The French Pension Reforms and their Impact on Unemployed Older Workers

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Abstract

This paper analyzes labour market position of unemployed older individuals after the implementation of two major pension reforms in France. We use the French Force Labour Survey for the period 2003-2011 to assess the effects of the 2003 and the 2010 pension reforms on the exit rate from unemployment of individuals aged over 54. Using a difference-in-differences approach, we look at the effects of these reforms on the exit from unemployment to employment, and into inactivity. We find that the 2003 pension reform reduces significantly the exit to employment, while there is no significant impact of the pension reform on the exit to inactivity. For the 2010 reform, we show that the reform leads to an increase of the probability to go back to work. At the same time, the transition out of labour force through inactivity exit also rises. Unemployment and other social schemes are used as a bridge to retire early.

Keywords: Pension reforms, Unemployed older workers, Difference-in-Differences estimation
JEL: J3, J14, J24
Fields: Labour Economics, Microeconometrics

Since the early 1970s, older workers, aged 50 or over, the labour market has been characterized by a low employment rate for most of European countries. The situation is particularly worrying in France where the labour force participation rate is one of the lowest among developed countries. For example, 47.1 % of those, aged between 55 and 64, were employed in 2014 (the rate is more striking for those aged between 60 and 64 (23.3%)) and the employment rates are lower than those observed in the European Union (EU27) (see Figure 1). Another important aspect of labour market of senior workers concerns the unemployment rate which has risen recently. Since the 2008 crisis, the situation for the over fifties is getting worse with an unemployment rate increasing, from 4% in 2008 to 7.5% in 2014[1], due largely to the crisis and measures which exempt older unemployed workers from actively seeking employment. This fact is illustrated in Figure 2, where we present the French unemployment rate of workers aged between 55 and 64 years old for the past fourteen years. Average unemployment rates are nearly around 4.5% until 2007 and displays an important increase by 1.4 percentage point in 2009, and the trend persists up to now. Although older people are less exposed to unemployment than the young, they experience difficulties in leaving this state. The situation is particularly difficult for older jobseekers. Their chances of re-employment are reduced thereby, increasing the length of time spent in unemployment, and then find themselves in a long-term unemployment trap. For example, in 2012, 61% of unemployed workers aged over 55 years where in long-term unemployment, compared to 47% in the OECD. Furthermore in almost one in two older workers do not move directly from employment to retirement. Before retirement, older unemployed tend to experience a lengthy spell of unemployment at the end of their working life[2].

The low employment rate of older workers and the difficulties encountered in returning to employment have attracted attention in public and political debates in many European countries. It has also raised questions about the sustainability of contribution-based state pension systems in context of aging population. In this context, policy-makers have taken several measures in order to improve the labour market participation of older individuals. At the same time one of the main features of pension reforms was to increase the minimum retirement age.

This paper examines the effect of the increase of number of years contributions induced by pension reforms on the unemployment of older workers in France. The main objective is therefore to assess the impact of the pension reforms introduced in France on exit rate out of unemployment and into employment of unemployed older workers. The analysis is focused on workers aged 55 and older, and whether the introduction of these pension reforms have lead to an increase in the exit out of unemployment.

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[1]Source: OECD (2014)
[2]Source: OECD (2014)

A first indicator of the difficulties encountered by older workers in the labour market can be found in the return to employment of an unemployed older worker compared to younger unemployed workers. Figures 3 to 7 show the exit rate from unemployment to employment drawn from the French Labour Force Survey (FLS) for the period 2003-2011 (Figures 3 and 5) and from unemployment to inactivity (Figures 6 and 7). The exit rate from unemployment to employment is low for the seniors and decreases with age. The exit rate is generally lower for the 55-59 age-group than for the 50-54 age-group. From 2003 up to 2008, workers aged 55 and older tend to experience fewer exits to employment than unemployed workers with younger age groups. After 2008, the exit to employment for seniors increased thereby reducing the gap between age-groups. Similar conclusions appear for the exit to inactivity which is higher for the unemployed in the 55 and over age bracket. Between 55 and 59, the transition from unemployment to inactivity is greater than to employment, due to the possibilities of leaving the labour force through early retirement or specific schemes for older unemployed workers. A decrease is observed after the crisis, for the over 50s but the decline is more pronounced for the 55-59. At the same time, there is a slight increase in the exit to employment for seniors, although older unemployed workers remain longer in unemployment.

In this paper, we analyse how the effects of the pension reforms implemented in the last decade in France on employment of older people have affected the exit from unemployment. The period of study allows us to investigate the impact of two main pension reforms on the labour market of older workers in France: the 2003 and 2010 reforms. The main finding is that the different pension reforms implemented in France appear to have limited effects on exits out of unemployment for older unemployed persons. The 2003 French reform has effects on the re-employment of unemployed older workers. In almost all cases, the effects are significantly different from zero. However we find no impact of the reform on the exit to inactivity. For the 2010 reform, we find evidence of an increase of the probability of going back to work, while the 2010 reform seems to have some significant effects in increasing transitions out of labour force. The results are robust to alternative specifications. This paper is organized as follows: We begin the paper by first presenting an overview of the literature relative to employment of older workers in Section 1. Section 2 gives a briefly review the organisation of French social security system to understand the reforms recently enacted and their consequences on the labour market. Section 3 describes the data set used before presenting the approach applied to analyse the effects of reforms on the labour market of older workers. Section 4 reports the results of our model . Section 5 presents some sensitivity analysis before concluding in section 6.

1. Institutions and Unemployment of Older Workers: Evidence from the Empirical Literature

Even though an improvement of the participation rate among older persons is observed in recent years, the employment of older people remains low compared to most of the major EU countries. France is also faced with the challenge of higher unemployment among older persons for whom it remains difficult to find employment after age of 55 in France. The unemployment rate is still high with almost one in four unemployed workers aged over 49. It is an important policy issue to have effective ways of helping older unemployed people to remain into labour market in the context of an increasing unemployment rate.

Several reasons can explain the low labour force participation rate of older workers. One of them is the labour market policies implemented in France which has a tradition of early-retirement and special treatment for older unemployed workers since 1980, since the access to disability benefits or unemployment benefits, enabled them to exit early from the labour market. Another factor that affects the participation in labour market is directly related to the jobseekers' decisions. In a search model, if the reservation wage of the unemployed jobseeker is higher, the utility of being in unemployment state is higher, involving a lower probability to leave unemployment.

Difficulties encountered by the older workers in finding employment could also explain this low rate with the issues related to age discrimination and negative stereotypes of older workers' productivity (Neumark (2008), Neumark and Button (2014)). In addition, the financial difficulties encountered by the social system in a context of aging society, the persistently low rate of participation of older workers in the labour force becomes a central question in national and international politics. Delaying retirement by working longer is one of the levers used to finance the French social system. Having a job or being able to find an employment at older ages is essential for the sustainability of the French social model. Given the difficulties for a senior to find a job, getting older unemployed workers back into work becomes a major problem. In an attempt to address these issues, public authorities and social partners have taken numerous measures to keep seniors in employment and to promote greater participation of seniors in the labour market over the last 20 years. These measures have been strengthened by the National Action Plan on employment for seniors (2006-2010) with the aim of reaching an employment rate of 50 % for the 55-64 age group in 2010 (such as the "contrat senior" temporary contract, for up to 18 months, for those aged over 56). The reforms implemented in France, with the raising of the legal minimum retirement age and the measures to encourage workers to remain longer in the labour force, are a key to increase the labour market participation of older workers and to limit the consequences of aging population on financing social welfare and on economic growth.

Previous studies have analyzed how pension reforms affect the labour force behaviour of seniors. They have found that the raising in the retirement age entails an increase in labour force participation. Mastrobuoni (2009) examines the impact of the pension reform that has raised the normal age of retirement and reduced benefits in the United States. He finds that the policy changes have significant impact on the labour supply of older workers. Retirement is delayed for the cohorts affected by the reform by one month for each of two month increase in the normal age of retirement (or statutory retirement age). García-Pérez, Jiménez-Martín and Sánchez-Martín (2013) analyse the impact of the 2002 pension reform implemented in Spain on older workers. The reform delays the minimum age of retirement from age 60 to 61 in order to reduce the strategic use of the benefit unemployment benefit program by employers and employees as a means of early retirement. Using a double difference approach on administrative data, the authors find that the reform has significant impact on workers' decisions. The flow transition from unemployment to employment decreases significantly after the implementation of the law. They also show that employers' decisions change after the application of the law. The firing rate at 58 and 59 increases, reflecting the strategic use of unemployment insurance by companies for their employees to withdraw early from the workforce.

The French case has also been studied by for example Aubert (2012) who examines the impact of the 1993 French pension reform on the retirement age. Using administrative data from "régime général" for French wage-earners of the private sector, Aubert finds a significant increase in age of retirement for individuals affected by the 1993 pension reform. He also shows that the probability of retiring early increases significantly by encouraging individuals to claim specific benefits (disability pensions, long careers,...). Bozio (2008) reports similar results of the effects of the 1993 reform. The extension of the minimum contribution period for pension eligibility has positive effects on the employment of older workers aged between 55 and 60. The author shows that the increase in senior's employment is driven by two mechanisms: the distance to retirement age (at 60) and the missing years to full rate pension. He finds a negative impact of distance to retirement on labour supply for men over 56 years of age. The probability of leaving employment is lower when the distance to retirement increases. The results suggest there are strong incentives to leave the labour market when the duration until the minimum contribution years is short. Benallah (2011) analyzes the financial incentives induced by the 2003 pension reform on the employment of older workers. For the 1944 generation, the "surcôtes" (i.e. penalty rates) lead to a raise in the probability of employment after 60, the age of minimum retirement, by 7 percent points and an increase around 0.2 years of the age of liquidation rights. However, Benallah points out that these results are specific to the cohort studied and the impact on all cohorts should be examined to evaluate the effect of the reforms in a long-term perspective.

