

## PhD THESIS DECLARATION

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Tesi di dottorato "Gender, Family Structure and Pension System Design"

di DE MICCO PATRICE

discussa presso Università Commerciale Luigi Bocconi-Milano nell'anno 2015

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## Abstract

This dissertation investigates retirement behaviour and the relevance of pensions from a gender and family perspective. Retirement is seen as a complex embedded set of decisions in which the individual's characteristics interact with the family structure.

The dissertation is composed by three essays. The first chapter, titled "Gender, Family and Retirement Behaviour: Evidence from Spain" delineates the links between gender roles, family structure and retirement. I provide an empirical analysis of the effect of a reform implemented in Spain in 2007, which increased the amount of minimum pensions. Using Spanish data from the Continuous Work History Sample, I show that the reform modifies the incentives to retire, inducing in particular female workers who are minimum pension eligible to retire. On one side, the reform involves a decrease in female labour participation; on the other, it induces women to move from labour market to retirement or, better, to home production, as they tend to provide child and old people care..

The second chapter is titled "From Wife to Widow: How do Survivor Pension Benefits Affect Women's Retirement Decision?" Using the same dataset as Chapter 1, I compare the retirement behaviour of widows and non-widows, distinguishing between widows who are entitled to receive the survivor pensions and widows who are not. Receiving a survivor benefit positively and significantly affects widows' hazard of retiring. The larger the income and substitution effects faced by the widow, the lower her hazard into retirement. If her household is composed of individuals who need to be taken care of, she will have incentive to retire. Hence, although survivor benefit programs were originally designed to support women when their partner died, they also lead to work disincentives which should not be ignored.

The third chapter, "Home Made Welfare: The Role of Pensions in Intergenerational Transfers. Evidence from Italy" (joint with I. Lauro and V. Scrutinio) focuses on the welfare function of pensions. We study how relevant pension income is in determining the occurrence of intergenerational monetary family transfers, using data from the Bank of Italy's Survey on Household Income and Wealth. We investigate both interhousehold transfers and intrahousehold transfers. Results clearly point out that pension income has a positive and significant impact on the probability of both kinds of transfers to occur. The presence of a pensioner increases the probability of making an interhousehold transfer by 2.4% and we identify nonlinearities in this effect.

To conclude, in ageing countries, where the share of elderly in population is constantly increasing, having a better understanding of individual retirement behaviour, evaluating the responsiveness to retirement policy measures and gaining a deep insight on the role that pensions have at a family and social level is ever more important.

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# Chapter 1

## Gender, Family and Retirement Behaviour: Evidence from Spain

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, kids younger than 6, 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 household; 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 workers 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 labour 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.

## 1.1 Introduction

Into the unknown. . .

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

*The Economist, 2009*

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 seen as being 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 also significantly affect when individuals retire.<sup>1</sup>

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 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, 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. Individuals included in my sample are eligible for early retirement and they are not receiving any other pension or any other complement which is not

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<sup>1</sup>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.

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, who are entitled to a regular contributory pension, receive a contributory minimum pension if 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 meant 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.<sup>2</sup>

I first conduct a descriptive analysis investigating 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. More specifically, I perform a multinomial logistic regression comparing individuals who end up retiring on a minimum contributory pension, on a standard contributory pension or who 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 women is 36.1% higher than for men. As expected, the decision of retiring is affected by monetary incentives. In particular, the larger the distance between the minimum pension set by Social Security authorities and the individual's pension amount currently 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, while having a physically demanding

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<sup>2</sup>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. Moreover, their financial weight within pension expenditure, in most European countries, is increasing over time.

job induces workers to leave the labour force and retire. Family structure significantly affects women's retirement decision. 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 household. 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 pension institutions, individuals may plan their working life to use these incentives.

In order to gain a better understanding of the impact of gender and family within individuals' retirement decision, I exploit an exogenous variation provided by the 2007 Spanish reform which led to an increase in the minimum pension amount between 5% and 6.5%. I perform a survival analysis that 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 this reform modifies the incentives to retire, inducing in particular female workers who are minimum pension eligible to exit the labour force and retire. Being a female increases the hazard rate of retiring. In particular, the women who tend to be more responsive to the change in the degree of generosity of the pension system caused by the reform are individuals who have a specific family structure: besides having a partner of retirement age, these women tend to have within their household people older than 75 and kids younger than 6 (especially if with disabilities). A trade-off thus 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 labour participation; on the other side, 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 and family

characteristics.

The remainder of the paper proceeds as follows. Section 1.2 presents a review of the literature the paper is related to and clarifies its contribution. Section 1.3 describes the main features of the Spanish pension system. In Section 1.4, I analyse the evolution of minimum pension reforms and illustrate the 2007 reform. Section 1.5 presents the empirical estimation and the results. I conclude in Section 1.6.

## 1.2 Review of the 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 (Brugiavini, Peracchi and Wise, 2003). Besides the impact of financial incentives on retirement behaviour, the recent literature has been investigating 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 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 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), 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, 2003), 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, 2014) 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 household increases the likelihood of women to retire, while it makes it decrease for men. This paper shows that it is not the number of dependants per se which affects retirement choices, but rather the kind 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 provides 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 years 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 years. These women are squeezed between older family members and grandchildren care. Whereas the socio-

logical literature on the sandwich generation is mostly qualitative in nature (Künemund, 2006, Grundy, Henretta, 2006, 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 et al. 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: the presence of minimum pensions triplicates the occurrence of early retirement in the case of low-income workers. This paper confirms the fact that minimum pensions are associated with early retirement and extends this research significantly by providing an empirical analysis of gender and family effects triggered by minimum pension reforms.

### 1.3 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 labour income. The contributory system is divided into five different types of pensions: old age, disability, orphans, widows and widowers, and other relatives.<sup>3</sup>

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<sup>3</sup>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

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

### 1.3.1 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:

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

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

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

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

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at least two years.

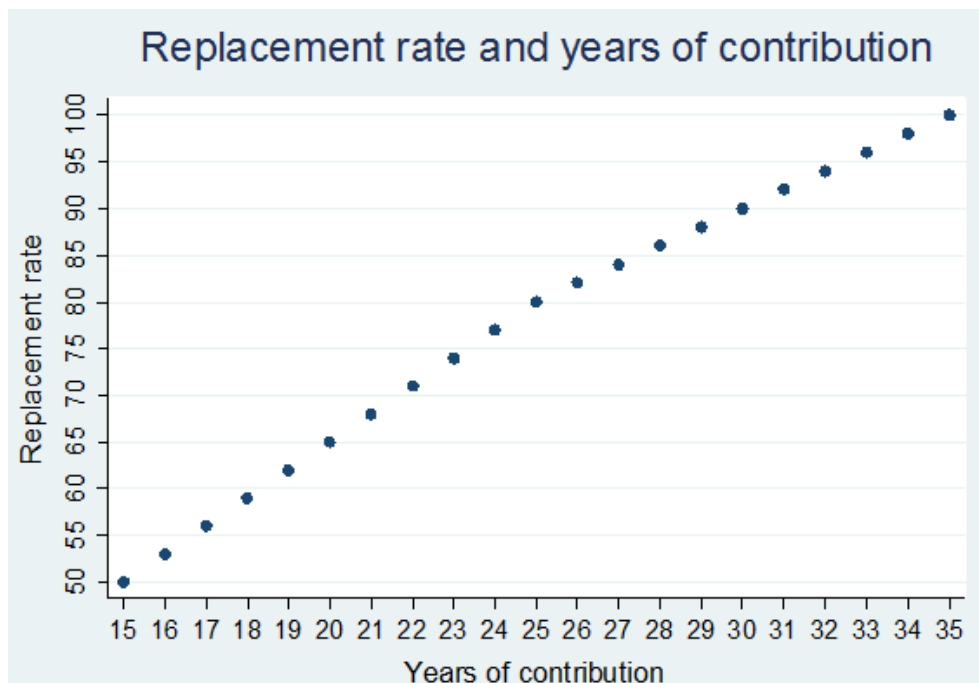


Figure 1.1: The replacement rate

computed at their nominal value, whereas previous contributions from the 25th to the 180th month are indexed according to the Spanish Consumer Price Index.

$RR$  is the replacement rate which is the percentage of the regulatory pension that is actually paid. As shown in Figure 1.1, it increases with the number of years of contribution. The  $RR$  rises 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 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% ( $\alpha$ ) 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 retires. 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.

### 1.3.2 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 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 cohabit, 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 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 minimum pensions by the 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 1.1 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 1.1: 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

## 1.4 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 1.2 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 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 all the pension benefits provided by the Spanish

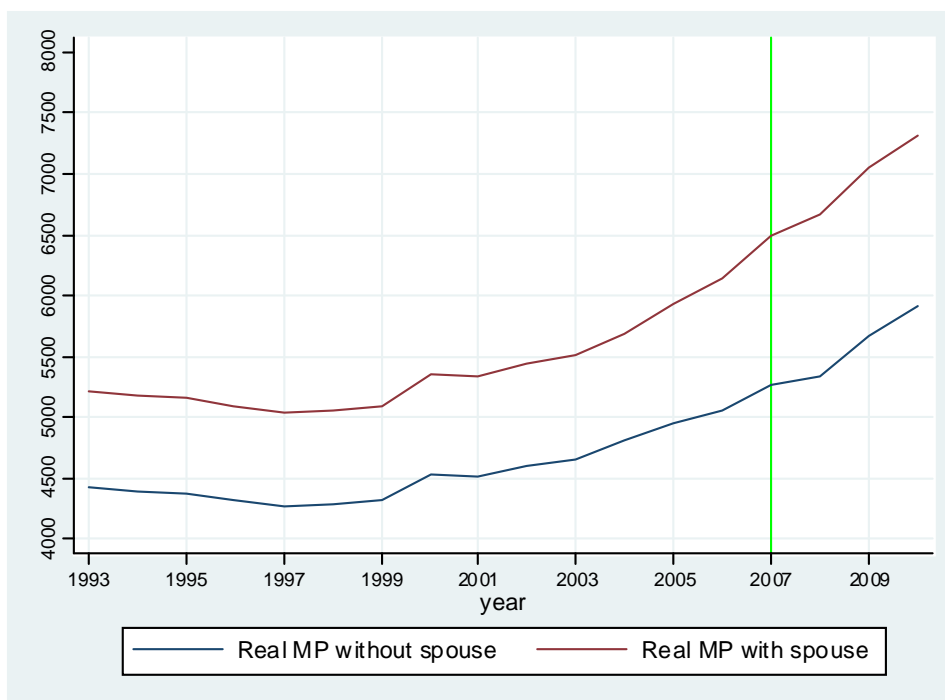


Figure 1.2: The Real Growth of Minimum Pensions

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.

## 1.5 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 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 the following characteristics: they were 60 years old in 2005, eligible for early retirement and not receiving any other pension or any other complement which was 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

Table 1.2: Descriptive Statistics - I

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

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 survivor 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 1.2 and 1.3 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 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



Table 1.3: 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 $\leq 2$	74%	79.8%	81.7%
HH members $\geq 3, \leq 4$	21.3%	17.2%	14.7%
HH members $\geq 5$	4.7%	3%	3.6%
Partner	71.4%	68.8%	55.1%
Partner of retirement age	31.4%	28.1%	27.1%
Descendants $\leq 6$	13.6%	4.1%	4.0%
Descendants $\leq 6$ w/disability	3.1%	1.3%	0.4%
Other descendants	47.7%	45%	44%
Ascendants $\geq 75$	13.6%	4.6%	3.5%
Ascendants $\geq 75$ w/disability	4.1%	0.5%	0.4%
Observations	2713	5070	1082

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, distinguishing 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 1.3. 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:

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

$X_i$  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 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 observed wages, main affiliated pension scheme, employment 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:

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

where  $Z_i$  is the vector of the family characteristics;  $\varepsilon_1$  and  $\varepsilon_2$  have correlation  $\rho$ . Table 1.4 reports the results of the main equation. If a variable appears only in the outcome equation its 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 interpreted 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  $\beta$  is the coefficient of the variable in the outcome equation,  $\alpha$  is the corresponding coefficient in the selection equation,  $\rho$  is the correlation between the errors in the two equations and  $\sigma$  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 1.4 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 1.11).

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 employment 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,

Table 1.4: 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*** (0.011)	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)	Artistic activities	-0.102*** (0.034)
Basic manufacturing	-0.111*** (0.022)		-0.198 (0.000)
	-0.134 (0.000)	International	-0.055 (0.094)
Advanced manufacturing	-0.023 (0.022)	organizations	-0.203 (0.001)
	0045 (0.000)	Years of contributions	0.024*** (0.001)
Electricity and environment	-0.090*** (0.030)		0.046 (0.000)
	-0.212 (0.000)	Constant	7.117*** (0.098)
Observations		8865	
Censored observations		1097	

having a partner of retirement age increases the probability of retiring. Moreover, when children younger than 6 or people older than 75 are present in the household, a person is more likely to retire. Since  $\rho$  is significantly different 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.

### 1.5.1 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 differences between men and women's retirement behaviour. In order to do that, I perform a multinomial logistic regression, first considering the whole sample and then splitting it into female and male. 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 contributory 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 possible 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 dataset 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 grounded on the individual's family situation (see Section 1.2).

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 for 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 demanding 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 1.5 and 1.6 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 like-

Table 1.5: 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 1.6: Multinomial Logistic Regression - II

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

Tesi di dottorato "Gender, Family Structure and Pension System Design"  
di DE MICCO PATRICE

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

discussa presso Università Commerciale Luigi Bocconi-Milano nell'anno 2015

La tesi è tutelata dalla normativa sul diritto d'autore(Legge 22 aprile 1941, n.633 e successive integrazioni e modifiche).

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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 individuals with a higher level of schooling. In particular, people 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 is restricted to female only.

Interestingly, geographical mobility does not seem to significantly affect the retirement choice. 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 characteristics of 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 labour force, care for older family members can lead to absenteeism and changes in work hours. 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 labour force, tend to postpone retirement. Table 1.6 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 seems to prevail: on average, a higher wage 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, results point out that individuals involved in physically demanding jobs tend to retire earlier.

Table 1.7 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 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 towards their social function as caregiving people.

## **1.5.2 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

Table 1.7: 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 \*\*\*

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.

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:

$$h_{it} = \Pr [T_i = t | T_i \geq t]$$

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  $\eta_t$ , 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 disability, 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 1.8 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 labour 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 labour 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 variable mobility, which identifies the number

Table 1.8: 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 ***			

of times an individual has moved from one region to another during her working career, has a negative effect on the hazard rate into retirement, as expected, but it is only slightly significant and loses significance when the sample includes women only.

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 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 labour 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 degree of generosity of the system by changing the amount of minimum and maximum pensions without modifying the requirements concerning pension eligibility in terms of years and years of contributions required.

Looking at the household characteristics, the estimates confirm that joint retirement potentially plays a role in the retirement decision, since having a partner, and in particular 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, namely by the characteristics of the household members. When the household is composed of people older than 75 years, especially if with disabilities, and by children younger than 6, the hazard of leaving the labour force increases. This effect is particularly strong when the sample includes female workers only.

As a robustness check, I estimate the same equation modifying the sample. Table 1.12 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 1.13, 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 younger 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 entire sample is included and when female and male are analysed separately. As in the baseline specification, the interaction term 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:

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

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 1.9. The positive and significant effect of being a female, having descendants younger than 6 and people older than 75 in the household on the hazard of retiring is confirmed in this specification as well. The effect of the 2007 reform is positive and significant. In addition to this, the interaction term given by 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 younger than 6 is not significant when the estimation is conducted on the whole sample or male only. Interestingly, it is slightly significant when the sample includes women only. 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. These women have incentives to respond to the reform which appear to go beyond financial aspects and extend to gender roles and family structure. This empirical outcome 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.



Table 1.9: 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 ***			

## 1.6 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 kind 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 household.

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 labour 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 women 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 when 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 caregiving people. 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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## 1.7 Appendix

### 1.7.1 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. The number of observations has increased throughout the different waves, as Table 1.10 shows.

Table 1.10: 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

The *MCLV*, in each year, is composed of different files. 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 labour relations the individual has had during her working life; through it, it is possible to construct the whole labour history of an individual, since she first registered to Social Security (i.e. type of activity, starting and ending date of each job experience, the 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. As a result, the dataset provides information on both workers and retirees and it is thus a valuable tool in the study of labour 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 labour market and retirement issues.

## 1.7.2 Tables

Table 1.11: Heckman Selection Equation

	Likelihood of retiring
Age	0.001*** (0.000)
Female	0.636*** (0.023)
Low education	0.280*** (0.022)
Medium education	0.246*** (0.023)
Log average observed wages	-0.075*** (0.006)
Primary sector	0.134** (0.065)
Basic manufacturing	-0.060 (0.069)
Advanced manufacturing	0.176** (0.073)
Electricity and environment	-0.316*** (0.089)
Constructions	0.257*** (0.065)
Retail	-0.376*** (0.067)
Transport	0.290*** (0.067)
Tourism	-0.118 (0.073)
Information	0.026 (0.100)
Public sector	0.179*** (0.065)
Professional activities	0.111* (0.067)
Auxiliary activities	-0.115* (0.066)
Medical activities	-0.136** (0.066)
Artistic activities	-0.248** (0.099)
International organizations	-0.384 (0.273)
Years of contributions	0.058*** (0.001)
Partner	0.028 (0.020)
Partner of retirement age	0.018** (0.009)
HH members	0.025 (0.024)
Descendants <=6	0.065** (0.032)
Descendants <=6 w/disabilities	0.897*** (0.315)
Other descendants	-0.045*** (0.017)
Ascendants >=75	0.008** (0.002)
Ascendants >75 w/disability	0.101*** (0.021)
Constant	5.656*** (0.331)
Observations	8865
Censored observations	1097

Table 1.12: 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)	0.147* (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 ***			

Table 1.13: 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 (0.138.)	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 (0.142)
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 ***			

Tesi di dottorato "Gender, Family Structure and Pension System Design"

di DE MICCO PATRICE

discussa presso Università Commerciale Luigi Bocconi-Milano nell'anno 2015

La tesi è tutelata dalla normativa sul diritto d'autore(Legge 22 aprile 1941, n.633 e successive integrazioni e modifiche).

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## Chapter 2

# From Wife to Widow: How do Survivor Pension Benefits Affect Women's Retirement Decision?

This paper contributes to the debate on women's retirement choices by providing an empirical analysis of their behaviour in a context in which widowhood occurs. How responsive are widows' retirement decisions to survivor benefits? Which factors make their effect stronger or weaker? Survivor pensions are paid to the person who, at the time of death, is the legal spouse or common-law partner of the deceased contributor. Using the Spanish administrative panel dataset, called *Muestra Continua de Vidas Laborales* (Continuous Work History Sample), I implement a survival analysis and estimate widows' hazard rate into retirement. I compare the retirement behaviour of widows and non-widows and, in particular, I make a distinction between widows who are entitled to receive the survivor benefit and widows who are not. Results point out that receiving a survivor pension benefit has a positive and significant effect on widows' hazard of retiring. The larger the income and substitution effects faced by the widow, the lower her hazard into retirement. If the widow lives alone after the loss of the partner, she is more likely to delay retirement. On the contrary, if the widow's household is composed of individuals who need to be taken care of, such as grandchildren younger than 6 and people older than 75, with and without any degree of disability, she will have incentive to retire: the widow fulfils the family role of care provider that is usually assigned to women. As a result, although survivor benefit programs were originally designed to support women when their partner died, they also lead to work disincentives which should not be ignored.

## 2.1 Introduction

Male and female face different challenges when deciding about retirement. Women are living longer, have more intermittent work histories and, usually, gain lower earnings that translate into lower pension benefits. In investigating female retirement behaviour, research has mostly focused on labour market status as the most relevant factor in determining the relative retirement income of women with respect to men. This paper focuses on marital status and, specifically, on the effect of becoming widow and perceiving a survivor pension benefit on women's own retirement choices, by conducting an empirical analysis on Spanish women's retirement behaviour.

Widows and widowers account for a substantial share of elderly population. There is a substantial difference in the widowhood proportion between men and women. According to United Nations estimates, in 2013, in OECD countries the proportion of widowhood was 4.5% among men aged 50-64 and 12.8% among the same aged women, and 17.6% among men aged 65 and older compared to 47.8% among women of the same age group. These figures clearly show that widowhood is primarily a female experience.

