Gender, Family and Retirement Behaviour: Evidence from Spain

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Abstract

Is retirement decision an individual decision? Research has mostly focused on the impact of individual characteristics such as financial incentives and health on retirement. This paper views retirement as an embedded set of decisions and delineates, in particular, the links between gender roles, family structure and retirement. To examine the relevance of the family structure, such as the presence of a partner, of kids younger than six, of other descendants and people older than 75, I provide an empirical analysis of the effect on retirement choices of a reform implemented in Spain in 2007, which increased the amount of minimum pensions between 5 and 6.5%. Using Spanish data from the *Muestra Continua de Vida Laborales* (Continuous Work History Sample, 2005-2010), I show that female and low educated individuals tend to retire on a minimum contributory pension. The household composition matters significantly: the relative probability of receiving a minimum contributory pension rather than a standard pension for female increases by 3.8 times when there are old people in the HH; the presence of kids younger than 6 makes it double. Monetary factors and expectations are more relevant for men than for women. The 2007 reform modifies the incentives to retire, inducing in particular female worker who are minimum pension eligible to retire. A trade-off arises: on one side, the reform involves an increase in government spending and a decrease in female labor participation; on the other, women affected by the reform move from labour market to retirement or, more specifically, to home production, as they tend to provide child and old people care, thus leading to an increase in kids, old people and possibly their own welfare.

JEL Classification: H55, J14, J16, J26
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1. Introduction

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Into the unknown...

The world has never seen population ageing before. Can it cope?

The Economist, 2009

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Retirement is an important and often irreversible decision in people's life. How do individuals decide when to retire? Are these choices driven by retirement policies and financial incentives? In ageing countries where the share of elderly in population is constantly increasing, having a better understanding of individual retirement behaviour and evaluating the responsiveness to retirement policy measures is ever more important.

Most research on the retirement decisions tends to adopt an "individualistic" perspective. Retirement is largely determined by individual factors such as wealth, financial incentives provided by the different pension systems and health. People in better health and of higher socioeconomic status tend to retire later (McGarry 2002, Li, Hurd and Loughran 2008). While financial and health concerns are certainly a relevant part of the retirement decision, other family related issues may significantly affect the decision to retire.[1]

The purpose of this paper is to provide a better understanding of retirement as an embedded set of decisions by analysing, in particular, the links between gender roles and family structure on one side, and retirement decisions on the other. These aspects may account for the differences in women and men's retirement behaviour. To examine the relevance of the family structure, such as the presence of a partner, of kids younger than six, of other descendants and people older than 75, I provide an empirical analysis of the effect on retirement choices of a reform implemented in Spain in 2007 which led to an increase in the amount of minimum pensions. Most existing research on retirement has focused on the impact of having a partner and, in particular, a partner of retirement age on the retirement decision,

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[1] Actually, factors that influence retirement can be the outcome of both temporary factors such as health and job shocks and also long-run processes such as labour career and family dynamics.

but has disregarded the effect of family composition, such as having kids and, in particular, old people within the household.

I analyse the retirement behaviour of Spanish pensioners using data from 2005 to 2010 of the *Muestra Continua de Vida Laborales* (MCVL, Continuous Work History Sample) provided by the Spanish Social Security. This dataset contains information on about 4% of all individuals, enrolled in the Spanish Social Security in a particular year. It provides personal, family and fiscal data and collects information on past and current labour and retirement situations.

I consider individuals aged 60 in 2005 and analyse their retirement behaviour. I exploit an exogenous variation provided by an increase in the minimum pensions amount that provides financial incentives to retire early. Individuals included in my sample are eligible for early retirement and not receiving any other pension or any other complement which is not compatible with the possibility of receiving a standard contributory pension and/or a minimum pension benefit. To assess their pension eligibility, I reconstruct their labour history and, in particular, the exact years of contributions accrued. In accordance with the Spanish pension computation formula, I select only individuals with at least 15 years of contributions and with at least 2 of them in the last 15 years before possibly applying for the pension. The selected individuals are followed throughout the sample period, from 2005 to 2010, until they retire (on a contributory pension or on any other pension which makes them ineligible for other contributory pensions), until they die or until 2010, in case they decide to keep on working.

In Spain individuals may retire on a regular contributory pension if they meet the requirements needed in terms of age and years of contribution; in this case, the pension benefit they get is the amount that is computed according to the rules of the pension system they belong to. They are entitled to receive a contributory minimum pension when they satisfy all the requirements needed to qualify for standard contributory pensions, but the pension amount they have accrued during their working career is lower than a specific threshold that

is legislated annually by Social Security authorities. This threshold is set as to guarantee an adequate level of subsistence to retirees and alleviate old-age poverty. If the pension accrued by the individual is lower than the minimum pension amount, Social Security authorities intervene by topping the pension up with a complement which is financed through taxes and contributions paid by people who are currently working. The importance of minimum pensions benefits varies across countries; on average, in 2013 within OECD countries where a minimum pension scheme was implemented, 29.7% of the pensions were classified as minimum pensions (similarly, in 2013, 30% of the pensions granted by the Spanish system were indeed classified as minimum pensions). Moreover, their financial weight within pension expenditures, in most European countries, is increasing over time.

My descriptive analysis investigates the contribution of different factors in inducing individuals to retire on minimum contributory pensions, on standard contributory pensions or keep on staying on the job. I perform a multinomial logistic regression comparing individuals who end up retiring on a minimum contributory pension, on a standard contributory pension or keep on working beyond the pension standard eligibility age. The estimation results clearly point out that the retirement decision is affected by gender and education: individuals who retire on a minimum pension tend to be female and low educated. The relative probability of receiving a minimum pension benefit rather than a standard pension for female is 36.1% higher than for men. As expected, the decision of retiring is affected by monetary incentives. For instance, the larger the distance between the minimum pension set by Social Security Authorities and the individual's pension amount accrued, the more likely it is that the individual will choose to retire on a minimum pension as soon as possible. However, if by working longer, individuals expect to collect a contributory pension that is higher than the minimum pension, they will tend to postpone retirement. This is particularly true for men whose retirement decision is more affected by monetary expectations, compared to that of women. The current working situation matters as well: the higher the current wage the higher the probability of postponing retirement, whereas having a physically demanding job

induces workers to leave the labour force and retire. Besides all that, family structure significantly affects the retirement decision in the case of women. In accordance with the existing literature, I find evidence of joint retirement: the presence of a partner of retirement age stimulates the exit from the labour force, especially in the case of female. Furthermore, the presence of people older than 75 - in particular with disabilities - and descendants younger than 6 within the household has a significant impact on women's retirement choice. The relative probability of receiving a minimum pension benefit rather than a standard pension for female increases by 3.8 times when there are old people in the HH. The presence of kids younger than 6 makes it double. As a result, women with old people and kids in their household tend to retire early and are more likely to end up receiving a minimum pension benefit than men. As a result, given the existence of these minimum pensions institutions, individuals may plan their working life to use these incentives.

The pension reform implemented in Spain in 2007, which increased minimum pension benefits between 5 and 6.5%, modifies these financial incentives by making early retirement on minimum contributory pensions financially more convenient. I perform a survival analysis as it allows me to follow individuals through time until their retirement decision occurs or until the end of the sample period. The empirical analysis shows that such a reform modifies the incentives to retire, inducing in particular female worker who are minimum pension eligible to exit the labour force and retire. A trade-off arises: on one side, the reform involves a price to pay not only in terms of increased government spending (since the pension amount covered by Social Security authorities increases after the reform) but also in terms of a decrease in female labor participation; on the other, female workers who retire on a minimum pension when the reform is implemented tend to provide child and old people care, thus leading to an increase in kids, old people and possibly women's welfare. Women affected by the reform move from the labour market to home production as they retire to take care of their young and old family members. As a result, despite being implemented mainly for redistributive reasons, minimum pensions end up modifying the incentives to retire, in

particular those of women. They cannot be thought of as being simply mere redistributive tools: they affect individual's incentives to retire and their impact, being particularly strong for female, is connected to the role of the woman within the family. This role is strongly driven by cultural beliefs according to which, in most cultures, women have to fulfil their duties as daughters (taking care of old people) and grandmothers (taking care of children). Thus, the choice of retiring on a minimum pension goes beyond mere economic aspects and involves personal, family and cultural characteristics.

The remainder of the paper proceeds as follows. Section 2 presents a review of the literature the paper is related to and clarifies its contribution. Section 3 describes the main features of the Spanish pension system. In Section 4, I analyse the evolution of minimum pension reforms and illustrate the 2007 reform. Section 5 briefly describes the dataset and Section 6 presents the empirical estimation and the results. I conclude in Section 7.

2. Review of Literature

This paper is related to the empirical literature on retirement behaviour. In 2001 Gruber and Wise launched an international research project aimed at studying the relationship between social security provisions and retirement behaviour. They found a strong cross-country relationship between the financial incentives to retire provided by different Social Security programs and the proportion of old people who decide to exit the labour force in advance. These results have been confirmed in the subsequent literature, which has emphasized the fundamental role that Social Security rules, policy changes and financial incentives have in shaping individuals' retirement decisions (see Brugiavini, Peracchi and Wise, 2003). Besides the impact of financial incentives on retirement behaviour, the recent literature has been einvetsigating the effect of health issues. For instance, Gustman and Steinmeier (2014) conclude that poor health has a great impact on the disutility of work and pushes the individual to retire earlier. They estimate that, compared to a situation where the entire population is in good health, the current health status of the population reduces

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the retirement age by an average of about one year. Besides health, subjective longevity may affect the timing of retirement: an individual who is more optimistic about her longevity, has a greater probability to postpone retirement and retire at the standard age (Khan, Rutledge and Yanyuan Wu, 2014). Other studies have focused on the impact of peer effects on retirement choice, pointing out that, when deciding on retirement, an individual tends to harmonise her choices with the ones made by peers. Brown and Laschever (2012), using administrative data of retirement eligible Los Angeles teachers and controlling for individual and school characteristics, find that the retirement of an additional teacher in the previous year at the same school increases a teacher's own likelihood of retirement by 1.5-2 percentage points.

