The Employment of Older Workers

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Abstract

This paper investigates the employment of individuals older than 55 years old using a dataset for Catalonia. We pin down the groups of individuals associated with lower employment rates: females, disabled and people with low qualifications. Part-time work rates for this age group are low, suggesting that employment could increase through more flexi-time at work. We also evaluate a reform in 2002 that changed pension incentives to early retirement and launched fiscal incentives for employers to retain individuals aged 60 or older. Results suggest that the reform increased the probabilities to remain employed for the affected group. We estimate that had not been for the reform, the employment for the age group 60–64 in 2004 would have been at least 1.6 percentage points lower.

JEL Classification: J10, J22
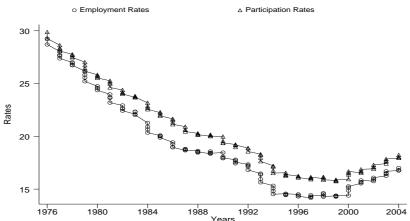Keywords: older workers employment, retirement

1   Introduction

The labour force participation rate of older individuals declined substantially in many countries during the 1970s and 1980s (OECD (2004)). Figure 1 shows the drop in employment and activity rates of people older than 55 years old in Spain from 1976 to the mid 1990s. The decline occurred in a period of industrial restructuring and high unemployment that coexisted with a social security system that encouraged early retirement. Blanco (2000), for example, finds evidence that in the mid 1990s Spanish individuals reacted positively to the early retirement incentives provided by the existing legal framework. Figure 1 also shows that the declining trend in participation started to reverse after 2000. Although part of this change in trend may be due to the improvement of the economic cycle, there are also other factors that may have contributed to overturn the propensity for early retirement, such as pension and labour market reforms.

Figure 1: Employment and Participation Rates of Spanish Aged 55 and Over

The Spanish government launched a reform of the Pension System in 1997 and an amendment to it in 2002, with the aim of changing the retirement incentives of older workers. In parallel, it has also reformed the labour laws to encourage employers to hire older people.

This paper investigates the employment of older individuals using a dataset for Catalonia, the 'Panel de Desigualtats Socials a Catalunya' (PaD). First, we analyse the characteristics of older workers in Catalonia. This exercise is helpful to pin down those individuals that may be targeted to raise employment through labour market active policies. For example, are highly qualified individuals having longer working

lives? What is the role of personal income, health or disability conditions? Do older individuals work more flexi-time compared to their younger counterparts? We address these issues by exploring the cross-section information of the PaD survey. We find that older individuals with lower employment rates are females, older than 60 years old, born outside Catalonia, with some of disability, married, with median-low qualifications, and with higher non-work related income. Part-time work rates for this age group are also low.

Second, we study transitions from employment to retirement or to other non–employment status for individuals older than 55. We use this analysis to evaluate the effect of a pension system amendment (Law 35/2002, BOE 167, article 3,4,10–13) and a labour policy reform (Law 35/2002, BOE 167, article 14) taken place in 2002. The former increased slightly the incentives to continue to work after 65 years old and brought in a penalisation rule for early retirement starting at age 61. The latter introduced fiscal incentives for employers to retain individuals aged 60 and over, with tenure of five or more years in the firm.

Results point out that females tend to retire earlier and that individuals with no qualifications are prone to move to other type of inactivity than retirement, or to unemployment. Low skilled individuals therefore require special attention since transitions to inactivity are very likely to be permanent for this age group. Finally, the results suggest that the pension and labour market reforms of 2002 have contributed to a rise in the probability of remaining employed for individuals older than 60 and hence gains in employment. For example, for the 60-64 years old, we have calculated that, had not been for the reform, the employment for this age group in 2004 would have been at least 1.6 percentage points lower (28.8% instead of 30.4%), which is not negligible.

The fact that EU countries become increasingly more interested in the employment of older individuals is not surprising. Low employment rates of older workers are not only a waste of human capital but also a financial problem for governments, especially since life expectancy continues to increase. Furthermore, there is broad social acceptance that there is a need for encouraging later retirement. For example, Galasso (2006) evaluates the political feasibility of postponing the retirement age and finds that there would be political support for undertaking this policy. This results stems from the fact that countries with generous social security systems are aging and future generations forecast a reduction in the profitability of the system

and opt for substituting leisure time by postponing retirement for higher pension benefits. Moreover, as Esping-Andersen (2006) discusses, postponing retirement age is intergenerational equitable since if not done, the future working age population will have to stand a huge financial burden.

EU member states have been implementing reforms in order to boost employment of older individuals and reach a target of 50% by 2010. For the Spanish case, Boldrin et al. (1999) and Boldrin et al. (2001) explore the effect of the pension reform undertaken in 1997 and they find gains in employment for this age group. In particular, they predict a significant cut in the exit rate at age 60. However, their results also reveal that this should not be sufficient to contain the forthcoming Spanish pension deficit. Research by Cañada (2006) focuses on the 2002 active policy reform in Spain and points out that the weak increase in employability achieved is insufficient to reach the EU targets.

The rest of the paper is organised as follows: in Section 2 we describe the Spanish social security system affecting older workers. Section 3 explains our data sources. In Section 4 we describe the characteristics of older workers (55–64). Section 5 analyses the probability of employment for this age group given individual's observed characteristics. Section 6 studies transitions out of employment. This section also investigates whether the 2002 pension and labour reforms increased employment for this age group. Section 7 concludes.

2   Public Programs for Old-Age Workers

The employment of older workers responds to the retirement incentives given by the social security system (unemployment, disability and retirement benefits) and by active labour market policies that influence the employers' hiring decision. The 2002 introduced amendments in both systems.

This section describes the pension system before 2002 and the 2002 amendments. The 'official' form of retirement offered two options: early retirement from the age of 61 and normal retirement at the age of 65. The 'official' early retirement is only possible for those workers who started their contribute career before 1967. The normal retirement age is 65, although it is lower for some professional groups such as miners, military personnel, policemen and fishermen. Collective agreements often impose mandatory retirement age at 65, facilitate retirement at 64 with full benefits,

or encourage retirement between 60 and 63 through lump-sum payments.

Under the current legislation, public contributory pensions are provided by the following programs: General Social Security Scheme ("Régimen General de la Seguridad Social" or RGSS), Special Social Security Schemes ("Régimes Especiales de la Seguridad Social" or RESS) and Scheme for Government Employees ("Régimen e Clases Pasivas, or RCP). The RGSS covers private sector employees, members of cooperative firms, employees of most public administrations other than the central government, and all unemployed individuals complying with the minimum number of contributory years when reaching 65. RESS covers self-employed, agricultural workers and small farmers, domestic workers, sailors and coal miners. RCP includes public servants employed by the central government and its local branches. More information about the system can be read in Boldrin et al. (1999) and Boldrin et al. (2001).