Finally Staubli and Zweimüller (2013) evaluate the impact of the 2000 and 2004 reforms in Austria which have increase the age of early retirement. Using administrative data on private-sector wage earners, they show that

the policy changes have reduced retirement among seniors (by 19 percent points among men affected and 25 percent point among women affected). They also find that the increase in the early retirement age leads to a higher unemployment rate of older workers (increase in the demand for unemployment insurance of 10 percent points among men and 11 percent pints among women). Tightening access to retirement can moderate the effects of pension reforms on employment and leads to substitution effects between early retirement schemes. Alternative schemes such as unemployment, sickness or disability leave can be used to leave the labour force before being eligible to full pension entitlement. Mostly studies which have analysed the effect of pension reforms suggest that these measures are effective in increasing the employment of seniors. However, few studies evaluate how the pension reforms affect the labour market behaviour of unemployed older workers. Our study examines the impact of recent pension reforms on the labour market behaviour of unemployed older workers.

2. A Brief Overview of the French Pension System and Its Reforms

The French pension system is divided into three major occupational groups: the private sector, the public sector and the self-employed. Wage-earners in the private sector which represent about 70 percent of the labour force, the pension depends on two mandatory pillar schemes. The first pillar, the "Caisse Nationale d'Assurance Vieillesse des Travailleurs Salariés" (CNAV), is a general regime (régime général) which pays a basic pension based on years of contributions and on a reference wage. The pension system is based on pay-as-you-go (PAYG) financing. The system, based on solidarity between generations: current contributions from workers and employers, based on earnings, are used to pay current pensions of the retired individuals. Pensions received are proportional to the number of years that a worker has made contributions and to a reference wage. The conditions required to receive a full rate pension are: to have contributed a minimum duration (from 40 years to 41.5 years following the reforms, see in section 2.1 for details) and to have reached the minimum age of retirement (from 60 to 62 years - 2010 reform) or to have reached the mandatory age retirement (65 to 67 years - after the 2010 reform). For a full career, workers are entitled to a pension equal to 50 percent of a reference wage computed on the basis of their past wages. However, the amount of pension can be reduced/increased in the case of missing/additional quarters (see next section).

The second pillar is a compulsory complementary scheme constituted of two pension funds, depending on the occupation categories. The "Association pour le Régime de Retraite complémentaire de Salariés" (ARRCO), for all workers and the "Association Générale des Institutions de Retraite des Cadres" (AGIRC) for executives only. These schemes are also based on a PAYG financing and pensions from these supplementary schemes are based on system of points. Employees accumulate points during their careers, the value of which determines the level of the pension received. Wage-earners belonging to the public sector (around 20% of the labour force)

or to large national firms and self-employers (around 10% of the labour force) have their specific schemes and are covered by a single pillar. Public sector schemes provide more generous pensions (final six months salary rather than the last 25 years for the private schemes). However since 2003 special schemes have been integrated to the Social Security pension scheme in order to standardize the French retirement system.

In the remainder of this section we discuss the changes in the public pension scheme induced by these measures.

2.1. The 2003 Pension Reform

Reforms have been implemented over the last decade in order to remove the incentive to leave the labour force early. The 2003 pension reform act introduced a series of measures to encourage seniors to remain in the labour force. The first of these measures was to reduce the differences in length contributions between public and private sector. This measure extended the number of years of contributions to qualify for a full rate to 40 years (it was previously 37.5 years) in the public sector and bring it in line with the private sector between April 1st 2004 and January 1st 2009 (not studied in this paper). After this convergence of conditions between public and private sectors, the duration of contributions required for a full rate pension was progressively increased for the both sectors. The number of contribution years required to receive a full pension at age 60 was increased gradually from 40 to 41 by January 2009. They increased by one quarter each year until 2012 for generations born between 1949 and 1952 (see Table 9). To encourage people to work longer and to delay their exit from the labour force, a system of bonus ("surcôte") was introduced. In case of delayed retirement after reaching the full rate, the pension would increase by 3% from January 1st 2004 per additional year of contribution (this rate was increased later and it has been 5% since January 1st 2009). In contrast, the social security pension was reduced for those retiring early. The 2003 reform corrected the penalty difference between sectors by reducing the penalty for early retirement in the private sector and increasing it in the public sector where it was weaker. A penalty of 5% per missing year is applied instead of 10 % in the private sector (1993 Balladur reform). Retirement due to an employer decision was prohibited from January 2010.

Another aspect of the 2003 reform affected the eligibility conditions for early retirement. Early retirement schemes allow older employees to stop work before retirement, while maintaining their income. In the private sector, early retirement schemes can be partially or fully supported by firms. While private early retirements depend entirely on the company, the State finances three types of mechanisms. The first early retirement scheme is entirely financed by the State including the Allocation Spéciale du Fonds National pour l'Emploi (AS-FNE), the Cessation Anticipée de certains Travailleurs Salariés (CATS), the Cessation anticipée des Travailleurs de l'Amiante (CAATA), the Préretraite progressive (PRP) allowing part-time work until retirement and the l'Allocation de Remplacement pour l'Emploi (ARPE). With the aim of increasing the labour supply

and demand of older employees, the 2003 pension reform tightened conditions for early retirement before age of 60 through an increase in the number years of contributions (CATS, AS-FNE) or the abolition of several measures (ARPE, FNE and PRP). The second early retirement scheme was introduced as a part of the 2003 pension reform and allows workers who started working at a very early age, who are disabled and with difficult working conditions the possibility of retirement before the age of 60. One of the aims of the August 2003 law was to provide equity between generations of workers. From January 1st 2004, individuals with long careers or with disabilities could retire before the minimum age retirement (60 years old in 2003). Workers with long careers, disability or who have worked in an unhealthy or physically environment can retire and claim their pensions before reaching the legal minimum retirement age. The third component is the Dispense de Recherche d'Emploi (DRE). The DRE allows unemployed older persons aged, above 55, to continue to receive unemployment benefits and be exempted from actively seeking employment. The DRE recipient is no longer considered as a job-seeker. It is equivalent to early retirement because it provides unemployment insurance until the unemployed person becomes eligible for a full pension. Among the measures to increase the employment rate of seniors was the progressive abolition of the Dispense de Recherche d'Emploi[3]. Eligibility criteria were progressively tightened after January 1st 2009 in order to lead to full abolition by January 1st 2012. The minimum age to qualify for job search exemption was progressively increased from 57 to 60 (an increase of one quarter per year in the requisite contributory period for entitlement to a full retirement pension since January 1st 2009). Measures taken for the 2009-2012 period (extending the required number of contribution years to reach 41 years in 2012) have made it more difficult to retire early.

The 2003 law also includes a number of other measures to encourage older workers to remain into labour market: relaxation of Delalande measure, which permitted to employers to pay a large penalty in order to be able to fire workers aged above 55, the possibility to buy missing years of contributions, the extension of the maximum retirement age to 70 and the introduction of a tax on early retirements fully financed by the companies in 2003 which was increased in 2008. The pension reform encourages contracting out to private sector and personal savings with the introduction of private pension funds based on employees' own savings. Occupational pension schemes are arrangements established by employers to provide pensions for their employees. However, retirement by capitalization remains marginal in France. Mandatory schemes (general and supplementary schemes) still provide 85% of pensioners' income. The remaining 15% comes from income from property and income from retirement products where the main saving tool used for retirement remains life insurance (life insurance and equity represent 45% and 24% of assets in 2013 respectively[4]).

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[3]Law of 1 August 2008 concerning the rights and duties of job seekers
[4]Source: Observatoire des Retraites Européennes Eres

2.2. The 2010 Pension Reform

The 2010 Pension Reform has gradually increased the qualifying age of retirement from 60 to 62 years effective as of July 1st 2011 to 2017 among generations born between 1951 and 1955, that is to 60 years and 4 months for those born between the first July 1951 and December 31st 1951, 60 years and 9 months for the 1952 birth cohort, and so on. Individuals born before the first July 1951 are not affected by this reform and can take their retirement at the age of 60. The law also involved the extension of the number of years of contributions to qualify for a full rate to 41 years. The minimum age for the full pension without the required years of contributions will be raised from 65 to 67 between 2016 and 2022 (see Table 9): Once the age of automatic entitlement to a full pension is reached, workers receive full pension even if the qualifying conditions are not satisfied. Among measures to promote labour demand for older people, financial incentives were provided for companies who hire unemployed workers over 55 and extended to companies that hire unemployed workers aged 45 or over in 2011. At the same time, the conditions for earlier exits have been reduced for a few exceptions such as early retirement for those with difficult working conditions. Since July 1st 2011, employees affected by this measure can receive a full pension benefits from the age of 60. Eligibility to retire at the age of 60 is maintained for workers whose state of health has deteriorated as a result of difficult working conditions, aggressive physical environment or due to specific working patterns. Workers with a permanent disability of at least 20% as a consequence of an occupational disease or of a professional activity can also retire early. Since November 1st 2012, measures for those with long careers have extended to those who started working before the age of 20. For these workers, retirement at the age of 60 is possible, provided that required years of contributions for the full pension has been validated and the length of contributions should exceed two years than the length required for their generation. The reform strengthens retirement savings with the establishment of several measures that encourage retirement pension investment plans in companies which cover all employees. Next to this reform, another took place in 2013 which increase the length of contribution period and the minimum retirement age[5].

3. Empirical Analysis

3.1. The Data Used

The data used for the analysis are taken from the quarterly French Labour Force Surveys (FLFS) for the period 2003-2011 conducted by the National Institute of Statistical and Economic Information (INSEE)[6]. The FLFS is a 18 month rotating panel of households where one sixth of the sample is replaced every quarters and each person who participates in the survey appears at most in 6 consecutive surveys. The survey is representative of

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[5]but not study here

[6] the period before 2003 is not covered since there was a methodological change to the FLFS in 2003. Until 2002, households Ire interviewed in March of each year during three consecutive years. One third of the households Ire replaced each year

the French population aged fifteen and over. The FLFS provides information on socio-demographic status such as age; gender; education level and occupation, and labour market status is known at each interview. One of the advantages of using a rotating panel data is the large number of observations contained in each sample, which guarantees a greater degree of representativeness compared to a long run of panel data (such as the PSID or the BHPS).

In this paper, we want to examine how the probabilities to re-employment and to early retirement are affected by pension reforms. For that, we focus on three dependent variables: The probability to exit unemployment (Exit henceforth) which will then be distinguished between exit to employment (Employment henceforth) and exit to inactivity (Inactivity henceforth). The FLFS allows us to construct flows of workers between three labour market states according to the International Labour Office definitions (ILO): Employment, Unemployment and Inactivity. And because individuals are followed for up to six quarters, we can observe the labour force state at each quarter and when therefore workers experience a transition into employment or out of labour force. Some of them remain unemployed throughout the period of the analysis. Therefore, we can construct the sample which is comprised by individuals aged between the ages of 54 and 64 for males and females. To construct the transition rate from unemployment, we select individuals who are unemployed in period t (i.e quarter t) and could potentially leave unemployment in period $t + 1$. We apply the same principle to construct the transition from unemployment to employment (or to inactivity) and select unemployed individuals in period t which could leave unemployment state to employment (or to inactivity) in period $t + 1$.