This paper contributes to the literature on retirement behaviour by assessing the impact of gender and family structure on retirement. The effect of family situation on individuals' economic behaviour and decisions has been studied by Alesina and Giuliano (2010) who found a significant impact of family ties on economic decisions. They showed that when family ties are strong, home production is higher and labour force participation of women and young people and geographical mobility are lower. Strong family ties typically lead to a more traditional role of women within the household: the wife tends to stay home and run the family rather than actively participating in the labour market. As for retirement, the effect of having a partner and the issue of joint retirement has been widely investigated, starting from Hurd (1989) who pointed out that, in the absence of major shocks such as ill-health or job loss, between 20% and 30% couples retire within one year of each other. This evidence has been documented for several cohorts and countries. Examples include Blau (1998), Gustman and Steinmeier (2000), Michaud (2003), Gustman and Steinmeier (2004), and Hospido and Zamarro (2014). Most studies conclude that joint retirement is driven by preferences for shared leisure and is not very much affected by financial pressures.

As for the linkages between family structure and retirement, most research has been conducted in the US and is survey-based (Phillipson and Smith, 2005). Several studies suggest

that domestic circumstances play a major role in women's retirement decisions (Henretta et al., 1993, Pienta and Hayward, 2002, Nesteruk and Price, 2008), but the analysis is centered on marital status and not much on family as a broader unit including other members besides the partner. Recent research on joint retirement (Hospido and Zamarro, 2012) suggests that, on average, in European countries, a significant share of spouses retire within less than one year of each other, independently of the age difference between them. Talaga and Beehr (1995) found that the number of dependants living in the households increases the likelihood of women to retire, while it decreases it for men. This paper shows that it is not the number of dependants per se which affects retirement choices, but rather the type of members, since it is the presence of kids and especially old people which induces women in particular to retire earlier.

More specifically, this paper contributes to the literature on gender differences in retirement. Gynn (2004) showed that women's retirement decisions crucially depend on their discontinuous labour careers and on their key role within the family. Boeri and Brugiavini (2008) analysed the effects of pension reforms on the planned retirement age of women and find out that women are less responsive than men to changes in pension policies since they have binding constraints due to gaps in their contributory history. Gustman and Steinmeier (2009) state that the retirement decision is family based and gendered, as it is taken differently by men and women. This paper extends this research by investigating family as a crucial element in determining the different retirement behaviour of men and women.

This paper also provide a different interpretation of the so-called "sandwich generation", grounded on empirical and economic analysis. This expression is commonly used in sociology to describe the specific burden placed on women aged 40 to 59 by competing demands coming from the labour market on one side, and both older family members and children' care on the other. The sandwich generation studied by this paper is actually a different one, as it is composed by women aged 60 to 65. These women are squeezed between older family members and grandchildren care. Whereas the sociological literature on the sandwich

generation is mostly qualitative in nature (Künemund, 2006, Grundy, Henretta, 2006, P. A. Dykstra 2010), this paper provides an empirical quantitative perspective on the retirement decisions of women who can be said to belong to this particular sandwich generation.

Finally, the literature on pension presents only few systematic investigations of minimum pensions. In 2002, Atkinson, Bourguignon, O'Donoghue, Sutherland, and Utili explored the effects of the implementation of a European Minimum Pension, seen as an anti-poverty policy. Thus, their focus is mainly on redistribution, equality and poverty issues rather than on the effects induced by minimum pensions on retirement behaviour. They claim that the European Union could introduce minimum pension common standards across EU member states as to reduce poverty among the elderly. The distortion caused by minimum pensions on retirement behaviour is analysed by Jiménez-Martín and Sánchez Martín (2007). They set up a stylized life-cycle model and quantitatively assess the contribution of minimum pensions to early retirement behaviour. They found that minimum pensions create a very strong incentive to retire as soon as possible, in particular for low-income workers: the presence of minimum pensions triplicates the occurrence of early retirement. This paper confirms the fact that minimum pensions are associated with early retirement and extends this research significantly by providing an empirical analysis of the gender and family effects triggered by minimum pension reforms.

3. The Spanish Pension System

The Spanish public pension system consists of two different programs, non-contributive and contributive. The non-contributive program is means-tested and provides a pension benefit to people aged 65 and older who are not entitled to receive a contributory old-age pension, since they have not accomplished the requirements fixed by the law. It is financed by tax revenues. In order to be eligible for this welfare pension, a person is required to have lived in Spain for at least 10 years after the age of 16 and for the 5 consecutive years prior to applying for the pension.

The second program is a PAY-AS-YOU-GO contributory pension system. It is mandatory for all employees and self employed people. Pensions are financed through social contributions paid by companies (8.2% of earnings in 2010) and workers (29.9% of earnings, on average in 2010). Contributions depend on the category the worker belongs to and are computed as a fixed proportion of gross labor income. The contributory system is divided into five different types of pensions: old age, disability, orphans, widows and widowers, and other relatives.[2]

The old age pension, in turn, can follow three different schemes, each of which covers a different group of workers, with peculiar characteristics:

1) *General Regime*, the main scheme including all private sector employees who are not part of any other special scheme and part of the public servants. In 2011 it accounted for 79% of all pensions. Most contributory minimum pensions belong to it.

2) *Central Government Civil Servants*;

3) *Special Regimes*, including self-employed people, farmers (all people who work in agriculture, forestry or with livestock), miners, sailors and domestic workers.

3.1. Eligibility and Pension Computation

The sample period of this paper ranges from 2005 to 2010. In this period, according to the Spanish pension rules, the standard retirement age is 65 years for both men and women. However, it is possible to retire on a contributory pension at 60 (if the person has started to pay contributions before January 1967) or 61 years of age. In all cases, in order to get a contributory pension, a person needs to have a minimum contribution period equal to 15 years, of which at least 2 must have occurred in the last 15 years before claiming the pension.

The way to compute the amount of the pension was established in 1997. Pensions are computed according to the following formula:

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[2]The benefits granted to "other relatives" are pensions in favor of family members who depend economically on the deceased, have no others means to support themselves and have lived with the deceased for at least two years.

$$P = PB \cdot RR \cdot ER$$

PB is the regulatory pension base (*base reguladora*) which is calculated as follows:

$$PB = \frac{\sum\limits_{i=1}^{i=24} C_m + CPI \sum\limits_{i=25}^{i=180} C_m}{210}$$

where C_m (*base de cotization*) is the monthly contribution accrued by the individual and i indicates the months. PB is equal to the sum of the contributions made during the last 180 months of work before retirement, divided by 210, since the pension is paid 14 times a year. Monthly contributions paid by workers have a minimum and a maximum value. This means that if a person's monthly contribution is lower than the established minimum value, it is increased so as to reach this minimum value and, if it is above the maximum level, it is capped to the maximum. These minimum and maximum amounts are decided every year by Spanish Social Security authorities and vary according to the different professional categories. In 2011, for example, the minimum monthly contribution for a worker with no specialization was € 748, 20, while the maximum amount was equal to € 3262, 50. Contributions for the 24 months immediately prior to retirement are simply computed at their nominal value, whereas previous contributions from the 25th to the 180th month are indexed according to the Spanish Consumer Price Index (CPI).

RR is the replacement rate which is the percentage of the regulatory pension that is actually paid. As shown in Figure 1, it increases with the number of years a pe50% of PB. The RR increases from 50% after 15 years by 3% a year between the 16th and the 25th year (reaching 80% after 25 years) and by 2% a year until the 35th year (reaching 100%). If a person continues to work after having reached age 65, this percentage increases by an additional 2% for every full year contributed after that age, provided that 35 years contributions have already been paid.

ER is the early retirement penalty applied when retirement occurs before the standard
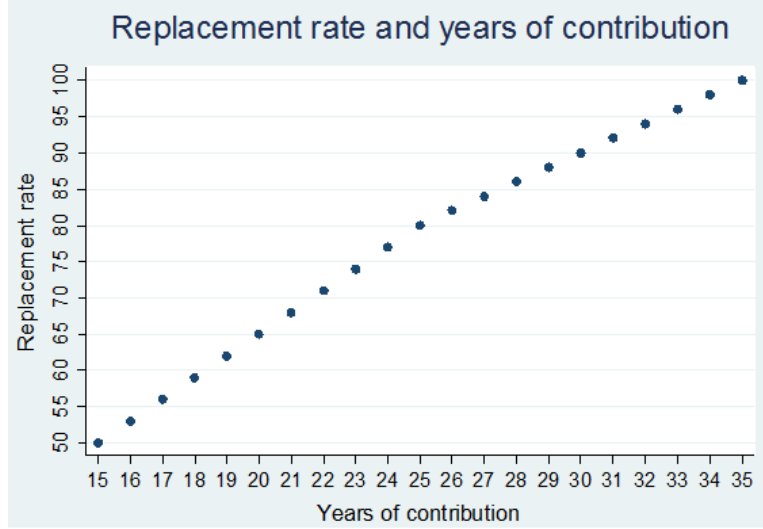
Figure 1: The replacement rate

age of 65 years. It is equal to

$$ER = 100 - \alpha(65 - RA)$$

where RA is the actual retirement age. The pension benefit is reduced by 8% (α) for every year of retirement before age 65. An individual receives 100% of the accrued pension amount if the person is 65 or older when she retirees. In this case there is no penalty. The maximum reduction is 40% and is applied when the person retires at 60. Thus, in order to be entitled to receive a pension equal to the calculated PB, it is necessary to have paid contribution for 35 years and to retire at the age of 65.