Public contributory pensions are financed by a 'pay-as-you-go' scheme. The current RGSS contribution is 28.3 percent, of which 23.6 is paid by the employer and the remaining 4.7 by the employee. Entitlement to a public pension requires at least 15 years of contributions. As a general rule, it requires reaching the age of 65 and it is incompatible to any sort of employment that requires affiliation with the SS system.

The 2002 pension system amendment introduced the following changes: a generalised penalisation rule for early retirement, starting at age 61 and a new incentive scheme for those retiring after the age 65 with, at least, 35 years of contributions.

When eligibility conditions are met, the calculation of the monthly pension benefit is

$$P_t = \alpha_n BR_t$$

where the benefit base (*base reguladora*) BR_t is a weighted average of covered monthly earnings over the last 15 years before retirement. The replacement rate α_n depends on the age a of the retirees and on the number of years of contribution n. When age is below 61, $\alpha_n = 0$ for all n. In case of early retirement (between 61 and 65), α_n has a penalisation factor that increases every year until reaching 1 at age 65. Individuals with 40 or more years of contributions are exempted from this penalisation.

$$\alpha_n = \begin{cases} 0 & if \quad a < 61, \\ 1 - k(65 - a) & if \quad 61 \le a < 65, \\ 1 & if \quad 65 \le a. \end{cases} \quad where \quad k = \begin{cases} 0.08 & if \quad n = 30, \\ 0.075 & if \quad 31 \le n \le 34, \\ 0.07 & if \quad 35 \le n \le 37, \\ 0.065 & if \quad 38 \le n \le 39, \\ 0.06 & if \quad 40 \le n. \end{cases}$$

The amendment in 2002 increased the permitted age of early retirement from 60 to 61. It also raised slightly the penalisation factor for early retirement and made it more dependent on the number of contributed years.[1]

Furthermore, the 2002 legislation introduced incentives to work past age 65 so that

$$\alpha_n = 1 + 0.02(a - 65), \quad if \quad 65 \le a \quad and \quad n \ge 35.$$

It also eliminated social security contributions for workers meeting the eligibility criteria for full normal retirement ($65 \le a$ and $n \ge 35$) who continue working.

Besides pension programs, the employment of old-age individuals is also affected by other programs such as unemployment and disability benefits. Unemployment benefits are generally conditioned on previous spells of contributions and are available only for workers in the RGSS of the Spanish Social Security System (SSS). There are two continuation programs for those who have exhausted their entitlement to contributory unemployment benefits: one for those age 45+ (UB45+ program) and the other for those aged 52+ (UB52+ program). The latter is a special subsidy for unemployed people that are older than 52, lack other income sources, have contributed to unemployment insurance for at least 6 years in their life and, and except for age, satisfy all requirements for an old-age pension.

Contributory disability benefits are far more generous than other old-age programs

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[1]Before the 2002 amendment and since the 1997 pension reform, the replacement rate was

$$\alpha_n = \begin{cases} 0 & if \quad a < 60, \\ 0.6 + 0.8(a - 60) & if \quad 60 \le a < 65, \\ 1 & if \quad 65 \le a. \end{cases}$$

since they are not subject to penalties for young age or insufficient years of contribution. The evaluation criteria for temporary disability was tightened in the 1990s.

Regarding active labour market policies, the labour market Law 35/2002 introduced fiscal incentives for employers to retain individuals aged 60 and over, with tenure of five or more years in the firm. More precisely, employer's contributions to the social security have the following allowances: 50% for for those who are eligible in 2003 and 60% for those who were eligible the previous fiscal year. These percentages will be increased in 10% in each fiscal year until reaching 100%. If the worker does not have 5 years of tenure at the age of 60, the allowance will be applicable once he gets the required tenure.

3   Data and Variables

PaD is a longitudinal survey starting in 2001 that tracks the same representative sample of individuals over time. So far there are three waves of available data: September 2001–April 2002 (wave 1), January–June 2003 (wave 2) and January–June 2004 (wave 3). It is also household-based and therefore interviews every adult member of the sampled households.

The wave 1 panel consists of 1,991 households and 5,757 individuals drawn from the Catalan population. The PaD collects information about education, household characteristics, health, labour force status, income and other socioeconomic factors. The questionnaire has experienced variations over time and, for this reason, we have created new variables that homogenise the information across waves. A full description of these variables is provided in Appendix A.

The number of individuals older than 16 are 4,874, 4,354 and 4,120 for the first, second and third wave, respectively. We often restrict our sample to individuals who are 55–64 years old since 'older workers' are defined within this age group (540, 531 and 521 observations). We use the Encuesta de Población Activa (EPA) (Spanish Labour Force Survey) to check the robustness of our results for those statistics that are common to both surveys.

Before proceeding, we should mention that individuals are classified differently across their labour force status in the PaD than in the EPA or other European surveys such as the European Community Household Panel (ECHP). Respondents in PaD

select the option that better describes their 'paid work' status (working full-time, working part-time and working 'intermittently') and are not explicitly asked to focus on the 'reference week'. By contrast, the EPA does not include the alternative of working 'intermittently' and individuals must focus on the 'reference week'. These two differences imply that we observe proportionally more individuals in 'paid work' in PaD than in EPA and, in accordance, lower unemployment rates. For example, 16+ employment rates in the first wave are roughly four points higher in PaD (56%) than in EPA (52%) for a similar period in Catalonia.

Therefore, particular attention is needed in drawing comparative conclusions based on the employment or unemployment rates. The concern is smaller in the comparison of participation rates, the description of the older workers and the transition analysis.

4   Characteristics of Older Workers

In this section, we describe the characteristics of older workers in Catalonia (55–64) such as gender, marital status, origin, family structure, health and disability, pension schemes, and qualifications, using the cross-section information of the first wave (September 2001–April 2002). We also describe the job characteristics for this age group. There are 540 individuals within the age band of 55–64 in the first wave.[2]

The total PaD employment rate of older workers (55–64) is 42%, lower than the Stockholm target of 50% to be achieved by 2010 and roughly the European mean in 2001 (European Comission (2003)). The unemployment rate of this age group is around 6% and the participation rate is 45%. For a comparable period, for Catalonia, the EPA 55–64 employment rate was 42%, the EPA 55–64 unemployment was 7% and the EPA 55–64 participation was 45%.

The Catalan PaD employment rate of individuals of the age group 65–69 is very low at 2–3%, suggesting that there is scope for large gains in employment for this segment. The EPA 65–69 employment rate was 4%.

