform as is captured by the discontinuity in average age. The estimated parameter turns out to be statistically significantly negative for the 46–51 group (those with the maximum entitlement duration and in STW) and positive for the 52–59 group (those with the maximum potential duration, dismissed and in work-sharing programmes).

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

$$Y_i = \beta_0 + \beta_1 S_i + \beta_2 R_i + \beta_3 S_i R_i + \beta_4 X_i + \varepsilon_i \quad (4)$$

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 age 52 and over at the date of UI admissions, and 0 otherwise. X_i represents a vector of exogenous control variables for the individuals (gender, citizenship, number of children, region of residence, occupation and industry affiliation) and ε_i is the error term in the model.

Results (with and without exogenous control variables) are provided in Table 4 for the entire sample and broken down by cause of entry and entitlement duration. β_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 nearly all the models the former is estimated around 48.8, while the latter just below 55.5 (48.6 and 55.0, respectively, when controls are added). β_1 is meant to capture the impact of the change in rules that is common to all older workers. It is statistically significantly positive, suggesting that some underlying common impact of the legal change is at work. However, it is not found to be statistically significant for workers in STW and with medium and long UI potential entitlements (14–22 months and 24 months), when we do not take account of observable characteristics of workers and jobs, and for laid-off workers and those entering due to ‘Other reason’, when we do.

The DID effect (β_3) is statistically significantly negative but small in the estimates either with or without controls in the case of all UI admissions, and similar for those accessing UI due to the ending of a contract and those with short entitlement durations. However, it is positive and relatively large (0.27, i.e. three months) when the cause of entry is ‘Others’, and positive and marginally significant for workers with long entitlement durations, dismissed workers and those in STW.⁹

⁹ As an extension of the analysis carried out in this subsection, we have also estimated the impact of the reform on the average age at UA 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

Our estimated effects for these groups are similar to those obtained by Baguelin and Remillon (2014) for France, who found that a PBD reduction of 20 months increased by four 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.

Taken these results together, they may indicate that firms retained some workers who, having turned between 52 and 55 years, would have been fired in the absence of the reform, and were more active in putting older workers in work-sharing arrangements (implying temporary layoffs and reductions of the working time) after the reform, which subsequently translated into layoffs and unemployment with increased likelihood for participants (Arranz et al., 2018).

Robustness checks

In order to test the robustness of our baseline estimates, we examine whether our main results are robust to alternative definitions of the control group.

One concern is whether some workers assigned to the control group are truly unimpacted by the policy change and thus should also belong to the treated group. This would be the case for workers aged 50–51, if one thinks that they could have been affected by the reform of the unlimited UA benefits. Although workers who were 50–51 years-old were not at least directly affected, because they did not meet one of the requirements to qualify for the benefits (age), it is likely that some of them were indirectly affected by the policy change, because they did fulfil some other conditions (employment records, for instance). We acknowledge that some of them (probably, those dismissed and with the longest entitlements) could have been potentially affected, but they would be a minority within the 46–51 age group. This fact, and the difficulties to separate adequately those who were potentially affected and those who were not, is the reason why we included the whole group of workers aged 50–51 within the control group. The findings from subsection 5.1 tend to support our decision, since no (or very small) effects have been detected for ages 50 and 51.

Nevertheless, we have estimated Eq. (4) using workers aged 46–49 (thus, excluding those who are 50–51 years-old) as the control group. The results provided in panel A of Table 5 are remarkably similar to those examined previously. The DID effect (β_3) is negative and small in the case of the overall UI admissions, positive and small for workers accessing UI due to ‘Layoff’ or ‘STW’ and with long entitlement durations, and positive and large when the cause of entry is ‘Others’. Therefore, the exclusion of worker aged 50–51 from the control group do not alter our main results.

As an additional robustness check, we have used workers aged 60–64 as an alternative control group. This group is characterised by

(footnote continued)

cases fulfil all the conditions to receive the ‘52/55ys. benefit’.