Table 1 contains characteristics of all individuals in the sample for the 2008-2009 period (column (1)) and for the 2011 period (column (2)), which corresponds to the period before and after the pension reforms. Means and proportions are displayed for both periods. Overall, the individual characteristics are stable between these two periods except for few cases. For instance, the share of men is slightly higher than women in 2008-2009 period. There is a slight decline in the average age which is around 58 years old, and we also find some differences in educational level. However, the sample is characterized by a low educational level, and more than one third of individuals have only basic secondary education. They are also characterized by a long spell of unemployment, and more than 20% of them have experienced an unemployment duration of more than 36 months.

We now present interesting stylized facts obtained by the data from the FLFS for the same periods. Tables 4 and 5 summarize flows and transition rates of unemployed workers before and after the two pension reforms. Transition matrix display flow out of unemployment for sample by groups affected or not by policy reform. In Table 4, we report transition of unemployed workers for the 2008 to 2009 period, which corresponds to one year before and one year after the 2003 pension reform. First, we note that a large share of unemployed

workers leave labour force for inactivity before the reform. After the 2003 pension reform, we observe fewer exit to employment and the exit to inactivity decreases, while the proportion of workers who remain unemployed increases after the policy changes. More than 50% of unemployed workers remain unemployed after the implementation of law. This period also correspond to the 2008 economic crisis, characterized by a high level of job separation and which could explains the high level of unemployed workers flows. The proportion of workers who remain in unemployment is more important for control group, while the increase in exit to employment is slightly stronger for treated group. Unemployed individuals experience less exit into employment and remain more longer in unemployment. Unemployment seems to be used as a bridge until retirement for older unemployed individuals.

For the 2010 pension reform (see Table 5), the share of transition of unemployed workers in different labour market states has changed significantly from January 2011 to December 2011. Exits to employment and to inactivity decrease after the implementation of the 2010 pension reform. Over this time period the share of unemployed workers who shift back to work decreases from 27.9 to 14.2%, and to 37.9 to 20.6% among those who become inactive after the policy reform. These decreases are accompanied by an increase of the share of unemployed workers who remain unemployed after the reform. This increase of unemployed proportion is particularly strong for individuals not affected by the pension reform. Our descriptive statistics indicate that the share of share of workers which remain in unemployment increases with the policy reform. To clearly assess the effects of pension reforms on labour market outcomes, we present in the next section the difference-in-differences approach used.

3.2. The Empirical Model: Difference-in-Differences Estimation

In this section, we explore the effects of both pension reforms on labour market outcomes for unemployed older workers. We focus especially on the effects on policy changes on job take-up, and also on exit to inactivity. The approach used to analyze the potential effects of these measures is a standard difference-in-differences method. The idea is to compare the evolution of the variable of interest, that is the exit from unemployment to employment or to inactivity, for the treatment group relative the control group. In regression terms, the approach as follows:

$$Y_{it} = \alpha + \beta_1 D_{Treated} + \beta_2 Post_t + \gamma(D_{Treated} * Post_t) + X_{it}\delta + \psi D_t + u_{it} \qquad (1)$$

where Y_{it} is equal to 1 if the individual i leaves unemployment for employment/ inactivity in the quarter t given that she was unemployed in the previous quarter, $t-1$, and 0 otherwise. $D_{Treated}$ is the treatment group, β_1 is the treatment-group specific effect which accounts for average permanent differences between treated

and control groups, and which is constant over time. $Post_t$ is a dummy variable which indicates whether the dependent variable is observed after the implementation of the policy change. It is a control for the time trend common to control and treatment groups. β_2 is therefore the estimated post-treatment which is the same for both treated and control groups. ψ_t are seasonal effects (quarters) and X_{it} represents individual specific characteristics to control observable differences between individuals (gender, education level, marital status, ...). The policy effect is captured by γ, the interaction term between the treatment group dummy and the policy year dummy. It captures the average effect of pension reform on exit rates.

The implementation of pension reforms, which affects specific groups of workers, creates a setting similar to a natural experiment. The effects of the reforms can be identified because they introduce heterogeneity in treatment among individuals. The gradual implementation of the reforms does not affect cohorts in the same way. The number of years of contributions and the age at which the full rate pension will be reached is different depending on year of birth. For individuals belonging to the same generation but with different careers, reforms affect them differently. Whatever the reforms, individuals are not affected in the same way. For example, workers born in 1949 have to contribute 161 quarters while those born in 1950 could contribute 162 quarters and those born in 1951 could contribute 164 quarters (see Table 9). The heterogeneity in the reform implementation over time and across cohorts creates a natural experiment and allows us to define the treated and control groups.

In our context, the treated group is composed of individuals affected by the pension reform. We define two distinct treated groups because we analyse the effects of two pension reforms. For the 2003 pension reform, the group of treatment is composed by individuals born between 1949 and 1952. The control group is by definition the group of individuals not affected by the policy changes. For the 2003 pension reform, control group is composed by individuals born between 1944 and 1948. We choose to define control group by older generations of unemployed workers, aged between 61 and 64 in 2009, because the 2003 reform did not modify the minimum age of retirement which was still possible at the age of 60 at this time (until the 2010 reform) for these cohorts. Younger generations of unemployed workers are not used as alternative control group first, because these generations are gradually concerned by the increase of length of contributions even if they are not affected at the time of study; secondly, because when we test the common trend assumption we detect significant effect on the 'fake' reform (see Section 5), which suggests that this group is not a good control group. Therefore we can exploit the heterogeneity introduced by the reform because control group are not subject to the 'treatment' during the whole period, while the treated group is subject to the new regulation. We proceed in the same way to define both control and treated groups for the 2010 pension reform. Individuals born from 1953 to 1957 are defined as the treated group, while those born from 1947 to 1952 are referred as the

control group as there are not affected by the 2010 pension reform. We chose to restrict the age of individuals between 49 and 64 years old to have homogenous groups as far as possible due to the identifying assumption behind the difference-in-differences estimation which is that trends in employment outcomes would have been the same between treated and control groups in the absence of a change in the policy.

We need next to define the period before and after the policy becomes effective. For the 2003 reform, the law was passed in August 21st 2003 but its implementation was January 1st 2009 for the private sector (and July 1st 2011 for the 2010 Reform as noted in section 2). The year 2008 is therefore defined as the control year and 2009, 2009-2010 as the treatment years. Years before 2008 are not taken as control years since the first step of the law was to increase the length of the contribution period in the public sector (effective between 2004 and 2008) and could influence our labour market outcomes. The year 2011 is not included in the post-treatment period since another measure starts at that time. January 2010 until June 2011 is defined as the pre-treatment period and July 2011 to December 2011 as the post-treatment period for the 2010 reform, as the policy was effective as of July 2011. We check the robustness of the results by varying the window of period around the reform threshold (one quarter before/after the implementation of the policy change, two quarters before/after, ...).

The validity of quasi natural experiment requires that the pension reforms are exogenous to shocks to participation rates of older workers. The difference-in-differences method is based upon the assumption that seasonal effect would have been the same for both treated and control groups in the absence of the pension reform. We test the common trend assumption in Section 5. Moreover control and treated groups seem to be comparable in terms of observable characteristics. Tables 2 and 3 summarize the demographic characteristics of unemployed individuals in each group. Overall, the null hypothesis of equality of means between treated and control groups cannot be rejected apart from two cases: significant differences are found for college/university degree (significant at 1%) and spell in unemployment for 18 to 23 months in Table 3.

4. The Effect of Pension Reform on Exit from Unemployment

In this section we analyse the effects of the reforms on leaving unemployment for employment, and on leaving unemployment for early retirement. First of all, we begin by presenting the effects of the 2003 reform on exit rates. Then we examine how the 2010 pension reform affects the transition out of unemployment.

We begin with the results of difference-in-differences estimates in Table 6 for exit out of unemployment (columns (1) to (3)), then we distinguish between two transition exits which are presented separately: the transition from unemployment into reemployment (columns (4) to (6)) and the transition from unemployment

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to inactivity (columns (7) to (9)). The dependent variable Y_{it} is a dummy equal to 1 if an unemployed worker in quarter t leaves unemployment in quarter $t + 1$ and 0 otherwise. The control group consists of individuals born between 1944 and 1948, and the treated group refers to those born between 1949 and 1952.

4.1. Effects of the 2003 Reform on Re-Employment

Table 6 presents the results of the estimation on the probability of an unemployed older individual to go back to work after the implementation of the 2003 pension reform. The first column reports the results without taking account seasonality while the second column presents the difference-in-differences estimates which control for seasonality. Columns 1 through 9 provide estimates of our key explanatory variable which is the effect of pension reform ($D_{Treated} * Post_t$). We do not report estimated results of other controls in Table 5 because the main interest of our study is the impact of the policy changes on leaving unemployment states. The other explanatory variables include sex, household composition characteristics, level of schooling.

The estimate which refers to the effect of the 2003 pension reform on unemployed workers, aged between 55 and 59 is $D_{Treated} * Post_t$, and it reports the average treatment effect on the treatment group. A positive and significant coefficient of γ means that the 2003 pension reform increases the exit rate out of unemployment. In our case, the coefficient is negative and significantly different from zero. The 2003 reform reduced the probability of leaving unemployment after the age of 50. However, because older unemployed workers are facing different choices, we investigate the effects of pension reform on two distinct exits. For this reason, we distinguish two separate exit destination (columns (4) to (9)): Unemployed workers can return to employment or leave labour force for sickness, family leave or retirement which we group together under the label 'inactivity'.