Table 1 shows that employment varies substantially across groups. The female employment rate is 34%, while the male is 51%. Employment rates of older workers also differ by education attainment. For example, 80% of individuals aged 55–64

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[2]We use the first wave since disability information was better specified than in subsequent waves.

with a graduate or post-graduate degree are in paid work, while the rate is 26% for those without primary education. By marital status, both divorced and separate individuals have higher employment rates. Regarding origin, individuals born in Catalonia experience higher employment. As expected, good health also coincides with higher rates, and only 1% of individuals reporting any sort of disability are in employment.

Table 1: 55–64 Employment Rates by Characteristics

Characteristics	%	Characteristics	%
Average	42		
Gender		Marital Status	
Male	51	Married	40
Female	34	Non-Married	49
Disabled		Age	
Yes	1	55–59	58
No	44	60–64	24
Health		Private Pension Holders	
Good	51	Yes	61
Bad	28	No	28
Origin		Undertaking Elder Care	
Born in Catalonia	56	Yes	40
Born Rest of Spain	27	No	42
Born Abroad	60		
Number of Children		Qualifications	
0	34	Under Primary	26
1	51	Primary	37
2–3	45	Secondary	58
4 or more	35	Graduate-Postgraduate	80

NOTE: Calculated with cross-sectional weights.

We observe that more individuals holding a private pension plan are in paid work. This is not surprising since individuals at work are probably the ones who are able to pay for it. More interesting is to see the effect of pension schemes on the retirement decision (to be discussed below in Section 6), which can go either way depending on whether the plan penalises or not earlier retirement.

It is important to point out that the descriptive statistics reported in Table 1 do not take into account correlations across characteristics. This could lead us to attribute the wrong weight to employment of some of these characteristics. For example, the employment gap between males and females shown in Table 1 may

be due to the fact that males in that age group are more educated than women. Hence, use of regression analysis in Section 5 allows us to account for this possibility and gives a more accurate information about the association of each of the factors with employment. This is important since policy makers need to pin down the low employable groups that require more attention in order to boost employment of older individuals.

We now move on to describe the job characteristics of older workers. Concerning flexi-time, only 12% of the Catalan older workers were in part-time work, compared to the 22% EU average in 2001 (European Comission (2003)). Part-time rates for individuals aged 55–64 are not higher than those for younger age groups, although they are for the few individuals older than 65 years old who are at work.

Regarding the type of contracts, 86% of older workers hold a permanent contract compared to 47% of the 16–24 years old group. One third of older workers are self-employed, and one fourth are owners or co-owners of a business, much higher than for younger individuals.

5 Employment Decision: Individuals 55–64 Years Old

5.1 Empirical Model

In the previous section we highlighted the importance of using regression analysis to determine the individual characteristics associated with lower employment rates once correlations with other explanatory variables have been taken into account.

First, we estimate the probability of being in paid work for individuals 55–64 years old controlling for individual characteristics. Behind this estimation there is a rational discrete choice model, where individuals choose the outcome (employment or non-employment) that maximises the utility gain from that choice subject to their budget constraint (McFadden (1981)). The utility of each alternative depends on a set of characteristics and a random error associated with that choice. For given preferences, welfare and taxation policies have an impact on the individual's budget and influence the individual choice.

We observe the outcome, which is a binary variable E_i: an individual i is at work

$(E_i=1)$ or not ($E_i=0$, comprises both inactivity and unemployment).[3] Since we assume that the errors associated to that choice are normally distributed, we have a probit model, which is estimated with maximum likelihood techniques. The likelihood function is:

$$L_i(\beta/E_i, X) = \prod_{E_i=1} \Phi(\beta x_i) \prod_{E_i=0} (1 - \Phi(\beta x_i)) \tag{1}$$

x_i is a vector of explanatory variables such as age, gender, marital status, number of children, origin, health and disabilities, holding a private pension and qualifications. The β's will be the values of the parameters that maximise the likelihood of observing the sample data that were actually observed.

The employment outcome can be thought in two stages. First, individuals choose whether they are active or not in the labour market. Second, once they have selected to participate, individual characteristics and economic factors will determine whether they are employed or not. The β resulting from the estimation of the probability of employment in Equation 1 gives the total correlation each variable and it does not distinguish whether there is a different impact of a variable in each of the two stages. For this reason, we also estimate a model on participation where $E_i=1$ if the individual is either employed or unemployed and $E_i=0$ otherwise. This will inform us whether there are some factors that determine participation differently from employment.

5.2   Empirical Results

Table 6 in Appendix C shows the results of the probability of employment (column I) and participation (column II) for the age group 55–64 estimated in Equation 1. Coefficients for the two models are close. This is not surprising since the number of unemployed people for this age group is small (14 out of 523), and we therefore expect the individual probability of employment and activity being similar. There is however an exception, which is the effect of origin. We observe that individuals born abroad (omitted category) have higher probability of being active compared to individuals born in Catalonia or in the rest of Spain, but this pattern does not

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[3]We base our model description on Long (1997).

determine the probability of employment. This means that individuals born abroad are more likely to be unemployed.

Table 2: Predicted Probabilities of Employment for 55–64 Years Old

Characteristics	%	Characteristics	%
Average	37		
Gender		Marital Status	
Male	45	Married	34
Female	31	Non-Married	53
Disabled		Age	
Yes	1	55–59	51
No	43	60–64	24
Health		Private Pension Holders	
Good	40	Yes	50
Bad	34	No	29
Origin		Undertaking Elder Care	
Born in Catalonia	53	Yes	37
Born Rest of Spain	25	No	37
Born Abroad	48		
Number of Children		Qualifications	
0	36	Under Primary	38
1	47	Primary	28
2–3	37	Secondary	43
4 or more	34	Graduate-Postgraduate	63

NOTE: Estimated with cross-sectional weights.
$Pr(E = 1|\bar{x}, x_k)$: Probability computed when all variables except x_k are set to their means.

Table 2 shows the predicted probabilities of employment for the 55–64 years old for different values of the independent variables. In particular, we report $Pr(E = 1|\bar{x}, x_k)$, which is the probability computed when all variables except x_k are set equal to their means, and x_k equals some specified value. In our analysis, all explanatory variables are dummies, taking value one or zero. This means that Table 2 shows, for example, that the predicted probability of a male is 45%, while that of a woman is 31%, ceteris paribus. This is a useful exercise to compare the effect on the probability over a range of a variable. But the reader must bear in mind that the average individual does not correspond to any observed values in the population and might not be realistic, especially when we are dealing with dummy variables. The predicted probability numbers in Table 2 must be read with caution and not compared directly to the percentages displayed in Table 1.