Table 3
 Linear regression (OLS estimation) on mean age with changing trend: UI admissions. PES data files (January 2010-December 2014).

| Panel A. Entire sample and age group | | | | |
|--------------------------------------|-----------------------------|-------------------------------|-----------------------------|--------------------------|
| | Entire sample | 46–51 | 52–59 | |
| $\widehat{\beta}_0$ | 0.000272*** (0.0000135) | 0.0000589*** (0.00000823) | –0.000182*** (0.0000115) | |
| $\widehat{\rho}$ | 0.0164* (0.00924) | –0.0162*** (0.00573) | 0.0165** (0.00770) | |
| $\widehat{\beta}_1$ | –0.000447*** (0.0000162) | –0.0000501*** (0.00000990) | 0.000216*** (0.0000138) | |
| $\widehat{\alpha}$ | 52.10*** (0.00692) | 48.83*** (0.00430) | 55.46*** (0.00579) | |
| N | 2,475,926 | 1,298,617 | 1,177,309 | |
| Panel B. By cause of UI entry | | | | |
| | Layoff | End of contract | Short-time work | Other reasons |
| <i>46–51</i> | | | | |
| $\widehat{\beta}_0$ | –0.00000806 (0.0000137) | 0.0000333*** (0.0000119) | 0.000184*** (0.0000219) | 0.0000664 (0.0000759) |
| $\widehat{\rho}$ | –0.0101 (0.00971) | –0.0170** (0.00841) | –0.0550*** (0.0141) | –0.0589 (0.0513) |
| $\widehat{\beta}_1$ | 0.0000157 (0.0000169) | 0.0000237* (0.0000140) | –0.000177*** (0.0000291) | –0.000124 (0.0000895) |
| $\widehat{\alpha}$ | 48.80*** (0.00726) | 48.78*** (0.00631) | 49.00*** (0.0103) | 48.95*** (0.0400) |
| N | 446,181 | 661,909 | 172,980 | 17,547 |
| <i>52–59</i> | | | | |
| $\widehat{\beta}_0$ | –0.000173*** (0.0000182) | –0.0000222 (0.0000185) | –0.000493*** (0.0000268) | –0.0000741 (0.000102) |
| $\widehat{\rho}$ | 0.0232* (0.0127) | –0.0397*** (0.0129) | –0.0950*** (0.0152) | 0.158** (0.0675) |
| $\widehat{\beta}_1$ | 0.000187*** (0.0000225) | 0.0000822*** (0.0000216) | 0.00118*** (0.0000338) | 0.000206* (0.000120) |
| $\widehat{\alpha}$ | 55.72*** (0.00943) | 55.28*** (0.00971) | 55.31*** (0.0113) | 55.45*** (0.0523) |
| N | 457,343 | 477,568 | 225,013 | 17,385 |
| Panel C. By entitlement duration | | | | |
| | 4–12 months | 14–22 months | 24 months | |
| <i>46–51</i> | | | | |
| $\widehat{\beta}_0$ | 0.0000110 (0.0000121) | 0.0000207 (0.0000207) | 0.000107*** (0.0000135) | |
| $\widehat{\rho}$ | –0.0176** (0.00845) | –0.0213 (0.0153) | –0.0296*** (0.00914) | |
| $\widehat{\beta}_1$ | 0.0000499*** (0.0000142) | 0.00000375 (0.0000258) | –0.000123*** (0.0000169) | |
| $\widehat{\alpha}$ | 48.77*** (0.00633) | 48.79*** (0.0112) | 48.92*** (0.00685) | |
| N | 656,396 | 185,842 | 456,379 | |
| <i>52–59</i> | | | | |
| $\widehat{\beta}_0$ | –0.0000135 (0.0000189) | –0.0000168 (0.0000307) | –0.000467*** (0.0000164) | |
| $\widehat{\rho}$ | –0.0477*** (0.0131) | –0.0369 (0.0225) | 0.0400*** (0.0106) | |
| $\widehat{\beta}_1$ | 0.0000487** (0.0000221) | 0.000140*** (0.0000381) | 0.000847*** (0.0000204) | |
| $\widehat{\alpha}$ | 55.29*** (0.00983) | 55.39*** (0.0165) | 55.58*** (0.00792) | |
| N | 466,005 | 146,148 | 565,156 | |

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4
 DID estimate of the effect of a reduction in entitlement duration: UI admissions. PES data files (January 2010-December 2014).