This paper aims at contributing to the debate on women's retirement choices by providing an empirical analysis of their behaviour in a context in which widowhood occurs and answering the following questions. How does this event affect women's retirement? In other words, how responsive are widows' retirement decisions to survivor benefits? Which factors make their effect stronger or weaker? Furthermore, compared with men, women usually invest more of themselves in family and home life and less in the professional sphere. What repercussions does this division of roles have when widowhood is experienced?

Next to old-age and disability pensions, survivor benefits form part of the traditional benefit package provided by most existing public pension schemes. They are derived pension rights since they are not earned as a result of a worker's own contributions and earnings history. It is usually paid to the person who, at the time of death, is the legal spouse or common-law partner of the deceased contributor and is usually calculated as a percentage of originator's rights. The pension is set up as to offset the loss of income that occurs following the death of the partner. Hence, they are meant to alleviate poverty that an individual may suffer when one of her relative dies. It paid to the person who, at the time of death, is the legal spouse or common-law partner of the deceased contributor. All OECD pension systems offer benefit protection for widows, by means of contributory or non-contributory benefits.

In this paper the empirical analysis is restricted to widows, excluding widowers, for two reasons. First, women tend to outlive men, as they experience greater longevity than men do: their death rate is lower than men's and they are generally younger than their husbands. Figure 2.1 shows life expectancy in OECD countries. In Spain, women are

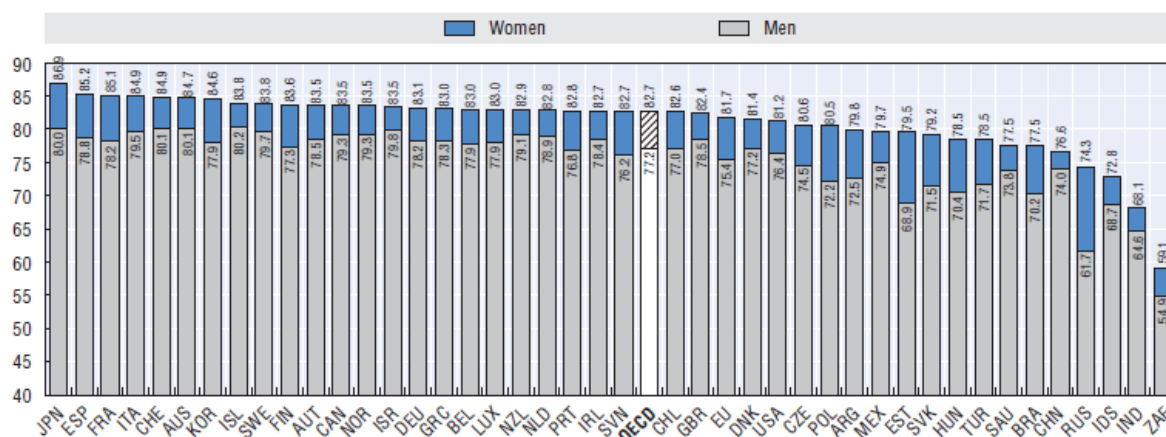


Figure 2.1: Life expectancy at birth in years, 2010-2015 - Source: United Nations, World Population Prospects, 2012.

expected to reach 85.2, while men 75.8 years. Age at marriage is on average about 3.3 years younger and life expectancy is about 7 years longer for women than men. Secondly, among the widowed, remarriage rates are significantly lower for women than men. A woman who becomes widowed at age 45 has the same probability of being remarried ten years later (7%) as a man widowed at 65: widowhood tends to be an irreversible situation for women. Because there is little chance that the mortality differences between genders will be reversed anytime soon, the excess of women at the upper ages will continue to increase, and the older population will be comprised of a larger proportion of widows. Hence, it is relevant to understand the conditions surrounding female survivors and their consequences. Moreover, income reduction upon widowhood is in general larger among widows than widowers; many widowed women strongly depend on survivor pensions as their main income source and as this pension is much lower than old-age pension in most countries, widows suffer much larger income reduction than widowers. As a result, they represent the most interesting sample to investigate the potential effect of survivor benefits.

Unlike most research that has focused on elderly women living alone, this paper provides a broader analysis of widows' retirement decisions. The empirical investigation is conducted using a Spanish administrative panel dataset, called *Muestra Continua de Vidas Laborales* (Continuous Work History Sample), which provides detailed personal, family and fiscal information, and the individual's labour and pension history. I compare the retirement behaviour of widows and non-widows and in particular, I make a distinction between widows who are entitled to receive the survivor benefit and widows who are not. In addition to this, besides considering personal and monetary factors, I also study the impact on retirement choices of both living alone and sharing the household with other family members.



I implement a survival analysis and estimate womens' hazard rate into retirement considering different sample specifications. The event of specific interest is the widow's transition from the pension eligibility state into retirement when the survivor pension is received and when it is not received. The selected women are all working and pension eligible and are followed throughout the sample period, which goes from 2005 to 2010, until they retire, until they die or until 2010, in case they decide to keep on working. Results point out that receiving a survivor pension benefit has a positive and significant effect on widows' hazard of retiring and the composition of the household has a significant and relevant impact on widow's retirement decision. If the widow lives alone after the loss of the partner, she is more likely to delay retirement. On the contrary, if the widow's household is composed of individuals who need to be taken care of, such as grandchildren younger than 6 and people older than 75, with and without any degree of disability, she will have incentive to retire: the widow fulfils the family role of care provider that is usually assigned to women. Moreover, the widow faces both an income and a substitution effect. The first is the difference between the partner's income and the survivor benefit amount, while the second captures the difference between the widow's wage and the pension amount she would get if she retired. The larger they are, the lower the widow's hazard into retirement. When widowhood is experienced before becoming pension eligible, the negative income of the substitution effect is confirmed, while the income effect does no longer affect the woman's retirement choice. The widow has had time to reorganize her life and face the loss in economic power due to the income effect. As a result, survivor benefits create incentives that affect retirement behaviour. While survivor benefit programs can improve both equity and efficiency, if not well designed they may also be costly and lead to work disincentives and perverse redistributions.

The remainder of the paper proceeds as follows. Section 2.2 presents a review of the literature the paper is related to. Section 2.3 provides details about survivor pension benefits within the Spanish Social Security system. Section 2.4 presents the dataset and describes the empirical estimation. Section 2.5 adds some additional descriptive evidence on widows' behaviour. I conclude in Section 2.6.

## 2.2 Review of Literature

This paper is closely related to the literature on gender and retirement that provides an analysis of the differences in retirement behaviour between male and female and attempts at providing an explanation for their existence. In particular, it provides an empirical analysis of the effects of survivor pension benefits, which together with orphan benefits and pensions paid to other family members upon the death of the originator, can be defined as derived pension rights. These rights do not represent a well-researched area

of pension system analysis. Most empirical studies are about derived rights in the US pension system and do not provide systematic investigations, as they tend to be survey based.

My paper takes a more specific point of view and analyses the effect of becoming a widow and receiving a survivor pension benefit on women's own retirement choices. Most studies on widowhood tend to take a more general point of view and assess the impact of widowhood on the individual's health, family, social relationships and economic situation; hence, this literature aims at analysing widowhood from a gender inequality perspective, trying to account for the behavioural differences between male and female. Delbès and Gaymu (2002), by exploiting the longitudinal nature of the French dataset *Transition from Working Life to Retirement Survey* and interviewing the same people at age 62 and again at age 75, analyse how life is reorganized when widowhood is experienced, by comparing the behaviour of respondents who are still married with those who have been widowed. They examine the effects of widowhood on health and its economic consequences and investigate whether widowed people compensate for the recent loss of their partner by investing more in family relations or leisure activities. They show that the effects and experience of widowhood are different for men and women. When widowhood occurs, men receive more support from their family than women do. According to their results, while widowed men's health tends to deteriorate, widowhood does not appear to have a major influence on women's health. They also point out that widowed persons experience a greater decline in their economic status than married individuals do and this drop is larger for widows than for widowers.

A relevant part of the research on survivor pension benefits has specifically focused on widows. My empirical analysis as well is restricted to widows only. This literature has aimed at understanding the new economic situation that widowhood brings about and at investigating the effective power of survivor pension benefits as a tool to alleviate poverty for women. Hurd and Wise (1997) are among the first researchers to show the important effect of poverty alleviation of survivor pension benefits. Hungenford (2001), using longitudinal data from the U.S. *Panel Study of Income Dynamics* and the *German Socioeconomic Panel*, compares women's economic wellbeing the year before becoming widows and the year after. He finds strong evidence of a decline in standards of living and a frequent fall into poverty at widowhood in both countries, and concludes that both pension systems fail in providing decent standards of living to widows.

Several papers have analysed the impact of widowhood on old women living alone, pointing out that low incomes are dramatically more prevalent among them than among the elderly population as a whole. For women in the age range 65-74, becoming widowed leads to an income fall of between a fifth and a third (Casey and Yamada, 2002) and they mainly rely on survivor pension benefits as a source of income. Similarly, Ahn (2004) and Choi (2006) find a relatively strong negative relationship between the size of the pension

benefit and the poverty level of older women living alone. Their higher poverty is due to lower female labour market participation rates and caring and frequently interrupted work histories. They both confirm that the most important source of income for elderly women are old-age pensions and survivor benefits. Choi, in particular, argues that the share of older women living alone will increase substantially due to population ageing and to the higher female life expectancy; moreover, the expected rising female labour force participation will not prevent older women from falling into poverty, due to the persistence of career interruptions and periods of caring for children or elderly relatives. Bíró (2013), using the *Survey of Health, Ageing and Retirement in Europe*, analyses the adverse short-run and long-run effects of widowhood on financial, health, and labour force status and emphasizes the role survivor pensions have in mitigating the adverse effects of widowhood.

Other studies have discussed the efficiency and equity of survivor benefit programs. James (2009), using a sample of 39 high, middle and low income countries, argues that, even in a world of perfect gender equality, these programs are still needed because couples are unlikely to plan adequately for household economies of scale. According to her estimates, about 70% of previous household income is needed to maintain the widow's living standards without children, while 80% is needed with children. She argues that an ideal survivor program should include a poverty-prevention component, such as a flat benefit or a minimum pension guarantee, and a consumption-smoothing component, designed to enable the survivor to maintain her previous standard of living, taking into account the new household economies of scale. Moreover, this is one of the first papers which provides evidence that actually many survivor benefit programs entail work disincentives and perverse redistributions from women who work to those who do not, from singles and dual career couples to single-earner couples. Her results are basically confirmed by Horstmann and Hülsman (2011) who analyse 15 European member States. This paper contributes to this literature by providing empirical evidence of the relevant disincentive effect caused by survivor pensions, which are shown to significantly encourage widows to leave the labour force and enter retirement.

More recently, derived pension rights, and in particular, survivor benefits have been analysed from a political economy perspective. Leroux and Pestieau (2012) explain how they can emerge from a political economy process when social security is a combination of Bismarckian and Beveridgean pillars and conclude that the optimal pension system should be contributive but with a positive level of derived rights. They also confirm that, however, such a system encourages stay-at-home wives, thus involving a trade-off between female labour participation and poverty alleviation.

As for the disincentive effect of survivor benefits and their impact on individual's retirement decision, an important contribution has been made by Werding (2005) who questions the legitimacy of the traditional form of providing survivor benefits within

public pension schemes. He claims that they can lead to disincentive effects, especially for married women with some degree of labour-force attachment, and for them they appear to be far from optimal. Knapp (2014) adopts a structural retirement model to estimate how responsive husbands and wives' retirement decisions are to spouse<sup>1</sup> and survivor benefits using the *Health and Retirement Study* (HRS) from 1992 to 2010. He estimates that eliminating spouse and survivor benefits would increase women's labour force participation by 1.27 years and decrease men's labour force participation by 0.53 years. Reducing both benefits by 50% would increase women's labour supply by 0.47 years and increase men's labour supply by 0.29 years.

Other studies have emphasized that, despite the greater economic difficulties that widows usually face compared to widowers, women do enjoy some advantages compared to men. For example, older women have better social relationships with both friends and family members (Finch and Mason 1993). The findings of these studies reveal that, unlike widowers, widows are able to develop emotionally supportive relationships and be engaged in new social activities. Moreover, for older women, widowhood may lead to a new sense of freedom and autonomy, whereas widowers see no advantages at all of being widowed compared to being married (Davidson 2001).

As a result, the literature on widowhood and retirement has mostly been concerned with the evaluation of survivor pensions as potential antipoverty tools, especially for women. This paper takes into account the income change that widows who are approaching retirement have to face after their partner's death; however, widows' retirement is viewed as a broader and more complex decision which cannot be explained by referring only to monetary aspects. My empirical results confirm that survivor pension benefits do trigger a disincentive effect to work. This effect is shown to be also deeply affected by the widow's family composition.

## 2.3 Survivor Contributory Pension Benefits in Spain

The social security system in Spain has two levels of protection: the contributory system, which is a labour-market-based social security scheme and is divided into five different types of pensions (old age, disability, orphans, widows and widowers, and other relatives), and the non-contributory system. Survivor contributory pensions, like old age and disability pensions, belong to the contributory public pensions system and, in particular, to the General and Special Schemes. The General Regime is the main scheme and includes all private sector employees who do not belong to any other special scheme and part of the

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<sup>1</sup>In the US pension system, when a worker retires, the worker's spouse may be eligible for the spouse benefit, which depends on the worker's earnings. The spouse must meet some requirements: she must be at least 62 years old or have a qualifying child in her care (a qualifying child is a child who is younger than 16 or who receives disability benefits).

public servants. The Special Scheme is composed by self-employed individuals, farmers, miners, sailors and domestic workers.<sup>2</sup>

On January 30, 1900 financial aid for funeral expenses and a lump-sum for widows, children and other relatives of workers whose death was caused by a work-related injury, was introduced for the first time in Spain. In 1912, the allowance became a life benefit for the widow and a temporary benefit for descendant orphaned. After a series of minor modifications, the big change to regulations concerning widows occurred in 1963, when non-contributory widow pensions were established in case of financial need, requiring the widow to be older than 40 years, incapacitated to work or have children to be taken care of. In 1972 the contributory widow pension benefit was introduced: it was granted to all widows provided that the deceased met some conditions in terms of years of contribution. Only in 1984 the right for male to perceive a survivor benefit was established and in 2007 this right was extended to common-law partners.

Broadly speaking, widowhood contributory pensions are meant to alleviate poverty that an individual may suffer when the partner dies. In other words, they aim at the protection of financial needs following the death of the person who triggered the entitlement. More specifically, a widowhood pension is a financial benefit that consists of a lifetime pension granted to people who were the legal spouse or common-law partner of the deceased contributor, provided that specific requirements are met. In Spain, it is granted by the Spanish National Institute of Social Security, except for sea workers for whom the Social Marine Institute intervenes. When the death is due to a work-related injury it is granted by the Social Security Mutual Society for Work-related Injuries and Occupational Diseases.

### 2.3.1 Some facts

In Spain, as in the other OECD countries, the percentage of widows is larger than that of widowers. The Spanish gender gap in the pension amount was 36% in 2011, slightly below the OECD average equal to 38%. Women in Spain receive old age contributory pensions less frequently than men, as Figure 2.2 shows. It is, on average, half as frequent for women to have a contributory pension as for men belonging to the same age group. The older the women, the larger the gender pension gap. The gap is mostly due to lower participation in the labour force of women which makes it hard for them to satisfy the

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<sup>2</sup>The part of the scheme that covers the self-employed and the employees in the private sector and the public employees of the regional and local public administrations is administered and managed by the Social Security (SS), as a pay-as-you-go system. The military and the central government employees have their pensions administered and managed by the State (*Clases Pasivas del Estado*, CPE). Pensions from the SS are financed by contributions from employers and employees and by State transfers to finance minimum pension supplements. Pensions from the CPE are financed by contributions from the employees and from the State.

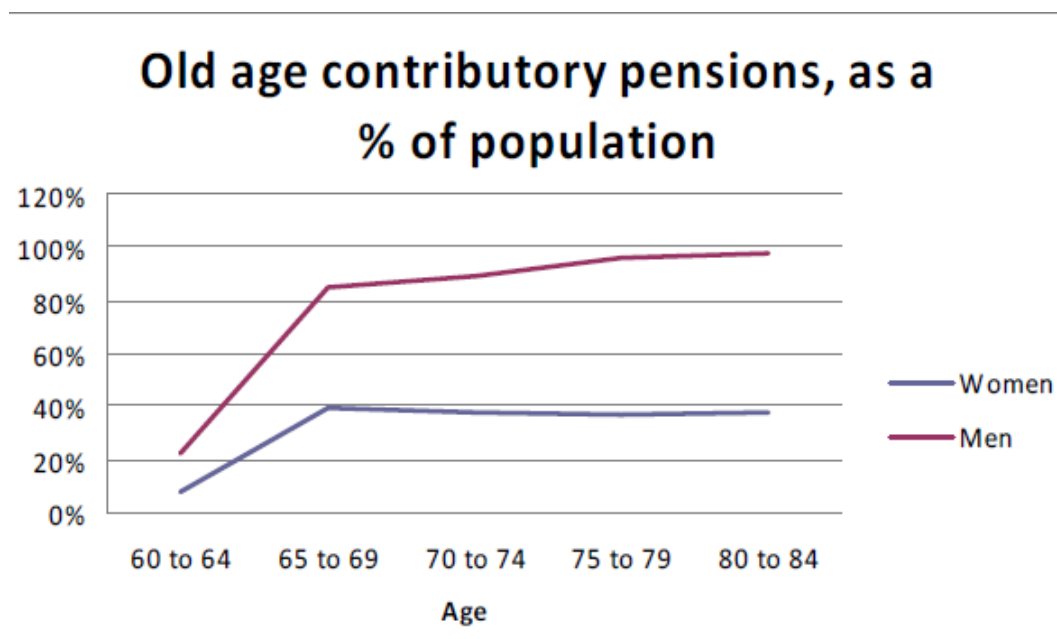


Figure 2.2: Old age contributory pensions: female versus male

requirements needed to obtain old age pensions. In addition to this, as a result, their average pension is also lower. Hence, Spanish women rely on survivor benefits more than men do and most recipients of these benefits are actually female.

Survivor pensions represent a relevant fraction of overall pension expenditure in Spain. Table 2.1 reports the 2010 total Spanish pension expenditure as a percentage of GDP, distinguishing between contributory and non-contributory public pensions. Survivor pensions are more costly than disability pensions and cover 23.40%, hence almost a quarter, of total pension expenditure. Similarly in 2010, the average expenditure on survivor pensions in OECD countries was equal to 20.9%.

The relevance of survivor benefits is supposed to be stable in the future. Figure 2.3 shows some predictions concerning Spanish pension expenditure as a percentage of GDP up to year 2050, based on projections elaborated by the Spanish Statistical Office. Survivor pensions are expected to reach and slightly overcome the 2% and to keep on accounting for a larger fraction of pension expenditure than disability pensions.

### 2.3.2 Eligibility requirements

In order for the widow to be entitled to receive the survivor benefit, both the deceased and the widow herself must meet specific requirements.