Results from the regression analysis confirm the direction of the effects of the characteristics on employment that we examined in Section 4. To summarise, males, non-married individuals, under sixty years olders, non-disabled individuals, with good health, private pension plan holders, individuals born in either Catalonia or abroad and individuals with higher qualifications are more likely to be in paid work than their comparable counterparts. However, it is important to notice that the the magnitude of the impact for many variables has changed, mostly reduced. This confirms the importance of allowing for individual characteristics being related with each other to describe employment patterns.

For example, Table 2 shows that the disparity across gender is remarkably strong although it is slightly less that the one inferred in Table 1. The same happens with the negative effect of age on paid work. The gap between the effect of marital status is actually increased, which means that married individuals are characterised by some factors that make them more likely to be employed. Once these are net out, married people are expected to have even less probability to be employed than their comparable non-married individuals. A separate estimation by gender (not reported) shows that the negative effect of being married on employment is driven by females. Regarding origin, we observe that, ceteris paribus, individuals born in the rest of Spain are less likely to be in paid work.

Not surprisingly, reporting good health has a positive impact on employment, although its effect is reduced significatively once we control for other explanatory variables (i.e. age).

Results from the estimation confirm that individuals with any sort of disability have extremely low probability of being employed. That is, the low employment rates for disabled individuals seen in Section 4 are not due to, for example, disabled being characterised by lower education, which will make them less prone to be in paid work, but indeed are related to their special condition. Although we do not have specific information on the seriousness of the disability, the latter clearly suggests that there is scope for raising participation for this group. The very low predicted employment for disabled individuals is in line with the cross-country report by the OECD (2003), which refers to Spain as one of the countries with lowest participation of disabled people, either moderate or severe. Since Spain is characterised by overall low employment, a relative measure to total employment is more informative. OECD (2003) confirms that even in relative terms, Spain is located in the queue of disabled

employment, located in the third lowest position. According to this study, the relative employment of disabled over non-disabled individuals aged over 50 years old is 0.36, being 0.30 the lowest number (Belgium) and 0.67 the highest (France).[4]

Very low levels of disabled people in employment may be due to subsidies that reduce incentives to work and can be used as a pathway to early retirement, or to the lack of supported work environments. In the UK, for example, Bell and Smith (2004) pointed out that the decrease in employment among men was related to generous subsidies for sick people. Some studies for the US also attribute the decline in the labour market attachment of older workers to the work disincentives created by the Social Security Disability Program (Autor and Duggan (2003)), although other authors claim that this is not the case (Bound (1989)). Studies have found that there is a cross-country relationship between large disability cash benefits and low employment amongst disabled individuals (Bound and Burkhauser (1999)). For the Spanish case, Jiménez-Martín et al. (2006b) show that disability benefits are used as pathway to retirement and that there are errors in awarding these benefits. Jiménez-Martín et al. (2006a) find that suffering any disability reduces the probability of being employed immediately prior to retirement age.

Mont (2004) reports that there has been a recent shift away from guaranteed income security towards economic integration programs for disabled people in the OECD countries. This article points out some of the measures that could be implemented in order to increase the participation in the labour market of disabled individuals: tightening the eligibility conditions to receive cash benefits, introducing some quotas and implementing rehabilitation and training when they are cost-effective. Disability quotas are an obligation to employ a percentage of people with disabilities, and varies across countries. This rate is 2% in Spain for employers with 50 or more employees (for example, 6% in France and 7% in Italy). Supported employment programs aim at integrating people with disabilities into the workplace and are used in countries such as Australia, Norway, Denmark, the UK and the US, but they have a negligible role in Spain. In general, though, governments spend much more in disability benefits than in active labour market programs for disabled (Table 3).

Regarding other factors, being involved in either child or elder care activities is expected to decrease the probability of being employed. We proxy the former with

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[4]This information has been extracted from Table 3.4 in OECD (2003).

Table 3: Disability Programme Expenditure in Percentage of GDP, 1999

Country	Benefits[1]	BroadBenefits[2]	All Programs[3]
Belgium	1.06	1.61	1.72
Germany	1.01	2.90	3.08
Netherlands	2.65	4.14	4.64
Norway	2.36	4.83	5.58
Spain	1.24	2.26	2.28
Sweden	2.05	4.02	4.66
United Kingdom	1.27	1.52	1.54
United States	0.71	1.37	1.40
OECD(17)[4]	1.52	2.53	2.73

SOURCE: OECD (2003), selected countries.
[1]Disability benefits = Contributory (earnings-related) and non-contributory disability benefits.
[2]Broad disability benefits = Disability benefits, sickness cash benefits and work injury benefits.
[3]All disability programmes = Broad disability benefits and employment-related programmes for disabled people.
[4]Excludes Korea, Mexico and Turkey.

the number of children, which is not an ideal indicator for child care, especially for the age group 55–64. The latter is the response to the question on whether the individual takes care of an elder person. None of them are found to have an impact on the probability of employment. We would like to point out, however, that a separate estimation by gender (not reported) found a negative effect on the number of children on employment for the females group. Elder care was also found to have a negative impact if the same estimation was undertaken in a sample of people aged 65 and above (not reported). This means that for individuals older than 65 years old, being involved in elder care reduces the likelihood of employment.

Table 2 confirms that holding a graduate or postgraduate degree increases significatively the probability of employment, ceteris paribus, although the effect is smaller that the one shown in Table 1. Interestingly, the ranking in employment between individuals with no qualifications and with primary degree is reversed once we control simultaneously for other factors. Results in Table 2 show that the lowest educational group in fact has higher probability of employment than individuals with a primary degree.

We have also investigated the role of personal non-work related income (*NonWork-*

Inc) on the probability of employment, but this analysis has been muted by the large number of missing values.[5] To deal with this problem, we substitute the missing values for the median of the distribution of *NonWorkInc*. Besides this new non-work related variable, in the regression we add a dummy variable with value one if the individual had a missing in the old non-work related variable and zero otherwise. Results from this new estimation showed that other things equal, individuals with higher non-work personal income are less likely to be in paid work.

To summarise, Table 2 identifies the characteristics that make older individuals in Catalonia be less likely to be in paid work once other common factors have been net out. In general, the direction of the effects is the same we observed in Section 4, but the magnitudes of the effects changed, with the following being the factors that reduce the probability of being in paid work, ceteris paribus: females, older than 60 years old, with some disability, married, with median-low qualifications, and with higher non-work related income. Overall, this exercise has eliminated the difference between low- and medium-educated individuals. The positive impact of holding a graduate or postgraduate degree is maintained, although the gap has been reduced. Finally, we would like to remark the very low employability of disabled individuals, ceteris paribus.