| Panel A. Without regressors | | | | | | | | |
|-----------------------------|-------------------------------------|------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|------------------------------------|
| | All | Cause of entry | | | | Entitlement duration | | |
| | | Layoff | End of contract | STW | Other reasons | 4–12 months | 14–22 months | 24 months |
| β_1 | 0.0151 ^{***} (0.00305) | -0.00945 [*] (0.00518) | 0.0349 ^{***} (0.00427) | 0.0160 [*] (0.00844) | -0.0638 ^{**} (0.0268) | 0.0271 ^{***} (0.00430) | 0.00186 (0.00801) | 0.00759 (0.00517) |
| β_2 | 6.738 ^{***} (0.00390) | 6.991 ^{***} (0.00620) | 6.523 ^{***} (0.00599) | 6.552 ^{***} (0.00965) | 6.562 ^{***} (0.0350) | 6.534 ^{***} (0.00608) | 6.619 ^{***} (0.0101) | 6.900 ^{***} (0.00595) |
| β_3 | -0.0573 ^{***} (0.00520) | 0.0377 ^{***} (0.00858) | -0.0450 ^{***} (0.00783) | 0.00657 (0.0126) | 0.268 ^{***} (0.0446) | -0.0575 ^{***} (0.00793) | 0.0239 [*] (0.0143) | 0.0566 ^{***} (0.00797) |
| β_0 | 48.80 ^{***} (0.00227) | 48.80 ^{***} (0.00377) | 48.77 ^{***} (0.00323) | 48.93 ^{***} (0.00628) | 48.92 ^{***} (0.0209) | 48.76 ^{***} (0.00327) | 48.78 ^{***} (0.00563) | 48.87 ^{***} (0.00382) |
| <i>N</i> | 2,475,926 | 903,524 | 1,139,477 | 397,993 | 34,932 | 1,112,2401 | 331,990 | 1,021,535 |
| <i>R</i> ² | 0.737 | 0.744 | 0.730 | 0.727 | 0.734 | 0.730 | 0.735 | 0.736 |

| Panel B. With regressors | | | | | | | | |
|--------------------------|-------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|----------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| | All | Cause of entry | | | | Entitlement duration | | |
| | | Layoff | End of contract | STW | Other reasons | 4–12 months | 14–22 months | 24 months |
| β_1 | 0.0575 ^{***} (0.00319) | 0.00850 (0.00549) | 0.0692 ^{***} (0.00443) | 0.0829 ^{***} (0.00887) | -0.0355 (0.0280) | 0.0601 ^{***} (0.00445) | 0.0420 ^{***} (0.00836) | 0.0456 ^{***} (0.00550) |
| β_2 | 6.480 ^{***} (0.00391) | 6.710 ^{***} (0.00624) | 6.330 ^{***} (0.00597) | 6.266 ^{***} (0.00972) | 6.325 ^{***} (0.0351) | 6.347 ^{***} (0.00606) | 6.440 ^{***} (0.0101) | 6.606 ^{***} (0.00601) |
| β_3 | -0.0428 ^{***} (0.00510) | 0.0201 ^{**} (0.00842) | -0.0436 ^{***} (0.00771) | 0.0232 [*] (0.0124) | 0.278 ^{***} (0.0440) | -0.0605 ^{***} (0.00781) | 0.0219 (0.0141) | 0.0136 [*] (0.00786) |
| β_0 | 48.59 ^{***} (0.0141) | 48.57 ^{***} (0.0190) | 48.66 ^{***} (0.0113) | 48.45 ^{***} (0.0445) | 48.62 ^{***} (0.0868) | 48.62 ^{***} (0.0273) | 48.83 ^{***} (0.0372) | 48.64 ^{***} (0.0276) |
| <i>N</i> | 2,475,926 | 903,524 | 1,139,477 | 397,993 | 34,932 | 1,122,401 | 331,990 | 1,021,535 |
| <i>R</i> ² | 0.747 | 0.754 | 0.737 | 0.739 | 0.743 | 0.737 | 0.741 | 0.747 |

Note: Estimations of models in panel B include personal characteristics (gender, nationality, number of children and region) and job attributes (occupation, industry, cause of entry and entitlement duration). Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

being entitled to the unlimited benefits before and after the reform. The estimate results are shown in panel B of Table 5. In this case, the coefficient for the DID effect is significantly positive overall, meaning that the reform caused an increase in the age of entrance into UI for workers aged 52–59 after the reform compared to workers aged 60–64 and relative to the period before the change. Moreover, the effect is significantly positive for each category of workers, being especially large (above 0.20, i.e. nearly three months) when they entered UI because of STW or ‘Other reason’. Reassuringly, the results obtained with the use of this alternative control group confirm and strengthen our baseline results.