#### The deceased

The deceased must fall into one of the following categories:

Table 2.1: Total pension expenditure, 2010; Source: Instituto Nacional de Estadística (INE)

Type of pension	%	% of GDP
Contributory public pensions:	97.10	8.70
<i>Old age pensions</i>	62.80	5.60
<i>Disability pensions</i>	10.90	1.00
<i>Survivor pensions</i>	23.40	1.90
Non-contributory public pensions:	2.90	0.20
<i>War pensions</i>	0.60	0.04
<i>Other non-contributory pensions</i>	2.30	0.16
Total	100.00	8.90

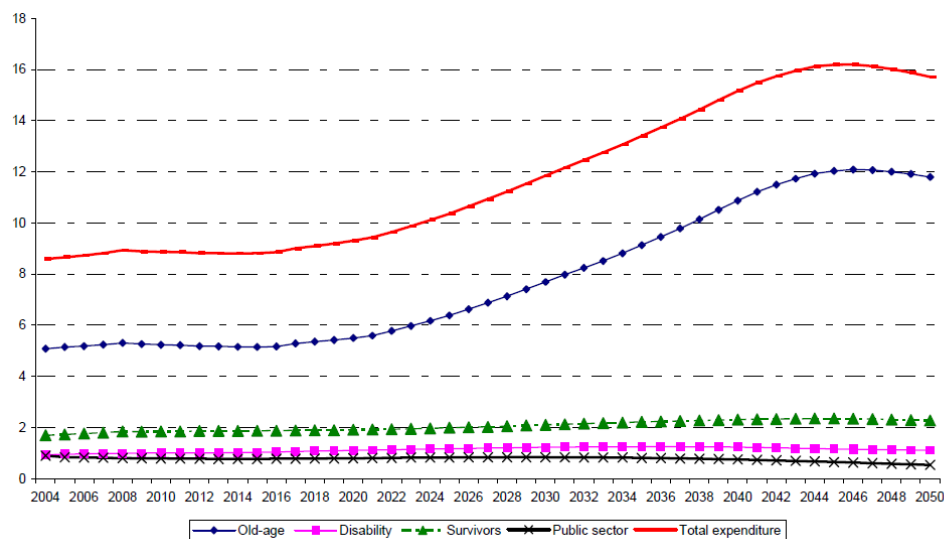


Figure 2.3: Pension Expenditure as a % of GDP by type of pensions; Source: Instituto Nacional de Estadística (INE)

1) He was an active contributor of the General Scheme of the Social Security. If death is due to a common disease, the deceased must have contributed for at least 500 days within an uninterrupted period of 5 years immediately before the death. If death was caused by an accident, whether or not it was work-related, or by occupational disease, no previous contribution period is required.

2) If the deceased was not in an active contributor status or assimilated situation, he must have contributed for a minimum of 15 years.

3) He was a worker who stopped working and had the right to collect a contributory retirement pension but died without requesting it.

4) He was receiving benefits for temporary disability when he died.

5) He was a retiree receiving a contributory or a permanent disability pension.

### **The surviving spouse**

The surviving spouse, in the event of death due to a common disease prior to the marriage, must prove either that there are children in common or that the marriage took place one year before the death. This duration of the marriage is not required in case it can be proved that, on the date of the wedding, there had been a period of cohabitation in which the originator was a partner in a de facto couple which, when added to the duration of the marriage, exceeded two years. If the spouse does not fulfil neither of these requirements, she may access a temporary widow benefit,<sup>3</sup> provided that she meets the following requirements which are compulsory:

1) She is legally separated and divorced, she has not remarried or entered into a common law marriage, and she is entitled to the compensatory pension that will terminate upon the death of the originator.

2) She can prove she has been victim of gender-based violence at the time of legal separation or divorce.

3) If the legal separation or divorce precedes January 2008, the divorced or legally separated widow does not need to be entitled to the compensatory pension, provided that the marriage tie has lasted for a minimum of 10 years and that a period of over 10 years has not passed between the date of divorce or legal separation and the death of the partner. Furthermore, there must be common children from the marriage or the beneficiary must be older than 50 when the partner dies.

4) She is a survivor of a de facto couple and the death occurred after January 2008. The de facto couple must have been registered in one of the specific registries of the

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<sup>3</sup>The surviving spouse will be the beneficiary of a temporary widowhood pension only when her marriage with the deceased did not last longer than 1 year or, alternatively, when there are no common children, although the deceased meets all other general requirements. The amount of the benefit is equal to that of the widow's pension to which they would have had right and is granted for 2 years.



Autonomous Communities or Town Councils of the place of residence or there must be a signed public record that certifies the establishment of the couple, in both cases, for a minimum of 2 years before the date of death of the originator. The cohabitation must have lasted no less than 5 years and must have been stable. Moreover, her income, during the calendar year prior to the death, must not have reached 50% of the amount of her own income plus the income of the originator in the same period, or 25% in the event that there are no children in common with entitlement to orphan's pension; or, alternatively, it is less than 1.5 times the amount of the minimum professional wage in force at the time of death. This specified limit will increase by 0.5 times the amount of the minimum professional wage in force for each shared child with entitlement to orphan's pension that lives with the survivor.

### 2.3.3 The pension amount

The widow pension amount is obtained by applying the following formula:

$$WP = Y \cdot RB$$

where  $Y$  is the corresponding percentage which is applied to  $RB$ , the regulatory base. Generally,  $Y$  is 52% of the regulatory base. It is increased up to 70% if the following requirements are met for the entire period in which the pension is collected:

1. The widow has dependent family members. Dependent family members are children under the age of 26, or older with disabilities, or minors in foster care live with the widow. A disability is deemed to exist when a degree of disability greater than or equal to 33% is certified. There are dependent family members when the annual earnings of the family unit, including those of the widow, divided by the number of family members, do not exceed 75% of the minimum professional wage in effect at the time.

2. The annual amount of the pension is greater than 50% of the widow's total earnings. In this case, the widow's pension is the primary or unique source of income.

3. The annual widowhood pension plus the pensioner's annual income cannot exceed the income limits shown in Table 2.2 which are legislated each year.<sup>4</sup> If they do, the amount of the widow's pension will be reduced accordingly as to avoid exceeding this income limit.

These three requirements must be met simultaneously. The loss of any of them will lead to the application of a percentage equal to 52%.<sup>5</sup> Each year minimum survivor

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<sup>4</sup>The income limit is given by the sum of the minimum payments needed for contributory pensions and the annual amount that, in each tax year, corresponds to the minimum widowhood pension with family dependants.

<sup>5</sup>Furthermore, starting from January 1, 2010, the amount of the widowhood pension cannot be greater than the compensatory pension. If the amount is higher, it will be reduced to the amount of the compensatory

Table 2.2: Survivor pensions - Income limits

	Income limit
2005	€ 12,057.43
2006	€ 12,758.07
2007	€ 13.400,37
2008	€ 15.114,53
2009	€ 15.884,43
2010	€ 16.439,70

pension amounts are legislated. Table 2.12 in the Appendix shows these amounts from 2005 to 2010.

The amount of the regulatory base  $RB$  is calculated differently, depending on the situation of the originator (whether he was an active worker or a pensioner) and the cause of death (common or occupational contingency). If the originator had a permanent disability or was a pensioner, the regulating base is the same as the one used to determine the retirement or permanent disability pension of the deceased. If the deceased was on partial retirement status, the contribution bases corresponding to the period of part-time work are taken into account and increased up to 100% of the amount that the worker would have received in conditions of full-time work during that period. If the deceased was an active worker and death was due to common contingencies, the regulatory base is the ratio resulting from dividing the sum of the contribution bases during an uninterrupted period of 24 months by 28. This period is chosen by the beneficiaries during the 15 years immediately prior to the month before death. If the death was due to a non work-related injury and the worker had not completed an uninterrupted contribution period of 24 months in the 15 years prior to the month before the death, the regulatory base will be the most beneficial of the following two bases: the base explained above for the case of death due to common contingencies and the base resulting from dividing the sum of the minimum contribution bases in the 24 months immediately prior to the death by 28, based on the amount corresponding to the working schedule of the deceased's last contract.

If death was due to a work-related injury or occupational disease, the regulatory base is the ratio resulting from dividing the following totals by 12:

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pension. In cases of legal separation or divorce, when there is a single beneficiary with entitlement to a pension, it will be for the full amount. If due to divorce there are several beneficiaries with entitlement to the pension, it will be granted in proportion to the amount of time each of them lived with the originator; under all circumstances, 40% will be granted to the surviving spouse or common law partner with entitlement to a widowhood pension. For separated or divorced people who are not eligible for the compensatory pension or when the marriage is annulled, the pension will be granted in proportion to the amount of time spent living with the deceased originator.

1) the daily wage and days of service on the date of the injury or sick leave due to disease, multiplied by 365 days.

2) For permanent-intermittent contracts, the daily wage is the result of dividing the wages earned by the worker during the same period, by the number of calendar days of the working season up to the date of the casual event.

3) The ratio that results from dividing the bonuses, supplementary compensation and overtime hours earned in the year prior to the injury by the number of actual days worked in that period. The result is multiplied by 273, unless the number of effective days in the activity in question is lower, in which case it will be multiplied by the relevant number.

The pension is paid monthly to recipients with two extra payments per year, in June and November, except in cases of work-related injury and occupational diseases, when they are prorated within the 12 ordinary monthly payments. The pension, including the minimum pension amount, is revalued at the beginning of each year, in accordance with the Consumer Price Index for that year.

### 2.3.4 Termination of the benefit

The widowhood pension is compatible with any income from the beneficiary's work and with any retirement or permanent disability pension that she may be entitled to.<sup>6</sup> The termination of benefits occurs:

1) due to remarrying or forming a common law marriage. Nevertheless, the widowhood pension can still be received, even if the pensioner remarries or forms a new common law marriage, as long as the following requirements are satisfied: the beneficiary is 61 years or older at the time of remarriage, receives a permanent disability pension or suffers from a severe disability or is certified with a degree of disability greater than 65%; the widow's pension must constitute the main or only source of income for the pensioner. as it must represent at least 75% of the total annual income; the newly married or common law couple has an annual income, of any form, including the widowhood pension, which does not exceed two times the minimum professional wage (if the income exceeds this level, the amount of the pension will be decreased proportionately).

2) By being judged in a final sentence of being guilty of the death of the originator or of having been the cause of serious injuries to him.

3) On death.

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<sup>6</sup>If the widowhood pension is still being received, even if the pensioner has remarried or formed a common law marriage, due to meeting the necessary requirements, the new widowhood pension that may be activated as a result of the death of the new spouse or common law marriage, shall be incompatible with the widowhood pension previously received and just one of these must be chosen.

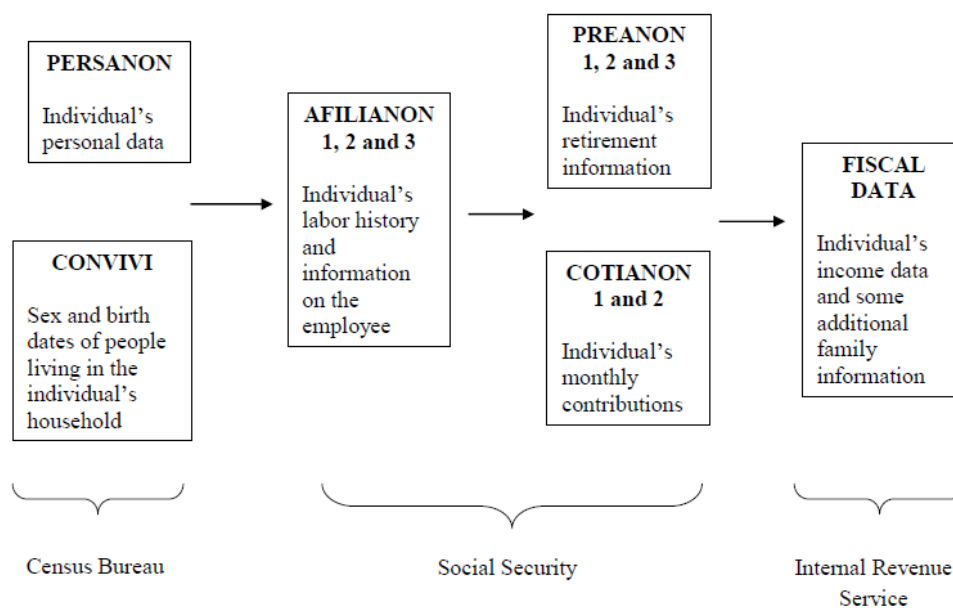


Figure 2.4: Muestra Continua de Vida Laborales

## 2.4 Empirical Estimation

### 2.4.1 The Dataset

The dataset I am using for the empirical analysis is called *The Continuous History Work Sample* (Muestra Continua De Vidas Laborales, MCVL). It is a panel representative administrative dataset organized by the Ministry of Employment and by Spanish Social Security. Data are collected from different sources: the Social Security, Census Bureau and Internal Revenue Service. The first wave is 2004 and data are collected each year up to the current year. Personal and family characteristics, income and fiscal information, the labour history and information concerning the retirement situation are provided for each individual in the sample. Figure 2.4 shows the different files the dataset is divided into and the specific kind of information they provide. It is a representative dataset as it contains information on about the 5% of individuals who have had any kind of relationship with Spanish Social Security in a particular year of the sample. As for personal information, the date of birth, gender, the level of education, the province of birth, the province where the first job took place and the current residence are provided. Family characteristics include the composition of the household, namely the specification of the birth date and gender of all members who are part of the individual's household. As far as the labour information is concerned, for each individual in the sample, it is possible to reconstruct the whole labour career since the individual's first job experience: for each experience the beginning and ending dates, the specific task performed and information about the

firm are provided. There are also detailed information about retirees, among which the pension regime they are affiliated to, the kind of pension or pensions they perceive and their respective amounts.

## 2.4.2 Empirical Strategy

The aim of my empirical analysis is to investigate the impact of receiving a widowhood pension benefit on women's own retirement decisions. More specifically, the event of interest is the widow's transition from the pension eligibility state into retirement when the survivor pension is received and when it is not received. In order to be able to perform such a transition, the woman herself must be entitled to receive a contributory pension benefit. In other words, she must be pension eligible and satisfy the requirements established by Spanish Social Security authorities, which are briefly discussed in the Appendix. As my focus is on time to the event of retirement, I perform a survival analysis because I precisely aim at investigating widows' retirement decisions as long as they are still at risk of retiring. I use a proportional discrete hazard model since, although such a transition may occur at any point in time, data are provided in a discrete form.

## 2.4.3 Different Specifications and Results

### 60-year-old women who become widows in 2005

I conduct my empirical investigation using different samples. The first sample is composed of women who are 60 years old in 2005, they are working and are pension eligible in 2005, since they meet the requirements established by Spanish Social Security authorities. In particular, in order to determine exactly their pension eligibility status, I have reconstructed the labour history of each woman in my sample. This has enabled me to compute the exact years of contributions accrued. Hence, following the Spanish Social Security requirements, I have selected only women with at least 15 years of contributions and with at least 2 of them occurring in the last 15 years before being entitled to apply for the pension. In 2005, their husband dies and, as a result, they become widows. Since not all the deceased met the requirements, some women are entitled to receive the survivor pension benefit, while others are not.

I call  $h$  the hazard of retiring and  $T$  the amount of time spent in the labour market. The hazard rate into retirement of woman  $f$  is given by the probability of leaving the labour force and retiring in the interval  $(t - 1, t]$ , provided that she has not retired up to time  $t - 1$  and that she satisfies the requirements needed for retiring at time  $t$ . As a result, the hazard rate is given by the following expression:

$$h_{ft} = \Pr [T_f = t | T_f \geq t]$$

I choose a complimentary log-log hazard model (Jenkins, 2005) with random effects and estimate the hazard rate  $h_{ft}$ . This model is actually consistent with a continuous time specification, which characterises the retirement decision, and with interval censored data. The dependent variable of my estimation is the duration of the transition, expressed in years, from the eligibility pension state into retirement. In all my estimations, the selected women are followed throughout the sample period, which goes from 2005 to 2010, until they retire, until they die or until 2010, in case they decide to keep on working. In other words, I observe each woman's spell from 2005 to 2010 when her spell is completed or before 2010 when it is right censored. This happens for example when the woman dies before retiring. My first specification of the hazard rate into retirement for woman  $f$  at time  $t$  is given by (Jenkins, 2005):

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta Family_{ft} * Pension_{ft}) \end{array} \right]$$

The error term is normally distributed and it is assumed to be independent from the other independent variables (Lancaster, 1979; Nickell, 1979). In this first specification, women's hazard rate into retirement depends on  $\beta_t$ , which is the age and expresses the time dependency. The education level is divided into three categories: low, medium and high education. Low education ranges from no schooling up to completed and uncompleted primary school. High education includes completed secondary school, graduate and post-graduate studies. Medium education represents the in-between level of schooling, in particular completed and uncompleted junior school or uncompleted secondary school.

The family information, which may vary overtime, included in this first baseline regression, specifies whether the woman is living alone or not and the composition of her household: if there are, within the household, children younger than 6 and people older than 75, with and without any degree of disability, and if there are sons or daughters aged between 30 and 40 years. The estimated equation also includes a dummy variable for each year of the sample period taken into consideration and some interaction terms between family characteristics and receiving a survivor pension benefit. Three variables are included in the hazard equation as to describe the woman's labour situation: her wage and two dummy variables specifying whether the woman has a public job or a job in the private sector, and whether her contract is temporary or permanent. In addition to that, the regression specifies whether the widow is receiving a survivor pension benefit or not, her accrued pension amount and whether in the family there are members receiving orphan pensions.<sup>7</sup>

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<sup>7</sup>The orphan pension is granted to children of the originator and to those of the surviving spouse brought to the marriage at least two years before the death of the originator, if they have lived at his expenses, do not receive any other Social Security pension and there are no family members who can support them. They must be under 21 years of age but the age is extended to 25 in the cases of absolute

The computation of the woman's accrued pension amount, which is included among the explanatory variables, deserves some more explanation. The dataset provides the woman's exact accrued monthly pension amount only if she actually retires during the sample period. As far as my first sample is concerned, 88.1% of the women retire. For the women included in my sample who do not retire, I need to compute the pension amount accrued, which is given by the formula explained in Appendix:

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

where  $PB$  is computed as:

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

$C_m$  is the woman's monthly contribution and  $i$  indicates the months. Since the dataset does not provide information on all the values of  $C_m$  necessary to compute  $PB$ , I compute a predicted value of the accrued pension amount, using a Heckman selection model, in order to take into account possible selection bias into continuing to work (as opposed to retire early). The Appendix shows the details of the Heckmann selection estimation for the sample composed by working and pension eligible women who are aged between 60 and 63, with some of them becoming widows in 2005.

Table 2.3 shows some descriptive statistics distinguishing between widows who end up receiving the contributory survivor pension benefit after their partner's death and women who experience widowhood but do not receive any contributory survivor pension since the deceased did not meet the requirements. The two groups of women appear to be similar in terms of education (most of them have a low level of education) and family structure. The average retirement age is slightly different within the two groups: on average widows not receiving any survivor benefit retire at 62.4, while widows entitled to the benefit retire earlier, at the age of 62.0.

Column (1) of Table 2.4 reports the estimated hazard coefficients for this first specification. The hazard of retiring is positively affected by the age of the widow. Moreover, orphanhood, orphans with a disability of 33% or higher, if the orphan is not in paid employment or self-employed, if the orphan is employed but his earnings are lower than the minimum professional wage and if the orphan is still studying.

The amount of the pension is calculated by applying the relevant percentage to the base pension, which is calculated in the same way as for the widow's pension. The percentage applied is 20% of the base pension. In the case of absolute orphanhood, the percentage might be higher if certain terms and conditions are met. The pension is paid monthly, with two extra pays each year, except in the cases of work-related injury and occupational diseases, as they are already prorated in each of the twelve ordinary monthly payments. As in the case of old age and survivor pensions, there are minimum monthly amounts guaranteed.

Table 2.3: Descriptive Statistics: Widows in 2005

	Widows		Non widows
	Survivor	No Survivor	
	Pension	Pension	
Observations	561	159	2847
Retired during sample period	94%	86%	87%
Avg. age of retirement	62.0	62.4	62.5
Low Education	49.4%	49.9%	48.6%
Medium Education	36.7%	37.0%	37.2%
High Education	13.9%	13.1%	14.2%
Descendants $\leq 6$ years	7.1%	7.2%	7.9%
Descendants $\leq 6$ years w/disability	1.0%	1.0%	1.2%
Sons/daughters, 28-40 years	12.8%	13.0%	11.9%
Ascendants $\geq 75$ years	9.8%	9.6%	9.9%
Ascendants $\geq 75$ years w/disability	2.8%	2.7%	2.9%
Public job	35.6%	32.1%	35.9%
Permanent contract	78.9%	75.8%	78.7%

widows tend to retire earlier than the standard retirement age which is reached in 2010. Lower levels of education induce retirement; interestingly, for the purpose of this paper, receiving a survivor pension benefit has a positive and significant effect on widows' hazard of retiring. Moreover, the composition of the household appears to have a relevant impact on widow's retirement decision. For instance, similarly to receiving a survivor pension benefit, the fact that a family member is entitled to receive an orphan pension benefit, increases the hazard to retire. If the widow lives alone after the loss of the partner, she is more likely to keep on working and delay retirement. In this case, probably, the widow prefers to continue to have an active working life: she desires to keep up a commitment which probably helps her to be engaged in social relationships and partly avoid loneliness. On the contrary, if the widow's household is composed of individuals who need to be taken care of, such as children younger than 6 and people older than 75, with and without any degree of disability, she will have incentive to exit the labour market and retire. As a result, the widow is no exception with respect to the family role that women are usually expected to fulfill as care providers. The presence of sons or daughters aged between 30 and 40 appears to have a negative but non significant effect on the hazard to retire. In order to better understand the effect of family composition on widow's retirement decisions, three interaction terms given by receiving the survivor benefit and having descendants younger than 6, people older than 75 and sons or daughters between 28 and 40 are included in the hazard equation. Being the recipient of the benefit and having



kids and old people in the household has a significant and positive effect on the hazard to retire. As far as the monetary factors are concerned, the higher the wage the lower the widow's likelihood to retire, although the effect is significant only at the 10% level. While the type of employment contract does not seem to significantly affect the retirement decision, having a job in the public sector discourages early retirement. It may be argued that the public sector may be able to create favourable working conditions for women, for example in terms of working hours required, thus inducing women to participate longer in the labour force.