3.2. Defining minimum contributory pensions

Minimum pensions are aimed at ensuring that pensions reach at least a threshold legislated by the government annually through a *Real Decreto*. In order to be eligible for a minimum pension, an individual needs to meet the common requirements needed to receive a standard pension. If the accrued pension is below the legislated threshold, the individual receives the minimum pension and the difference between the minimum and the accrued pension is financed by the government According to the Spanish pension system, minimum

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complements can be granted for all types of pensions, i.e old age, disability, orphans, widows and widowers, and other relatives. Minimum pensions are defined as contributory only when complements are given to individuals who retire on an old age pension. Those individuals will satisfy all the conditions to receive an old age pension: they have paid contributions for at least 15 years (two of which in the last 15 years before retiring) and they are at least 60 or 61 years old, depending on when they started to contribute to the Social Security System. Contributory minimum pensions belong to the *General Regime* and to *Special Regimes,* in particular to those for self-employed individuals and farmers.

If the pension holder has a dependent spouse then he is entitled to receive a higher minimum pension complement. The dependent spouse is required to live with or to cohabitate, except in the event of legal separation, and to be financially dependent upon the pensioner. The spouse is considered to be financially dependent if she does not receive any pension from a basic social welfare scheme, which includes minimum income guarantee and third-party assistance benefits. In any case, the pensioner's and spouse's income or earnings from any source need not to exceed a threshold which is established each year

Minimum complements are subject to restrictions. They are not compatible with the pensioner receiving a full working income and/or capital or any other type of income, when the total amount of this income, considering all the deductible expenses in accordance with tax law (and not including the pension that is eventually going to be supplemented) exceeds the threshold established for the minimum pension by the Social Social Security each year. Moreover, if an individual receives more than one pension, she is granted a minimum contributory complement amount only if she retires on an old age pension and if the total sum of the pensions received is lower than the threshold established by the Spanish Social Security for that particular year. In such cases, the complement amount will be given by the difference between the total pension amount received and the threshold. Table 1 reports the yearly amounts in Euros of the minimum pension from 2005 to 2010, both in the case of a pensioner with and without a dependant spouse.

Table 1: Minimum Pension Amounts		
	With a dependent spouse	Without a dependent spouse
2005	6950.30	5801.60
2006	7445.76	6127.52
2007	8093.12	6566.56
2008	8653.12	6922.16
2009	9122.82	7339.92
2010	9515.80	7697.20

4. Minimum Pension Reforms in Spain

There is general agreement in the literature (Jimenez, Martin 2007) on the fact that in the last thirty years the Spanish pension system has undergone a series of silent reforms, small reforms concerning the value of its parameters, which in end have resulted in a deep change, although no structural reform took place. These changes have been specifically concentrated on the value of the minimum and maximum thresholds, thus modifying significantly the degree of generosity of the system.

The complements to minimum contributory pensions are defined as the difference between the minimum contributory pension the individual receives and the pension the individual would have received according to the standard rules of computation. This difference measures the financial pressure that the minimum pension program puts on the sustainability of the pension system. The contribution of these complements to the overall pension expenditure cannot be overlooked. Within the General Regime in 2008, 19% of the pensions granted were indeed classified as contributory minimum pensions and they accounted for 6.4% of the total pension expenditure. In 2008, more than 36% of the pensions granted to self-employed people were minimum pensions. In 2013 out of 9.111.203 pensions granted, 33.8% were classified as minimum contributory pensions. These data confirm the relevance of minimum pensions within the Spanish pension system.

Figure 2 shows the evolution of real contributory minimum pensions, both for individuals with and without a dependent spouse. Starting from 2004, a series of reforms concerning minimum contributory pensions have been implemented. After the *Real Decreto 2/2004*, all
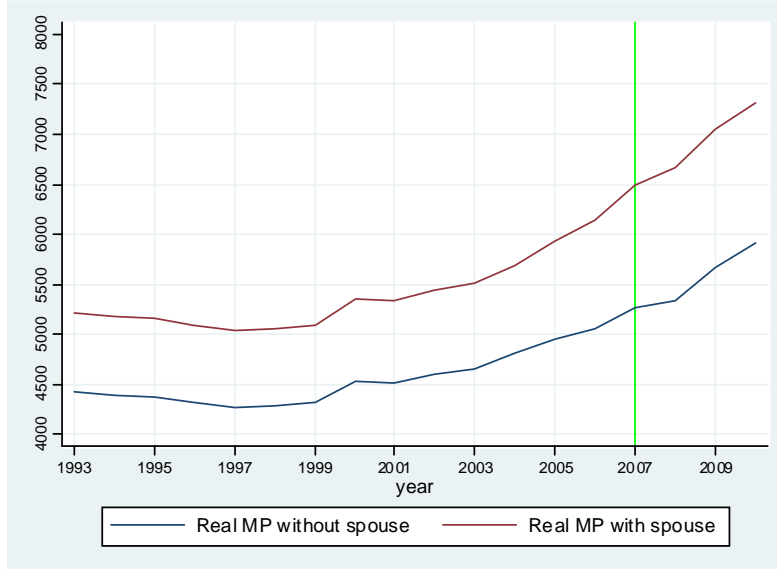
Figure 2: The Real Growth of Minimum Pensions

pensions experienced an increase of 2% (according to the expected CPI), while minimum contributory pensions were revalued by 3.8%. The year after, the *Real Decreto 1611/2005* enacted exactly the same increase for all pensions as the previous year and minimum contributory pensions were increased by 4%.

The impact of the reform evaluated in the this paper is the one endorsed on December 22, 2006 and in force starting from 2007, by the *Real Decreto 1578/2006*. This decree legislated on the 2007 increase in value of the pension benefits provided by the Spanish Social Security system. It established, once again, a 2% increase for all contributory pensions, a 3% increase for non-contributory pensions and a rise between 5% and 6.5% for minimum contributory pensions: the yearly amount of the minimum contributory pension was equal to € 8093.12 if the individual had a dependant spouse and to € 6566.56 otherwise.

5. Empirical Estimation

The dataset I am using for the empirical analysis is *The Continuous History Work Sample* (*Muestra Continua De Vidas Laborales, MCVL*). A detailed description of the dataset, its

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sources and the specific kind of information it contains, is provided in the Appendix. It is a panel administrative dataset whose first wave is 2004 and is collected each year up to the current year. For each individual in the sample, it provides personal and family characteristics together with income and fiscal information, individual's labour history and retirement situation.

To construct my sample, I select individuals with following characteristics: they were 60 years old in 2005, eligible for early retirement and not receiving any other pension or any other complement which is not compatible with the possibility of receiving a standard contributory pension and/or a minimum pension benefit. To assess their pension eligibility, I reconstruct the labour history for each individual in the sample and, in particular, the exact years of contributions accrued. In accordance with the Spanish pension computation formula, I select only individuals with at least 15 years of contributions and with at least 2 of them in the last 15 years before possibly applying for the pension. Besides that, in constructing my sample, I also take into account all the incompatibility rules set by the Spanish Social Security system, according to which, for example, an individual is not entitled to receive more than one pension from the same pension scheme. The incompatibility is not applied to survivors' pensions in any case. Moreover, in order to select individuals who are potentially entitled to receive a minimum pension supplement, I have excluded all the individuals who already perceived other pensions whose total amount exceed the threshold set each year for the minimum pension benefits.

The selected individuals are followed throughout the sample period, from 2005 to 2010, until they retire (on a contributory pension or on any other pension which makes them ineligible for other contributory pensions), until they die or until 2010, in case they decide to keep on working. Tables 2 and table 3 provide some descriptive statistics of the sample at the beginning and at the end of the spell. Throughout the sample period, 30% of individuals end up retiring on a minimum contributory pension, thus confirming the relevance of minimum pensions within the Spanish pension system. 58% of individuals retire on a standard

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Table 2: Descriptive Statistics - I

Sample period	2005-2010		
Observations	8865		
	Female	Male	
Gender	34%	66%	
	Contributory minimum pensions	Contributory pensions	Stay on the job/ other
	30%	58%	12%
Avg. CMP supplement	€ 233.70		

Table 3: Descriptive Statistics - II

	Contributory minimum pensions	Contributory pensions	Stay on the job/ other
	30%	58%	12%
Average age	62	63.8	64.5
Female	64%	28%	33%
Male	36%	72%	67%
Low Education	66%	41%	38%
Middle Education	25%	31%	24%
High Education	8%	27%	37%
HH members <=2	74%	79.8%	81.7%
HH members >=3,<=4	21.3%	17.2%	14.7%
HH members>=5	4.7%	3%	3.6%
Partner	71.4%	68.8%	55.1%
Partner of retirement age	31.4%	28.1%	27.1%
Descendants<=6	13.6%	4.1%	4.0%
Descendants<=6 w/disabiity	3.1%	1.3%	0.4%
Other descendants	47.7%	45%	44%
Ascendants>=75	13.6%	4.6%	3.5%
Ascendants>=75 w/disability	4.1%	0.5%	0.4%
Observations	2713	5070	1082

contributory pension, whereas 12% of individuals either keep on working until 2010 or until they are alive or end up receiving a non contributory pensions (disability, orphan, widows and relative pensions). The average minimum pension supplement granted to individuals in the sample who retire on a minimum pension benefit amounts to € 233.70.