Conclusions

This paper has investigated one feature of the incentive effects of the UCS 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 UI is much scarcer. However, this is a promising avenue for research because it relates to the potential influence of UCS 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 UI inflow.

In Spain, the existence of an unlimited UA 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, the pattern of UI

admissions altered: accessions moved from ages below 53 to ages 53–57, increasing the accessions by 10–15%. Furthermore, this latter behaviour seems to be explained by admissions of workers with the maximum UI entitlement (24 months) and who enter UI 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 inflows have had an influence on the age of older workers when entering the UI benefits. When we estimate the impact of the 2012 reform on the average age at UI entry of older workers, a significantly positive effect of between one and three months is found in the case of admissions related to layoffs, short-time work and other reasons (mainly ‘agreed’ quits and layoffs of discontinued permanent workers), and for workers with long UI entitlement periods. Results not shown suggest that the effect is six months 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 ‘52/55ys. benefit’. We take these results 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 later to shed labour.

Our results, thus, suggest that the UCS 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

Table 5

DID estimate of the effect of a reduction in entitlement duration: UI admissions. Results with alternative control groups. PES data files (January 2010–December 2014).

| Panel A. Control group: 46–49 years-old | | | | | | | | |
|---|-------------------------------------|------------------------------------|-------------------------------------|-----------------------------------|----------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| | All | Cause of entry | | | | Entitlement duration | | |
| | | Layoff | End of contract | STW | Other reasons | 4–12 months | 14–22 months | 24 months |
| β_1 | 0.0486 ^{***} (0.00250) | 0.0129 ^{***} (0.00439) | 0.0396 ^{***} (0.00336) | 0.104 ^{***} (0.00729) | -0.00284 (0.0224) | 0.0366 ^{***} (0.00336) | 0.0480 ^{***} (0.00640) | 0.0430 ^{***} (0.00452) |
| β_2 | 7.792 ^{***} (0.00362) | 8.009 ^{***} (0.00578) | 7.634 ^{***} (0.00555) | 7.686 ^{***} (0.00900) | 7.729 ^{***} (0.0326) | 7.649 ^{***} (0.00564) | 7.758 ^{***} (0.00933) | 7.953 ^{***} (0.00556) |
| β_3 | -0.0265 ^{***} (0.00469) | 0.0266 ^{***} (0.00771) | -0.0191 ^{***} (0.00715) | 0.0475 ^{***} (0.0113) | 0.239 ^{***} (0.0404) | -0.0414 ^{***} (0.00724) | 0.0150 (0.0130) | 0.0130 [*] (0.00716) |
| β_0 | 47.30 ^{***} (0.0149) | 47.22 ^{***} (0.0200) | 47.43 ^{***} (0.0114) | 47.10 ^{***} (0.0464) | 47.20 ^{***} (0.0916) | 47.42 ^{***} (0.0287) | 47.48 ^{***} (0.0395) | 47.22 ^{***} (0.0294) |
| N | 189,3654 | 704,838 | 846,970 | 315,087 | 26,759 | 833,856 | 250,007 | 809,791 |
| R ² | 0.822 | 0.816 | 0.831 | 0.798 | 0.811 | 0.832 | 0.827 | 0.802 |