Turning now to the effects of the reform on unemployment exit to employment. Table 6 column (4) shows that the differences are strong and significant between treated and control groups. The 2003 reform reduces the probability of leaving unemployment for employment by 30 percentage points. The reform does not produce the desired effects on employment for the oldest, that is to say an increase in the re-employment of unemployed workers. Part of this finding may be found in restriction in access to early retirement for long careers since the 2003 pension reform, which leads to a substitution effect between unemployment and early retirement exits. According to official statistics of the Ministry of Labour and Employment, number of workers who leave the labour force for long careers decreased from 119,620 in 2008 to 24,017 in 2009, a decline of 80% over one year[7]. Older workers in unemployment are not encourage to actively search an employment, given that, they are eligible for long unemployment benefit duration. This is confirmed by the sharp increase of unemployment rate of older workers after the 2008 crisis. The French unemployment rate of workers aged between 55 and 64

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[7]Statistics can be found at: http://dares.travail-emploi.gouv.fr/dares-etudes-et-statistiques/statistiques-de-a-a-z/article/la-cessation-anticipee-d-activite-les-series-annuelles

years old increases by 1.4 percentage point just after the 2008 crisis and continuously rise thereafter (see Figure 2). This raises issues related to difficulties encountered by senior unemployed to find a new job and reluctance of employers to hire them.

Tightening eligibility criteria of early retirement schemes results in fewer exit to inactivity, at least for one birth cohort, and in fewer exit to employment. Older workers use unemployment as an alternative way to leave labour force before being eligible to pension age. On the other hand, the deterioration of health status could also explain why unemployment route is used as bridge until retirement. Indeed, literature reports that a poor health state tends to decrease the job opportunity of individuals. For instance, the study of Behaghel, Blanchet, Debrand and Roger (2011) on French data shows the correlation between being unemployed and being in bad health. Unemployed workers are more likely to prone to a poor health than employed workers. Therefore older unemployed workers in bad health are condemned to remain unemployed because they have a lower probability of being hired than those in good health. Transition out of labour force can take place trough unemployment exit.[8].

Reforms can affect transition out of unemployment in different way workers among treated cohorts. To see whether pension reforms have different effects within the treated group, we split treated group into four birth cohorts. The interaction between birth cohort and post-treatment period provides the effect of pension reform across birth cohorts (see Table 6 column (6)). The coefficients estimates on the interaction between post-treatment period and cohort dummies, $D_{1949} * Post_t$ to $D_{1952} * Post_t$, indicate whether the pension reform has heterogeneous effect among birth cohorts. The interaction terms show that the reform has not the same intensity among treated birth cohorts. The reform implies a significant decline of the probability to experience an exit from unemployment only for the 1951 birth cohort, while for the other cohorts the coefficients associated to the effect of the reform are negative, but statistically insignificant and smaller.

Concerning the transition into employment, $D_{1949} * Post_t$ to $D_{1952} * Post_t$ give now the estimated effects on the reform on the opportunity of re-employment of older workers. These results indicate that pension reform does not affect birth cohorts in same way. The effects of pension reform have the unexpected sign (i.e. we expect a positive sign for pension reform, which would mean that the reform increases the probability of reemployment of unemployed workers) and are negative and significant for only two cohorts: the 1949 and the 1951. The job take-up significantly declines after the policy change, particularly for the 1951 birth cohort. The implementation of the pension reform tends to decrease the job take-up of older unemployed workers. When undertaken separately for males and females, the effects of pension reform on job take-up are only significant for males. The results are presented in Table 8 through gender and destination exits. The coefficient

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[8]Unfortunately there is no information available on health status in FLFS

which measures the change of the job take-up is strongly negative for males, which suggest a decline of exit to employment. The decomposition by birth cohorts shows that all cohorts treated are all significant, and more pronounced in size than for females. In all cases, the negative effects of pension reform are mostly driven by male unemployed workers in the 1949 and 1951 birth cohorts.

4.2. Effects of the 2003 Reform on Exit to Inactivity

Turning now to the impact of the 2003 reform on exit to inactivity, Table 6 columns (7) and (8) show that the estimated coefficient $D_{Treated} * Post_t$ is negative but not significant, indicating that differences in exit to inactivity are small and not significant between treated and control groups after the policy change. There is no evidence that the pension reform reduces the exit to inactivity state (see Table 6 columns (7) to (9)). However, pension reform could have different effects according to the cohort. In order to achieve this, we investigate whether the pension reform has heterogeneous effect among birth cohorts. Table 6 column (9) presents the results from estimation among treated cohorts. Pension reform does not affect any of cohorts in treatment group except for one. The coefficient that captures the effect of pension reform is negative and significant at 10 level for the 1951 cohort, for which pension reform decreases the exits to inactivity. When the estimation is taken separately for males and females (see Table 8), the effects of pension reform on inactivity are only significant for males. In almost all cases, we only observe a reduction of exit to unemployment for the male unemployed workers in the 1951 birth cohorts following passage of pension reform. The inactivity response is strong this cohort of workers since the reform leads to a sizeable fall in exit to inactivity. Except this case, the 2003 pension reform has no impact on the exit out of unemployment, which can be explained by the fact the reform has focused more on keeping workers in employment rather than hiring or encouraging them to return to work.

To sum up, the 2003 pension reform has some effects on leaving unemployment, particularly on the exit to employment. The findings indicate that the effect of the reform is driven by particular birth cohorts. As there are fewer exits from unemployment to employment and to inactivity for cohorts affected by the reform, unemployed workers stay longer in unemployment after the policy change. Unemployment is used as a bridge to early retirement mostly due to strengthening of early retirement schemes and, given that in France, older workers have favorable unemployment insurance cover. The French insurance system encourages unemployed older individuals not to look for work, since they can remain unemployed and draw insurance benefits until they reach the age of retirement. Unemployed older workers can claim unemployment insurance benefits for three years for individuals over 50, while it is two years for those under 50 but seven years after the age of 58. Older persons continue to receive benefits until they reach the full retirement age. All these measures do not encourage unemployed persons to looking for work. This is for this reason that a large number of older workers

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leave their jobs voluntary through a negotiated separation with the employer ("Les ruptures conventionnelles") which allows them to receive unemployment insurance benefits until the age of full rate retirement is reached.

4.3. Effects of the 2010 Reform on Re-Employment

Now we discuss the effects of the 2010 reform on the probability of re-employment. The results are shown in Table 7. We examine the effects of 2010 pension reform through a comparison between the period just before the implementation of the reform, that is six months before (January to June 2011) and six months after (July to December 2011). Individuals born from 1947 to 1952 represent the control group, and those born from 1953 to 1957 refer to the treated group. We start with exit out of unemployment, then with the transition from unemployment to employment and conclude with the results for the transition into inactivity.

Table 7 presents the results of the 2010 reform on the probability of an unemployed older worker to leave unemployment to go back to work or to inactivity. Columns (1) to (3) present the estimated effects of the reform on the exit from unemployment, all exits taken together. Differences in exit between both groups are significant. Cohorts affected by the pension reform have lower exit rates than cohorts that were not affected. There are also fewer exits after the implementation of the law.

The results also suggest that the measures introduced in 2010 tend to improve the labour market participation of older unemployed individuals. However when the exit state is distinguished between exit to employment or to inactivity, another and interesting results emerge. The effect of the reform on the re-employment of unemployed workers given on Table 7 columns (4) to (6) is positive and significant at 1 percent level. The implementation of the 2010 pension reform increases the probability of going back to work increases by 25 percentage points. The reform has the expected effects of helping older workers to get back employment after unemployment spells. Measures taken to encourage employment of older workers such as financial incentives provided to companies who hire unemployed workers over 55, or the introduction of new job contracts to employ workers over the age of 57 seem to affect positively the reintegration into employment of seniors.

Table 7 column (6) presents estimates across the different cohorts affected by the pension reform. As in the 2003 pension reform, there is heterogeneity in the effects among cohorts. All coefficients for the interacted terms are positive and significant in almost case, suggesting that re-employment is higher for the treated group. All the cohorts – except the 1955 cohort – see their exit to employment increasing after the policy change. The results undertaken separately for males and females indicates that reform does not have the same impact (see bottom of Table 8). For the re-employment of older workers, the pension reform increases the probability of leaving state of unemployment into employment for both males and females, but once again there is an heterogeneity in pension reform effects among cohorts. The coefficients are statistically different from zero

for the 1953 and 1956 birth cohorts in the case of males. For females, the coefficients on the interaction terms show that the reform affects only the transition into employment for two birth cohorts, the 1954 and 1956 birth cohorts.

Several authors (Hairault, Langot and Sopraseuth (2010), Legendre and Sabatier (2014)) have emphasized the role played by institutional regulation to explain the labour market participation of older workers, especially in France where institutions are strong and protect workers. The distance to retirement, which is the time remaining until the eligibility age for the state pension benefits, explains how the retirement age decision affects older workers' employment prior to retirement. A short distance to retirement exerts negative feedbacks on both labour supply and demand by first discouraging older workers in actively job search, and secondly because the investment returns become less profitable as retirement approaches. Hairault, Langot and Sopraseuth (2010) find that increasing the minimum age of retirement from age 60 to age 62 will increase the employment rate of older workers through various channels. From demand labour point of view, employers will invest more on employing older workers because the horizon is longer, and returns become more profitable. From supply labour point of view, workers in employment will invest more in training while workers in unemployment will increase job search effort and will actively look for a job when the distance from the retirement age increases.

4.4. Effects of the 2010 Reform on Inactivity

We next investigate the effect of the 2010 pension reform on the exit out of labour force. Table 7 columns (7) to (9) provides the difference-in-differences estimates for the exit out of labour force of unemployed persons. Regression results displayed in columns (7) and (8) show that the coefficients which capture the impact of reform on inactivity path are positive and significant, whether seasonal effects are taken into account or not. The 2010 pension reform increases significantly the probability of leaving unemployment to inactivity of older unemployed workers by 20 and 16 percentage points without or with controlling for seasonality. One reason for the positive sign could be explained by a substitution effect that leads individuals to use inactivity route (which includes sickness benefits, disability pensions and pre-retirement) rather than 'normal' retirement one due to the restriction of early retirement schemes but still maintained for some categories of workers, and the increase of minimum retirement age from the age of 60 to the age of 62. Studies have highlighted the role played by disability benefits route to explain the low labour force participation of older workers in France (Behaghel, Blanchet, Debrand and Roger (2011), Behaghel, Blanchet and Roger (2014)). Behaghel and al. point out that disability and sickness benefits claims increased significantly as a consequence of the pension system. They explain that this rise of invalidity/disability benefits demand is due to the fact that individuals who used to not claim invalidity benefits (i.e. disability, sickness benefits) because they were eligible for a full-rate pension at the age of 60 – more financially attractive – before the pension reform, request for it (if

they are eligible for these benefits) after the reform which removes the possibility to take retirement early at the age of 60. This results in substitution between inactivity and other retirement pathways. The rise in take-up of invalidity benefits after change in length contributions is also found in Bozio (2008) in which an increase in required number of quarters for a full-rate pension involves a rise of receiving disability benefits of 2 percentage point. Hence, the increase in the minimum retirement age added to the progressive abolition of the DRE, with a sizeable decline of around 35% from January 2011 to December 2011 in comparison with a fall around 8% over the 2008-2009 period[9], can explain why pension reform increases the probability of leaving labour force early through inactivity pathway. Restrict access to unemployment insurance increases the importance of other routes which become more accessible (with, for example, the extension of long careers, disability schemes or early retirement for workers with difficult working conditions) to exit labour force early .