The average age of retirement on a minimum pension benefit is 62 years, more specifically

61.55 years for women and 62.75 for men. Hence, minimum contributory pensions tend to be associated with early retirement behaviour compared to standard retirement pensions (whose average retirement age is 63.8 in the sample). Almost two thirds of individuals who retire on a minimum pension benefit are female. Not surprisingly, 66% of individuals who retire on a minimum pension are low educated. As for the family characteristics, retirement on minimum pensions seems to take place in the context of households with a slightly higher number of members compared to standard retirement. The composition of the household is relevant: the presence of ascendants older than 75 and descendants less than 6 years old characterises the households of individuals who retire on a minimum pension benefit.

The dataset provides detailed information on the individual's retirement situation such as the date of the first pension payment received and for each year of the sample the exact monthly and yearly amount divided between the pension amount effectively accrued, the complements added by the government in order to reach the minimum pension threshold and the monetary yearly revaluation of the pension amount. However, the accrued monthly pension is provided only for individuals who actually retired on contributory pensions during the sample period, which constitute 86.5% of the sample. For the others, I reconstruct the pension amount accrued using the pension computation formula discussed in section 3.1. Since complete information about the monetary contribution history and wages perceived by individuals throughout their working career is not available in the dataset, I compute a predicted value for the accrued pension amount. To avoid possible selection bias into continuing to work (as opposed to retire early), the Heckman selection model is used. The main equation includes variables which affect the accrued pension amount, whereas the selection equation is a probit estimate of the likelihood of retiring and receiving a pension. Thus, the selection equation includes also variables concerning the individual's family situation, since they influence the retirement decision but not the pension amount accrued per se.

The main equation of the Heckman selection model is the following:

$$Log\ Accrued\ pension\ amount = \beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Years\_Contributions + \varepsilon_1$$

X_i is the vector of personal characteristics, including age, gender and education. Low education corresponds to no schooling at all, completed and uncompleted primary school. High education includes completed secondary school, graduate and post-graduate education. Medium education represents the in-between level of schooling, namely having attended junior school only or also having attended but not completed a secondary school. For each individual in the sample, I reconstruct the labour career, starting from the very first job until the last one recorded in the data. Hence, Y_i contains all the variables which describe the individual's labour history: average of the observed wages, main affiliated pension scheme, job contract type, part-time versus full-time jobs and the sector the individual has been mostly working in throughout her life. Finally, I compute the exact years of contributions and include them among the explanatory variables. As a result, I assume the accrued pension amount to be observed if:

$$\gamma_0 + \gamma_1 X_i + \gamma_2 Y_i + \gamma_3 Years\_Contributions + \gamma_3 Z_i + \varepsilon_2 > 0$$

where Z_i is the vector of the family characteristics; ε_1 and ε_2 have correlation ρ. Table 4 reports the results of the main equation. If a variable appears only in the outcome equation tits coefficient can be interpreted as the marginal effect of a one unit change in that variable on the dependent variable. If, on the other hand, the variable appears in both the selection and outcome equations, the coefficient in the outcome equation is affected by its presence in the selection equation as well. As a result, it should be intepreted conditional on its inclusion in the selection equation, since the marginal effect on the dependent variable is composed of the effect of the selection and the outcome equation. Following Sigelman and Zeng (1999), I compute the marginal effect using this formula:

$$dE[y|\ z > 0]/dx = \beta - (\alpha\ \rho\ \sigma\ \delta(\alpha))$$

where β is the coefficient of the variable in the outcome equation, α is the corresponding coefficient in the selection equation, ρ is the correlation between the errors in the two equations and σ is the error from the outcome equation and finally $\delta(\alpha)$ is the inverse mills ratio multiplied by the inverse mills ratio plus the probability of being selected. For the variables included in both equations, Table 4 reports first the coefficient of the outcome equation and then the marginal effect computed following Sigelman and Zeng's methodology. The results of the selection equation estimation are reported in the Appendix (Table **??**).

Female has a negative and significant impact on the pension amount accrued. Having low education decreases the pension amount by 23% compared to high education. As far as the different contribution regimes are concerned, belonging to the Self-Employed Regime or to any Special Regime, rather than to the General Regime, affects negatively the individual's pension benefit accrued. Individuals who, throughout their careers, have mostly had temporary contracts or permanent contracts for seasonal jobs collect a pension benefit which, on average, is respectively 22.7% and 23.5% lower than individuals who have been mainly working on standard permanent contracts. As for the sector of activity, the excluded category in the estimation is the finance sector. On average, individuals working, for instance, in the primary sector, basic and advanced manufacturing, electricity and environment, retail and transport obtain a lower pension benefit. On the other hand, workers active in the medical sector end up receiving a higher pension amount than workers belonging to the finance sector. As expected, both the years of contributions and the average of the observed wages significantly and positively affect the pension amount.

The selection equation points out that the individual's family situation affects the likelihood of retirement. In particular, in agreement with the literature on joint retirement, having a partner of retirement age increases the probability of retiring. Moreover, when children younger than six or people older than 75 are present in the household, a person is

Table 4: Heckman Selection Model

	Log accrued pension		Log accrued pension
Age	0.005*** (0.000)	Constructions	-0.165*** (0.021)
	.0001 (0.000)		-0.066 (0.000)
Female	-0.278*** (0.007)	Retail	-0.140*** (0.022)
	-.2332 (0.001)		-0.285 (0.001)
Low education	-0.339*** (0.006)	Transport	-0.146*** (0.021)
	-0.231 (0.000)		-0.034 (0.000)
Medium education	-0.249*** (0.007)	Tourism	-0.155*** (0.024)
	-0.154 (0.000)		-0.200 (0.000)
Log average observed wages	0.137*** (0.002)	Information	-0.023 (0.031)
	0.108 (0.000)		-0.129 (0.000)
Self-employed regime	-0.332*** (0.007)	Public sector	-0.182*** (0.021)
Self-employed special regime	-0.408*** (0.025)		-0.113 (0.000)
Special regimes	-0.219*** (0.0111)	Professional activities	-0.101*** (0.021)
Permanent contract (seasonal)	-0.235*** (0.023)		-0.129 (0.000)
Temporary contract	-0.227*** (0.006)	Auxiliary activities	-0.161*** (0.021)
Part-time contract (<70%)	-0.176*** (0.018)		-0.204 (0.000)
Part-time contract (>70%)	-0.123*** (0.032)	Medical activities	0.098*** (0.022)
Primary sector	-0.304*** (0.021)		0.046 (0.000)
	-0.252 (0.000)		
Basic manufacturing	-0.111*** (0.022)	Artistic activities	-0.102*** (0.034)
	-0.134 (0.000)		-0.198 (0.000)
Advanced manufacturing	-0.023 (0.022)	International	-0.055 (0.094)
	0045 (0.000)	organizations	-0.203 (0.001)
Electricity and environment	-0.090*** (0.030)	Years of contributions	0.024*** (0.001)
	-0.212 (0.000)		0.046 (0.000)
Constant	7.117*** (0.098)		
Observations		8865	
Censored observations		1097	

more likely to retire. Since ρ is significantly differ from zero, the hypothesis of no correlation between the error terms of the main and the selection equation can be rejected, thus confirming the relevance of the selection bias issue. The Heckman selection model fits the data better than independent estimates of the main and the selection equations.

5.1. Understanding retirement behaviour

The goals of my empirical estimation are to understand which factors affect the retirement decision, assess which features increase the likelihood for an individual to retire on a minimum contributory pension or on a standard contributory pension and highlight the differeneces between men and women's retirement behaviour. In order to that, I perform a multinomial logistic regression, first considering the whole sample and then splitting it into female and male only. The reference category chosen for the baseline multinomial estimation is made by individuals who, throughout the sample period, stay on the job and do not retire. This category is compared to the group of individuals who retire on a minimum comntributory pension and on a standard contributory pension.

The retirement decision is affected by personal and family characteristics, by monetary factors and the individual's labour situation. As for the personal characteristics gender, age, education and geographical mobility within Spain are included as explanatory variables in the multinomial regression. The dataset specifies for each individual the country and district of birth, the district or region where the individual had her first job and the district or region where the individual lives in the year of the survey. In addition to that, for each job experience recorded in the dataset, the district and the region are specified. Finally the district or region where the individual lives when she receives a pension benefit is provided. Hence, it is possibile to draw information about how many times the individuals has moved from one Spanish region to another. Starting from this information, for each individual, I construct a variable called mobility which captures the number of times an individual has changed region within Spain throughout her life and working career.

As for the information concerning the family, the number of household members, the

presence of a partner and, in particular, of a partner of retirement age, the presence of people older than 75, kids younger than 6 and other descendants within the household are included as explanatory variables. Actually, the datset provides specific information for each individual about the number of people older than 75 and the descendants less than 6 years old living in the household and, if any, about their degree of disability. It is relevant to detect the presence of the partner in order to understand retirement behaviour, as there is common agreement and strong empirical support for retirement decisions being not much individual decisions, but rather being grounded on the individual's family situation (see Section 2). In addition to that, another aspect that it is worth investigating is whether having a partner whose age is close to the pension age or higher than the standard pension age, has any effect on the decision of retiring.