| Panel B. Control group: 60–64 years-old | | | | | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|------------------------------------|-------------------------------------|
| | All | Cause of entry | | | | Entitlement duration | | |
| | | Layoff | End of contract | STW | Other reasons | 4–12 months | 14–22 months | 24 months |
| β_1 | -0.0281 ^{***} (0.00461) | -0.0461 ^{***} (0.00626) | -0.0469 ^{***} (0.00797) | -0.0279 [*] (0.0143) | 0.0486 (0.0325) | -0.0509 ^{***} (0.00800) | -0.0324 ^{***} (0.0122) | -0.0170 ^{***} (0.00629) |
| β_2 | -5.985 ^{***} (0.00462) | -5.851 ^{***} (0.00653) | -6.285 ^{***} (0.00780) | -5.661 ^{***} (0.0131) | -6.179 ^{***} (0.0382) | -6.273 ^{***} (0.00788) | -6.349 ^{***} (0.0120) | -5.714 ^{***} (0.00641) |
| β_3 | 0.0839 ^{***} (0.00599) | 0.0557 ^{***} (0.00881) | 0.0947 ^{***} (0.0100) | 0.224 ^{***} (0.0165) | 0.205 ^{***} (0.0465) | 0.0727 ^{***} (0.0101) | 0.120 ^{***} (0.0164) | 0.104 ^{***} (0.00830) |
| β_0 | 61.10 ^{***} (0.0188) | 61.04 ^{***} (0.0247) | 61.42 ^{***} (0.0185) | 60.40 ^{***} (0.0668) | 61.10 ^{***} (0.116) | 61.47 ^{***} (0.0420) | 61.61 ^{***} (0.0512) | 61.01 ^{***} (0.0342) |
| N | 1,491,773 | 638,986 | 574,313 | 254,334 | 24,140 | 561,217 | 189,507 | 741,049 |
| R ² | 0.628 | 0.664 | 0.592 | 0.501 | 0.679 | 0.593 | 0.655 | 0.639 |

Note: Estimations of models in panel A and B include personal characteristics (gender, nationality, number of children and region) and job attributes (occupation, industry, cause of entry and entitlement duration). Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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 9500 euros per worker aged 55–57 eligible for the ‘regional extended benefits programme’ in Austria, while Kyyrä and Pesola (2020) 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 5000 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 unlimited UA benefits and their changes may induce responses by firms and workers resulting in varying UI inflows, with effects that appear to be quantitatively significant and may result in large costs/savings for the UCS. 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 UI 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 UI 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.

CRedit authorship contribution statement

José M. Arranz: Methodology, Software, Validation, Data curation, Writing - original draft, Writing - review & editing, Supervision. **Carlos García-Serrano:** Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing, Supervision.

Declaration of Competing Interest

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.

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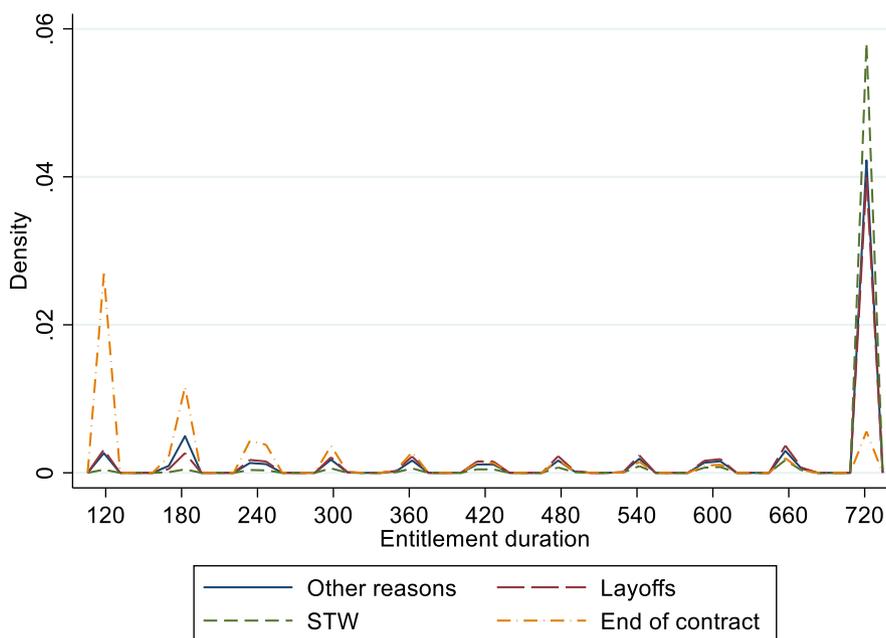
Appendix

Table A.1

Sample means at the time of entering UI benefits: before and after policy change. Age groups 46–51 and 52–59. UI admissions. PES data (2010–2017).