We also investigate the heterogeneity of the 2010 pension reform by splitting the sample into five birth cohorts. Column (9) of Table 7 presents estimates across cohorts affected by the pension reform. The results indicate that the pension reform affects significantly mainly one cohort in the case of exit to inactivity and, to a lesser extent, the 1957 cohort (it is only significant at 10 level). The result indicates that the 2010 reform leads to an increase of the exit to inactivity for the older cohort affected by the policy change. The reform increases the probability of leaving unemployment for inactivity by 30 percentage points for this cohort, while the transition to inactivity is not affected for the other ones.

When we analyse how the reform influence the transitions separately for males and females, we find again that the reform affects them differently in treated group (see bottom of Table 8 columns (5)-(6) and (11)-(12)). The coefficients for the interaction terms indicate that the reform impact on exit to inactivity is mainly driven by male unemployed workers, and especially by two cohorts: the 1953 and 1956 cohorts who react strongly to the reform. For the unemployed women, columns (11) and (12) report estimates of equation (1) for women. All estimates are smaller in size than for males, and are not statistically significant. There is therefore no evidence of a change in inactivity exit for women following the passage of the 2010 pension reform.

5. Robustness

In this section, we perform sensitivity checks of our findings. We begin by testing the common trend assumption of the difference-in-differences approach. The difference-in-differences approach assumes a common trend between treated and control groups. In other words, the trend in exit out of unemployment would have been the same for workers affected by the reform and those not affected without the reform. We perform a placebo

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[9]Figures can be found at: www.pole-emploi.org

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test to check the assumption of the common trend. For that, we estimate equation (1) for 2007 and 2008, two years before the implementation of the reform. We use the same treated and control groups and we assume that there is a change in policy that begins in 2008 while in reality there is no change in pension entitlement criteria during this period. If the common trend assumption is valid, we expect to find not evidence of effect of the reform. In Table 10 the coefficient which refers to the effect of the 'pseudo' pension reform is close to zero and statistically insignificant. It implies that macro effects or other institutional changes had a similar impact on both groups and provides the validity of results. The difference-in-differences seems to be appropriate.

Finally, estimates may depend on period used for the difference-in-difference estimation. In order to check the sensitivity of our results, we try several other sets of difference-in-differences regressions by varying the period of analysis, that is including/dropping years dummies in pre and post-period of analysis. Treated and control groups are the same that those used in main analysis. First, the impact of the 2003 pension reform is analysed by increasing the observation period one year before and after the policy change to one year before and two years after. The results presented in Table 11 columns (1) to (6) for the three exit cases. Starting with the likelihood of leaving unemployment without differencing exit destination, the decline is less pronounced but significant than those obtained in our main estimation. However the results are quite similar, and indicate that the 2003 pension reform decreases the probability to leave unemployment. The results are qualitatively and quantitively robust to the variation of the period window around the treatment threshold. Regarding the impact on re-employment, we find again negative signs of coefficients associated to the effect of the reform, after controlling for seasonal effects or not. Column 4 of Table 11 indicates that the pension reform is accompanied by a drop in job take-up of 20 percentage points. This decline is smaller compared to those obtained in Table 7, but it is significant at 5 percent level. Finally, columns (5) and (6) of Table 11 indicate that there is no effect on the exit to inactivity induced by the reform.

Turning to the results of the 2010 pension reform, we re-estimate the effects of the reform by including 2010 year as the pre-treatment years in the analysis sample and January 2010 to June 2011 is defined as the post-treatment years, and July 2011 to December 2011 as the control year. The results shown in Table 11 columns (7) to (12) for the exit from unemployment, to employment and to inactivity respectively. The findings are different from to those obtained in Table 7, except for the effects on exit to employment which are qualitatively similar. The estimates in Table 11 columns (8) illustrate that the reform leads to a decline in exit from unemployment, while the sign is significantly positive when the observation period is smaller. The reform again leads to a small increase in transition from unemployment into employment (column 10), while the effects on exit to inactivity are unaffected by the reform (columns (11) and (12)).

These findings suggest that the probability of re-employment of older unemployed workers decline after the

2003 pension reform, while it does not affect the probability of leaving unemployment to inactivity. However the results are mixed as regards the 2010 reform as we find evidence that this second reform leads to a rise in the re-employment of cohorts affected by the reform, while there is no impact on the exit to inactivity.

6. Conclusion

In this paper, we use a difference-in-differences approach to explore the impact of French reform pension on employment outcomes of unemployed older workers. Using the French Labour Force Survey for the 2003-2011 period, we attempt to identify the effects of two main pension reforms, the 2003 and 2010 pension reforms, on the exit out of unemployment of unemployed older workers. We also look at the effects of these both reforms on the re-employment of older unemployed workers, as well as on their exits to inactivity.

We find evidence of an impact of the 2003 French reforms on the re-employment of unemployed seniors. In almost all cases, the coefficients associated with the impact of the reform pension are significantly negative. The 2003 pension reform decreases the exit of unemployed older workers to employment. However the 2003 pension reform does not influence the probability of leaving unemployment for inactivity. The coefficients associated to the effect of pension reform have the expected signs but are not significant. The reform adopted in 2003 had only impact on re-employment of unemployed older individuals. When undertaken separately for males and females, we find that the effects of pension reform are mainly driven by males unemployed workers, while the effects are statistically insignificant for females. We also find substantial heterogeneity in pension reform effects among birth cohorts. We note that unemployed workers stay longer in unemployment after the 2003 policy change: Unemployment is used as a bridge to early retirement. This result is consistent with previous studies (Bozio (2008), García-Pérez, Jiménez-Martín and Sánchez-Martín (2013), Staubli and Zweimüller (2013)) which conclude that the increase in the early retirement age leads to a higher unemployment rate of older workers.

We also investigate the effects of the 2010 reform on the probability of re-employment and inactivity of unemployed older persons. The reform increases the probability to return to work of older workers, and also leads to a rise of the transition from unemployment for inactivity. The pension reform affects mainly male older workers and the impact is different within treated group. Our conclusion remains true after considering alternative specifications.

Reforms in pension system implemented since the last decade have pushed up the exit to inactivity or to unemployment of older unemployed workers: Unemployment and inactivity are used as alternative pathways to leave the labour force early. However the 2010 pension reform has address the difficulties encountered by

unemployed older people by increasing the probability of going back to work. Overall, the French pension system needs further reforms to encourage older workers to actively participate into labour market. As all policy measures should be taken to encourage employers to hire older workers. In the interests of sustainability of the French social system, it would be necessary to reform also labour demand side by increasing measures to provide incentives to promote the labour demand for older workers.

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Table 1: Means of the demographic variables for individuals present in 2008-2009/2011 and which experience an exit to employment or not

	Mean	Mean
	2008-2009	**2011**
Age	58.9	57.4
	(0.0772)	(0.0752)
Male	0.5585	0.5031
	(0.0183)	(0.0149)
Highest degree		
College/University	0.1811	0.1466
	(0.0142)	(0.0105)
Baccalauréat	0.1280	0.1262
	(0.0123)	(0.0099)
Brevet/CAP/BEP	0.3092	0.344
	(0.0170)	(0.0141)
No qualification	0.3814	0.3831
	(0.0179)	(0.0145)
Duration in unemployment		
Less than 1 month	0.0230	0.0287
	(0.0056)	(0.0050)
1 to 2 months	0.1294	0.1259
	(0.0127)	(0.010)
3 to 5 months	0.1539	0.1277
	(0.0136)	(0.0101)
6 to 11 months	0.1294	0.1583
	(0.0127)	(0.011)
12 to 17 months	0.1510	0.1416
	(0.0135)	(0.010)
18 to 23 months	0.0676	0.0722
	(0.0095)	(0.0078)
24 to 36 months	0.1237	0.1388
	(0.0124)	(0.0105)
More than 36 months	0.2215	0.2064
	(0.0157)	(0.0123)
Number of observations	734	1125

Note: Standard deviations in brackets
*** p<0.01, ** p<0.05, * p<0.1
Source: own calculations based on FLFS, 2003-2011

Table 2: Means of the demographic variables in treatment and control groups for individuals present in 2008-2009 period and which experience an exit out of to unemployment or not

	Treatment	Control	Difference
Age	57.9	61.9	-4.00***
	(0.0485)	(0.0945)	(0.1021)
Male	0.5488	0.5889	-0.0400
	(0.0215)	(0.0386)	(0.0444)
Single	0.4078	0.4478	-0.0399
	(0.0213)	(0.0390)	(0.0399)
Highest degree			
College/University	0.1684	0.2180	-0.0495
	(0.0160)	(0.0301)	(0.0325)
Baccalauréat	0.1153	0.1648	-0.0495
	(0.0136)	(0.0271)	(0.0282)
Brevet/CAP/BEP	0.3223	0.2712	0.0510
	(0.0200)	(0.0325)	(0.0390)
No qualification	0.3937	0.3457	0.0480
	(0.0209)	(0.0347)	(0.0410)
Duration in unemployment			
Less than 1 month	0.0207	0.0307	-0.010
	(0.0061)	(0.0135)	(0.0134)
1 to 2 months	0.1355	0.1104	0.0249
	(0.0148)	(0.0246)	(0.0300)
3 to 5 months	0.1616	0.1288	0.0328
	(0.0159)	(0.0263)	(0.0323)
6 to 11 months	0.1428	0.0858	0.0569
	(0.0151)	(0.0220)	(0.0300)
12 to 17 months	0.1447	0.1717	-0.0270
	(0.0152)	(0.0296)	(0.0320)
18 to 23 months	0.0620	0.0858	-0.0238
	(0.0104)	(0.0220)	(0.0676)
24 to 36 months	0.1259	0.1165	0.0093
	(0.0143)	(0.0252)	(0.0093)
More than 36 months	0.2067	0.2699	-0.0631
	(0.0175)	(0.0348)	(0.0371)
Number of observations	734	546	188