As far as the monetary aspects are concerned, two variables are included in the regression. The first one is the individual's monthly pension amount accrued. The second monetary variable included in the multinomial regression concerns expectations. The timing of the retirement decision is affected not only by the current pension amount accrued by the individual but also by expectations on how much the pension amount will increase period after period in case the individual decides to postpone retirement and keeps on working. It is reasonable to assume that individuals who are pension eligible, being almost at the end of their working career, are able to form correct expectations about the additional pension amount they will gain each year, in case they decide to stay in the labour force one additional year. I compute the expected pension amount for each individual up to 2012. Then I create a dummy variable, called future minimum pension non-eligibility, which is equal to 1 if the difference between the minimum pension set by Social Security authorities for that particular year and the individual's pension accrued is positive for at least one year and then becomes negative for at least one year. This happens for individuals whose pension amount accrued is at first below the minimum pension threshold and then exceeds it; in other words, this happens for individuals who will become eligible for the minimum pension benefit for a

certain period of time, but then they are no longer eligible since, by keeping on working and gaining contributions, the pension amount they accrue is higher than the minimum pension benefit set by Spanish Social Security authorities for a particular year. The purpose here is to evaluate the impact of expectations of future accrued pension amounts on the outcome of the retirement decision.

The retirement decision is also related to selected job characteristics. The wage and the fact of carrying out a physically demnading job are included among the regressors. As far as the effect of wage on the retirement decision is concerned, there are two effects taking place: a higher wage produces an income effect which tends to push individuals towards early retirement but also a substitution effect which makes leisure more costly, thus discouraging individuals from retiring. In the end, the net effect of wage on retirement behaviour depends on individual's preferences for work and leisure.

Tables 5 and table 6 report the relative risk ratios of the multinomial logistic estimation conducted on the whole sample and then splitting it into female and male, respectively. The results of the estimation on the whole sample point out that gender plays an important role in the retirement decision and outcome. The relative probability of receiving a minimum pension benefit rather than stay on the job for female is slightly more than double the corresponding relative probability for male, holding the other explanatory variables constant. On the contrary, being a female has no significant effect on the likelihood of retiring on a standard contributory pension compared to the choice of keeping on working.

Age, which is expressed in months, has a negative effect on the probability of retiring on a minimum pension. This means that minimum pensions, broadly speaking, tend to be associated with early retirement behaviour. As for education, it turns out that individuals with lower education are by far more likely to retire on a minimum benefit than an individual with a higher level of schooling. In particular, individuals with low education have a probability of receiving a minimum pension which is almost three times higher than individuals with a high level of education. This effect is significant and even stronger when the sample

Table 5: Multinomial Logistic Regression - I

	All sample	
	Minimum pensions	Contributory pensions
Female	2.041*** (0.261)	0.962 (0.101)
Age	0.989*** (0.001)	0.997*** (0.000)
Low Education	2.753*** (0.589)	1.314*** (0.262)
Medium Education	1.734*** (0.529)	1.299*** (0.314)
Mobility within Spain	1.032 (0.036)	1.099* (0.043)
HH members	0.903 (0.095)	1.218 (0.145)
Partner	1.947*** (0.328)	1.163*** (0.057)
Partner of retirement age	1.229** (0.199)	1.141* (0.284)
Descendants<=6	2.259*** (0.423)	0.725 (0.382)
Descendants<=6 w/disabilities	1.230* (0.521)	0.577 (0.683)
Other descendants	1.070* (0.141)	0.825 (0.124)
Ascendants>=75	2.599** (0.742)	2.003* (0.673)
Ascendants>=75 w/disability	1.271* (0.558)	1.021 (0.830)
Wage	0.987** (0.003)	0.989* (0.004)
Physically Demanding Job	1.112* (0.232)	1.035 (0.213)
Monthly pension accrued	0.994* (0.004)	1.003*** (0.001)
Future MP non-eligibility	0.864* (0.101)	1.182 (0.655)
Observations	8865	
Pseudo R2	0.704	
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***		

Table 6: Multinomial Logistic Regression - II

	Female		Male	
	Minimum pensions	Contrib. pensions	Minimum pensions	Contrib. pensions
Age	0.978***	0.981***	0.994***	0.994***
	(0.001)	(0.001)	(0.001)	(0.001)
Low Education	3.021***	1.654***	2.151***	1.322***
	(0.551)	(0.621)	(1.024)	(0.624)
Medium Education	1.994***	1.521***	1.663***	1.211***
	(0.404)	(0.345)	(0.634)	(0.576)
Mobility within Spain	1.108	1.163	1.020	1.088*
	(0.133)	(0.145)	(0.036)	(0.045)
HH members	0.565	1.094	0.999	1.189
	(0.121)	(0.235)	(0.124)	(0.170)
Partner	2.324***	1.205*	1.206*	1.024*
	(0.571)	(0.393)	(0.124)	(0.489)
Partner of retirement age	1.187***	1.064*	1.240	1.456
	(0.261)	(0.366)	(0.237)	(0.323)
Descendants<=6	3.675***	1.460	1.606*	0.771
	(1.058)	(0.257)	(0.379)	(0.230)
Descendants<=6 w/disabilities	1.264**	0.137	0.519	0.488
	(0.511)	(0.214)	(0.345)	(0.243)
Other descendants	1.669	0.971	0.969	0.833
	(0.448)	(0.269)	(0.151)	(0.149)
Ascendants>75	4.076***	3.232*	1.516	1.584
	(1.307)	(2.191)	(0.558)	(0.675)
Ascendants>75 w/disability	1.161**	0.105	1.202	0.467
	(0.449)	(0.141)	(1.147)	(0.553)
Wage	0.989*	0.991	0.986***	0.988*
	(0.008)	(0.009)	(0.002)	(0.006)
Physically demanding job	1.132	1.111	1.118*	1.028
	(0.388)	(0.212)	(0.076)	(0.121)
Monthly pension accrued	0.988	1.001***	0.991*	1.010***
	(0.0012)	(0.001)	(0.005)	(0.021)
Future MP non-eligibility	0.902	1.128	0.788*	1.281*
	(0.301)	(0.581)	(0.198)	(0.381)
Observations	3013		5852	
Pseudo R2	0.785		0.630	
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***				

is restricted to female only. Hence, on average, individuals with a higher level of education tend to retire later and stay longer in the labour force than people with lower education.

Interestingly, geographical mobility does not seem to significantly affect the choice of retirement. It has a positive and significant effect at the 10% level only in determining the contributory standard pension outcome and, when splitting the sample into male and female, this effect is confirmed only when the sample is reduced to male individuals only.

The composition of the family structure is shown to significantly affect the retirement decision. In particular, the kind, age and characteristics of the family members make a difference and enter into the retirement choice. Having a partner, and in particular a partner of retirement age, has a positive and significant effect on the individual's retirement decision. Results point out that it is not the number of household members which affects the retirement decision, but rather the family structure and its composition. Having descendants younger than 6 and people older than 75 within the household induces individuals to retire and, in particular, increases the probability of retiring on a minimum benefit. The effect is stronger when the sample is restricted to female individuals only. In this latter case, the probability of retiring on a minimum pension increases by more than three times when kids are present in the household. As for male, the presence of descendants less than 6 in the household is significant only at the 10% level, whereas the presence of little kids with disabilities does not appear to have an impact on the retirement decision. Additionally, living with people older than 75 years, especially if with some degree of disability, increases the probability of being granted a minimum pension rather than keeping on working. This effect is large and significant for female, but not for male. It is well known that family and work spheres are closely linked throughout the life course. For example, child births often foster at least temporary withdrawal from the labor force, care for older family members can lead to absenteeism and changes in work hours (Johnson and Favreault 2000). This empirical results show that the interdependence between work and family structure carries over into retirement. Family considerations influence retirement decisions, and retirement

transition processes affect family members' behaviours and well-being.

As expected, the monthly pension accrued by the individual has a negative effect on the likelihood of receiving a minimum pension, but a positive one on retiring on a standard contributory pension. Expectations on the future pension amounts, that the individual will accrue by keeping on working, do matter for the minimum pension outcome. Individuals who are currently eligible for a minimum pension benefit but who expect to receive a contributory pension if they continue to stay in the labor force, tend to postpone retirement. Table 6 shows that this result is mainly driven by males since it is no longer significant when the sample is restricted to female only. This suggests that women are less willing to postpone their retirement decision on the basis of future monetary expectations.

As for the effect of wage, the substitution effect seem to prevail: on average, a higher wages induces workers to postpone retirement. This deterrent effect of wage on retirement characterises men's retirement behaviour and becomes less significant when the sample is restricted to women. Another important factor is the nature of the job. In accordance with previous research (Gustman and Steinmeier, 1986), results point out that individuals involved in physically demanding jobs tend to retire earlier.