In order to better investigate widow's retirement behaviour and the effect of receiving the survivor benefit, I then estimate the hazard rate of retirement restricting the sample to women who are 60 years old in 2005, working and pension eligible; they all experience widowhood in 2005 and they all receive a survivor pension benefit. The specification for this second estimation of the hazard rate into retirement for woman  $f$  at time  $t$  is given by the following equation:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta IS\ Effects_{ft} + \\ + \theta Family_{ft} * IS\ Effects_{ft} + \vartheta Max.\ amount_{ft}) \end{array} \right]$$

Compared to the previous specification, some new variables are included in the equation.  $IS\ Effects_{ft}$  is composed of two different effects: the income and the substitution effects that the widow faces when receiving a survivor benefit and deciding about retirement. I define the income effect faced by the widow as:

$$IE_{ft} = W_{m,t-1} - SB_{ft}$$

if the deceased was an active worker, or as

$$IE_{ft} = PB_{m,t-1} - SB_{ft}$$

if the originator was already a pensioner.  $W_{m,t-1}$  denotes the deceased partner's wage, while  $PB_{m,t-1}$  is his pension amount.  $SB_{ft}$  is the amount of the survivor pension benefit perceived by the widow. As a result, the income effect measures the monetary loss the widows incurs in, given by the monetary difference between the partner's income and the survivor benefit which replaces it when he dies. The larger the difference, the higher the economic loss the widow has to cope with. In order to be able to quantify the income effect, I have computed for each widow in the sample the partner's income, according to the rules which determine how the amount of the survivor pension regulatory base.

The second effect is the substitution effect, which is computed as follows:

$$SE_{ft} = W_{ft} - PB_{ft}$$

Table 2.4: Hazard Rates into Retirement: Widows in 2005

	(1)	(2)	(3)
Age	0.023** (0.009)	0.022** (0.010)	0.020** (0.010)
Survivor pension	0.278*** (0.022)		0.204*** (0.031)
Widow			0.178 (0.162)
Widow*Survivor pension			0.112*** (0.008)
Orphan pension	0.102** (0.041)	0.086* (0.059)	
Low education	0.397*** (0.031)	0.392*** (0.024)	0.387*** (0.036)
Medium education	0.203** (0.053)	0.205** (0.078)	0.199* (0.082)
Living alone	-0.204** (0.071)	-0.197** (0.079)	
Descendants $\leq 6$	0.114** (0.043)	0.124** (0.058)	0.120** (0.066)
Descendants $\leq 6$ w/disab.	0.103** (0.041)	0.107** (0.49)	0.101* (0.051)
Sons/daughters 28-40 years	-0.087 (0.079)	-0.072 (0.070)	-0.093 (0.089)
Ascendants $\geq 75$	0.179*** (0.026)	0.186*** (0.021)	0.193*** (0.034)
Ascendants $\geq 75$ w/disab	0.118** (0.039)	0.124** (0.041)	0.122** (0.045)
Surv.pens.*Descend. $\leq 6$	0.173*** (0.019)		
Surv.pens.*Sons/daughters 30-40	0.134 (0.121)		
Surv.pens.*Ascend. $\geq 75$	0.198*** (0.035)		
Widow*Surv.Pens*Descendants $\leq 6$			0.075*** (0.011)
Widow*Surv.Pens*Sons/daugh 28-40			0.039 (0.041)
Widow*Surv.Pens*Ascendants $\geq 75$			0.098*** (0.012)
Wage	-0.016* (0.009)		
Public Job	-0.104** (0.041)	-0.102* (0.081)	-0.101* (0.079)
Contract	-0.103 (0.098)	-0.109 (0.105)	-0.095 (0.089)
Accrued pension amount	0.018* (0.012)		
Income effect (IE)		-0.021** (0.011)	
IE*Descendants. $\leq 6$		0.056 (0.048)	
IE*Sons/daughters 28-40		-0.154 (0.132)	
IE*Ascend. $\geq 75$		0.076** (0.038)	
Substitution effect (SE)		-0.013* (0.008)	-0.017 (0.015)
SE*Descend. $\leq 6$		0.072** (0.035)	
SE*Sons/daughters 28-40 years		-0.136 (0.118)	
SE*Ascendants $\geq 75$		0.082** (0.041)	
SE*Surv.Pens*Descendants $\leq 6$			0.102*** (0.024)
SE*Surv.Pens*Sons/daughters 28-40			-0.074 (0.068)
SE*Surv.Pens*Ascendants $\geq 75$			0.133*** (0.031)
Max. amount binding		-0.079** (0.031)	
Years Controls	YES	YES	YES
Constant	-5.865*** (0.421)	-5.457*** (0.385)	-5.148*** (0.456)
Observations	720	561	2847
Log likelihood	-546.972	-402.012	-1105.541

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

where  $W_{ft}$  is the current wage of the widow and  $PB_{ft}$  is the pension amount she has been able to accrue so far. The substitution effect measures the monetary cost of retiring, given by the monetary difference between the widow's salary and the amount of money she would receive as a pension if she decided to retire. The larger the substitution effect, the higher the opportunity cost of retirement compared to keep on working.

Furthermore, I include a dummy variable capturing whether the income limit reported in Table 2.2 is binding for the widow or not. This dummy variable is equal to 1 if the income limit is binding, which happens when the sum between the annual widowhood pension and her annual income exceeds the limit; in this case the widow knows that her survivor pension benefit will be reduced as to satisfy the income limit.

Results of this second specification are reported in column (2) of Table 2.4. The income effect has a negative and significant impact on the widows' hazard to retire. The larger the difference between the previous husband's income and the current survivor benefit received, the stronger the monetary incentive to make up for this money loss and keep on working. The substitution effect is similar: the larger the monetary loss the widow has to face when she retires, due to the positive difference between her wage and her accrued pension amount, the lower the hazard rate of retirement, although this effect is significant only at a 10% level. When interacting the two effects with family characteristics interesting implications come up. The interaction term between the income effect and having people older than 75 in the household is positive and significant. Hence, despite the disincentive effect towards leaving the labour force provided by a positive income effect, if a widow is involved in old people care, she will have a higher hazard rate of retiring. The same cannot be said about the presence of children younger than 6, since this interaction term does not appear to be significant. When considering the interaction between the substitution effect on one side and descendants younger than 6 and ascendants older than 75 on the other, both interaction terms are positive and significant. As expected when the income limit, which is legislated each year by Social Security authorities, is binding, thus leading to a reduction in the survivor benefit accrued, the widow's likelihood to retire decreases.

Finally, I consider a third sample, composed by women who are 60 years old in 2005, they are working and are fully pension eligible in 2005. In the same year, some of them become widows, while others do not, and, among the ones becoming widows, only some women are actually entitled to receive the survivor pension benefit. As a result, some women within the sample experience widowhood but do not receive any survivor pension benefit. This is the equation used to estimate the hazard rate into retirement for this

sample:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta SE_{ft} + \theta SE_{ft} * Family_{ft} \\ + \vartheta Widow_f * SB_{ft} + \iota Widow_f * SB_{ft} * Family_{ft}) \end{array} \right]$$

In this specification, among the variables describing the woman's family situation, I also include a dummy variable in order to distinguish widows from non-widows. Results are reported in column (3) of Table 2.4. Being a widow per se is not significant in increasing the likelihood of leaving the labour force. Like in the first specification, receiving a survivor pension benefit has a positive and significant impact on the hazard to retire. The coefficient of the interaction terms given by the widow status, receiving a survivor pension benefit and family characteristics deserves attention. Being a widow who receives the benefit and who has dependants younger than 6 in her household significantly increases the hazard rate into retirement. The same effect is determined by the presence of people older than 75. The substitution effect has a negative but not significant impact; however the interaction between this effect, the survivor pension benefit and the presence of young kids or old people leads to a positive and significant impact on women's retirement outcome.

### **Widowhood and time: 60-year-old women who became widows before 2005**

I now consider a different sample composed of women who are 60 years old in 2005, they are working and are pension eligible in 2005, since they satisfy the standard pension requirements set by Spanish Social Security authorities. All women in the sample have experienced widowhood but, unlike the previous sample, their partners died before 2005. As a result, when they became widow, they were not pension eligible yet. In addition to this, since not all the deceased met the requirements, some women have been entitled to receive the survivor pension benefit, while others have not. The purpose is to understand whether the fact of being widow and eventually perceiving the survivor benefit for a longer time affects widow's retirement decisions in a different way. The specification for this estimation of the hazard rate into retirement for woman  $f$  at time  $t$  is given by the following equation:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Months Widowhood_{ft} + \eta Year_t + \\ + \theta IS Effects_{ft} + \vartheta IS Effects_{ft} * Months Widowhood_{ft} \\ + \iota IS Effects_{ft} * SB_{ft} + SB_{ft} * Family_{ft}) \end{array} \right]$$

The duration of widowhood, expressed in months, is now included in the regression as explanatory variable of the duration of the transition into retirement. Income and substitution effects faced by widows are defined exactly as in the previous estimation. Hence, in order to compute the substitution effect, the widows' accrued pension amount is needed.

Table 2.5: Descriptive Statistics: Widows before 2005

	Widows with survivor benefit	Widows with no survivor benefit
Observations	402	182
Retired during sample period	91%	83%
Average age of retirement	62.2	62.8
Average months of widowhood	49	41
Low Education	48.4%	48.9%
Medium Education	37.1%	36.7%
High Education	14.5%	14.4%
Living Alone	61.7%	53.4%
Descendants $\leq 6$ years	6.3%	6.8%
Descendants $\leq 6$ years w/disability	1.2%	0.9%
Sons/daughters, 28-40 years	10.1%	9.4%
Ascendants $\geq 75$ years	9.2%	8.7%
Ascendants $\geq 75$ years w/disability	2.5%	2.3%
Public job	32.3%	34.5%
Permanent Contract	86.4%	82.1%

Following the same procedure as in the previous Section, I use a Heckman selection model to compute the accrued pension amount for women included in this sample who do not retire during the sample period. Discussion and results of this estimation can be found in the Appendix.

Table 2.5 shows some descriptive statistics making a distinction between widows who receive the contributory survivor pension benefit and widows who do not receive any contributory survivor pension. Compared to the previous sample made up of women who became widows in 2005, fewer widows retire during the sample period. Hence, women who experienced widowhood a longer time ago tend to stay longer in the labour force. This is particularly true for those women who have not been entitled to receive the survivor pension benefit, whose average retirement age is 62.8. Widows receiving and not receiving the survivor pension share similar levels of education, family structure and labour characteristics in terms of public versus private jobs and permanent versus temporary employment contracts. For example, slightly less than 7% and about 9% of widows in both groups have, respectively, children younger than 6 and people older than 75 in their households.

Column (1) of Table 2.6 reports the estimated hazard coefficients into retirement for this specification. Months of widowhood have a negative and significant effect on the hazard into retirement. This means that the longer the woman has been experiencing

widowhood, the more likely she is to decide to remain active in the labour force and postpone retirement. It may be argued that women who have experienced widowhood for a longer time are more engaged in labour market and have developed a higher degree of job affection than women who have spent a larger fraction of life with their partner. However, receiving a survivor pension benefit still makes the widow more likely to retire, hence this impact is persistent despite the fact that the benefit has been received for a longer time. Interestingly, the hazard to retire is no longer affected by the presence of one or more family members being the recipient of an orphan pension. The widow's family structure has exactly the same effect as in the previous specification, with the presence of kids and old people pushing the widow to leave the labour force and take care of her family members who need her help. The income effect does no longer affect the woman's retirement choice. It seems that, when the partner's death occurs before the woman becomes pension eligible, she has had enough time to face and solve the issue of losing economic power, caused by the negative income effect. On the contrary, the substitution effect significantly reduces the likelihood of retirement and, as expected, its negative effect increases as the months of widowhood rise. However, the relevance of the family structure seems to be strong enough as to offset its negative effect: for instance, the interaction term given by the substitution effect and the presence of people older than 75 in the household, is positive and significant.

In order to better understand the time effect of widowhood on women's retirement behaviour, I then restrict the previous sample and consider only women who became widows before 2005. Unlike the previous estimation, they are all entitled to be recipients of the survivor pension benefit. This is the equation I estimate:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Month\ Widowhood_{ft} + \eta Year_t + \\ + \theta IS\ Effects_{ft} + \vartheta IS\ Effects_{ft} * Month\ Widowhood_{ft} \\ + \iota IS\ Effects_{ft} * Family_{ft} \end{array} \right]$$

Results are reported in column (2) of Table 2.6. The outcomes of the previous estimation are basically confirmed. In particular, the months of widowhood still have a significant and negative effect on the hazard to retire, pointing out that the more distant in time the husband's death is, the later the widow will be likely to retire. Unlike the income effect, the substitution effect is significant and affects negatively the widow's likelihood to retire. This is consistent with the negative effect given by the binding income amount: when the sum between the widow's yearly pension and the survivor benefit is higher than the income limits legislated by Social Security authorities, and, as a result, the survivor pension is reduced accordingly, the widow's incentive to retire is lower. Finally, when interacting the substitution effect with the family composition characteristics, the

Table 2.6: Hazard Rates into Retirement: Widows before 2005

	(1)	(2)
Age	0.018** (0.010)	0.019** (0.010)
Months of widowhood	-0.010*** (0.002)	-0.007*** (0.001)
Survivor pension	0.169** (0.051)	
Orphan pension	0.077 (0.080)	0.088 (0.082)
Low education	0.326*** (0.040)	0.308*** (0.037)
Medium education	0.192* (0.091)	0.185** (0.094)
Living alone	-0.175** (0.061)	-0.163** (0.058)
Descendants $\leq$ 6 years	0.127** (0.060)	0.132** (0.055)
Descendants $\leq$ 6 years w/disability	0.104* (0.082)	0.113** (0.061)
Sons/daughters 28-40 years	-0.065 (0.061)	-0.052 (0.049)
Ascendants $\geq$ 75 years	0.178** (0.041)	0.184** (0.052)
Ascendants $\geq$ 75 years w/disability	0.121* (0.073)	0.128* (0.070)
Public Job	-0.018* (0.013)	-0.014* (0.011)
Contract	-0.085 (0.081)	-0.098 (0.096)
Income effect (IE)	-0.018 (0.017)	-0.015 (0.013)
Substitution effect (SE)	-0.019** (0.010)	-0.017* (0.012)
IE*Months of widowhood	-0.040 (0.038)	-0.036 (0.040)
SE*Months of widowhood	-0.052** (0.022)	-0.047** (0.021)
IE*Survivor pension	0.046 (0.043)	
SE*Survivor pension	0.025* (0.018)	
IE*Descendants $\leq$ 6 years		0.043 (0.040)
IESons/daughters 28-40 years		-0.089 (0.087)
IE*Ascendants $\geq$ 75 years		0.052 (0.049)
SE*Descendants $\leq$ 6 years		0.068* (0.049)
SESons/daughters 28-40 years		-0.096 (0.095)
SE*Ascendants $\geq$ 75 years		0.074** (0.039)
Survivor pension*Descendants $\leq$ 6 years	0.134** (0.041)	
Survivor pension*Sons/daughters 28-40 years	0.087 (0.082)	
Survivor pension*Ascendants $\geq$ 75 years	0.145** (0.054)	
Max. amount binding		-0.040** (0.016)
Constant	-6.028*** (0.423)	-5.899*** (0.402)
Year Controls	YES	YES
Observations	584	402
Log likelihood	-489.52	-473.16

Significance levels: p&lt;0.1 \* p&lt;0.05 \*\* p&lt;0.01 \*\*\*

positive impact determined by the presence of children younger than 6 and people older than 75 is confirmed.

### Widows aged between 60 and 63

In order to gain a deeper understanding of widows' retirement behaviour, I finally investigate a larger sample composed of women aged between 60 and 63 years in 2005. As in the previous samples, all women are working and at the beginning of the spell, in 2005, they all satisfy the requirements needed to be pension eligible. They all become widows during the sample period but only a fraction of them is entitled to receive the survivor pension benefit. I estimate these women's hazard rate into retirement using the following equation:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta SE_{ft} + \\ + \theta SE_{ft} * Pension_{ft} + \vartheta Pension_{ft} * Family_{ft}) \end{array} \right]$$

The family characteristics include the composition of the household and whether the widow is living alone or not, while the variables related to the pension status specify whether the woman is the recipient of a survivor benefit or not and her accrued pension amount. Table 2.7 shows some descriptive statistics of this sample, distinguishing between widows who are entitled to receive the survivor pension benefit and widows who are not. Within the sample, the women who are more likely to retire and who tend to retire early (with an average age of retirement equal to 62.8) are widows who are receiving a survivor pension benefit. Furthermore, the two groups of widows tend to be quite similar as for education, family and labour characteristics

Column (1) of Table 2.8 reports the estimated hazard coefficients for this larger sample. Receiving a survivor pension still has a positive and significant effect on the hazard to retirement and including older widows in the sample, the effect becomes even larger in size. Whereas education and family characteristics have the same impact on the retirement decision as in the empirical estimations described in the previous subsection, for older widows having a public versus a private job and a permanent versus a temporary contract does not seem to make any significant difference on the retirement outcome. On the contrary, the greater the money loss given by the difference between the widow's wage and the pension amount she has been able to accrue (measured by the substitution effect), the lower their likelihood to retire. Hence, even when the standard retirement age is approaching, the widow is affected by this monetary incentive when deciding about retirement. The fact of receiving a survivor pension benefit and having family members who need to be taken care of, such as young children and people older than 75, significantly pushes the widow to leave the labour force. Once again, the estimation results clearly point out the gender role that widows, being women, are expected to fulfil within their family: they appear to be the main family care providers.