Note: Standard deviations in brackets
*** p<0.01, ** p<0.05, * p<0.1
Source: own calculations based on FLFS, 2003-2011

Table 3: Means of the demographic variables in treatment and control groups for individuals present in 2011 and which experience an exit out of unemployment or not

	Treatment	Control	Difference
Age	55.9	60.3	-4.4***
	(0.0517)	(0.0833)	(0.0945)
Male	0.4901	0.5303	-0.0402
	(0.0181)	(0.0262)	(0.0319)
Single	0.4311	0.4364	-0.0052
	(0.0179)	(0.0260)	(0.0316)
Highest degree			
College/University	0.1218	0.1988	-0.0770***
	(0.0118)	(0.0210)	(0.0224)
Baccalauréat	0.1192	0.1408	-0.0216
	(0.0117)	(0.0183)	(0.0212)
Brevet/CAP/BEP	0.3486	0.3342	0.0143
	(0.0172)	(0.0248)	(0.0303)
No qualification	0.4102	0.3259	0.0842***
	(0.0178)	(0.0246)	(0.0309)
Duration in unemployment			
Less than 1 month	0.0430	0.0416	0.0013
	(0.0211)	(0.0237)	(0.0318)
1 to 2 months	0.1182	0.0972	0.0210
	(0.0336)	(0.0351)	(0.0492)
3 to 5 months	0.1182	0.1212	-0.0067
	(0.0159)	(0.0263)	(0.0323)
6 to 11 months	0.2043	0.125	0.0793
	(0.0420)	(0.0392)	(0.0589)
12 to 17 months	0.1397	0.1666	-0.0268
	(0.0361)	(0.0442)	(0.0565)
18 to 23 months	0.0860	0.0138	0.0721**
	(0.0292)	(0.0138)	(0.0721)
24 to 36 months	0.1182	0.125	-0.0067
	(0.0336)	(0.0392)	(0.0515)
More than 36 months	0.1505	0.1666	-0.0161
	(0.0372)	(0.0442)	(0.0575)
Number of observations	1125	763	362

Note: Standard deviations in brackets
*** p<0.01, ** p<0.05, * p<0.1
Source: own calculations based on FLFS, 2003-2011

Table 4: Transition matrix from unemployment before (January to December 2008) and after policy changes (January to December 2009)

	Before			After		
	All	**Control**	**Treated**	**All**	**Control**	**Treated**
Unemployment	**47**	29	18	**255**	198	57
	(20.3%)	(17.4%)	(27.7%)	**(50.8%)**	(52.2%)	(46.3%)
Employment	**53**	46	7	**66**	46	20
	(22.8%)	(27.5%)	(10.7%)	**(13.1%)**	(12.2%)	(16.3%)
Inactivity	**132**	92	40	**181**	135	46
	(56.9%)	(55.1%)	(61.6%)	**(36.1%)**	(35.6%)	(37.4%)

Table 5: Transition matrix from unemployment before (January to June 2011) and after policy changes (July to December 2011)

	Before			After		
	All	**Control**	**Treated**	**All**	**Control**	**Treated**
Unemployment	**93**	17	76	**553**	164	389
	(34.2%)	(18.9%)	(41.7%)	**(65.2%)**	(60.3%)	(66.9%)
Employment	**76**	22	54	**120**	23	97
	(27.9%)	(24.4%)	(29.7%)	**(14.2%)**	(8.5%)	(16.7%)
Inactivity	**103**	51	52	**180**	85	95
	(37.9%)	(56.7%)	(28.6%)	**(20.6%)**	(31.2%)	(16.4%)

Table 6: Effects of the 2003 reform one year before (2008) and one year after the policy change (2009)

	Exit			Employment			Inactivity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{Treated} * Post_t$	-0.165**	-0.136*		-0.394***	-0.302**		-0.116	-0.0898	
	(0.0821)	(0.0791)		(0.121)	(0.117)		(0.0916)	(0.0881)	
Date of Birth									
1949			-0.146			-0.433**			-0.163
			(0.106)			(0.197)			(0.122)
1950			-0.0787			-0.286*			0.00109
			(0.106)			(0.156)			(0.121)
1951			-0.255**			-0.450***			-0.223*
			(0.101)			(0.167)			(0.120)
1952			-0.0894			-0.208			-0.0232
			(0.101)			(0.139)			(0.114)
Seasonality	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	734	734	734	420	420	420	623	623	623
Adjusted R^2	0.100	0.217	0.212	0.133	0.242	0.226	0.092	0.210	0.227

Notes: In addition to variables shown, an intercept and controls for education, sex, marital status, household composition, a dummy for the treatment group and a dummy for the post-treatment period were included in all specifications.

Standard errors in parentheses are clustered at individual level

*** p<0.01, ** p<0.05, * p<0.1

Source: own calculations based on FLFS, 2003-2011

Table 7: Effects of the 2010 Reform, 6 months before (January to June 2011) and 6 months after the policy change (July to December 2011)

	Exit			Employment			Inactivity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{Treated} * Post_t$	0.175***	0.126**		0.242**	0.224***		0.202***	0.157**	
	(0.0648)	(0.0534)		(0.0947)	(0.0771)		(0.0750)	(0.0644)	
Date of Birth									
1953			0.190**			0.262**			0.284***
			(0.0939)			(0.117)			(0.110)
1954			0.0981			0.236**			0.128
			(0.0805)			(0.103)			(0.0918)
1955			0.0278			0.0571			0.132
			(0.0836)			(0.107)			(0.112)
1956			0.243**			0.399***			0.208*
			(0.100)			(0.130)			(0.116)
1957			0.0755			0.177*			0.0322
			(0.0774)			(0.106)			(0.0922)
Seasonality	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1,125	1,125	1,125	842	842	842	943	943	943
Adjusted R^2	0.092	0.338	0.330	0.084	0.286	0.279	0.108	0.338	0.336

Notes: In addition to variables shown, an intercept and controls for education, sex, marital status, household composition, a dummy for the treatment group and a dummy for the post-treatment periodwere included in all specifications.
Standard errors in parentheses are clustered at individual level
*** p<0.01, ** p<0.05, * p<0.1
Source: own calculations based on FLFS, 2003-2011

Table 8: Effects of the Reforms: One year before (2008) and one year after (2009) the 2003 reform, and six months before (January to June 2011) and six months after the 2010 Reform (July 2011 to December 2011) by gender

| | Males | | | | | | Females | | | | | |
| | Exit | | Employment | | Inactivity | | Exit | | Employment | | Inactivity | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2003 Reform												
$D_{Treated} * Post_t$	-0.157		-0.569***		-0.041		-0.069		0.072		-0.148	
	(0.099)		(0.146)		(0.111)		(0.126)		(0.174)		(0.135)	
Date of Birth												
1949		-0.106		-0.637**		-0.0003		-0.122		0.229		-0.287
		(0.143)		(0.254)		(0.161)		(0.154)		(0.287)		(0.181)
1950		-0.0632		-0.498**		0.086		-0.072		-0.024		-0.114
		(0.106)		(0.205)		(0.166)		(0.169)		(0.267)		(0.182)
1951		-0.381***		-0.940***		-0.317***		0.034		0.339		-0.010
		(0.111)		(0.137)		(0.121)		(0.194)		(0.273)		(0.234)
1952		-0.0518		-0.383**		0.083		-0.095		0.069		-0.152
		(0.133)		(0.176)		(0.154)		(0.154)		(0.234)		(0.166)
Seasonality	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	410	410	241	241	347	347	324	324	179	179	276	276
Adjusted R^2	0.221	0.237	0.257	0.284	0.242	0.245	0.191	0.201	0.174	0.211	0.211	0.228
2010 Reform												
$D_{Treated} * Post_t$	0.142*		0.263**		0.202**		0.117		0.224**		0.099	
	(0.074)		(0.118)		(0.092)		(0.079)		(0.104)		(0.093)	
Date of Birth												
1953		0.333		0.462***		0.417***		0.065		0.118		0.170
		(0.144)		(0.178)		(0.158)		(0.129)		(0.154)		(0.165)
1954		0.031		0.159		0.114		0.158		0.367**		0.099
		(0.103)		(0.145)		(0.128)		(0.125)		(0.147)		(0.134)
1955		0.005		0.086		0.049		0.054		0.051		0.171
		(0.109)		(0.147)		(0.148)		(0.127)		(0.156)		(0.168)
1956		0.314**		0.445**		0.390**		0.181		0.405**		0.042
		(0.149)		(0.189)		(0.173)		(0.139)		(0.184)		(0.157)
1957		0.027		0.162		-0.016		0.126		0.200		0.047
		(0.094)		(0.147)		(0.112)		(0.124)		(0.158)		(0.144)
Seasonality	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	566	566	422	422	466	466	559	559	420	420	477	477
Adjusted R^2	0.331	0.333	0.290	0.299	0.334	0.342	0.315	0.313	0.239	0.246	0.333	0.325

Notes: In addition to variables shown, an intercept and controls for education, sex, marital status, household composition, a dummy for the treatment group and a dummy for the post-treatment period were included in all specifications.
Standard errors in parentheses are clustered at individual level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendices

Table 9: French pension reforms and their main changes on length contributions for a full-rate pension and on age of retirement

Pension Reform	Date of birth	Contribution length (in quarters)	Minimum age of retirement	Age of retiremet without required years of contribution
	1943 and before	150 (37 years and 2 quarters)	60	65
1993 Reform	1944	152 (38 years)	60	65
(2003 Reform for public sector)	1946	156 (39 years)		
	1947	158 (39 years and 2 quarters)		
	1948	160 (40 years)		
2003 Reform	1949	161 (40 years and 1 quarter)	60	65
(public and private sectors)	1950	162 (40 years and 2 quarters)		
	1951	163 (40 years and 3 quarters)		
	1952	164 (41 years and 3 quarters)		
2010 Reform	1953-54	165 (42 years)	62	67
(public and private sectors)	1955-57	166 (41 years and 2 quarters)		
	1958-60	167 (41 years and 3 quarters)		
	1961-63	168 (42 years)		
	1964-66	169 (42 years and 1 quarter)		
	1967-69	170 (42 years and 2 quarters)		
	1970-72	171 (42 years and 3 quarters)		
	1973 and over	172 (43 years)		