Table 7 presents the coefficients of the same estimation conducted on a different sample, including only individuals who actually retired during the sample period. The purpose here is to compare individuals who retire on a minimum contributory pension with the reference category made up by individuals who retire on a standard contributory pension. The results are consistent with the previous estimation. In this setting, for female the relative probability of retiring on a minimum pension rather than on a standard contributory pension is 36.1% higher than for men, other things being equal. Again, the family composition significantly affects the retirement outcome. When the household is composed of children younger than 6 and people older than 75, the individual is more likely to retire on a minimum pension. Interestingly, this effect is stronger when the sample includes female only. For male the presence of kids, even with disabilities, is not significant and the presence of old people is

Table 7: Multinomial Logistic Regression - Minimum Contributory Pensions vs. Standard Contributory Pensions

	All sample	Female	Male
	Minimum pension	Minimum pension	Minimum pension
Female	1.361*** (0.278)		
Age	0.976*** (0.001)	0.987*** (0.048)	0.955*** (0.002)
Low Education	1.300*** (0.383)	2.368*** (0.692)	1.223*** (0.248)
Medium Education	0.913 (0.338)	1.203 (0.710)	0.689 (0.351)
Mobility within Spain	0.973 (0.032)	0.891 (0.171)	0.985 (0.035)
HH members	0.768 (0.175)	0.489 (0.204)	0.966 (0.274)
Partner	1.279*** (0.382)	1.386*** (0.3937)	1.111** (0.302)
Partner of retirement age	1.528** (0.506)	1.586*** (0.424)	1.067 (0.724)
Descendants<=6	2.035*** (0.362)	2.253*** (0.622)	1.867* (0.492)
Descendants<=6 w/disabilities	1.311** (0.542)	1.479*** (0.382)	1.213 (0.891)
Other descendants	1.386 (0.375)	1.539 (0.732)	1.258 (0.426)
Ascendants>=75	3.837*** (1.265)	4.726*** (0.816)	2.455 (1.403)
Ascendants>75 w/disability	1.158** (0.174)	1.245*** (0.347)	0.849 (0.568)
Wage	0.986** (0.006)	0.991* (0.008)	0.984** (0.006)
Physically Demanding Job	1.126* (0.110)	1.098 (0.123)	1.129* (0.108)
Monthly pension accrued	0.992*** (0.000)	0.995** (0.001)	0.991***(0.000)
Future MP non-eligibility	0.722*** (0.081)	0.810* (0.149)	0.664*** (0.065)
Observations	7783	2646	5137
Pseudo R2	0.746	0.746	0.733
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***			

significant only at the 10% level.

As a result, women and men take into account different factors when deciding about retirement. Some factors that are important in explaining men's retirement behaviour do not mean much in the retirement behaviour of women. This is the case of financial factors like the size of wage or pension. Conversely, family structure has a greater impact in shaping women's retirement decision: women are more oriented on their social function as caregiving people.

5.2. Adding the impact of the 2007 reform: survival analysis framework and results

In this section I analyse individual's retirement behaviour in the context of a reform of minimum contributory pension benefits implemented in January 2007 by the Spanish Social

Security authorities. Now the event of specific interest becomes the transition from the pension eligibility state into retirement in the presence of a reform of minimum contributory pensions. Such a transition can be accomplished only if the individual satisfies the requirement established by the Spanish Social Security authorities in order to be pension eligible. Once those requirements are met, the transition may occur at any point in time. Data are not provided on a continuous time basis, but rather in a discrete form with monthly or yearly intervals. This is the reason why I use a proportional discrete hazard model. The reference sample used for the empirical estimation is the one described in Section 5.

In order to assess the impact of the reform on individuals' retirement decisions, I perform a survival analysis, which typically focuses on time to event data, since it allows me to follow individuals throughout the whole sample period as long as they are still at risk of retiring on any contributory pension. When the individual dies before retiring, observations are right censored. Some observations are interval truncated because individuals are unobserved for a year or more and then reappear in the following survey waves. If, when they reappear, they are still at risk of retiring on a contributory pension, I include them in the sample, accounting for their gap in time. When the interval truncation covers more than one period and the individual is no longer at risk when she reappears in the sample, I drop the observation if it is not feasible to reasonably recover the failure time.

The hazard rate h of retiring for individual i at year t is the probability of becoming retiree from time $t-1$ to t, provided that she was not retiree up to time $t-1$ and that she meets the requirement needed for retiring at time t. Thus, the hazard rate is given by the following expression:

$$h_{it} = \Pr\left[T_i = t | T_i \succeq t\right]$$

I choose a complimentary log-log model with random effects, as it is consistent with a continuous time model and survival data which are interval censored.

The baseline specification for the estimation of the hazard rate for individual i at time t

is the following (Jenkins, 2005):

$$h_{it} = 1 - \exp - [\exp(\alpha + \eta_t + \beta X_i + \delta Y_{it} + \gamma year_t + \theta eligible_{it} + \zeta year_t * eligible_{it})]$$

My dependent variable is the duration of the transition, expressed in years, from pension eligibility - meaning that all individuals included in the sample meet the requirements needed to retire - into retirement on a contributory minimum pension or on a standard contributory pension.

The hazard rate into pension depends on η_t, which is the age and expresses the time dependency. The error term is normally distributed and it is assumed to be independent from the other independent variables (Lancaster, 1979; Nickell, 1979). The hazard rate also depends on X_i which contains all variables related to personal information, not time varying such as birth date, gender and education. Y_{it} is the personal information which may be varying overtime, such as the number of family members, the presence of a partner, children younger than 6 and people older than 75, with or without any degree of disablity, living in the same household. The estimated equation also includes a dummy variable for each year of the sample period taken into consideration.

The empirical strategy in order to identify the effect of the 2007 reform is the following. I define a variable called "eligible", which is equal to 1 for individuals who are eligible for the minimum pension benefit. When constructing the eligible group, following the minimum pension rules established by the Spanish Social Security authorities, I consider, for each individual, not only the pension accrued, but also any other type of income perceived, subtracting all deductible expenses, which may affect the eligibility to a minimum pension benefit. Thus, the variable eligible is equal to 1 if the expected monthly pension of the individual in case she retires at any specific point in time, taking into account all other potential sources of income, is lower than the minimum contributory pension set by the Social Security authorities, and 0 otherwise. People who belong to the eligible group at

a certain point in time are those individuals who would receive a minimum contributory pension benefit if they retired at that time. As a result, in order to capture the effect of the 2007 reform and compare the retirement choices of individuals who belong to the eligible group and individuals who do not belong to it, I estimate the equation described above, where the interaction term given by the year and the eligible group allows the empirical evaluation of the effect of the 2007 reform on individuals' retirement decisions.

Table 8 reports the estimated parameters of the retirement hazard equation. The variable eligible is defined using the observed accrued pension amount when available and its predicted value for individuals who do not retire during the sample period and for whom the pension benefit is not explicitly observed.

The first column includes the whole sample, whereas the second and the third include only male and female respectively. Age has a positive effect on the likelihood of exiting the labour market: the older an individual gets the more likely she is to retire. Being a female increases the likelihood of exiting the labour status and retire. Belonging to the eligible group has a positive and significant effect on the hazard of retirement: individuals who have collected throughout their working career a relatively low amount of contributions have less incentive to stay longer in the labor force. The pension they have accrued is, in most cases, too low and even if they continue working for a few years they will not be able to receive a standard contributory pension, and they will need in any case a minimum complement to reach the pension threshold. This effect is particularly significant when the sample is limited to include female only. These results are consistent with the results found in the previous section. Women who have paid little contributions, often due to strong discontinuities in their working career, exit the labor market and opt for retirement as soon as they are entitled to do so. Low education compared to high education affects positively and significantly the hazard of retiring, whereas having a medium education appears to be only slightly significant.

The effect of the 2007 reform of minimum pensions on retirement choices is captured by the interaction term between year 2007, the year in which the reform was implemented, and

Table 8: The 2007 Reform - Sample: observed and predicted accrued pension amounts

	All sample	Female	Male
Age	0.021** (0.008)	0.024** (0.008)	0.019** (0.009)
Female	0.386*** (0.021)		
Eligible	1.015*** (0.288)	1.221*** (0.300)	0.890** (0.401)
Year 2006	0.222 (0.193)	0.214* (0.152)	0.229 (0.196)
Year 2007	0.251* (0.174)	0.244** (0.161)	0.262 (0.201)
Year 2008	0.288** (0.170)	0.231 (0.177)	0.299** (0.151)
Year 2009	0.238 (0.201)	0.222 (0.168)	0.276 (0.209)
Year 2010	0.241* (0.199)	0.195 (0.129)	0.282* (0.198)
Year 2006*Eligible	0.123* (0.089)	0.118* (0.091)	0.134 (0.116)
Year 2007*Eligible	0.181** (0.103)	0.184*** (0.032)	0.179* (0.131)
Year 2008*Eligible	0.147 (0.142)	0.143 (0.112)	0.162* (0.133)
Year 2009*Eligible	-0.122 (0.101)	-0.150 (0.131)	-0.076 (0.059)
Year 2010*Eligible	-0.138 (0.113)	-0.181 (0.157)	-0.065 (0.053)
Low Education	0.367** (0.158)	0.401** (0.244)	0.344* (0.181)
Medium Education	0.134* (0.081)	0.146 (0.124)	0.127* (0.078)
Mobility within Spain	-0.102* (0.067)	-0.113 (0.097)	-0.098* (0.061)
HH members	0.101 (0.108)	0.366 (0.312)	0.342 (0.269)
Partner	0.103 (0.096)	0.114* (0.069)	0.097 (0.082)
Partner of retirement age	0.127** (0.056)	0.142** (0.065)	0.111* (0.064)
Descendants<=6	0.171** (0.071)	0.208** (0.088)	0.156* (0.087)
Descendants<=6 w/disabilities	0.101** (0.042)	0.128** (0.067)	0.081* (0.069)
Other descendants	0.112 (0.138)	0.264 (0.244)	0.202 (0.198)
Ascendants>=75	0.236** (0.105)	0.298** (0.125)	0.197* (0.107)
Ascendants>=75 w/disabilities	0.105** (0.048)	0.142** (0.065)	0.093* (0.057)
Constant	- 4.578*** (0.699)	-4.904*** (0.847)	-5.477*** (1.666)
Observations	8865	3013	5852
Log likelihood	-1,891.045	-1,045.876	-1,563.908
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***			

the eligible group. The reform, indeed, has a significant and positive impact for individuals belonging to the eligible group. This means that in the presence of the reform, people who are "eligible" tend to exit the labor force opting, as a result, for a minimum pension benefit. This effect is more significant when considering female workers only who appear to be particularly reactive to changes in the degree of generosity of the pension system. Interestingly, the interaction term between the year before and the year after the reform in question with the eligible group appear to be slightly significant as well. This is consistent with the story of the "silent pension reform" which has been going on in Spain: according to many scholars, in Spain, there have been reforms that year after year have modified the generosity of the system by changing the amount of minimum and maximum pensions without changing the requirements concerning pension eligibility in terms of years and amount of contributions required.