Table 2.7: Descriptive Statistics: Widows aged between 60 and 63 years

	Widows		Non widows
	Survivor	No Survivor	
	Pension	Pension	
Observations	1498	374	7780
Retired during sample period	96%	90%	91%
Avg. age of retirement	62.8	63.1	63.0
Low Education	49.9%	50.7%	49.6%
Medium Education	36.3%	36.1%	36.9%
High Education	13.8%	13.2%	13.5%
Descendants $\leq 6$ years	7.4%	7.5%	7.9%
Descendants $\leq 6$ years w/disability	1.2%	1.1%	1.3%
Sons/daughters, 28-40 years	12.2%	12.5%	11.4%
Ascendants $\geq 75$ years	10.1%	9.8%	10.0%
Ascendants $\geq 75$ years w/disability	2.5%	2.6%	2.8%
Public job	33.2%	30.8%	33.9%
Permanent contract	81.5%	79.7%	82.6%

I then restrict my sample to women aged between 60 and 63 years who become widows during the sample period and who, as a consequence, receive the survivor pension benefit. The specification for this estimation is the following:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta IS\ Effects_{ft} + \\ + \theta Family_{ft} * IS\ Effects_{ft} + \vartheta Max.amount_{ft}) \end{array} \right]$$

Results are shown in column (2) of Table 2.8. The explanatory variables that deserve special attention are the income and substitution effects. Both of them have a negative and significant impact on the hazard of retiring. The binding income amount has a negative effect as well. This means that even women who are about to reach the standard retirement age, when experiencing widowhood, are strongly affected by the economic loss that their partner's death involves and shape their retirement decision as to face this loss. As usual, this is counterbalanced by duties arising from the family composition: the presence of grandchildren and old people among family members induces the widow to retire and seems to overcome and dominate on the economic loss due to the income and substitution effects

Finally, I construct a sample with working and pension eligible women aged from 60 to 63 years, including both widows and non widows. Among the widows, only some of them are actually recipients of the survivor pension benefit. Table 2.7 shows some descriptive

Table 2.8: Hazard Rates into Retirement: Widows aged between 60 and 63

	(1)	(2)	(3)
Survivor pension	0.299*** (0.032)		0.223*** (0.022)
Widow			0.152 (0.132)
Orphan pension	0.098** (0.046)	0.086* (0.061)	
Low education	0.327*** (0.033)	0.338*** (0.038)	0.335*** (0.039)
Medium education	0.221* (0.099)	0.229* (0.102)	0.212** (0.077)
Living alone	-0.135* (0.088)	-0.122* (0.079)	
Descendants $\leq 6$ years	0.125** (0.051)	0.131** (0.060)	0.123** (0.045)
Descendants $\leq 6$ years w/disability	0.102** (0.039)	0.108** (0.042)	0.110** (0.038)
Sons/daughters, 28-40 years	-0.052 (0.063)	-0.061 (0.059)	0.085* (0.063)
Ascendants $\geq 75$ years	0.136** (0.042)	0.141*** (0.023)	0.139** (0.040)
Ascendants $\geq 75$ years w/disability	0.112** (0.038)	0.108** (0.041)	0.116** (0.035)
Widow*Surv. pens*Descendants $\leq 6$			0.099*** (0.020)
Widow*Surv. pens*Sons/daught, 28-40			0.076* (0.048)
Widow*Surv. pens*Ascendants $\geq 75$			0.103*** (0.023)
Income effect (IE)		-0.017* (0.012)	
IE*Descendants $\leq 6$ years		0.048* (0.029)	
IE*Sons/daughters, 28-40 years		0.042 (0.040)	
IE*Ascendants $\geq 75$ years		0.053* (0.032)	
Substitution effect (SE)	-0.021** (0.012)	-0.019* (0.014)	-0.018 (0.017)
SE*Descendants $\leq 6$ years		0.051* (0.036)	
SE*Sons/daughters, 28-40 years		0.046 (0.042)	
SE*Ascendants $\geq 75$ years		0.062** (0.026)	
SE*Survivor pension	0.035** (0.018)		
Surv. pens*Descendants $\leq 6$ years	0.112** (0.036)		
Surv. pens*Sons/daught, 28-40 years	-0.045 (0.042)		
Surv. pens*Ascendants $\geq 75$ years	0.129** (0.031)		
SE*Surv. pens*Descendants $\leq 6$			0.125*** (0.022)
SE*Surv. pens*Sons/daught, 28-40			0.040* (0.027)
SE*Surv. pens*Ascendants $\geq 75$			0.148*** (0.013)
Max. amount binding		-0.052* (0.029)	
Constant	-5.652*** (0.386)	-5.936*** (0.412)	-4521*** (0.452)
Controls	YES	YES	YES
Observations	1872	1498	9652
Log likelihood	-982.010	-906.523	-1434.052

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

statistics, splitting this sample into widows and non widows. As far as retirement behaviour is concerned, the descriptive statistics clarify that the difference is not so much to be found between widows and non widows, but rather between widows who are entitled to perceive the survivor pensions and widows who do not get the benefit. The retirement age and the percentage of women who retire during the sample period are very similar when considering non widows and widows with no survivor benefit. This is the equation being estimated:

$$h_{ft} = 1 - \exp - \left[ \begin{array}{l} \exp(\alpha + \beta_t + \gamma Educ_f + \delta Family_{ft} + \epsilon Labour_{ft} + \\ + \epsilon Pension_{ft} + \zeta Year_t + \eta IS\ Effects_{ft} + \\ + \theta Family_{ft} * IS\ Effects_{ft} + \vartheta Max.amount_{ft}) \end{array} \right]$$

Column (3) of Table 2.8 reports the estimated hazard coefficients. Receiving a survivor pension benefit still increases the hazard to retire and the more so when the widow has family members who are in need of care. As mentioned when commenting on the descriptive statistics of this sample, being a widow per se does not seem to significantly affect the retirement decision. Moreover, when including in the sample non widows as well, the monetary disincentive provided by the substitution effect is still negative but no longer significant. Hence, in this case, the main determinants of the hazard to retire appear to be the individual's education level, her family structure and her entitlement to the survivor pension benefit.

## 2.5 Beyond retirement choices: additional descriptive evidence on widows' behaviour

Besides investigating the impact of becoming widow and possibly receiving a survivor pension on women's own retirement choices, it is interesting to see whether when becoming widows, women tend to make other relevant changes in their life and understand why. In this section, I investigate two aspects. Firstly, do women change residence when experiencing widowhood? And secondly, when they decide to keep on staying in the labour force, does their labour situation change? For instance, in particular, do they modify their employment contract?

Table 2.9 shows some descriptive evidence which attempts at answering the first question. The sample considered is composed of women who retire throughout the sample period; some of them become widows in 2005, while others are still married. I make a distinction between widows who receive a survivor pension benefit and widows who do not. The descriptive statistics clearly point out that widows tend to change residence more than married women and, in particular, the percentage of widows moving is higher among women receiving no survivor pension benefit at all. In addition to this, most of

Table 2.9: Women who retire and change of residence

	Widows receiving survivor benefits	Widows receiving no survivor benefits	Married women
Change residence	7.2%	10.3%	1.2%
Living alone	62.1%	75.2%	
Moving to HH with sons/daughters	15.1%	19.0%	7.3%
Moving to HH with kids/old people	55.7%	48.2%	62.8%

the widows who move are actually leaving alone right after the death of the partner. This is the case for 75.2% of widows with no survivor benefit who change residence. Widows and married women tend to move to households where kids and old people are present. This is the case of 55.7% of the widows entitled to perceive survivor benefits who change residence. As a result, this table confirms that women are care providers within the family: they mostly move when there are either grandchildren or old people who need to be taken care of. In the case of widows with no survivor pension, it is also quite common to move to their sons and daughter's household even when no children and/or old people are present.<sup>8</sup> Probably, in this case, besides trying to alleviate the pain and the distress due to the loss of the partner, the decision of joining sons and daughters is significantly affected by the monetary constraints that widows have to face.

Table 2.10 shows the same statistics for women who, on the contrary, do not retire during the sample period. As expected, the percentage of women who change residence is now lower compared to the previous table, since these women are still working and are, as a result, more geographically constrained than women who decide to retire. Compared to retirees, the percentage of moving widows who live alone is higher and reaches almost 80% in the case of women without survivor pension benefit. The presence of kids and old people in the new household that women join when moving is still relevant, although less than in the case of pensioners.

Table 2.11 focuses on women who keep on working. The aim is to understand whether when widowhood is experienced women are likely to modify their labour status and, in particular, change their employment contract. Interestingly, a larger fraction of women who change contract are widows who are not entitled to survivor benefits and the change appears to take place in a precise direction, from part-time to full-time employment contracts. This is probably due to the monetary incentive provided by working longer

<sup>8</sup>Unfortunately, the dataset does not allow me to consistently distinguish between sons and daughters. It would be interesting to see whether the percentage of widows and non widows who change residence is significantly affected by the gender of the siblings.

Table 2.10: Women who do not retire and change of residence

	Widows receiving survivor benefits	Widows receiving no survivor benefits	Married women
Change residence	1.2%	2.1%	0.7%
Living alone	66.8%	79.1%	
Moving to HH with sons/daughters	17.3%	21.6%	6.8%
Moving to HH with kids/old people	52.1%	47.0%	64.2%

Table 2.11: Women who keep on working

	Widows receiving survivor benefits	Widows receiving no survivor benefits	Married women
From part-time to full-time	2.1%	4.5%	0.9%
From full-time to part-time	0.3%	0.2%	5.8%

hours which translates into a potential higher future pension benefit for the widow. On the contrary, it is interesting to point out that the change from full-time to part-time employment contracts occurs almost only in the case of married women who are probably less financially constrained than widow and are able to afford the wage reduction that this change involves.

## 2.6 Conclusions

While retirement is typically presented as a couple experience and seen as a final stage of life that men and women can share and enjoy with their partners, reality is different. Retirement is often lived alone. Sometimes this happens by choice, for instance as a result of a divorce, but sometimes it does not: this is the case of the death of the partner and the consequent experience of widowhood. This paper studies the effect of widowhood and, specifically, of receiving a survivor pension benefit on women's retirement behaviour.

Survivors benefits are set up in order to compensate and protect the financial needs of surviving people, caused by the death of the partner, which causes economic deprivation and emotional stress. They basically have two goals: preventing poverty and smoothing consumption levels over life of key family earners. Today, they are a very important

means of improving the income situation of surviving women in many countries: as life expectancy of women is usually higher than that of men, more women benefit from survivor pensions than men.

This paper contributes to the literature on gender and retirement. Most empirical studies on widows' retirement behaviour have focused on elderly women leaving alone and on the relevance of the new economic situation that the widow has to face in terms of loss of monetary power. This paper provides evidence of the differences in behaviour between widows who are entitled to receive the survivor benefit and widows who are not. The empirical analysis is conducted using the Muestra Continua de Vidas Laborales, a representative panel administrative Spanish dataset. A survival estimation is implemented and the event of interest is the widow's hazard into retirement. This paper also accounts for the effect of the widow's monetary incentives on her retirement choices, by analysing both the income and substitution effects that she has to deal with. In addition to this, it also shows how the impact of these incentives changes according to the length of widowhood and to the widow's family composition. Results point out that widows who receive survivor pensions have a hazard rate of retiring and this outcome is robust to different specifications. Hence, besides being an equity and redistributive tool, survivor pensions significantly affect women's retirement choices.

Survivors' pensions have been and still are a controversial matter for discussion. On the one side, they provide a large number of women with pension income that is higher than the income from their own pension would be and thus enable them to have decent standards of living after the partner has died. Although there has been an increase in female labour participation, women still work less, earn less and live longer than men. The importance of benefits from derived rights for female pensioners is confirmed by data on income and poverty among older people: poverty among elderly widows has been and remains much higher than the average. In addition to this, most recent pension reforms have aimed at tightening the link between working career and retirement benefits. This exposes women to new risks and makes their participation in the labour market and the continuity of their working careers even more crucial. This phenomenon has important implications for future pension policy decisions. It is actually very relevant for policy purposes to understand the incentive mechanisms that survivor benefits trigger for women, besides evaluating their efficiency in improving their financial situation.

Tesi di dottorato "Gender, Family Structure and Pension System Design"

di DE MICCO PATRICE

discussa presso Università Commerciale Luigi Bocconi-Milano nell'anno 2015

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## 2.7 Appendix

### 2.7.1 Minimum Amounts of Survivor Pensions, 2005 - 2010

Table 2.12 reports the minimum amounts for survivor pensions in the sample period considered in my empirical analysis. The criteria according to which the minimum pension amounts were defined from 2005 to 2010, have been slightly modified through time and, in determining the amount, more weight has been given to the fact of having dependent family members. Broadly speaking, the minimum amounts of survivor pension benefits depend essentially on the age and whether the beneficiary has dependent family members, who are people who live in the same household as the recipient and are financially and economically dependent on her.

Table 2.12: Survivor Benefits - Minimum Pensions

	W/family dep.	65 years	65 years w/family dep. or disab $\geq$ 65%	60-64 years	Younger than 60	Younger than 60 w/family dep.
2005		6.141,94		5.722,92	4.566,80	5.722,92
2006		6.537,72		6.091,68	4.861,08	6.091,68
2007			6.905,08	6.396,32	5.104,26	
2008	8.619,24		7.399,70	6.895,00	5.502,28	
2009	9.122,82		7.861,70	7.339,92	5.899,74	
2010	9.515,80		8.229,20	7.697,20	6.228,60	

### 2.7.2 The Spanish Pension System, 2005 - 2010: Eligibility Rules

The Spanish public contributory pension system is a PAY-AS-YOU-GO system and is financed through social contributions paid by companies and workers, whose amount depends on the category the worker belongs to. From 2005 to 2010, the standard retirement age in Spain was 65 years. Individuals, who met the requirement, could decide to opt for early retirement and retire at 60, if they had started to pay contributions before January 1967, or at 61 otherwise. In order to be pension eligible, the individual was required to have accumulated, throughout her working career, at least 15 years of contributions, at least 2 of which in the last 15 years before potentially applying for the pension right. The formula according to which the pension is computed in the sample period considered is the following:

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

$PB$  is the regulatory pension base (*base reguladora*) and corresponds to the sum of the contributions accumulated 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 which vary according to the different professional categories. Contributions concerning the 24 months immediately prior to retirement are computed at their nominal value, while previous contributions ranging from the 25th to the 180th month are indexed according to the Spanish Consumer Price Index.

$RR$  is the replacement rate. It is the percentage of the regulatory pension that is actually paid. It is equal to 50% if the years of contributions are 15 and it increases by 3% a year between the 16th and the 25th year and by 2% a year up to the 35th year. Hence, if the individual accrues 35 year of contributions,  $RR$  is equal to 100%. For every additional year of contribution following the 35th year,  $RR$  increases by an additional 2%.

Finally,  $ER$  is the early retirement penalty and is applied when the individual retires before the age of 65. Actually, the pension amount is reduced by 8% for each year of early retirement. As a result, according to the Social Security rules in force from 2005 to 2010, an individual is entitled to receive 100% of her accrued pension amount only if she is at least 65 when she retires and she has been paying contribution for at least 35 years.

### 2.7.3 The Heckman Selection Model: Women aged between 60 and 63 in 2005

Since the information available in the dataset does not allow to recover the accrued pension amount for women who do not retire throughout the sample period, I estimate an Heckman selection model to be able to predict the accrued pension amount for each individual in the sample. The first sample is composed by women aged between 60 and 63 years in 2005; they are all working and pension eligible. The main or outcome equation includes variables which affect the accrued pension amount, while the selection equation is a probit estimate of the likelihood of retiring and receiving a pension and includes also variables concerning the individual's family composition of the woman's household. The main equation of the Heckman selection model is given by:

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

$X_i$  is the vector of personal characteristics, including age and education;  $Y_i$  specifies the widow's labour history and in particular: the average observed wages, the pension scheme she is affiliated to, her main employment contract, whether she has mostly been employed in part-time or full-time jobs, the main sector she has been working in, and the years of contributions she has accumulated. The accrued pension amount is assumed to be observed if:

$$\alpha_0 + \alpha_1 X_i + \alpha_2 Y_i + \alpha_3 \text{Years\_Contributions} + \alpha_3 Z_i + \varepsilon_2 > 0$$

where  $Z_i$  is the vector containing information about family composition;  $\varepsilon_1$  and  $\varepsilon_2$  have correlation  $\rho$ . Table 2.13 reports the results of the main equation. When a variable appears in the outcome equation only, its coefficient can be interpreted as the marginal effect of a one unit change in that variable on the accrued pension amount. If, on the other hand, the variable appears in both the main and the selection equations, the interpretation of the coefficient in the outcome equation must take into account the presence of the same variable in the selection equation as well. As a result, in this case, the marginal effect of the variable on the dependent variable is composed of the effect of the selection and the outcome equation and can be computed, following Sigelman and Zeng (1999), using the following expression:

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

where  $\beta$  is the coefficient of the variable in the main equation,  $\alpha$  is the corresponding coefficient in the selection equation,  $\rho$  is the correlation between the errors in the two equations,  $\sigma$  is the error of 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 those variables which are included in both equations, Table 2.13 shows the coefficients of the outcome equation and the marginal effects computed following Sigelman and Zeng's methodology, in order to facilitate their interpretation.

The level of education significantly affects the pension amount accrued. On average, low education, compared to high education, lowers the pension amount by almost 25%. As expected, years of contributions and the average observed wages have a positive and significant impact on the pension amount. Being affiliated to a pension regime other than the General Regime, affects negatively the woman's pension benefit and this is particularly true for women belonging to the self-employed regime. Temporary contracts, with respect to standard permanent contracts, decrease the pension benefit by 27%, while having part-time jobs, which represent a relevant type of job contract for women, lowers the benefit by 22%. The job sector affects the pension amount accrued as well. In this estimation, the excluded category is represented by finance services. For example, on average, women active in the primary sector, manufacturing, retail, tourism and carrying out professional activities are able to collect a significantly lower pension amount than women working in the finance sector.

The estimation results of selection equation are shown in Table 2.14. Family structure significantly shapes womens' likelihood of retirement: the presence of grandchildren younger than 6 or people older than 75 increases womens' likelihood of retirement. As  $\rho$  differs significantly 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 and the need of using an Heckman selection model. It turns out that

Table 2.13: Heckman Main Equation: Widows in 2005

	Log accrued pension		Log accrued pension
Age	0.004*** (0.000)	Retail	-0.121*** (0.015)
	.0001 (0.000)		-0.219 (0.004)
Low education	-0.358*** (0.077)	Transport	-0.164* (0.083)
	-0.249 (0.000)		-0.095 (0.001)
Medium education	-0.276*** (0.007)	Tourism	-0.102*** (0.026)
	-0.183 (0.000)		-0.186 (0.000)
Log average observed wages	0.116** (0.035)	Information	-0.030* (0.021)
	0.081 (0.000)		-0.116 (0.000)
Self-employed regime	-0.388*** (0.026)	Public sector	-0.149*** (0.031)
Special regimes	-0.329 (0.195)		-0.094 (0.000)
Permanent seasonal contract	-0.285*** (0.045)	Profess.activities	-0.089*** (0.011)
Temporary contract	-0.271*** (0.029)		-0.099 (0.000)
Part-time contract	-0.225*** (0.037)	Auxiliary activities	-0.215*** (0.036)
Primary sector	-0.284** (0.081)		-0.195 (0.000)
	-0.252 (0.000)	Medical activities	0.145*** (0.032)
Manufacturing	-0.106*** (0.013)		0.097 (0.000)
	-0.123 (0.000)	Artistic activities	-0.184*** (0.028)
Electricity/environment	-0.076 (0.052)		-0.199 (0.000)
	-0.142 (0.000)	International	0.044 (0.064)
Constant	6.007*** (0.141)	organizations	0.173 (0.009)
Observations	9652	Years of	0.021*** (0.002)
Censored obs.	1158	contributions	0.043 (0.000)

Table 2.14: Heckman Selection Equation: Widows in 2005

	Likelihood of retiring
Age	0.001*** (0.000)
Low education	0.321*** (0.032)
Medium education	0.257*** (0.024)
Log average observed wages	-0.046** (0.008)
Primary sector	0.162** (0.077)
Manufacturing	0.040 (0.005)
Electricity and environment	0.087 (0.079)
Retail	-0.276*** (0.055)
Transport	0.141 (0.099)
Tourism	-0.127*** (0.023)
Information	0.058 (0.080)
Public sector	0.221*** (0.044)
Professional activities	0.097* (0.049)
Auxiliary activities	0.129* (0.075)
Medical activities	-0.158*** (0.066)
Artistic activities	-0.187* (0.102)
International organizations	-0.254 (0.234)
Years of contributions	0.072*** (0.006)
HH members	0.018 (0.021)
Descendants <=6	0.074** (0.032)
Descendants <=6 w/disabilities	0.297** (0.143)
Ascendants >=75	0.082*** (0.012)
Ascendants >75 w/disability	0.121*** (0.024)
Constant	6.016*** (0.312)
Observations	9652
Censored observations	1158

Table 2.15: Heckman Main Equationl: Widows before 2005

	Log accrued pension		Log accrued pension
Age	0.005*** (0.000)	Service sector	-0.081* (0.060)
	.0001 (0.000)		-0.101 (0.000)
Low education	-0.341*** (0.420)	Retail	-0.124*** (0.021)
	-0.218 (0.000)		-0.232 (0.005)
Medium education	-0.212*** (0.048)	Public sector	-0.161*** (0.028)
	-0.174 (0.005)		-0.096 (0.000)
Log average observed wages	0.124** (0.041)	Auxiliary activities	-0.221*** (0.028)
	0.062 (0.003)		-0.198 (0.000)
Self-employed regime	-0.342*** (0.037)	Medical activities	0.131** (0.052)
Permanent seasonal contract	-0.262* (0.168)		0.102 (0.000)
Temporary contract	-0.211** (0.091)	Years of	0.023*** (0.003)
Part-time contract	-0.198*** (0.029)	contributions	0.044 (0.000)
Primary sector	-0.251** (0.072)	Constant	5.823*** (0.444)
	-0.212 (0.000)	Observations	584
Secondary sector	-0.098** (0.039)	Censored obs.	78
	-0.103 (0.000)		

this model is able to fit the data better than independent estimates of the main and the selection equations alone.