Table 10: Placebo test: One year before (2007) and one year after the 'pseudo' reform (2008)

	Exit		Employment		Inactivity	
	(1)	(2)	(3)	(4)	(5)	(6)
$D_{Treated}$	0.0141	0.0205	0.154*	0.169**	-0.00787	-0.0137
	(0.0566)	(0.0573)	(0.0882)	(0.0828)	(0.0661)	(0.0675)
$Post_t$	-0.106	0.00303	-0.144	0.0203	-0.0695	0.0384
	(0.0678)	(0.0664)	(0.0929)	(0.0933)	(0.0741)	(0.0738)
Quarter 1		0.125**		0.0317		0.165***
		(0.0589)		(0.0741)		(0.0626)
Quarter 2		0.378***		0.410***		0.411***
		(0.0434)		(0.0706)		(0.0519)
Quarter 3		0.329***		0.214***		0.374***
		(0.0463)		(0.0755)		(0.0529)
$D_{Treated} * Post_t$	-0.0655	-0.0470	-0.0236	-0.0522	-0.116	-0.0754
	(0.0790)	(0.0757)	(0.108)	(0.101)	(0.0881)	(0.0857)
Constant	0.678***	0.432***	0.124	-0.0564	0.702***	0.425***
	(0.102)	(0.105)	(0.123)	(0.130)	(0.109)	(0.114)
Observations	734	734	397	397	610	610
Adjusted R^2	0.059	0.160	0.084	0.182	0.046	0.155

Notes: In addition to variables shown, an intercept and controls for education, sex, marital status, household composition were included in all specifications.
Standard errors in parentheses are clustered at individual level
*** p<0.01, ** p<0.05, * p<0.1
Source: own calculations based on FLFS, 2003-2011

Table 11: Effects of the Reforms: One year before (2008) and two years after (2009-2010) the 2003 reform, and one year before (January 2010 to June 2011) and six months after the 2010 Reform (July 2011 to December 2011)

|	2003 Reform						2010 Reform					
	Exit		Employment		Inactivity		Exit		Employment		Inactivity	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$D_{Treated}$	0.0705	0.0721	0.195**	0.155**	0.00209	0.00820	-0.132***	-0.0674***	0.0121	-0.000648	-0.232***	-0.218***
	(0.0641)	(0.0588)	(0.0763)	(0.0719)	(0.0701)	(0.0642)	(0.0264)	(0.0246)	(0.0382)	(0.0359)	(0.0310)	(0.0301)
$Post_t$	0.234***	0.242***	0.299***	0.224**	0.210***	0.216***	-0.169***		-0.201***	-0.286***	-0.127***	-0.221***
	(0.0633)	(0.0594)	(0.0902)	(0.0917)	(0.0699)	(0.0663)						
$D_{Treated} * Post_t$	-0.151**	-0.153**	-0.252**	-0.211**	-0.0964	-0.105	0.0195	-0.198***	0.0943	0.100*	-0.0109	-0.0199
	(0.0736)	(0.0691)	(0.105)	(0.101)	(0.0827)	(0.0782)	(0.0515)	(0.0341)	(0.0608)	(0.0588)	(0.0565)	(0.0553)
Seasonality	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	991	991	467	467	807	807	1,947	1,947	1,256	1,256	1,496	1,496
Adjusted R-squared	0.038	0.075	0.057	0.112	0.045	0.080	0.0402	0.0986	0.0175	0.0920	0.0741	0.1296

Notes: In addition to variables shown, an intercept and controls for education, sex, marital status, household composition, a dummy for the treatment group and a dummy for the post-treatment period were included in all specifications. The control group consists of workers born between 1944 and 1948 for the 2003 pension reform (columns (1)-(6)), and between 1947 and 1952 for the 2010 pension reform (columns (7)-(12))
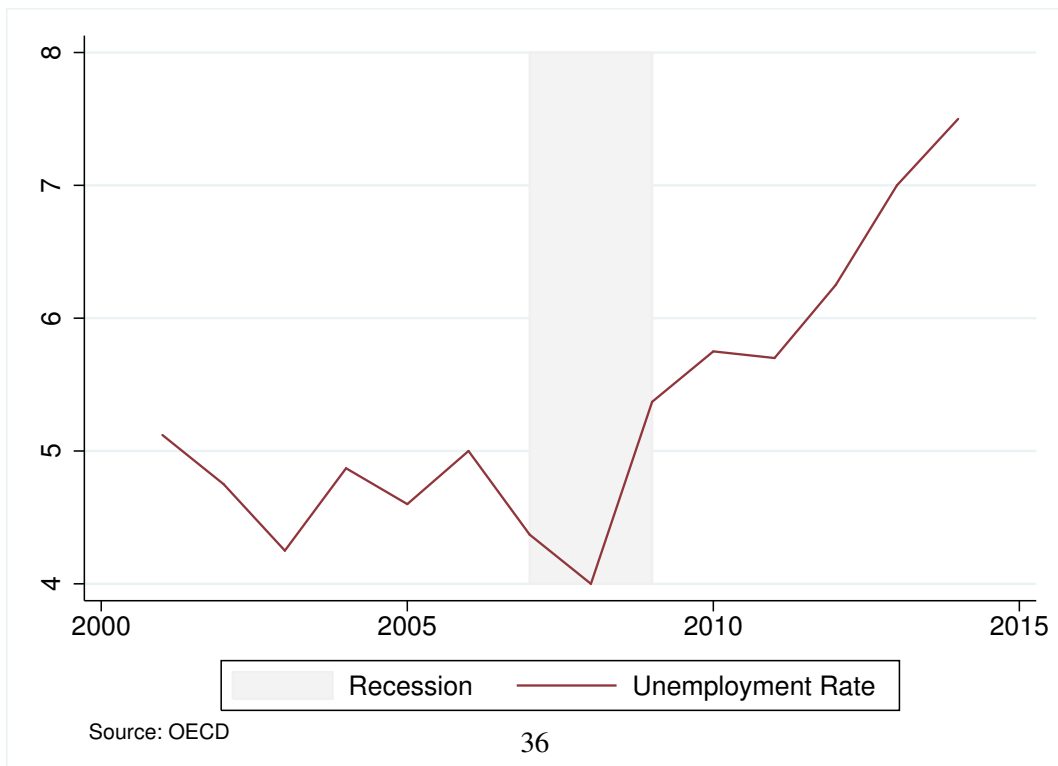Standard errors in parentheses are clustered at individual level
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
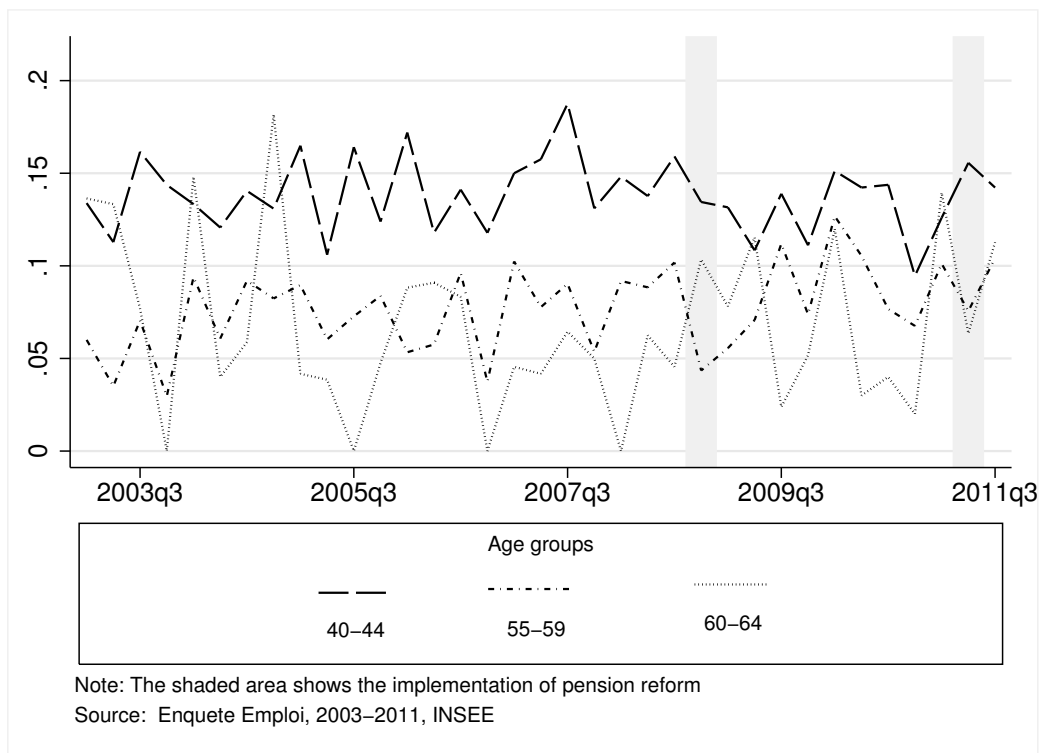Source: own calculations based on FLFS, 2003-2011

Figure 1: Employment rates for older workers for the 55-64 years old, France and E.U