6 The Retirement Decision

6.1 Empirical Model

This section analyses the factors that determine the retirement decision. To choose the optimal age of retirement (hence leisure), an employed individual maximises his/her utility subject to his/her lifetime income stream (Hamermesh (1984)). The latter is assumed to be larger when employed than when retired because a worker's salary typically exceeds his or her pension. Besides the budget constraint, the individual is also restricted by the legislation on pensions. Employer-provided benefits usually start upon retirement, while government-provided benefits begin at a pre-determined age, which is 65 for the Spanish case, although early retirement at age

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[5]Total personal income minus earnings. The number of missing observations is very large since we face unreported values for both total personal income and wages. This problem is especially important for Wave 1, since individuals only give positive values and we cannot distinguish between zero income and missing. The latter has been solved in subsequential waves.

61 is permitted for certain groups of individuals.

In 2002, the Law 35/2002 slightly increased the incentives to continue to work after 65 and brought in a penalisation rule for early retirement starting at age 61. In parallel, it introduced fiscal incentives for employers to retain individuals aged 60 or older with tenure of five or more years in the firm.[6] Given the fact that we observe transitions before (from Wave 1 to Wave 2, 219 observations) and after the reform (from Wave 2 to Wave 3, 240 observations), we explore whether both reforms might have influenced the individuals' employment decisions. We can not know which of the two policies had a larger effect.

Table 4 displays the number of transitions between employment (E), retirement (R) and other (O). It disentangles pre and post-reform and between two groups: individuals aged < 60 (*non-affected*) and $>= 60$ (*affected*). Individuals from 61 years old are affected by both the pension and the labour market 2002 reform but those aged 60 years old are only influenced by the latter. This means that either if we take the *affected* group as $>= 60$ or we take > 60, the 60 years old will be misplaced. Results with the two classifications of the *affected* group were similar and hence the 60 years old were not driving the results.[7]

Table 4 shows that there are differences in the transition patterns before and after the reform for the individuals aged 60 or more. We observe that transitions to retirement are lower for the *affected* group after the reform than before (16% compared to 20%). This pattern is not observed for the *non-affected* group. This could be due to the age in the sample pre-reform being relatively older than the sample in the post-reform. However, the average age in the sample for the $>= 60$ pre and post-reform is very similar, being 63.1 and 63.2, respectively. It could also be due to these two samples having different characteristics. That is, the sample in the post-reform may be characterised by more individuals with certain features that make them less prone to move to retirement. For this reason, regression analysis is useful since it is able to account for this possibility.

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[6]Law 35/2002 in B.O.E., 167, 13-07-2002, pp. 25633.

[7]The transitions *E-R* are negligible for the *non-affected* group, which could question the validity of the control group. Notice that the group *non-affected* use often the unemployment and sick leave as a stepping stone for retirement (*E-O*). It therefore makes sense to estimate a parallel model *E-NE* where we merge the two alternatives R and O into *NE*, non-employment. Using the estimates, we calculate that the transitions *E-NE* have decreased 4.4 percentage points for the *affected* group, while the drop has been only 0.8 percentage points for the *non-affected*. Clearly, we observe a significant change in behaviour in labour transitions for the *affected* that has not been followed by the *non-affected*.

Table 4: Transitions between Employment (E), Retirement (R) and Other (O)

Age Group	Pre 2002 Reform				Post 2002 Reform			
	E–E	E–R	E–O	n	E–E	E–R	E–O	n
>= 55	81%	12%	7%	219	88%	8%	4%	240
Non-affected (< 60)	93%	0%	7%	88	95%	1%	4%	129
Affected (>= 60)	73%	20%	7%	131	80%	16%	4%	111

NOTE: Law 35/2002 increased incentives to continue at work after 65 years old, brought in a penalisation rule for early retirement starting at 61, introduced fiscal incentives for employers who retain their employees aged 60 and older with tenure of 5 years or more.

We take individuals aged 55 and above who are in paid work in period $t = 1$ and estimate the probability of continuing to work, going to retirement or other alternatives in the following year ($t = 2$).

There are 459 individuals in the sample aged 55 and over that are employed in $t = 1$. From those, only 3 moved to unemployment in period $t = 2$. Because of shifts to unemployment being negligible, we estimate the probability of being in any of the following three categories in $t = 2$: employment (E), retirement (R) and other (O). The latter category comprises unemployment and inactive who are not retired, mostly houseworkers and very few under disability pension.

We checked the possibility that restricting our sample to individuals who were employed at $t = 1$ could lead to inconsistent estimates using the Heckman approach (Heckman (1979) and Van de Ven and Van Praag (1981)) and found that this was not the case.[8]

Since our dependent variable can take three nominal outcomes (employment (E), retirement (R) and other (O)), we opt for the multinomial logit model with $J = 3$.

Let $Pr(y = m|x)$ be the probability of observing outcome m given characteristics x. In the multinomial logit model, this probability is written as:

$$Pr(y_i = m|x_i) = \frac{exp(x_i\beta_m)}{\sum_{j=1}^{J} exp(x_i\beta_j)} \tag{2}$$

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[8]This methodology uses a probit model to predict whether an individual belongs to the sub-sample of being in paid work at $t = 1$. Then, it examines the factors that determine whether this sub-group chooses retirement at $t = 2$ with the inclusion of the inverse Mills ratio as a regressor.

where $\beta_1 = 0$ for identification purposes.

Let $Pr(y_i = m | x_i, \beta_2, ..., \beta_J)$ be the probability of observing $y_i = m$ given x_i with parameters β_2 through β_J. Assuming that observations are independent and plugging in Equation 2, the likelihood equation is:

$$L(\beta_2, ..., \beta_J | y, X) = \prod_{m=1}^{J} \prod_{y_i=m} \frac{exp(x_i \beta_m)}{\sum_{j=1}^{J} exp(x_i \beta_j)} \qquad (3)$$

where $\prod_{y_i=m}$ is the product over all cases for which y_i is equal to m. After taking logs, we maximise the log likelihood equation to estimate the β's.

In the estimation, we assume that over time the observations are independent across individuals (so called clusters) but not necessarily within individuals. Clustering affects the estimated standard errors and the variance-covariance matrix of the estimators, but not the estimated coefficients.

Our explanatory variables are the following: demographic factors (age and its square, gender, number of children, marital status and origin), health, qualifications, private pension plan and employment factors of the first state $t = 1$ (firm ownership and wage).