The estimates confirm that joint retirement potentially plays a role in the retirement decision, since having a partner of retirement age has a positive effect on the hazard of retiring. As shown in the previous section, retirement decisions seem not to be driven by the mere number of members within the household, but rather by its specific composition. When the household is composed of people older than 75 years, especially if with disabilities, and by children less than 6, the hazard of leaving the labor force increases, especially for female workers.

As a robustness check, I estimate the same equation modifying the sample. Table 11 in the Appendix presents the results of the estimation of the same equation conducted only on individuals whose accrued pension benefit amount is actually observed, since they retired throughout the sample period. In Table 12, on the contrary, the variable eligible is constructed using the predicted value of the accrued pension benefits for the whole sample. The results of the previous estimation are basically confirmed when including the whole sample, in both specifications. Being a female is still positive and has a significant effect on the hazard of exiting and retiring. As before, the composition of the family and, in

particular, the presence of a partner of retirement age and the presence of people within the household who need to be taken care of - children less than 6 and people older than 75, especially if with disabilities - has a positive impact on the hazard rate of retiring. The number of household members is slightly significant only when predicted values are used and the sample is restricted to female. The 2007 minimum pension reform has a positive and significant effect on the hazard of retiring of the eligible group in both specifications, both when the all sample is included and when female and male are analyzed separately. As in the baseline specification, the interaction between the eligible group and the year before and the year after the reform is positive and slightly significant.

In order to investigate further the relevance of the family composition on the retirement decision, in particular for individuals belonging to the eligible group, I estimate the following hazard rate equation:

$$h_{it} = 1 - \exp - \left[\begin{array}{c} \exp(\alpha + \eta_t + \beta X_i + \delta Y_{it} + \gamma year_t + \theta eligible_{it} + \zeta year_t * eligible_{it} \\ + \lambda year_t * eligible_{it} * ascendants > 75_{it} + \mu year_t * eligible_{it} * descendants < 3_{it}) \end{array} \right]$$

The objective is to evaluate empirically whether the effect of the 2007 reform is stronger for individuals belonging to the eligible group and having ascendants older than 75 and descendants younger than 6 living in their household. Results are shown in Table 9. The positive and significant effect of the 2007 reform captured by the interaction of year 2007 and the eligible group is confirmed. In addition to this, the interaction of the year of the reform, the eligible group and the presence of ascendants in the household has a positive and significant effect on the likelihood of exiting the labour force. This effect is stronger and more significant when the sample is restricted to female only. The interaction between the year of the reform, the eligible group and descendants is slightly significant only for women. Results suggest that women who have old people or kids within their household are particularly likely to exit the labour force and retire in the year of the reform. This empirical outcome

Table 9: The 2007 Reform and Family Structure - Sample: observed and predicted accrued pension amounts

	All sample	Female	Male
Female	0.373*** (0.035)		
Eligible	1.013*** (0.234)	1.125*** (0.354)	0.804** (0.318)
Year 2006*Eligible	0.125* (0.086)	0.116* (0.083)	0.139 (0.121)
Year 2007*Eligible	0.177** (0.279)	0.180*** (0.039)	0.172* (0.053)
Year 2008*Eligible	0.142 (0.079)	0.131 (0.083)	0.149* (0.071)
Year 2009*Eligible	-0.118 (0.101)	-0.139 (0.079)	-0.112* (0.053)
Year 2010*Eligible	-0.135 (0.098)	-0.164 (0.123)	-0.082 (0.061)
Descendants<=6	0.159** (0.084)	0.185** (0.102)	0.144* (0.082)
Descendants<=6 w/disabilities	0.125** (0.062)	0.143** (0.064)	0.121* (0.067)
Ascendants>=75	0.211** (0.126)	0.269** (0.142)	0.180* (0.112)
Ascendants>=75 w/disability	0.101** (0.063)	0.137 (0.076)	0.091* (0.058)
Year 2006*Eligible*Descendants<=6	0.071 (0.063)	0.064* (0.041)	0.077 (0.066)
Year 2007*Eligible*Descendants<=6	0.101 (0.096)	0.108* (0.088)	0.098 (0.089)
Year 2008*Eligible*Descendants<=6	0.083 (0.066)	0.091 (0.077)	0.060 (0.058)
Year 2009*Eligible*Descendants<=6	-0.075 (0.065)	-0.083 (0.073)	-0.057 (0.050)
Year 2010*Eligible*Descendants<=6	-0.081 (0.081)	-0.089 (0.092)	-0.084 (0.069)
Year 2006*Eligible*Ascendants>=75	0.079* (0.048)	0.071* (0.051)	0.082 (0.057)
Year 2007*Eligible*Ascendants>=75	0.110* (0.081)	0.119** (0.072)	0.095* (0.067)
Year 2008*Eligible*Ascendants>=75	0 083* (0.072)	0 087* (0.076)	0 076* (0.064)
Year 2009*Eligible*Ascendants>=75	-0.061 (0.056)	-0.054 (0.048)	-0.067 (0.058)
Year 2010*Eligible*Ascendants>=75	-0.067 (0.059)	-0.069 (0.057)	-0.062 (0.054)
Controls	Yes	Yes	Yes
Constant	-3.854*** (1.098)	-4.456*** (1.649)	-3.981*** (0.900)
Observations	8865	3013	5852
Log likelihood	-1,924.976	-1,089.654	-1,623.052
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***			

is relevant because it has implications which do not concern only the design of the pension systems, but it involves social issues such as elderly care and child care. The importance of the family composition is confirmed if the same specification is estimated using the sample formed only by individuals whose accrued pension amount can be directly observed or using the predicted pension amounts to define individuals belonging to the eligible group.

6. Conclusions

The retirement landscape is changing as a result of shifts in demographic trends, including decline in fertility and increased longevity. Much attention has been paid to the role that

financial incentives, health and work history play in retirement behaviour, whereas the role of gender and family structure has been overlooked. This paper advances our understanding of retirement by viewing it both as the outcome of decisions at the individual level and as the result of household dynamics and roles in which women tend to occupy domestic spheres. The domestic context allows capturing the linkages between long-run factors, such as the traditional role of women within the household, and issues that characterise the household that can be temporary, such as the presence of kids or old people. This paper contributes to the existing literature on retirement behaviour by empirically assessing, in particular, the role played by gender and family structure.

I analyse the retirement behaviour of Spanish pensioners using administrative data from the Muestra Continua de Vida Laborales (MCVL, Continuous Work History Sample). More specifically, this paper investigates the contribution of different factors in inducing individuals to retire on minimum contributory pensions, on standard contributory pensions or keep on staying on the job. Furthermore, it provides an empirical analysis of individuals' retirement behaviour in the presence of a minimum contributory pension reform implemented in Spain in 2007, showing how the impact of the reform on individuals' choices is closely connected to gender and family issues. The estimation results clearly point out that the retirement decision is affected by gender and education: individuals who are female and low educated are more likely to retire on a minimum contributory pension rather than on a standard contributory pension. Monetary factors and the current working situation matter as well and are particularly significant in determining men's retirement choices. Broadly speaking, the higher the current wage the higher the probability of postponing retirement. Family structure shapes women's retirement decision. In accordance with the existing literature, my empirical analysis provides evidence of joint retirement: the presence of a partner of retirement age pushes individuals to retire, especially female. Interestingly, it is not the number of members of the household which affects retirement behaviour. Individuals seem to take their retirement decisions according to the type of members they have in their household.

The presence of people older than 75 - in particular with disabilities - and descendants younger than 6 pushes women to exit the labour force and retire. For example, the relative probability of receiving a minimum pension benefit rather than a standard pension for female increases by 3.8 times when there are old people in the HH.

The empirical investigation of individual's retirement behaviour in the context of the reform implemented in Spain in 2007, which led to an increase in minimum pension benefits between 5 and 6.5% confirms the relevance of gender and family structure within the retirement decision. The reform modifies the incentives to retire, inducing in particular female worker who are minimum pension eligible to exit the labour force and retire, hence leading to a decrease in female labor participation. Female who are affected by the reform tend to retire and basically move to home production as they provide child and old people care, thus leading to an increase in kids and old people's welfare. As a result, minimum contributory pensions cannot be thought of as being simply mere redistributive tools: they affect individual's incentives to retire and their impact, being particularly strong for female, is connected to the role of the woman within the family.

Summing up, my empirical analysis shows that the determinants of the retirement decision are quite different for men and women. In other words, male and female take into account different factors while deciding about the retirement. Among the common determinants that explain their retirement decision is education level. Low educated individuals tend, on average, to retire earlier. Monetary factors, such as the size of pension and wage appear to be more relevant for men than for women. Furthermore, female are more oriented on their social and family function as a caregiving person. They make decision considering their marital status, kids and old people to be taken care of.