| | Before law change | | After law change | | Difference | | DID |
|---|-------------------|-----------|------------------|-----------|--------------|--------------|---------------------------------|
| | 46–51 (1) | 52–59 (2) | 46–51 (3) | 52–59 (4) | Diff (3)-(1) | Diff (4)-(2) | (Diff (4)-(2)) - (Diff (3)-(1)) |
| Age | 48.804 | 55.542 | 48.819 | 55.499 | 0.015 | -0.042 | -0.057 |
| Gender (Man) | 0.576 | 0.631 | 0.563 | 0.607 | -0.012 | -0.024 | -0.012 |
| Nationality (Spanish) | 0.883 | 0.927 | 0.892 | 0.933 | 0.009 | 0.006 | -0.003 |
| Industry | | | | | | | |
| Missing values | 0.004 | 0.004 | 0.002 | 0.002 | -0.002 | -0.002 | 0.000 |
| Agriculture and fishing | 0.053 | 0.042 | 0.075 | 0.056 | 0.022 | 0.014 | -0.008 |
| Manufacture | 0.196 | 0.264 | 0.176 | 0.257 | -0.020 | -0.007 | 0.013 |
| Building | 0.159 | 0.150 | 0.110 | 0.101 | -0.049 | -0.049 | 0.000 |
| Services | 0.588 | 0.541 | 0.637 | 0.585 | 0.049 | 0.043 | -0.005 |
| Occupations | | | | | | | |
| Missing value | 0.069 | 0.071 | 0.000 | 0.000 | -0.069 | -0.071 | -0.002 |
| Military | 0.024 | 0.021 | 0.000 | 0.000 | -0.024 | -0.021 | 0.003 |
| Directors and managers | 0.009 | 0.011 | 0.014 | 0.015 | 0.005 | 0.004 | -0.001 |
| Scientific and intellectual professionals | 0.027 | 0.023 | 0.060 | 0.048 | 0.033 | 0.025 | -0.008 |
| Mid-level professional technicians | 0.034 | 0.036 | 0.064 | 0.063 | 0.030 | 0.027 | -0.003 |
| Administrative support staff | 0.099 | 0.107 | 0.181 | 0.176 | 0.081 | 0.069 | -0.012 |
| Service workers | 0.128 | 0.106 | 0.178 | 0.159 | 0.050 | 0.052 | 0.002 |
| Farmers and skilled workers | 0.015 | 0.013 | 0.017 | 0.015 | 0.001 | 0.002 | 0.000 |
| Officials, operators and artisans of mechanical arts and other crafts | 0.123 | 0.129 | 0.132 | 0.141 | 0.009 | 0.012 | 0.003 |
| Operators of facilities and machines and assemblers | 0.077 | 0.103 | 0.111 | 0.167 | 0.034 | 0.064 | 0.030 |
| Elementary occupations | 0.393 | 0.381 | 0.243 | 0.217 | -0.150 | -0.164 | -0.014 |
| Number of children | 0.938 | 0.452 | 1.006 | 0.536 | 0.068 | 0.084 | 0.017 |
| <i>Cause of UI entry</i> | | | | | | | |
| Layoff | 0.364 | 0.426 | 0.327 | 0.359 | -0.037 | -0.068 | -0.031 |
| End of contract | 0.490 | 0.384 | 0.526 | 0.423 | 0.036 | 0.040 | 0.003 |
| STW | 0.134 | 0.177 | 0.132 | 0.202 | -0.002 | 0.025 | 0.027 |
| Other reasons | 0.012 | 0.013 | 0.015 | 0.016 | 0.003 | 0.003 | 0.001 |
| <i>Entitlement duration</i> | | | | | | | |
| 4–12 months | 0.478 | 0.372 | 0.528 | 0.415 | 0.049 | 0.043 | -0.006 |
| 14–22 months | 0.163 | 0.141 | 0.127 | 0.111 | -0.036 | -0.031 | 0.005 |
| 24 months | 0.359 | 0.487 | 0.345 | 0.474 | -0.013 | -0.013 | 0.001 |
| <i>Regions</i> | | | | | | | |
| Andalucía | 0.160 | 0.137 | 0.165 | 0.132 | 0.004 | -0.006 | -0.010 |
| Aragón | 0.050 | 0.076 | 0.062 | 0.120 | 0.012 | 0.043 | 0.031 |
| Asturias | 0.021 | 0.021 | 0.022 | 0.022 | 0.001 | 0.001 | 0.001 |
| Baleares | 0.028 | 0.029 | 0.035 | 0.036 | 0.007 | 0.007 | 0.001 |
| Canarias | 0.050 | 0.041 | 0.050 | 0.038 | 0.001 | -0.002 | -0.003 |
| Cantabria | 0.013 | 0.013 | 0.013 | 0.013 | 0.000 | 0.000 | 0.000 |
| Castilla León | 0.043 | 0.039 | 0.041 | 0.038 | -0.003 | -0.001 | 0.001 |
| Castilla La Mancha | 0.051 | 0.052 | 0.050 | 0.052 | -0.001 | 0.000 | 0.001 |
| Cataluña | 0.166 | 0.175 | 0.155 | 0.152 | -0.012 | -0.023 | -0.011 |
| Comunidad Valenciana | 0.117 | 0.118 | 0.111 | 0.108 | -0.006 | -0.010 | -0.004 |
| Extremadura | 0.027 | 0.022 | 0.026 | 0.023 | -0.002 | 0.001 | 0.002 |
| Galicia | 0.055 | 0.056 | 0.053 | 0.052 | -0.002 | -0.004 | -0.001 |
| Madrid | 0.117 | 0.119 | 0.120 | 0.120 | 0.003 | 0.001 | -0.002 |
| Murcia | 0.032 | 0.027 | 0.032 | 0.026 | 0.001 | -0.001 | -0.001 |
| Navarra | 0.015 | 0.015 | 0.015 | 0.015 | 0.000 | -0.001 | -0.001 |
| País Vasco | 0.045 | 0.050 | 0.043 | 0.045 | -0.001 | -0.005 | -0.004 |
| La Rioja | 0.007 | 0.007 | 0.007 | 0.007 | 0.000 | 0.000 | 0.000 |
| Ceuta | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| Melilla | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| R (= 1 if age 52–59) | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 |
| S (= 1 after law change) | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.000 |
| S*R | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000 | 1.000 |
| No. individuals | 582,593 | 519,895 | 716,024 | 657,414 | | | |