To evaluate whether the policies to encourage employment of the 60 or more years old had an effect we pool the observations before and after the reform. In the estimation, we include the following regressors: *Post2002* (dummy one if the transition analysis corresponds to post reform), *Affected* (dummy one if individual is aged 60 or more years old) and the interaction of the two *Affected*Post2002*. The coefficient on *Post2002* gives the change in the probability of staying-on employed, moving to retirement or other between the pre and post year reform for both age groups (the $>= 60$ and < 60). The coefficient on *Affected* gives the age effect that is not due to the change in the policy. For instance, even before the year of the reform, individuals in the age group $>= 60$ had a higher probability to move to retirement, ceteris paribus. The coefficient on the interaction term gives the changes in the probabilities due to the introduction of the new policy. This assumes that the change in behaviour of the affected age group was not due to other reasons.

Table 5: Predicted Probabilities of the Transitions between Employment (E), Retirement (R) and Other (O)

Characteristics	Age Group	Pre 2002 Reform			Post 2002 Reform		
		E–E	E–R	E–O	E–E	E–R	E–O
Average	Non-affected (< 60)	100%	0%	0%	99%	1%	0%
	Affected (>= 60)	82%	18%	0%	88%	12%	0%
Male	Non-affected (< 60)	100%	0%	0%	99%	1%	0%
	Affected (>= 60)	85%	15%	0%	90%	10%	0%
Female	Non-affected (< 60)	100%	0%	0%	99%	1%	0%
	Affected (>= 60)	73%	27%	0%	85%	15%	0%
Under	Non-affected (< 60)	91%	0%	9%	92%	1%	7%
Primary	Affected (>= 60)	78%	17%	5%	84%	12%	4%
Graduate	Non-affected (< 60)	100%	0%	0%	99%	1%	0%
Post-graduate	Affected (>= 60)	87%	13%	0%	92%	8%	0%

NOTE: Law 35/2002 increased incentives to continue at work after 65 years old, brought in a penalisation rule for early retirement starting at 61, introduced fiscal incentives for employers who retain their employees aged 60 and older with tenure of 5 years or more.

6.2   Empirical Results

In a multinomial logit model, the interpretation of the magnitudes and the directions of the estimates is easier by constructing a table of probabilities at key combinations of the values of the independent variables. Table 5 shows the predicted probability of continuing in employment (E), going to retirement (R) or other (O) for different representative individuals, holding the rest of the variables at their means. Although this is not ideal for binary independent variables, it will give us a good indicator of the effects within characteristics. The comparison of probabilities across characteristics needs to be done with caution since they are calculated for the average of the remaining independent variables, which may not be realistic.

Table 5 shows the predicted probabilities of the employment transitions for the 'average individual' (all variables at the sample mean), males, females, without any qualifications and with graduate and post-graduate degree. Table 7 in Appendix C shows the estimates of the coefficients of all the explanatory variables. As expected, age is a crucial factor in the decision of retirement.

We observe in Table 5 that, ceteris paribus, there is a reduction in the probability of moving to retirement for the individuals aged 60 or more and hence affected by the

2002 policy reform. For example, for the fictitious 'average individual affected', the predicted probability of moving to retirement in the following period declines from 18% before the reform to 12% afterwards. There has been therefore some gains in employment for the *Affected* group. As an illustration we have calculated that had not been for the reform, the 2004 employment rate for the age group 60–64 would have been 1.6 percentage points lower (see Appendix B).[9]

But these gains in employment are conditioned to this group of individuals being unaffected by other reasons between the pre and post period reform. For example, could this result be driven by the business cycle, with economic expansion explaining the rise in staying-on rates in employment for the 60 and over years old? This effect would be a concern if the *Affected* group was more vulnerable to economic shocks than the 55–59 years old (non-affected group). It is rather unlikely that the economic cycle alone was the motor of the change since the periods pre- and post-reform did not differ in terms of economic growth in Catalonia. Moreover, Alternatively, could the rise be the result of increases in the labour demand for individuals aged 60 or more years old and hence completely unrelated to the policy reform? This also seems unlikely.

Table 5 also displays whether there are differences in patterns across gender and qualifications. It shows that females aged 60 and over who were employed at $t = 1$ are more likely to move to retirement at $t = 2$ than males prior and post reform. Interestingly, differences across qualifications levels influence substantially transitions to inactivity and less to retirement. Graduates and postgraduates do not move to inactivity, while other educational groups, especially the one with no qualifications do.

In Table 7 in Appendix C we can read other effects, although they are smaller. For example, individuals born in the rest of Spain have higher probability of retirement, compared to those born in Catalonia, ceteris paribus. As expected, individuals who report having a good health are less likely to retire.

Transitions to retirement are higher for individuals holding a private pension plan, other things equal. Although this variable is rather general and do not specify whether there are ageing restrictions to withdraw payments, it indicates that relying on an extra form of savings induces earlier retirement. As expected, individuals who

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[9]This exercise calculates that the 2004 60–64 employment rate would have been 28.8% without the reform and 30.4% with the reform. The employment rate for this age group calculated with the EPA is 30.6, which is very close to our estimate of 30.4%.

own a firm are more likely to continue to work. Regarding transitions to other sort of inactivity (O), we observe that individuals born abroad, without a private pension plan and females have higher probabilities to make such a move.

We also estimated a separate model with age dummies (not reported) and we observed a large downwards shift in the probability to continue to work for individuals aged 65 and older, which coincides with the legal retirement age.[10] Table 5 also shows that shifts to retirement are negligible for individuals aged below 60 years old.

Finally, we investigated the role of earnings on the employment transitions. Information on wages at stage $t = 1$ is missing for a large number of individuals. After estimating Equation 3, the average of the predicted probabilities for the sample turned out to be more than two points below the proportion of individuals actually moving to retirement from the original sample. We therefore decided to exclude wage information from the final estimation. We would like to point out, however, that the estimate for the earnings parameter showed that individuals who chose moving to category 'other' (O) had a job in the first period with earnings below the 25% percentile of the wage distribution for the individuals aged 55 and over.

To summarise, our results help us understand the kind of individual that has a higher probability of moving to retirement or to other sort of inactivity. These individuals may be targeted by future laws aiming at encouraging higher employability of older people. The estimation points out that males are more likely to retire later than females, as well as healthier individuals, ceteris paribus. Holding a private pension plan increases the likelihood of retiring earlier which suggests that these plans may not have extreme age restrictions. It is also important to notice that there is the possibility of moving to other sort of inactivity and that these moves are concerning for being difficult to reverse (Jiménez-Martín et al. (2006a)). These shifts are mainly driven by unskilled individuals, and with less intensity by people born abroad.

Regarding the policy evaluation, our results suggest that the 2002 reform possibly played a role in the decrease in the number of transitions to retirement for the 60 and older individuals. This suggests that a higher flexibilisation in the retirement age and the fiscal incentives given to employers may have been useful.