My empirical results are based on Spanish data and on the Spanish pension system design, but it would be interesting to extend them to other countries as well. This paper shows that family structure has consequences for old age security programs and policies will be more successful if they accommodate family preferences and needs. On a more general

level, research linking family and retirement experiences overcomes both the individualistic and economic bias that predominates in the current literature. Retirees are, in many cases, family members. As such, they adapt their retirement decisions not only to bureaucratic rules but also (and in many cases primarily) to their families' needs. In-depth knowledge of family-retirement linkages will also be needed to assess how recent changes in the old age security policies of many countries will impact families and how families will respond to these changes.

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Table 10: MCVL:Number of observations, 2004 - 2010

Years	Observations
2004	1.089.016
2005	1.140.929
2006	1.170.862
2007	1.200.998
2008	1.212.884
2009	1.214.727
2010	1.219.423

A. The Dataset: Muestra Continua de Vidas Laborales (MCVL)

The empirical analysis is conducted using the dataset *Muestra Continua de Vidas Laborales (MCVL)*, a unique Spanish dataset organized by the Ministry of Employment and Social Security. They are anonymous microdata coming from three different sources, the Social Security, the Census Bureau and Internal Revenue Service, starting in 2004 and collected each year up to 2010. It is a representative sample: each year a random sample of 4% of the whole population who has been affiliated to the Social Security System in that particular year, is selected. Each year individuals, who were already part of the sample in the preceding year and who continued having a connection with the Social Security System, are kept in the sample and new individuals are added. About 75% of the individuals are observed in all the six waves following the initial one (Lapuerta, 2010). The number of observations has increased throughout the different waves, as Table 10 shows.

The *MCLV*, in each year, is composed of different files (Figure 3). The first contains basic personal characteristics, among which birth date, gender and education. The personal information is completed by an additional file where it is possible to find the birth date and the gender of up to ten people living in the same household as the individual Then, there is a file which concerns the labor relations the individual has had during her working

life; through it, it is possible to construct the whole labor history of an individual, since she first registered to Social Security (i.e. type of activity, starting and ending date, reason for the interruption, etc.). Within the same file, it is possible to retrieve information on the employer and on the firms where the individual has worked. Another file records the individual's monthly contributions but only for the specific year of the sample. The *MCVL* provides a file on retirement, containing complete information on the amount and kind of the pension received. Finally, from the fiscal file, information on the person's income can be retrieved, together with some additional insights into her family composition, namely the presence of ascendants or descendants, their eventual degree of incapacity and their age range. As a result, the dataset provides information both on workers and retirees and it is thus a valuable tool in the study of labor and retirement decisions: it includes people who are working and paying contributions, including self-employed people, individuals who are on a non-contributory pension or benefit (for instance unemployment benefits, temporary incapacity) and retirees who receive a contributory pension. Each individual has an ID number that makes it possible to merge folders and put together the information available for one individual, thus leading to a panel structure.

Since the dataset collects information on a huge amount of individuals coming from different data sources, its handling requires a huge amount of data cleaning and a careful check of the matching of information across the different files. Nevertheless, the *Muestra* embeds a great potentiality of analysis because it allows longitudinal and dynamic investigations of the labor market and retirement issues.

B. Tables

Table 11: The 2007 Reform - Sample: observed accrued pension amounts

	All sample	Female	Male
Age	0.018** (0.009)	0.022*** (0.007)	0.017** (0.008)
Female	0.374*** (0.043)		
Eligible	1.019*** (0.254)	1.156*** (0.289)	0.887** (0.421)
Year 2006	0.213 (0.190)	0.235* (0.15)	0.237 (0.188)
Year 2007	0.237* (0.159)	0.214** (0.176)	0.245 (0.232)
Year 2008	0.255** (0.165)	0.204 (0.180)	0.268** (0.180)
Year 2009	0.233 (0.149)	0.184 (0.151)	0.276 (0.182)
Year 2010	0.243 (0.193)	0.165 (0.104)	0.286 (0.198)
Year 2006*Eligible	0.114* (0.089)	0.106* (0.076)	0.123 (0.098)
Year 2007*Eligible	0.167** (0.082)	0.173*** (0.048)	0.154* (0.091)
Year 2008*Eligible	0.141 (0.121)	0.136 (0.111)	0147.* (0.116)
Year 2009*Eligible	-0.117 (0.098)	-0.114 (0.095)	-0.120 (0.101)
Year 2010*Eligible	-0.125 (0.101)	-0.119 (0.105)	-0.128 (0.109)
Low Education	0.306** (0.134)	0.357*** (0.096)	0.289** (0.120)
Medium Education	0.128* (0.078)	0.147 (0.119)	0.115 (0.103)
Mobility within Spain	-0.133 (0.109)	-0.124 (0.105)	-0.138* (0.094)
HH members	0.226 (0.209)	0.289 (0.257)	0.202 (0.188)
Partner	0.111 (0.097)	0.135* (0.091)	0.102 (0.086)
Partner of retirement age	0.137** (0.063)	0.161** (0.070)	0.128* (0.074)
Descendants<=6	0.166** (0.076)	0.199** (0.087)	0.141* (0.078)
Descendants<=6 w/disabilities	0.123** (0.512)	0.142** (0.489)	0.101 (0.092)
Other descendants	0.213 (0.184)	0.256 (0.236)	0.165 (0.154)
Ascendants>=75	0.275** (0.115)	0.334** (0.143)	0.249* (0.136)
Ascendants>=75 w/disability	0.126** (0.057)	0.167** (0.071)	0.106* (0.060)
Constant	-2.546** (1.189)	-2.091** (0.935)	-3.921** (1.633)
Log likelihood	-1,678.144	-987.334	-1,237.053

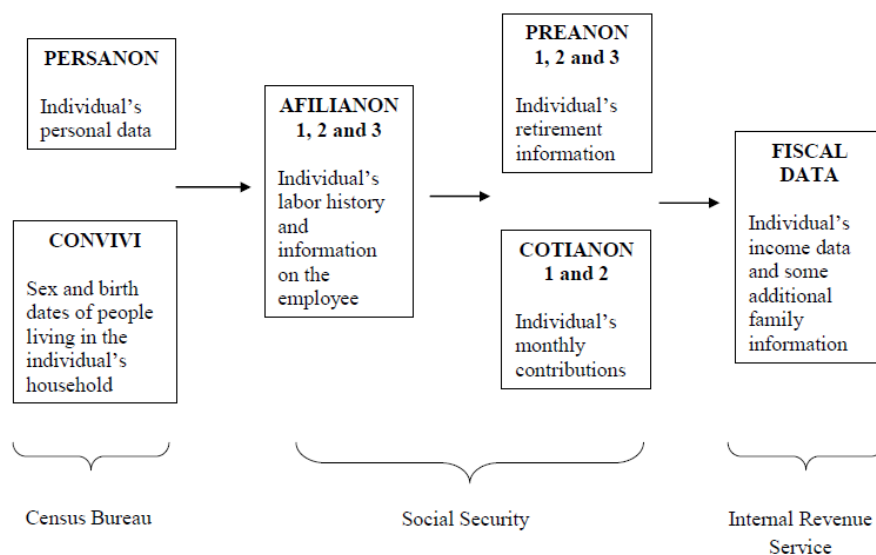Significance levels: p<0.1 * p<0.05 ** p<0.01 ***

Figure 3: Muestra Continua de Vida Laborales

Table 12: The 2007 Reform - Sample: predicted accrued pension amounts

	All sample	Female	Male
Age	0.025** (0.010)	0.029** (0.011)	0.021** (0.009)
Female	0.402*** (0.136)		
Eligible	1.066*** (0.343)	1.283*** (0.418)	0.912*** (0.288)
Year 2006*Eligible	0.132* (0.094)	0.121* (0.091)	0.138* (0.099)
Year 2007*Eligible	0.189** (0.121)	0.197*** (0.088)	0.179* (0.124)
Year 2008*Eligible	0.161 (0.132)	0.157 (0138.)	0.168* (0.142)
Year 2009*Eligible	-0.129 (0.102)	-0.144 (0.113)	-0.109 (0.098)
Year 2010*Eligible	-0.143 (0.112)	-0.161 (0.139)	-0.136 (0.102)
Low Education	0.331** (0.139)	0.375** (0.158)	0.306* (0.165)
Medium Education	0.179* (0.116)	0.199 (0.153)	0.167 (0.0.142)
Mobility within Spain	-0.108* (0.072)	-0.101 (0.080)	-0.116 (0.093)
HH members	0.304 (0.235)	0.322* (0.226)	0.295 (0.246)
Partner	0.094 (0.081)	0.103* (0.066)	0.081 (0.068)
Partner of retirement age	0.118** (0.056)	0.135** (0.060)	0.102* (0.057)
Descendants<=6	0.163** (0.069)	0.194** (0.082)	0.147** (0.062)
Descendants<=6 with disabilities	0.121* (0.071)	0.142** (0.060)	0.109 (0.098)
Other descendants	0.221 (0.179)	0.302 (0.150)	0.202 (0.186)
Ascendants>=75	0.213** (0.088)	0.276** (0.113)	0.194* (0.106)
Ascendants>=75 w/disability	0.097** (0.045)	0.131** (0.058)	0.086* (0.048)
Controls	Yes	Yes	Yes
Constant	-2.067** (0.898)	-2.542* (1.544)	-2.334* (1.460)
Log likelihood	-1,987.435	-1,678.991	-1,873.987
Significance levels: p<0.1 * p<0.05 ** p<0.01 ***			