### 2.7.4 The Heckman Selection Model: Women aged 60 in 2005 who became widows before 2005

This sample includes women who are 60 years old in 2005, they are working and are pension eligible. They are all widows and they have experienced widowhood before 2005. Out of 584 women, 506 retire during the sample period. As it is not possible to compute the accrued pension amount for women who keep on working during the sample period using the information provided in the dataset, I use an Heckman selection model.

Table 2.15 reports the coefficients and the marginal effects of the main equation. The secondary sector includes manufacturing activities and industry jobs related to electricity, transport and environment. Jobs related to art, tourism, communication and professional activities belong to the service sector.

The pension amount accrued increases with the level of education, the years of contributions and the average observed wages. Widows who do not belong to the General Regime, on average, benefit from a lower pension amount. As far as the job sector is



Table 2.16: Heckman Selection Equation: Widows before 2005

	Likelihood of retiring
Age	0.002*** (0.000)
Low education	0.341*** (0.026)
Medium education	0.242*** (0.029)
Log average observed wages	-0.037** (0.005)
Primary sector	0.121* (0.039)
Secondary sector	0.103** (0.040)
Service sector	-0.084* (0.056)
Retail	-0.201*** (0.042)
Public sector	0.195*** (0.032)
Auxiliary activities	0.132* (0.061)
Medical activities	-0.122* (0.068)
Years of contributions	0.051*** (0.005)
HH members	0.015 (0.019)
Descendants <=6	0.068** (0.029)
Descendants <=6 w/disabilities	0.126** (0.071)
Ascendants >=75	0.077*** (0.010)
Ascendants >75 w/disability	0.133*** (0.029)
Constant	6.489*** (0.492)
Observations	584
Censored observations	78

concerned, only women active in the medical sector appear to be able to accrue a higher pension amount than women working in the finance sector. The estimation results of the selection equation (Table 2.16) confirm the relevance of family composition on widows' probability of retirement. Grandchildren younger than 6 and people older than 75, with and without any degree of disability, significantly make women's likelihood of retirement rise, while the number per se of people who are part of the widow's household does not appear to be significant at all.

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## Chapter 3

# Home Made Welfare: The Role of Pensions in Intergenerational Transfers. Evidence from Italy (*Joint with I. Lauro and V. Scrutinio*)

How relevant is pension income in determining the occurrence of intergenerational family transfers? Using data from the Bank of Italy's Survey on Household Income and Wealth, this paper provides an empirical investigation of family intergenerational monetary transfers. We investigate the occurrence of donations when the donor is a family member and expects no repayment to take place. We distinguish between interhousehold and intrahousehold transfers and analyse the role of income deriving from pension benefits in affecting the probability of both transfers to occur. Results clearly point out that pension income positively and significantly affects the probability for the family to make both interhousehold and intrahousehold transfers. For instance, when in the household only one pensioner is present, the probability of a interhousehold transfer increases by 2.2%; in addition, we identify the presence of nonlinearities in this effect. Since our dataset does not provide precise information on intrahousehold transfers, we study the probability for a person aged between 25 and 50 years to live together with a person older than 60, assuming that, when this happens, the old individual provides economic support to the younger one and gives rise to intrahousehold transfers. The role of pensions is crucial: the number of pensions perceived by the younger individual's parents has a positive and significant effect. In particular, if there is only one parent who receives a pension benefit, the increase in the probability of cohabitation ranges between 9% and 11%.

### 3.1 Introduction

Aging and the aged are not, as so often supposed,  
the cause of our problems— they are and always have  
been the source of the answers we need.

*William H. Thomas*

The transfer of resources between generations represents a large informal safety net and has an important influence on family dynamics, inequality and growth. In any society, the generation of young people depends on the resources that it receives from older members. At the same time, the well-being of the elderly depends on family support and care. The ageing of the population is expected to strongly influence both the structure of family relations and the pattern of private transfers between generations.

A transfer can be broadly defined as an item of value given to another person. When observing the structure of intergenerational transfers, one cannot be but stricken by their variety: the nature of goods and services transferred may differ, as there are cash or in kind transfers; furthermore, their setting can vary, since they can occur within the family, through the market or be State monitored. Finally, according to their direction, they flow upwards (from young to old people) or downwards (from old to young people).

This paper provides an empirical investigation of family intergenerational monetary transfers, in which the donor expects no repayment to take place. More specifically, the focus is on downward transfers and on amounts donated: hence, we analyse transfers donated by old to younger people within the family. Moreover, we make a distinction between interhousehold transfers, which occur between a family member and another family member or a friend leaving outside the household, and intrahousehold transfers, which take place between family members sharing the same household.

In the economic literature there is a broad agreement that intergenerational transfers play an important role in the household's dynamics and in the accumulation of wealth. Households who receive or give transfers may change their consumption and savings plans and their efforts in producing income, having important consequences for social policies concerning the redistribution of wealth. We focus on downward transfers. The transfer direction has been reshaped by recent demographic trends and by the setting up of welfare systems. Older people, who used to be economically supported by the younger generation, have become providers of financial support to their offspring. As a matter of fact, transfers from the elderly parents to their children are much more frequent and also usually much more intense than those in the opposite direction.

The literature has widely discussed the issues of family as insurance provider mechanism and the use of intergenerational transfers as a tool to perform this task. This paper contributes to the existing literature in two ways. First, within monetary intergenerational

transfers, it distinguishes between interhousehold and intrahousehold transfers, while this distinction has been overlooked in previous studies which, due to data availability, have mostly focused on interhousehold transfers. Actually, families can help the younger generation in two ways: it can transfer resources to members living outside the household or to young members who decide to keep on living home. Secondly, the literature has investigated the role of the income family in inducing the involvement in transfers. This paper takes a more specific perspective and analyses the role of income deriving from pension benefits in affecting the probability of the transfer and its amount. This research question is relevant since nowadays most family transfers are given by old individuals to younger ones.

Our empirical analysis concerns Italy, a country where family networks are typically strong and where a large fraction of social expenditure is absorbed by pensions. We use data from the Bank of Italy's Survey on Household Income and Wealth (SHIW), which is a representative survey of the Italian population, conducted every two years on a sample of about 8,000 households, selected from population registers (24,000 individuals) and distributed over 300 Italian municipalities. In the first part of our empirical analysis, we use a linear probability model to investigate the probability of an interhousehold transfer to occur. Results clearly point out that the number of pensioners present in the household, the share of family income given by pensions and the weighted replacement rate<sup>1</sup> positively and significantly affect the probability of making interhousehold transfers. For instance, when in the household only one pensioner is present, the probability of a transfer being made increases by 2.2%; the presence of two retirees makes this probability rise up to 4.5%. It becomes equal to 8.5% and 21.2% when there are, respectively, 3 and 4 or more pensioners among the family members. Then, using a linear model, we find evidence that the number of pensioners and the pension income share have a positive impact also on the amount of money being transferred, while the importance of the weighted replacement rate appears to be less clear. In the second part of our empirical investigation, we focus on intrahousehold transfers. In our dataset we have no precise information on the kind and amount of resources that are transferred within the household, nor in terms of time or monetary values. Hence, we study the probability for a person aged between 25 and 50 years to live together with a person older than 60, assuming that, when this happens, the old individual provides economic support to the younger one and gives rise to intrahousehold transfers. The role of pensions is crucial also in this kind of transfers: the number of pensions perceived by parents has a positive and significant effect: the higher the number of pensions that parents receive, the higher the probability of intrahousehold transfers. In particular, if there is only one parent who receives a pension benefit, the

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<sup>1</sup>The weighted replacement rate measures the generosity of the pension amount; it is the percentage ratio between the total yearly pension amount and the total yearly income accrued by the individual the year before retiring, weighted by the family pension amount.

increase in the probability of having intrahousehold transfers ranges between 9% and 11% and doubles when both parents are pensioners.

The remaining of the paper is organised as follows. Section 3.2 reviews the literature this paper is related to. Section 3.3 provides a brief overview on the Italian welfare system and on the relevance of pensions. Section 3.4 presents the dataset and Section 3.5 describes the empirical analysis and its findings. I conclude in Section 3.6.

## 3.2 Review of Literature

This paper is related to two connected fields of the economic literature. The first one concerns family as an insurance provider mechanism and, in particular, the dynamics of family intergenerational transfers as tools to perform this task. The second one is more specifically concerned with the role of pensions within families as safety and welfare nets.

The overall role of the family as insurance provider has been investigated for a long time. Kotlikoff and Spivak (1981) pointed out that the family can efficiently perform this role since it has lower monitoring costs and is able to solve the issues of adverse selection and moral hazard more easily. One of the main tools that the family uses to act as an insurance provider is represented by intergenerational transfers, which can be either interhousehold or intrahousehold.

The motivation behind intergenerational transfers has been widely discussed in the literature. In some models, individuals have fully altruistic utility functions that ultimately depend on the welfare of all of their descendants (Barro and Becker, 1989). In other studies, they are assumed to be only semi-altruistic and derive utility from the consumption of their offspring and the size of transfers they make (Nishimura and Zhang, 1995). Other researchers, on the contrary, adopt a non-altruistic perspective and claim that transfers may arise out of self-interest because of mutual benefits of exchange: parents may behave strategically and make transfers to induce their children to provide them with assistance in old age (Cox and Rank, 1992). Altonji et al. (1995) support this view and find that increasing the income of active parents in making transfers by one dollar and reducing the child income by one dollar, leads to a less than 13 cent increase in parents' transfer to children. Recent research agrees on the fact that motivations behind transfers consist of a complex pattern and interaction among different motives (Kohli and Künemund, 2013).

Whatever the motives are, in the literature the relevance of intergenerational transfers has been widely confirmed. Cannari and D'Alessio (2008) focus on inheritance and on the impact of intergenerational transfers on the distribution of household wealth. Confirming the empirical results found by Kotlikoff (1987), they claim that households receiving transfers show higher levels of lifetime income, consumption, net wealth and given transfers than non-recipient households; moreover, transfers and lifetime income are positively

correlated.

Several studies have discussed the different kinds of intergenerational transfers and the possible directions in which they can occur. Monetary transfers have received the most attention. Cox (1990) and Cox and Japelli (1990) claim that family money transfers are targeted toward liquidity-constrained consumers. Cardia and Michel (2004) examine the role of time transfers and conclude that they increase capital accumulation by relaxing the young's time constraint and thus allowing them work more. Ogg et al. (2005), using data from the *Survey of Health, Ageing and Retirement*, analyse financial and time transfers in Europe. They find that monetary transfers mainly flow to the younger generations, while time transfers are directed both upwards and downwards.

As for the direction of transfers, Caldwell (1976) distinguishes between two types of societies: pre-transitional societies with transfers from young to old, motivated by high fertility, and post-transitional societies with low fertility and transfers from parents to children. This theory has been questioned by Kaplan (1994) who argues that the net flow of resources is always from old to young even when fertility is high, since individuals tend to produce more than they consume at every age. Similarly, Albertini et al. (2007), analysing several European countries, show there is a net downward flow of resources from old to young across all countries and age groups.

The insurance device provided by transfers has been widely analysed in the case of unemployment shocks. Bentolila and Ichino (2008), following a cross-country approach, compare Italy and Spain with Great Britain and the United States. They find that family support and welfare State tend to substitute each other: when the male household becomes unemployed, family transfers are lower in Great Britain, where actually the highest unemployment benefits are provided. Cox and Way (2011) study the responsiveness of intergenerational monetary transfers to the economic distress caused by the Great Recession, using the *American Life Panel* which provides detailed information about the effects of the recent recession and about family transfers. They find that receipt of monetary transfers is positively correlated with unemployment, especially for liquidity-constraint recipients. However, transfers are weaker for individuals whose relatives were themselves adversely affected by the recession. As a result, family transfers can function as insurance providers during recessions but they are not able to provide complete insurance.

The literature on intergenerational transfers is extensive but the distinction between interhousehold and intrahousehold transfers has not been satisfactorily addressed. Due to the lack of reliable data, only few studies have focused on intrahousehold transfers. Empirical research has studied the occurrence of intrahousehold transfers analysing the patterns of cohabitation between young people and the older generation. The idea is that when cohabitation takes place, then intrahousehold transfers occur.

Several studies have documented the issue of cohabitation between young and old people in Italy. Ongaro (2000) points out that this complex phenomenon traces back to



1980s and has involved a deep change in the relationships between generation. In Italy, young people leave home at the highest age of Europe and leaving is closely associated with first marriage unions (Billari et al., 2002). The main reasons appear to be the length of graduate studies, the difficulties young people have when entering the labour force, the structure of the housing market but also young and old people's preferences.

Le Blanc and Wolff (2003) examine the role of parents' and children's incomes in the leaving home decisions of young adults in Europe. They suggest that this decision is positively correlated to the child's income, while the effect of parents' income is less clear and of lower magnitude. Manacorda and Moretti (2006) provide alternative evidence. They investigate the household structure of Italian families and its impact on the occurrence of transfers within the household. They estimate the effect of exogenous changes in parental income on rates of cohabitation in Italy. They find that a 10% increase in parental income results in a 10% increase in boys living with parents, concluding that cohabitation is a normal good for parents who are willing to offer higher levels of consumption to young people in exchange for their presence at home. Moreover, cohabitation is associated with a decrease in children's labour supply. Becker et al. (2010) test whether job insecurity of parents and children affect children's moving-out decisions. Their estimates for 13 European countries over 1983–2004 show that the rate of cohabitation increases by 1.7 percentage points when there is a 10 percentage points rise in the share of youths perceiving their job to be insecure and declines by 1.1 percentage points if the same increase occurs in job insecurity for older workers.

While the relevance, the direction and the difference among different kinds of intergenerational transfers have been investigated, the role of pensioners and pensions within them has been overlooked in the literature. What is well known is that the presence of pension income, especially if deriving from old-age pensions, significantly contributes to the improvement of the average economic condition of families (Baldacci and Proto, 2000). Research is even more lacking when it comes to the role of pensions within intra-household transfers. A stream of literature has analysed the effect of pensions on living arrangements, but focusing only on how the pension benefits modifies elderly's preferences on living arrangements (Costa, 1997, McGarry and Schoeni, 2000).

This paper attempts at filling the gap. The objective is to provide empirical evidence of the contribution and role of retirees and pensions in intergenerational transfers taking place from old to young individuals, making a distinction between interhousehold and intrahousehold monetary transfers.

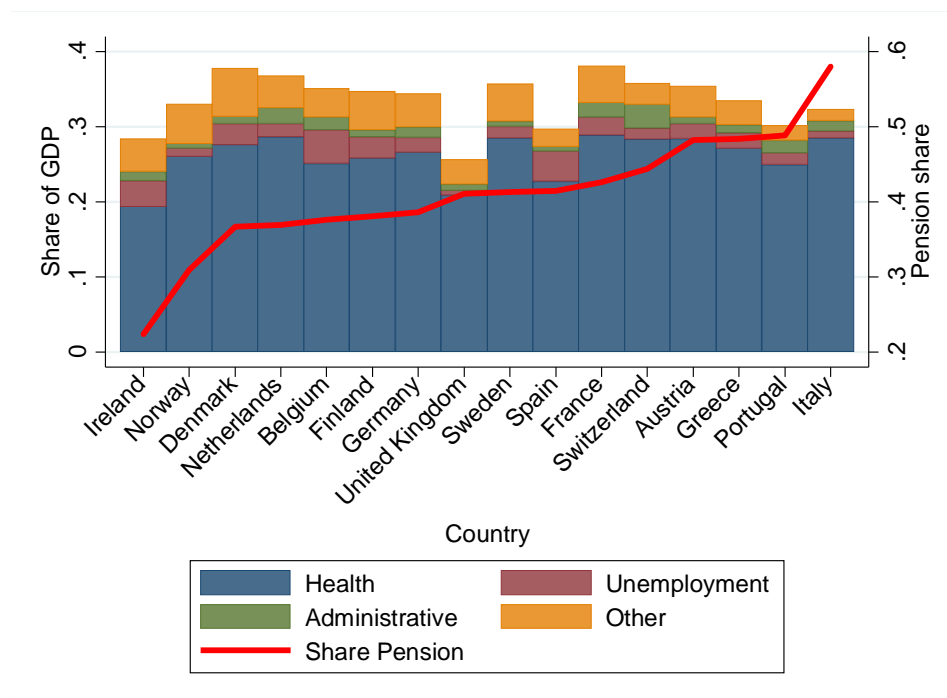


Figure 3.1: Social Expenditure in Europe, 2010.

### 3.3 The Italian Welfare System and the Relevance of Pensions: A Brief Overview

In order to better clarify the relevance of intergenerational transfers and the supportive financial role of pensions in Italy, in this Section we briefly present some features of the Italian welfare system. Figure 3.1 depicts the decomposition of 2010 social expenditure as a percentage of GDP for several European countries. The total amount of social expenditure in Italy is slightly lower than in most of the other countries but the most interesting aspect is the distribution of its social expenditure amount. A significantly higher share of public financial resources is devoted to pensions and only a very small fraction to supporting unemployed people. This trend is not limited to 2010 and can be said to be a peculiarity of the Italian spending system. For instance, the period 2000-2008, 59.1% of Italian social expenditure was absorbed by pensions, while the European average was equal to 43,7%. In the same period, expenditure on family support, unemployment benefits and housing was respectively equal to 4,2%, 1,8% and 0,3%, against European average values of 7.8%, 5.7% and 3.3%.<sup>2</sup>

This distortion dates back to 1950s and has become rapidly wider in the following

<sup>2</sup>Ferrera, M., Fargion, V. and Jessoula, M. (2012). *Alle Radici del Welfare all'Italiana – Origini e Futuro di un Modello Sociale Squilibrato*. Collana Storica della Banca d'Italia, Serie Saggi e Ricerche Volume VII. Marsilio Editori, pp. 14-15.

decades. The reasons of this imbalance towards spending in favour of older generations needs to be contextualised within the Italian social, economic and cultural environment and is also the result of political competition, since the increase in pension generosity and the easing of eligibility requirements has been used to gain political consensus. While the support given to unemployed individuals through targeted benefits is much lower compared to the European average, disability pensions have been largely granted and have taken the form of permanent benefits. Young unemployed people, in particular, appear to be the least protected category. According to estimates based on the Bank of Italy's *Survey Household Income and Wealth* for the period 1995-2010, while unemployment benefits were granted to 18% of individuals aged between 36 and 64 years, only 12% of people aged between 31 and 35 was entitled to receive the benefit and the percentage went further down to 5% for individuals between 21 and 30 years. The rise in non-standard employment contracts experienced by young people has contributed to this situation. As a result, individuals who lose their job can count on a limited public support. This has further increased the importance of the family as a safety net; the family, through interhousehold and intrahousehold transfers act as an insurance mechanism and attempts at providing the necessary financial support.

### 3.4 The Dataset

The dataset we use is the Survey on Household Income and Wealth (SHIW). It is a representative survey of the Italian population ran by the Sample Surveys Division of the Bank of Italy. It is conducted every two years on a sample of about 8,000 households, selected from population registers (24,000 individuals) and distributed over 300 Italian municipalities. The unit of observation is the household, which is defined as a group of individuals linked by ties of blood, marriage or affection, sharing a common dwelling and pooling all or part of their incomes.