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[10]The standard age of retirement is 65 in Spain, although retirement at earlier stages is possible under certain conditions, especially from 61 years old onwards.

7 Conclusion

The employment rate for older individuals (aged 55–64) in Catalonia was 42% in 2002, below the European target of 50% to be achieved by 2010. European countries are in the process to reform their labour markets to increase the employability of older people (55–64 years old).

Who are the older individuals in Catalonia with lower employability and hence require more attention? Females, older than 60 years old, born out of Catalonia, with some disability, married, with median-low qualifications, and with higher non-work related income.

Participation and employment patterns are close for individuals aged 55–64 years old, reflecting their low unemployment rates. For this age group, observable characteristics determine employment and participation similarly, the only exception being the individual's origin. People born abroad have higher probability of being active but lower of being employed than their counterparts, which means that they have higher probability of being unemployed.

Employability of individuals aged 55–64 with any sort of disability is very low. There is a clear scope for raising employment rates for disabled individuals. An examination of various studies suggest that the raise of paid work for disabled people could be achieved through tightening the disability requirements for granting disability benefits. The introduction of specific programs aimed at integrating people with disabilities into the workplace may also be useful.

For the 55–64 years old, part-time rates in 2002 in Catalonia were 12%, lower than the 22% EU average for a comparable period. The low flexi-time in Catalonia means that there exists the possibility to increase employment through part-time. Data reveal that for the Catalan population, part-time rates for the 55–64 age group are not higher than for younger age groups. Only individuals aged more than 65 report higher flexi-time. Regarding other job characteristics, older workers are more likely to hold a permanent contract, to be self-employed and to own a firm than younger age groups.

Which factors make more likely that an individual older than 55 will continue to work? Age, gender and qualifications. Results show that females are more prone to retirement, possibly due to care activities. Regarding education, individuals with no qualifications are particularly vulnerable to shifts to unemployment or other forms

of inactivity such as housework and disability pension. This group requires special attention since for individuals older than 55 years old, shifts to inactivity are likely to be permanent.

The 2002 reform aimed at encouraging employment of individuals older than 60 contributed to the increase in the staying-on employed probabilities of this group. The Law 35/2002 introduced incentives to continue at work after 65 years old and brought in a penalisation rule for early retirement starting at age 61. In parallel, it launched fiscal incentives for employers to retain individuals aged 60 or older with tenure of five or more years in the firm. We find indeed a decrease in the number of transitions from employment to retirement for the targeted group after the reform took place, which suggests that a larger flexibilisation of the retirement age proved useful.

A   List of Variables

- **Qualifications:** Four 0–1 dummies that capture the highest education level achieved by each individual. *Qual0* is 1 if the person does not have any qualification (omitted category). *Qual1* is 1 if the individual has a primary degree. *Qual2* is 1 if she/he obtained a secondary degree. *Qual3* is 1 if the person has a graduate or postgraduate degree.

- **Age dummies:** *Age55–59* (omitted category), *Age60–65*.

- *Gender*: dummy one if female.

- *Married*: dummy one if married.

- **Origin:** Three 0–1 dummies that capture whether the individual was born in Catalunya (*Catalonia*), rest of Spain (*Rest of Spain*) or in a foreign country (*Abroad*, omitted category).

- **Number of Children:** Four 0–1 dummies that capture whether the individual has no children (*Child0*, omitted category), one child (*Child1*), two or three children (*Child23*) and four or more children (*Child4+*).

- *Health*: dummy one if individual reports that his/her health is good or very good.

- *Elder Care*: dummy one if individual takes care of an elder person.

- *Disabled*: dummy one if individual reports that he/she has any sort of disability.

- *FirmOwner*: dummy one if individual is the owner or the co-owner of a firm.

- *Private Pension*: dummy one if individual has a private pension plan, either a 'pla de jubilacions' or a 'pla de pensions'. The former is less restricted in terms of when the money can be withdraw.

- *Wage25pp*: dummy one if individual's wage at stage one was above the 25 percentile of the wage distribution of the individuals aged 55 and older.

- *NonWorkInc*: individual per ten thousand ptes (or per sixty €) personal income after subtracting job earnings. There is a great number of missing values in total personal income and wages. These missing values have been replaced by the median value of the reported values.

- *Post2002*: dummy one if the first stage in the transition analysis corresponds to

Wave 1 (September 2001 – April 2002) and zero if the first stage corresponds to Wave 2 (January – June 2003.)

B   Calculation of the 60-64 Employment Rate

What would have been the number of people employed at time *t+1* (2004) for the age group of 60–64 years old ($e_{60-64,t+1}$) had the reform not been taken place? How different it is from the number estimated after the reform?

$$e_{60-64,t+1} = (e_{59,t} + n_{59,t}) \times er_{59,t} + e_{60-63,t} \times (1 - \lambda_{en}) - e_{64,t} + n_{60-63,t} \times \lambda_{ne}$$

where e denotes total employment, n stands for the non-employed and hence $e+n$ is the stock of population, er means employment rate, λ_{en} and λ_{ne} are the estimated transition rate from employment to non-employment and from non-employment to employment respectively.

The transition rates are different before and after the reform and accordingly they will be driving the different employment rates for this age group.

The first term of the equation is the proportion of people aged 59 years old at time t (2003) who is employed. This is calculated by taking the stock of people of that age times its employment rate. This assumes that all the 59 years old continue to work, which is more likely to be the case after the reform than before, given the fact that the law increased the minimum early retirement age from 60 to 61. Therefore, we are overestimating this component of the calculation of the pre-reform rate, and hence underestimating the reform effect.

The second term is the number of people that was 60–63 years old at t who are aged 61–64 at *t+1* who continued to work. This is calculated multiplying the number of people of that age band who was working with the corresponding estimated transition rate.

The third term discounts the number of people aged 64 who were employed but left the age group we are focusing on.

The last term adds in the number of people who were aged 60–63 (and now 61–64) who started to work. This last term is negligible since there is hardly any individual that makes this sort of transition at this age. For this reason, it will be disregarded in the calculations.

In order to calculate the employment rate we divide everything by $e_{60-64,t+1} + n_{60-64,t+1}$. By rearranging terms we can calculate this employment rate using demographics information from the EPA. λ_{en} prior to the reform is 0.18, while it is 0.12 afterwards. Plugging this in the formula gives a 2004 employment rate for the 60–64 years old of 28.8% and 30.4% prior and post reform respectively.