55–64 France   55–64 U.E

Source: OECD, 2003–2014
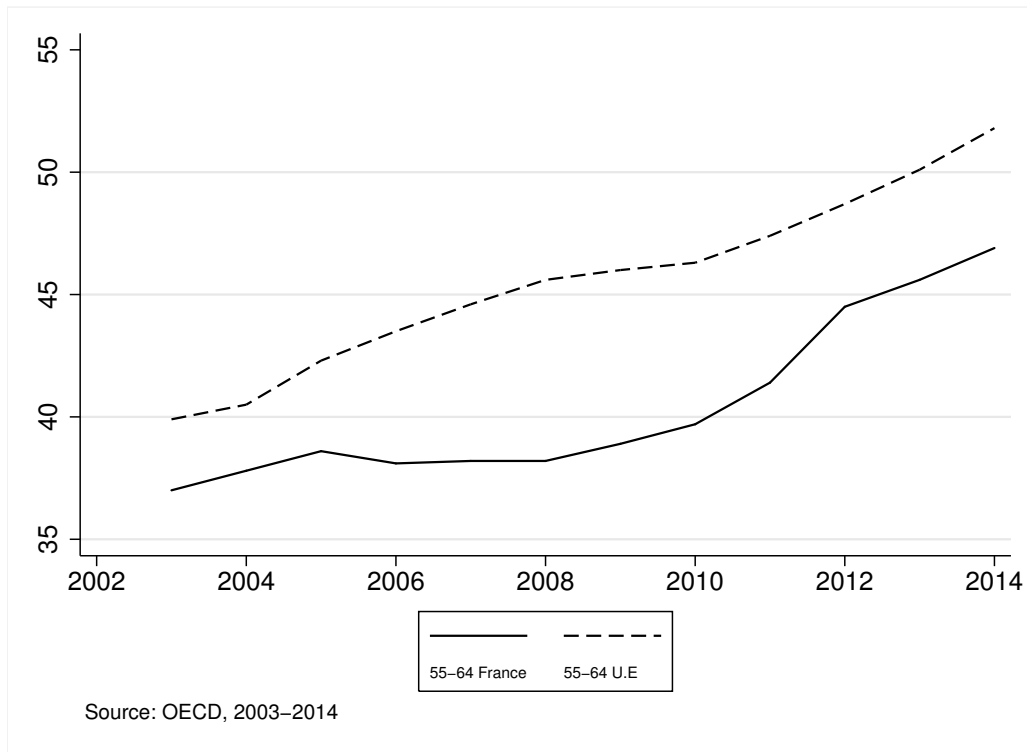
Figure 2: Unemployment rates for older workers for the 55-64 years old, France

Recession   Unemployment Rate

Source: OECD

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Figure 3: Exit rate from unemployment to activity, France

Note: The shaded area shows the implementation of pension reform
Source: Enquete Emploi, 2003–2011, INSEE

Figure 4: Exit rate from unemployment to activity, France

Note: The shaded area shows the implementation of pension reform
Source: Enquete Emploi, 2003–2011, INSEE
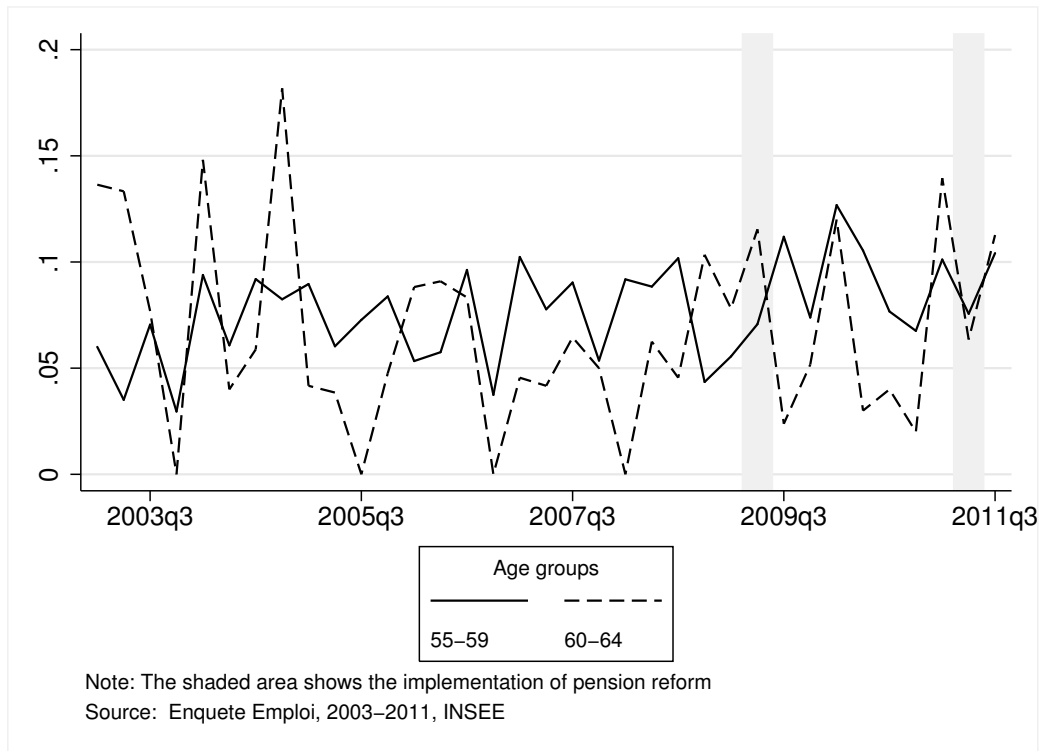
Figure 5: Exit rate from unemployment to activity, France

Note: The shaded area shows the implementation of pension reform
Source: Enquete Emploi, 2003–2011, INSEE
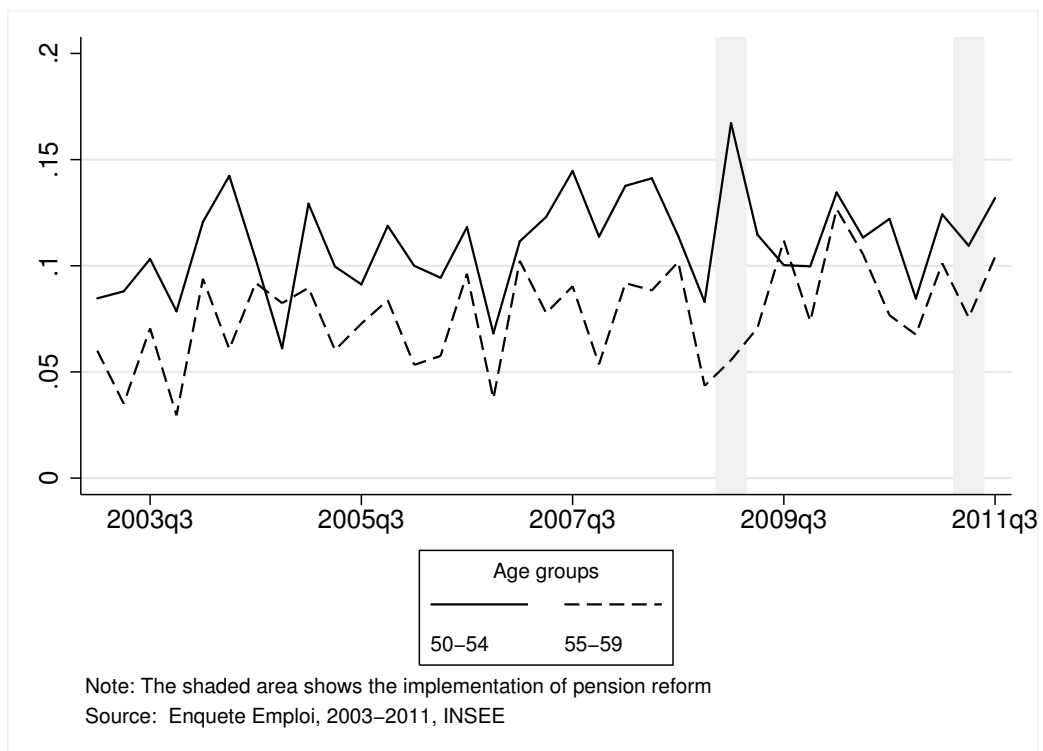
Figure 6: Exit rate from unemployment to inactivity, France

Note: The shaded area shows the implementation of pension reform
Source: Enquete Emploi, 2003–2011, INSEE
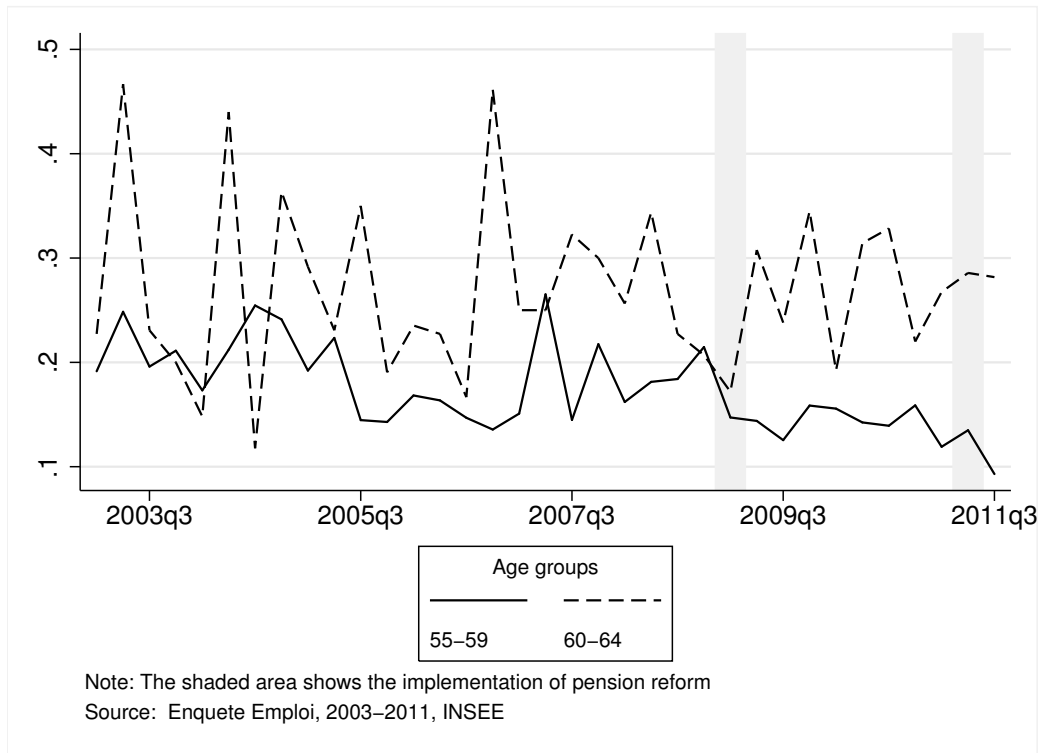
Figure 7: Exit rate from employment to inactivity, France

Note: The shaded area shows the implementation of pension reform
Source: Enquete Emploi, 2003–2011, INSEE