Before policy change



After policy change

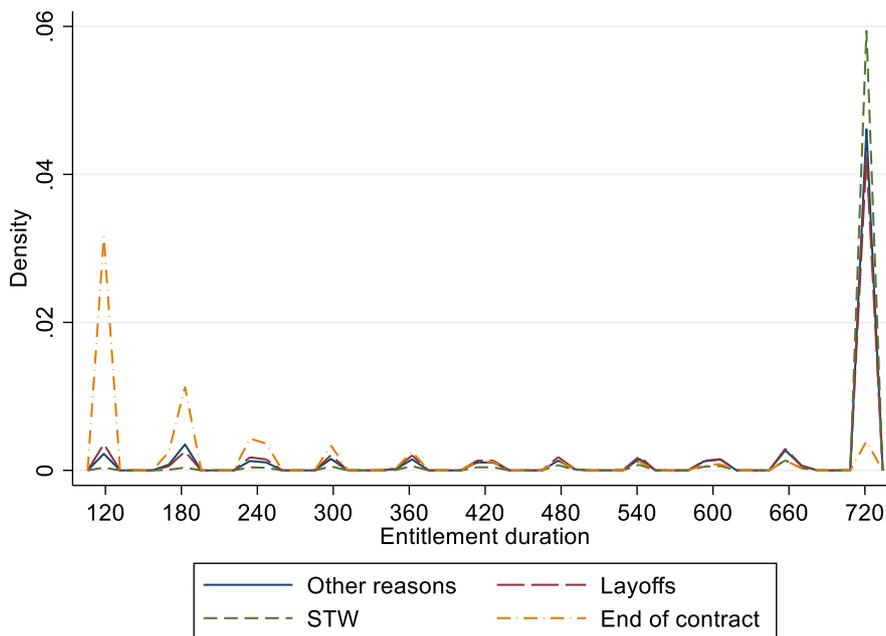


Fig. A.1. Kernel density: entitlement duration by cause of entry, before and after change in rules. UI admissions. PES data files (January 2010–December 2014). Before policy change. After policy change.

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