C Tables

Table 6: Probability of Being in Paid Work/Active for Individuals 55–64 Years Old

Variables	Change in Probability	
	Employment=1 (I)	Participation=1 (II)
Gender[1]	-0.1359**	-0.1394**
Married[2]	-0.1842**	-0.1700**
Disabled[3]	-0.4185***	-0.3475***
60–64[4]	-0.2734***	-0.3257***
Health[5]	0.0663	0.0353
Private Pension[6]	0.2095***	0.1937***
Catalonia[7]	0.0447	-0.2332*
Rest of Spain	-0.2380	-0.4475***
Child1[8]	0.1123	0.1046
Child23	0.0101	0.0614
Child4+	-0.0219	0.0221
Elder Care[9]	0.0004	-0.0256
Qual1[10]	-0.1028	-0.0874
Qual2	0.0423	0.1117
Qual3	0.2471**	0.2382**
Log likelihood	-228.9	-236.9
Pseudo R-squared	0.2861	0.2699
N observations	473	

NOTE: Estimated with cross-sectional weights.

*$p < .1$; **$p < .05$; ***$p < .01$.

[1]Dummy (1 if female; 0 male).

[2]Dummy (1 if married).

[3]Dummy (1 individual reports to have any type of disability).

[4]Dummy (omitted category is 55–59).

[5]Dummy (1 if good health).

[6]Dummy (1 if individual holds a private pension plan).

[7]Origin dummies (omitted category is born *Abroad*).

[8]Number of children dummies (omitted category is no children *Child0*).

[9]Dummy (1 if individual reports to care for elder individuals).

[10]Qualification dummies (omitted category is *Qual0*).

Table 7: Logit Estimates of the Transition Analysis from Employment to Retirement or to Other Inactivity for Individuals 55 and Over Years Old

Variables	Coefficients	
	Retirement (I)	Other (II)
Post2002[1]	18.2563	-0.0738
Affected[2]	18.1409	-1.7770
Post2002*Affected	-18.7389	-0.0776
Age	3.1020***	0.9196
Age*Age	-0.0199***	-0.0054
Gender[3]	0.3590	1.9929***
Married[4]	0.3148	0.0620
Health[5]	-0.6229	-0.4926
Private Pension[6]	0.2889	-1.1204*
Catalonia[7]	-0.0281	-2.4506**
Rest of Spain	0.2144	-1.7092
Child1[8]	-0.4136	1.1855
Child23	0.6526	1.0474
Child4+	-0.3150	0.7258
Firm Owner[9]	-0.8303	0.2530
Qual1[10]	0.6641	-0.7170
Qual2	-0.2940	-1.1739
Qual3	-0.1349	-46.5886***
Log likelihood	-135.2	
Pseudo R-squared	0.3815	
N observations	402	

NOTE: The base outcome is *Employment*. Estimated with clusters.

*$p < .1$; **$p < .05$; ***$p < .01$.

[1]Dummy (1 if transition analysis is undertaken after the reform).

[2]Dummy (1 if individual is aged 60 or over years old).

[3]Dummy (1 if female; 0 male).

[4]Dummy (1 if married).

[5]Dummy (1 if good health).

[6]Dummy (1 if individual holds a private pension plan).

[7]Origin dummies (omitted category is born *Abroad*).

[8]Number of children dummies (omitted category is no children *Child0*).

[9]Dummy (1 if individual is owner or co-owner of a firm).

[10]Qualification dummies (omitted category is *Qual0*).

References

Autor, D. H., Duggan, M. G., February 2003. "The Rise in the Disability Rolls and the Decline in Unemployment". *Quarterly Journal of Economics* (118), 27–50.

Bell, B., Smith, J., 2004. "Health, Disability Insurance and Labour Force Participation". Bank of England Working Paper no. 218.

Blanco, A., April 2000. "The Decision of Early Retirement in Spain". FEDEA EEE 76.

Boldrin, M., Jiménez-Martín, S., Peracchi, F., 1999. "Micro-modelling of Retirement Behaviour in Spain". Chicago University Press for the NBER, Cambridge.

Boldrin, M., Jiménez-Martín, S., Peracchi, F., 2001. "Sistema de Pensiones y Mercado de Trabajo en España". Fundación BBVA, Madrid.

Bound, J., June 1989. "the Health and Earnings of Rejected Disability Insurance Applicants". emphAmerican Economic Review (79), 482–503.

Bound, J., Burkhauser, R. V., 1999. "Economic Analysis of Transfer Programs Targeted on People with Disabilities". In: Ashenfelter, O. C., Card, D. (Eds.), emphHandbook of Labor Economics. Vol. 3. North Holland, Ch. 51.

Cañada, J. A., 2006. "The Employability of Older Workers in a Dual Labour Market: Assessing the Measures Taken in Spain since 2000". University of Las Palmas de Gran Canaria.

Esping-Andersen, G., 2006. "Col.locar el Bou Davant del Carro: el Cam cap a un Model Social per a l'Europa de la Meitat del Segle". In: de Catalunya. Departament d'Economia i Finances, G. (Ed.), *L'Estat de Benestar a Catalunya*. Vol. 85 (2n quadrimestre). Revista d'Economia Catalana i de Sector Públic, Ch. 1.

European Comission, 2003. *Employment and Social Affairs*. Eurostat, Ch. 5.

Galasso, V., August 2006. "Postponing Retirement: the Political Push of Aging". CEPR Discussion Paper No. 5777.

Hamermesh, D. S., July 1984. "Life-Cycle Effects on Consumption and Retirement". *Journal of Labor Economics* (2), 353–370.

Heckman, J., 1979. "Sample Selection Bias as a Specification Error". *Econometrica* 47, 153–161.

Jiménez-Martín, S., Labeaga, J. M., Vilaplana, C., 2006a. "A Sequential Model of Older Workers' Labour Force Transitions After a Health Shock". *Health Economics* (15), 1033–1054.

Jiménez-Martín, S., Labeaga, J. M., Vilaplana, C., May 2006b. "Award Errors and Permanent Disability Benefits in Spain". FEDEA Documento de Trabajo no. 2006-18.

Long, J. S., 1997. *Regression Models for Categorical and Limited Dependent Variables*. SAGE Publications.

McFadden, D., 1981. "Econometric Models of Probabilistic Choice". In: Manski, C. F., McFadden, D. (Eds.), *Structural Analysis of Discrete Data*. Cambridge, MA: MIT Press.

Mont, D., 2004. "Disability Employment Policy". Social Protection Discussion Paper Series no. 413, World Bank.

OECD, 2003. *Transforming Disability into Ability*.

OECD, 2004. *Ageing and Employment Policies, Live Longer, Work Longer*.

Van de Ven, W. P. M. M., Van Praag, B. M. S., 1981. "The Demand for Deductibles in Private Health Insurance: A Probit Model with Sample Selection". *Journal of Econometrics* 17, 229–252.