Data collection and interviews are carried out by professional interviewers and participation is voluntary and not remunerated. The survey results are regularly published in the Bank of Italy's Reports and are diffused through the Supplements of the Statistical Bulletin.<sup>3</sup> The survey has been conducted yearly from 1977 to 1984. There have been two changes during the years regarding the frequency of publication. Starting in 1984, it

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<sup>3</sup>Recently, the survey has been integrated and become part of international research projects such as the Luxembourg Income Study and the Luxembourg Wealth Study. The main objective of these programs is to produce a comparable cross-country dataset on household's economic behaviour, income and wealth. In addition to this, starting from 2008, the SHIW has also been included in a European project ran by the European Central Bank, aiming at producing a comparable survey on household finances and consumption within the European population, the *Household Finance and Consumption Survey* (HFCS).

was published biannually (with the exception of the year 1987). A further change took place in 1995 and the survey has been published biannually since then (last available is for year 2012 published in 2013). Data are freely available for research purposes on the Bank of Italy's website (formats: ASCII, SAS and Stata).<sup>4</sup>

It first began with the aim of gathering data on income and savings of Italian households, in order to study the microeconomic behaviour of Italian households. Over the years, the scope of the survey has been widened. Two types of files are now available. The first is the *historical archive*, whose files represent the main dataset. The second type of file is composed by the *year surveys*: beyond the standardized questions, the Bank of Italy survey contains also specific information collected in particular years or at certain frequencies. They represent special modules; for instance, they provide information on capital gains, inheritance, risk aversion, unpaid work, economic mobility, social capital, tax evasion, financial literacy and fertility plans.

The files present in the historical archive contain answers to standard questions and their content is generally comparable, although some changes in the number and kind of questions have occurred during the years. The files usually report data at two levels of disaggregation, the family and the individual level. Detailed data have been collected continuously on the social and demographic characteristics of household members and their income and, since 1980, on consumption expenditure. Questions regarding the whole household are answered by the head of the family (or by the person most knowledgeable about the family financial situation). The historical archive contains a wide range of variables including: characteristics of the household and of its members (number of income earners, gender, age, education, job status, characteristics of the dwelling), income (wage and salaries, income from self-employment, pensions and other financial transfers, income from financial assets and real estate), consumption and savings (food consumption, expenses for housing, health, insurance, spending on durable goods and household savings), and wealth in terms of real estate, financial assets and liabilities. The documentation on the structure of the archives and questionnaires used is provided separately for each year.

The information on household wealth is complemented with data on transfers. The survey asks whether any member of the household, in a given year, made or received monetary transfers to relatives or friends not cohabitating. Moreover, it provides the amount transferred. Unfortunately, the data do not allow to identify the person who actually made or received the transfer within the household. Hence, the head of the family will be used to represent the whole family.

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<sup>4</sup>Details on methodology (sample design, questionnaires, data collection and editing, non response, data quality, etc) can be found at <http://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/bilanci-famiglie/documentazione/index.html>.

## 3.5 Empirical Analysis and Results

Our empirical analysis is divided into parts. In the first part, we analyse the occurrence of interhousehold transfers, while in the second we focus on intrahousehold transfers. As detailed in Section 3.4, the dataset used is the Bank of Italy's Survey on Household Income and Wealth and our empirical estimations focus on Italy.

### 3.5.1 Interhousehold transfers

Interhousehold transfers are an external flow of resources between households. They can be time, money, goods or services that a household member provides to other individuals outside her household, with the intention of helping and, in the case of money and goods, supporting the recipients' current consumption. Their main characteristic is that, unlike loans, the donor does not expect any repayment to take place. As a result, the recipients' economic well-being is increased thanks to the additional economic resources she receives from the donor. Due to data availability, we focus only on interhousehold transfers of money. The first aim of our empirical analysis is to investigate which factors affect the probability of monetary interhousehold transfers to occur.

#### Descriptive evidence

Figure 3.2 shows the shares of donors and receivers of interhousehold money transfers that occurred from 1995 up to 2010. Data for donors are not available in 1995; hence, for this particular year, only the share of receivers is reported. The pattern of donors shown in the graph is fairly clear: their share has been significantly increasing, especially from 1998 to 2010. During the recent economic crisis, the share of donors has risen substantially, literally jumping from 12% in 2006 to 21% in 2008. In 2010, almost one family out of four reported to have donated to family members or friends living outside the household.

The share of receivers is significantly lower than the one of donors: reported transfers made exceed reported transfers received. Part of the difference can be explained by remittances to and from abroad, but it is generally believed that differences due to mis- and under-reporting can be substantial. It can very well be the case that people who have received free money transfers from other family members or friends tend not to report the event or to underestimate the number of times the event has occurred; they probably prefer to avoid admitting the situation of financial need they have experienced. This is the main reason why our empirical analysis focuses on donors rather than receivers. As a result, not surprisingly, the share of recipients is fairly stable during the sample period, showing only a slight increase at the beginning of the crisis (from 2006 to 2008) and remaining constant afterwards.

For the purposes of our empirical analysis, it is relevant to figure out the composition

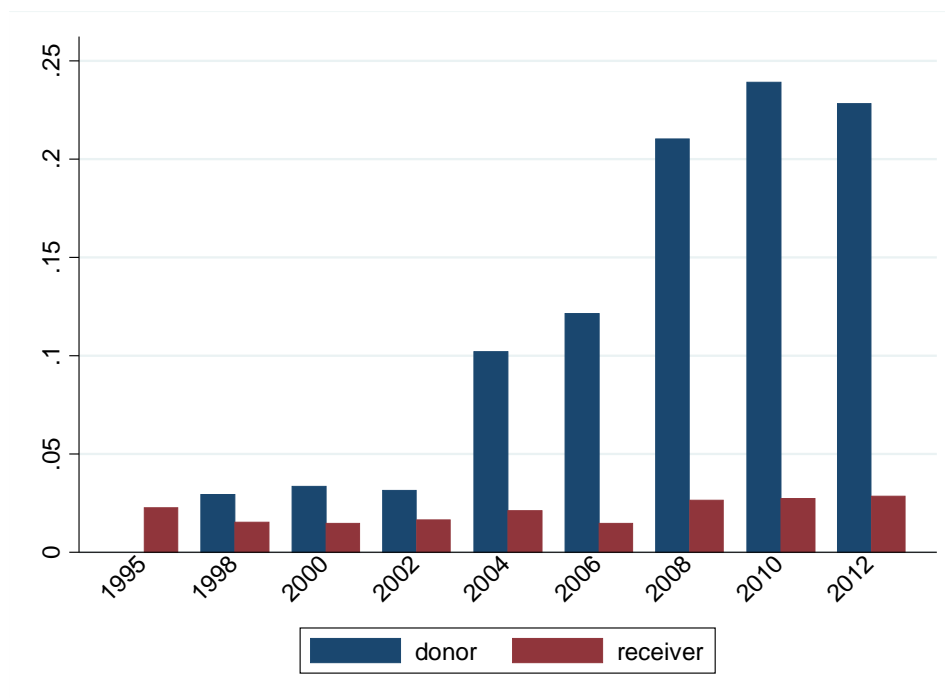


Figure 3.2: Shares of donors and receivers, 1995-2012.

by age of donors and receivers. Figure 3.3 shows the shares of the two categories divided into 5 age groups. Donors tend to be more concentrated among individuals aged between 51 and 65 and older than 65 years. During the recent economic crisis, the share of donors has risen across all age groups, but the increase has been larger for older individuals. In particular, donors between 30 and 50 years have reduced transfers in 2012, compared to the level of 2006. It may be argued that the crisis has deprived them of financial resources, hence limiting their ability to transfer monetary resources to friends and other family members. This reduction does not characterise older individuals whose transfers have slightly increased in 2012 compared to 2010. As a result, old people represent the most relevant age group within donors. As far as receivers are concerned, the situation is exactly the opposite: they appear to be mostly under 30 years and to almost disappear among individuals who are older than 65.

Besides analysing age composition, it is also interesting to investigate whether donors and receivers tend to be concentrated geographically in a particular area in Italy (Table 3.12 in the Appendix reports the list of Italian regions included in each area). Table 3.1 shows donors and receivers' shares by year and by area. As for donors, the table confirms the growing trend that started in 2002 and lasted up to 2008. During the crisis, the largest fraction of transfers has been made in the South and in the Islands, with both areas experiencing a remarkable increase from 2006 to 2008. As for receivers, this table supports the evidence of the previous graph: it is not possible to detect any consistent

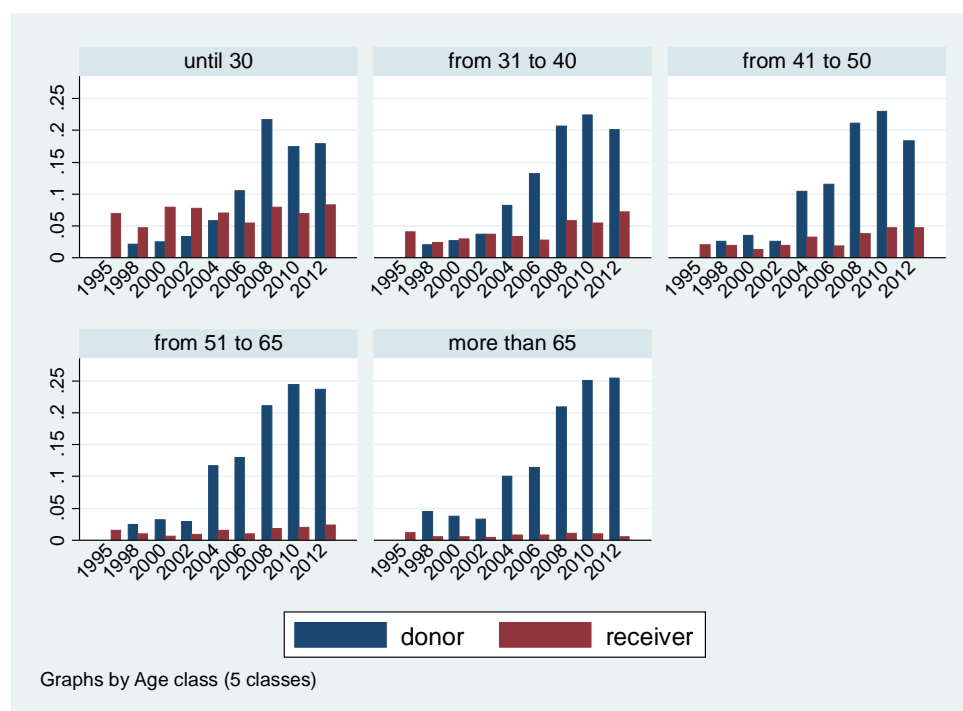


Figure 3.3: Share of donors and receivers by age groups, 1995-2012

Table 3.1: Shares of donors and receivers by geographical area, 1995-2012

	1995	1998	2000	2002	2004	2006	2008	2010	2012
<i>Donors</i>									
North-West		0.036	0.051	0.047	0.071	0.076	0.123	0.104	0.108
North-East		0.023	0.031	0.031	0.071	0.098	0.094	0.125	0.116
Center		0.029	0.033	0.030	0.084	0.106	0.153	0.188	0.182
South		0.032	0.015	0.016	0.085	0.090	0.206	0.237	0.194
Islands		0.019	0.042	0.027	0.095	0.086	0.168	0.183	0.215
<i>Receivers</i>									
North-West	0.017	0.018	0.011	0.012	0.012	0.008	0.008	0.012	0.012
North-East	0.021	0.012	0.013	0.026	0.021	0.016	0.014	0.018	0.013
Center	0.016	0.013	0.019	0.012	0.017	0.014	0.026	0.025	0.015
South	0.031	0.015	0.014	0.015	0.022	0.023	0.065	0.055	0.064
Islands	0.032	0.017	0.019	0.022	0.048	0.013	0.017	0.024	0.037

trend, especially in the case of the North. The only relevant aspect is that, consistently with the information on donors, the share of receivers has mostly increased in the South during the recent economic crisis.

This preliminary descriptive evidence shows the relevance of donors of transfers with

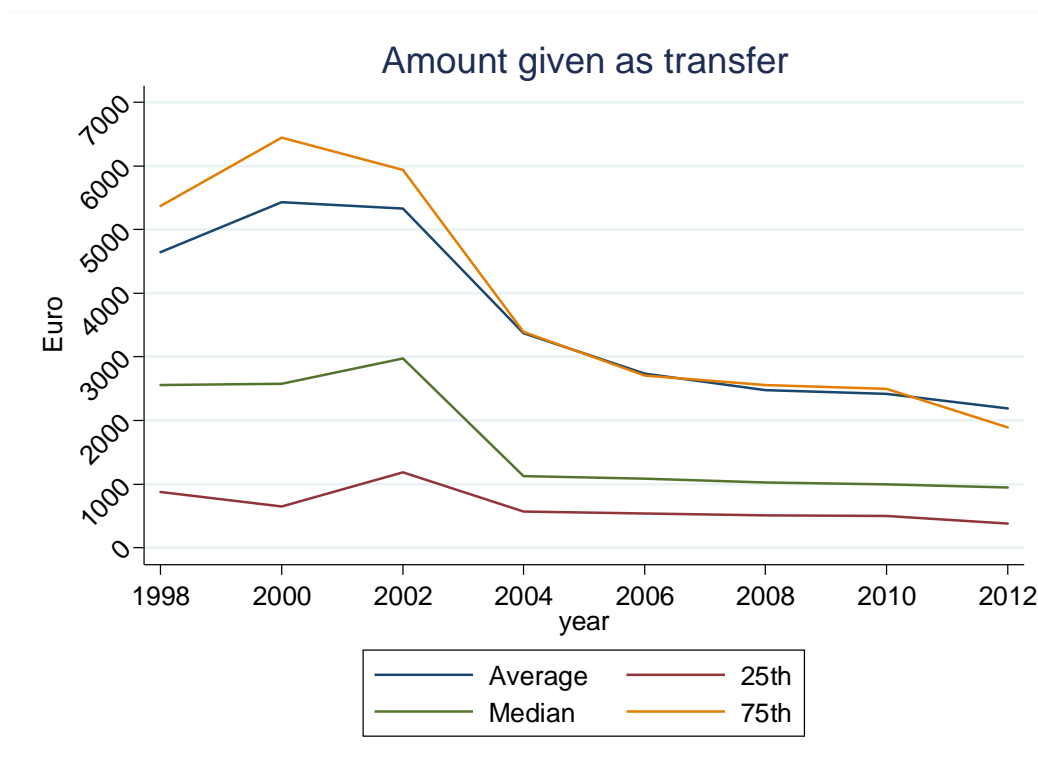


Figure 3.4: Average amounts donated, 1998-2012

respect to receivers and the predominance of old people among donors. Figure 3.4 depicts the average amounts donated from 1998 to 2012. The overall distribution is highly disperse. Interestingly, it turns out that the average amount of transfers made during the crisis is significantly lower than its pre-crisis level. Hence, during the crisis the number of transfers has increased but their average amount has decreased. This could be explained with the fact that in the pre-crisis years, transfers were usually given to help receivers to cope with more exceptional events and hence their average amount was higher. During the crisis, their social and economic function appears to have changed: they have become much more frequent and have been used to balance a wider range of economic difficulties that require less monetary resources to be faced.

Besides transfers given for free, donors can actually transfer money to individuals outside their household expecting to be repayed. In this case, the donor builds up a credit, while the receiver becomes a debtor. In our dataset, however, the share of lenders and borrowers appears to be secondary with respect to donors and receivers. (See Figures 3.9 and 3.10 in the Appendix). Moreover, the dataset does not provide information for lenders from 2008 to 2010 and the analysis of the share of lenders and borrowers by geographical area points out that no well defined trend can be identified. As for age, not surprisingly, borrowers tend to be younger than 50 years and be concentrated in the age group ranging from 30 to 40. They sharply decrease after 51 years. People older than



65 are neither lenders nor borrowers: as a result, their role as creditors and debtors is marginal.

As a consequence, the issue of interhousehold transfers is the one that appears to have more interesting implications and be worth being investigated. Their share has increased during the recent economic crisis particularly in South Italy and the Islands and they have mostly been made by old people to younger individuals.

### Probability of making transfers: empirical estimation and findings

The aim of our first set of regression is to investigate the probability of a free transfer being made, or in other words, the extensive margin of transfer provision. The first model we estimate is a probability binary response model. For our analysis we rely on a linear probability model which allows an easier interpretation of the parameters of interest. We correct for the inherent heteroskedasticity of the model by using robust standard errors.<sup>5</sup>

Our variable of interest tells us whether a member of the household has made a transfer or not in a given year to a family member or a friend living outside the household itself; it is not possible to retrieve the exact identity of the person who inside the family has actually made the transfer. Hence, in this sample we keep only the head of the family. Information on this kind of transfers is consistently provided only starting from 1998; this is the reason why this first sample ranges from 1998 to 2012. We estimate the following equation:

$$Transfer = \beta_0 + \beta_1 Pension + \beta_2 X + \alpha_{jt} + \gamma Cohort + \varepsilon$$

*Pension* is a variable which represents the relevance or the characteristics of the pensions received within the household. In particular, we implement at first two measures of the relevance of the pension, using the number of pensioners present in the household and the share of family income due to pensions. In addition to this, in our third specification, we control for the specific effect of the generosity of the pension, using the weighted replacement rate.

We first estimate our equation including the number of pensioners present in the household. Table 3.2 reports the descriptive statistics for this first sample. The probability of making a transfer is regressed on information concerning the family pension situation and several controls. Two variables describe pensions in this first estimation: the number of pensioners and the number of disability pensions received within the family. The income situation of the family includes net family income, which is the sum of net labour income and revenues from financial investments, and wealth which is given by the family's real estate and financial assets, both computed in real terms. Personal information on the head of the family includes age, gender, education and the marital status, distinguishing among married, divorced and widowed individuals. Education is differentiated

<sup>5</sup>As a robustness check, in the Appendix, we also provide probit estimates for our regression results.

Table 3.2: Descriptive Statistics - First Sample

	(1)	(2)	(3)	(4)	(5)
	N	Mean	SD	Min	Max
Transfer made	63,018	0.126	0.332	0	1
N. Pensioners	63,018	0.663	0.742	0	6
% Share of income due to pension	62,761	0.333	0.355	0	1
Weighted replacement rate	22,556	0.717	0.178	0.01	1.5
Avg transfer amount (tens of thousands of €)	63,018	0.035	0.253	0	21.632
Age	63,018	57.053	15.683	16	104
Male	663,018	0.623	0.485	0	1
Primary education	63,018	0.269	0.443	0	1
Secondary education	63,018	0.301	0.459	0	1
High school	63,018	0.276	0.447	0	1
University degree	63,018	0.090	0.286	0	1
Master or above	63,018	0.005	0.070	0	1
Married	63,018	0.651	0.477	0	1
Divorced	63,018	0.064	0.245	0	1
Widow/Widower	63,018	0.172	0.377	0	1
N. disability pensions	63,018	0.052	0.238	0	4
N. of components	63,018	2.606	1.287	1	12
N. of children < 6 years	63,018	0.109	0.370	0	4
N. of children > 5 and < 13 years	63,018	0.166	0.457	0	5
N. of children > 12 and < 19 years	63,018	0.168	0.445	0	4
N. of individuals > 60 and < 81 years	63,018	0.618	0.781	0	4
N. of individuals > 80 years	63,018	0.105	0.340	0	4
N. of unemployed	63,018	0.148	0.432	0	7
N. of employed	63,018	0.873	0.888	0	5
N. of inactive	63,018	0.336	0.593	0	5
Net family income (tens of thousands €)	63,018	3.331	2.677	-5.160	115.552
Wealth (hundreds of thousands €)	63,018	2.398	4.672	-8.324	292.509

among primary education, secondary education (completed junior school), high school, university (completed undergraduate studies) and master or above (completed graduate studies). The family composition specifies the number of components of the household and distinguishes among different age groups. The family controls are complemented by the presence of unemployed, inactive, employed individuals and early pensioners, aged between 19 and 60 years.

The estimated coefficients are reported in Table 3.3. Regional, year and cohort fixed effects are included in the regression. Our main regressor of interest is the total number of pensioners present in the household. Its effect on the probability of making a transfer is positive and significant in all the specifications estimated and ranges from 7% to 2.4%. Column (6) shows the estimation results when the total number of pensioners is replaced with the exact number of retirees. When in the household there is only one pensioner, the probability of a transfer being made increases by 2.2%; in addition to this, we identify the presence of nonlinearities in this effect.<sup>6</sup> The number of disability pensions received within the family has a negative and consistently significant effect. This can be explained with the higher amount of financial resources disabled people usually need, which translated into a limitation of the family ability to be a donor.

The personal characteristics of the head of the family have an impact too. As for age, it turns out that the amount of transfers increases with her age. As Figure 3.11 in the Appendix shows, age has a parabolic pattern and displays a maximum at 74 years. After this peak, it decreases sharply. Being a male increases the transfer probability by 1.3%. Married, divorced and widowed individuals have a positive effect on the transfer probability. More specifically, the impact of being divorced or widowed is significant in all specifications and the size of the effect is particularly relevant for divorced individuals who increase the probability of interhousehold transfers by 11%. Finally, as far as education is concerned, the transfer probability appears to increase in the level of education. While lower levels of education are not significant, having attended high school increases the probability to make interhousehold transfers by 1.6%, on average.

Among the family controls included in this first regression, family net income, as expected, has a positive and significant effect on our dependent variable. The richer the family as a whole, the more likely are its members to be donors. Wealth is not significant in any specification. This is probably due to the fact that it is largely composed by illiquid assets which do not directly affect the willingness to make transfer. However, when the log value of wealth is included, its coefficient becomes positive and significant as expected.

Besides income, it is also important to take the family composition into account and, in particular, the presence of old people within the household. When there are people aged between 60 and 80 in the family, the increase in the probability of being donors is between 1% and 2.2%. Interestingly, the presence of people older than 80 tends to have a positive but lower impact than individuals aged between 61 and 80. These older individuals, as in the case of disabled people, probably require more support and this explains the size of their effect. The higher the total number of family members, the lower the probability

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<sup>6</sup>In our sample, the number of pensioners within a household ranges from zero to seven but only a small minority of household reports 4 or above; so we collapsed all the effects in a single category. In general, single coefficients confirm the non linearity of the effect although the small sample size suggests to take this result with caution.

of the transfer taking place: the smaller the size of the family, the more likely the family is to have monetary resources to distribute among other relatives and/or friends. Finally, family members are divided according to their occupational status, among unemployed, inactive, employed individuals and pensioners aged between 19 and 60 years, which are the category we leave out in our results. When there are inactive and employed members, the family has a higher probability to make transfers, while unemployed individuals do not have any significant effect.

As a robustness check, we estimate the same equation of column (6) using a probit model, which solves some of the drawbacks of the linear probability model. Columns (1) and (3) of Table 3.13 in the Appendix report the probit estimation results. The signs of the coefficients are consistent with those of our linear probability model. The coefficient of wealth in column (1), although not statistically significant, is negative. In this column for wealth we do not use the logarithm, since, in order to be consistent with our measure family net income, we do not want to lose the negative values of this variable. Column (3) shows the results of the same regression including wealth in a logarithmic form. Wealth becomes significant and, as expected, has a positive sign.

Results clearly point out the essential role that retirees and pensions have in the propensity of family to make intergenerational transfers. Figure 3.5 clarifies the effect of having a pensioner in the household on the probability of making a transfer over time. In this baseline regression we impose a constant coefficient on the number of pensions but it could be argued that they may have been affected by general economic circumstances or may have changed over time. In order to investigate this possible source of heterogeneity, we run a year-by-year regression and report the effect of our main variable of interest in the Figure. As it can be noted, the relevance of pensions increased substantially across the years, moving from almost 0 in 1998 to 4% in 2010. It is not clear why the effects declined in 2012 but it is still remarkably higher with respect to the beginning of the sample.

In order to further investigate the role of pensions within interhousehold transfers, we then estimate a second equation and we replace the number of pensioners with the share of pension income within total family income, computed as the ratio between total pension family income and total family income. As Table 3.2 reports, on average one third (33.3%) of the total family income of the households in the sample is made up by pensions.

Our main concern here is the effect of the share of pension income on the probability of a interhousehold transfer being made by a family member. Results are shown in Table 3.4. The effect is positive and significant when variables describing the composition of the family are not included in the regression. When they are, it becomes negative and not significant, most probably because it is collinear with the presence of old people within the household. If the pension share increases by 10%, the transfer probability increases by

Table 3.3: Estimation Results: Transfer Probability and Number of Pensioners

	(1)	(2)	(3)	(4)	(5)	(6)
N. Pensioners	0.007*** (0.002)	0.014*** (0.003)	0.014*** (0.003)	0.016*** (0.003)	0.024*** (0.004)	
Net family income	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.009*** (0.001)	0.008*** (0.001)	0.008*** (0.001)
Wealth	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Male		0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)
Married		-0.003 (0.004)	-0.003 (0.004)	0.044*** (0.005)	0.043*** (0.005)	0.043*** (0.005)
Divorced		0.108*** (0.008)	0.108*** (0.008)	0.111*** (0.008)	0.112*** (0.008)	0.111*** (0.008)
Widow/Widower		0.016*** (0.006)	0.016*** (0.006)	0.032*** (0.006)	0.031*** (0.006)	0.031*** (0.006)
N. disab. pensions		-0.026*** (0.005)	-0.026*** (0.005)	-0.019*** (0.005)	-0.016*** (0.005)	-0.017*** (0.005)
N. of components				-0.038*** (0.002)	-0.055*** (0.006)	-0.055*** (0.006)
N. of kids < 6				0.015*** (0.004)	0.032*** (0.007)	0.032*** (0.007)
N. of kids > 5 and < 13				0.008*** (0.003)	0.025*** (0.006)	0.025*** (0.007)
N. of kids > 12 and < 19				0.015*** (0.003)	0.032*** (0.006)	0.031*** (0.007)
N. of indiv. > 60 and < 81				0.010*** (0.003)	0.022*** (0.005)	0.022*** (0.005)
N. of indiv. > 80				0.004 (0.006)	0.016** (0.007)	0.015** (0.007)
1 pensioner						0.022*** (0.005)
2 pensioners						0.045*** (0.008)
3 pensioners						0.085*** (0.020)
Pensioners $\geq 4$						0.212** (0.065)
Observations	63,018	63,018	63,018	63,018	63,018	63,018
R-squared	0.106	0.114	0.114	0.122	0.122	0.122
Region X year, Cohort FE	YES	YES	YES	YES	YES	YES
Age, educ. controls	NO	YES	YES	YES	YES	YES
Occupational controls	NO	NO	NO	NO	YES	YES

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

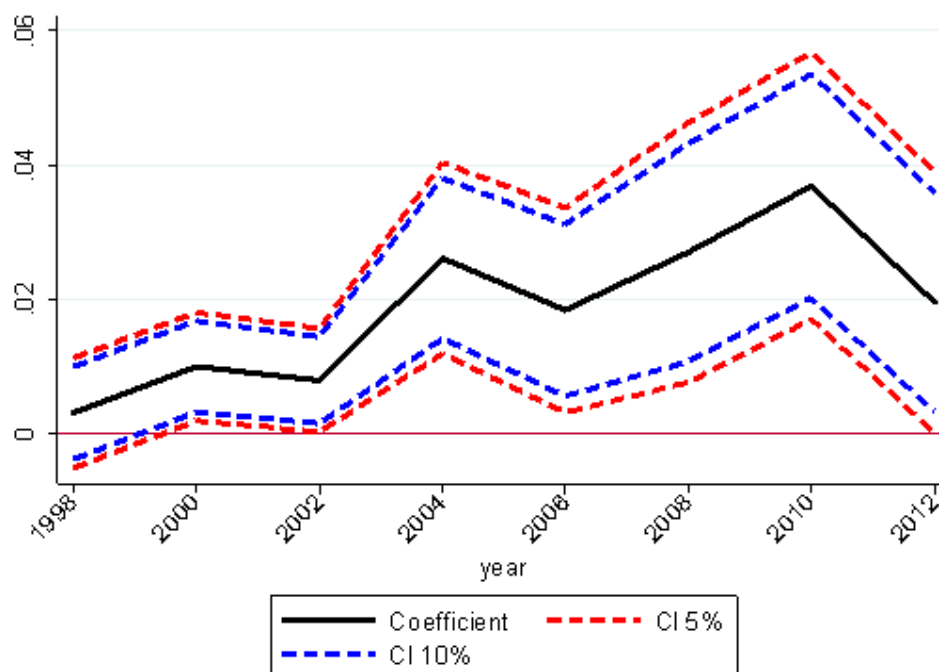


Figure 3.5: Number of pensioners and transfer probability, 1998-2012.

0.25% (Column (1)). Compared to the previous specification, family income, individual and family composition controls have a similar effect. In column (5), in addition to variables describing the family composition, the occupational status of household members is included among the explanatory variables. The only significant effect is given by the presence of unemployed people within the family, which, compared to the presence of pensioners aged between 19 and 60, has a negative impact on the transfer probability equal to slightly less than 2%.

Columns (2) and (4) of Table 3.13 in the Appendix report the results of the probit estimation, first including wealth in hundreds of thousand Euros (column 2) and then its logarithmic value (column 4). This robustness check basically confirms the results of our main linear probability model.

Finally, we include the generosity of pensions as main regressor in our specification. The pension generosity is given by the weighted replacement rate which is the percentage ratio between the total yearly pension amount and the total yearly income accrued by the individual the year before retiring, weighted by the family pension amount. This ratio is useful to evaluate the potential loss of purchasing economic power the individual experiences when retiring and the degree of generosity of the pension system. Table 3.2 reports the average weighted replacement rate for the whole sample: on average, the total pension income is equal to 71.7% of the labour income accrued the previous year, hence the economic power loss approaches the 30%. In this regression, we drop the

Table 3.4: Estimation Results: Transfer Probability and Share of Pension Income

	(1)	(2)	(3)	(4)	(5)
% Share of income due to pension	0.025*** (0.004)	0.015*** (0.005)	0.021*** (0.006)	-0.007 (0.006)	-0.010 (0.007)
Net family income		0.006*** (0.001)	0.006*** (0.001)	0.009*** (0.001)	0.008*** (0.001)
Wealth		0.001 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Male			0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)
Married			-0.002 (0.004)	0.043*** (0.005)	0.042*** (0.005)
Divorced			0.109*** (0.008)	0.111*** (0.008)	0.111*** (0.008)
Widow/Widower			0.011** (0.005)	0.031*** (0.006)	0.032*** (0.006)
N. disab. pensions			-0.022*** (0.005)	-0.012** (0.005)	-0.014*** (0.005)
N. of components				-0.038*** (0.002)	-0.029*** (0.005)
N. of kids < 6				0.015*** (0.004)	0.007 (0.006)
N. of kids > 5 and < 13				0.008*** (0.003)	-0.000 (0.005)
N. of kids > 12 and < 19				0.014*** (0.003)	0.006 (0.005)
N. of indiv. > 60 and < 81				0.019*** (0.003)	0.014*** (0.005)
N. of indiv > 80				0.017*** (0.006)	0.011 (0.007)
N. of unemployed					-0.019*** (0.005)
N. of inactive					-0.005 (0.005)
N. of employed					-0.005 (0.005)
Observations	62,761	62,761	62,761	62,761	62,761
R-squared	0.001	0.107	0.114	0.122	0.122
Region X year FE	NO	YES	YES	YES	YES
Cohort FE	NO	NO	NO	NO	NO
Age and education comtrolls	NO	NO	YES	YES	YES

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

observation with a pension generosity equal to zero. Hence, we want to investigate how important is the generosity of pensions in inducing transfers for those family where at least one pensioner is present.

Table 3.5 reports the estimated coefficients. The weighted replacement rate has a positive and significant effect on the transfer probability in all specifications. In the specification shown in Column (5), for instance, if it increases by 10 percentage points, the probability that the family will make transfers increases by 0.51%. Unlike the previous estimation, being a male has now a negative impact, although significant only at a 10% level and in one specification. Having members within the family entitled to receive disability pension benefits no longer significantly affects our dependent variable. As for individual's education, the only level, which has a significant effect with respect to having no education, is given by graduate studies: having attended university, increases the probability of interhousehold transfers being made by 3% or 4%, depending on the specification considered. The family composition maintains its significant effect, unless details on the occupational status are included in the regression. While the number of inactive individuals is not significant, having unemployed and employed members significantly decreases the probability of a transfer, by 2% and 2.3% respectively, compared to having members aged between 19 and 60 years who receive a pension. Columns (3) and (6) in Table 3.13 in the Appendix show the results of the probit estimation as a robustness check. Similarly to the previous two equations, results are consistent with our linear probability model.

Our empirical analysis and the different specifications we have referred to consistently confirm that pensions are correlated with a higher probability of making transfers to relatives or friends living in another household. We now address the question whether the effect given by number of pensioners in the family and by pension generosity is driven by a specific geographical area. Table 3.6 reports the estimated coefficients of the numbers of pensioners and the weighted replacement rate for the 5 geographical areas (North-West, North-East, Center, South and Islands). It turns out that the effect of pension generosity is mostly driven by regions of the North of Italy, while it is not statistically significant in the Center and in the Islands. On the contrary, the effect of the number of pensioners is relevant in the Center and in the South areas of the country. This could mean that, while in the North transfers made are more linked to the pension amount, in the Center and the South the presence of pensioners per se induces family members to help others by means of monetary transfers.

### **Transfer amount: empirical estimation and findings**

In this second set of regressions our dependent variable is the amount in tens of thousands of Euros being transferred during a year by a family member to another family member or a friend who live in another household. Table 3.2 reports that the average amount



Table 3.5: Estimation Results: Transfer Probability and Pension Generosity

	(1)	(2)	(3)	(4)	(5)
Weighted replacement rate	0.102*** (0.012)	0.058*** (0.012)	0.057*** (0.012)	0.052*** (0.012)	0.051*** (0.012)
Net family income		0.009*** (0.001)	0.008*** (0.001)	0.015*** (0.002)	0.015*** (0.002)
Wealth		0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Male			-0.011* (0.006)	-0.006 (0.006)	-0.007 (0.006)
Married			0.024*** (0.009)	0.059*** (0.010)	0.054*** (0.010)
Divorced			0.059*** (0.015)	0.056*** (0.015)	0.057*** (0.015)
Widow/Widower			0.035*** (0.009)	0.044*** (0.009)	0.045*** (0.009)
N. disab. pensions			-0.009 (0.010)	0.004 (0.010)	-0.002 (0.011)
N. of components				-0.048*** (0.003)	-0.031*** (0.009)
N. of kids < 6				0.075*** (0.022)	0.059** (0.023)
N. of kids > 5 and < 13				0.040** (0.016)	0.024 (0.018)
N. of kids > 12 and < 19				0.024** (0.011)	0.007 (0.013)
N. of individ. > 60 and < 81				0.018*** (0.005)	0.008 (0.008)
N. of individ. > 80				0.019** (0.009)	0.008 (0.011)
N. of unemployed					-0.021** (0.010)
N. of inactive					-0.002 (0.009)
N. of employed					-0.023*** (0.008)
Observations	22,556	22,556	22,556	22,556	22,556
R-squared	0.003	0.121	0.124	0.132	0.132
Region X year, Cohort FE	NO	YES	YES	YES	YES
Age and education controls	NO	NO	YES	YES	YES

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.6: The Effect of Number of Pensioners and Pension Generosity by Geographical Area

	Number of pensioners	Pension generosity
North-West	0.029*** (0.007)	0.108*** (0.025)
North-East	0.012* (0.008)	0.08***(0.021)
Centre	0.033*** (0.009)	-0,02 (0.027)
South	0.027*** (0.008)	0.033* (0.025)
Islands	0.014 (0.012)	0,007 (0.047)

Table 3.7: Estimation Results: Transfer Amount and Number of Pensioners

	(1)	(2)	(3)	(4)	(5)	(6)
N. Pensioners	0.009*** (0.002)	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.004)	0.104*** (0.020)	
1 Pensioner						0.011** (0.005)
2 Pensioners						0.023*** (0.008)
3 Pensioners						0.031** (0.014)
Pensioners $\geq$ 4						0.067** (0.026)
Observations	63,018	63,018	63,018	63,018	63,018	63,018
R-squared	0.001	0.027	0.032	0.032		0.032
Region X year, Cohort FE	NO	YES	YES	YES	YES	YES
Income controls	NO	YES	YES	YES	YES	YES
Individual, age, educ. controls	NO	YES	YES	YES	YES	YES
Family composition controls	NO	NO	YES	YES	YES	YES
Occupational status controls	NO	NO	NO	YES	YES	NO

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

transferred in a year, which is equal to 350€. We now use a linear model and the equation we estimate our equation first including the number of pensioners as our main regressor of interest.

Table 3.7 reports the estimated coefficients. If the family has one more retiree as a member, on average, the increase in the amount transferred is between 90€ and 120 €. Column (6) shows the results when the exact number of pensioners present in the household is included in the regression. If the household includes one retiree, the average transfer amount increases by 110 €. The amount doubles in the case of two pensioners and becomes equal to 670 € when there are 4 or more retirees.

Table 3.8: Estimation Results:Transfer Amount and Share of Pension Income

	(1)	(2)	(3)	(4)	(5)	(6)
% Share of income due to pension	0.007** (0.003)	0.022*** (0.006)	0.024*** (0.006)	0.007 (0.006)	-0.006 (0.006)	-0.023 (0.032)
Observations	62,761	62,761	62,761	62,761	62,761	62,761
R-squared	0.000	0.021	0.027	0.031	0.032	
Region X year, Cohort FE	NO	YES	YES	YES	YES	YES
Age Polynomial	NO	NO	YES	YES	YES	YES
Income controls	NO	YES	YES	YES	YES	YES
Individual, educ. controls	NO	NO	YES	YES	YES	YES
Family composition controls	NO	NO	NO	YES	YES	YES
Occupational status controls	NO	NO	NO	NO	YES	NO

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.9: Estimation Results:Transfer Amount and Pension Generosity

	(1)	(2)	(3)	(4)	(5)	(6)
Weighted replacement rate	0.057*** (0.011)	0.015 (0.019)	0.012 (0.015)	0.006 (0.016)	0.004 (0.017)	0.309*** (0.014)
Observations	22,556	22,556	22,556	22,556	22,556	22,556
R-squared	0.001	0.034	0.036	0.043	0.045	
Region X year, Cohort FE	NO	YES	YES	YES	YES	YES
Age Polynomial	NO	NO	YES	YES	YES	YES
Income controls	NO	YES	YES	YES	YES	YES
Individual, educ. controls	NO	NO	YES	YES	YES	YES
Family composition controls	NO	NO	NO	YES	YES	YES
Occupational status controls	NO	NO	NO	NO	YES	NO

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In column (5) we report the results of the tobit estimation as a robustness check, since the amount of the transfer is a censored variable larger than zero. The tobit estimation yields that one more pensioner in the household increases the average yearly transferred amount by 1,040 €.

We then regress the transfer amount on the pension income share. Table 3.8 reports the estimated coefficients. If the share of the pension income over total family income increases by 10 percentage points, the rise in the average amount of the interhousehold transfer ranges between 70 € and 240 €. The coefficient loses significance when the household composition is included in the regression. Column (6) reports the results of the tobit estimation which yields a negative but insignificant effect of the share of income due to pension on the amount transferred.

Finally, we focus on the effect of pension generosity on the transfer amount. In table 3.9 it can be seen that the effect of the weighted replacement rate, which is our measure of pension generosity, is positive and significant only in the baseline specification of column (1) and when the tobit is used, column (6). If the pension generosity increases by 10 percentage points, the rise in the transfer amount is 570 € (column (1)). In this specification, the amount of the transfer is mainly affected by the characteristics of the individual and by the family composition, in particular by the presence of young kids and people aged between 60 and 80 years.

### 3.5.2 Intrahousehold transfers

Intrahousehold transfers are an internal flow of economic resources which are exchanged between members living in the same household. Similarly to interhousehold transfers, they can take the form of time, money, goods or services and the donor expects no repayment to take place. Their aim is to support other family members. In our dataset we have no precise information on the kind and amount of resources that are transferred within the household, nor in terms of time or monetary values. As a result, in order to investigate the occurrence of intrahousehold transfers, we empirically investigate the probability for a person aged between 25 and 50 years to live together with a person older than 60, assuming that, when this happens, the old individual provides economic support to the younger one and gives rise to intrahousehold transfers. Actually, transfers are only one of the possible ways in which households may support their members. Cohabitation in particular may provide substantial benefits to needy household members as it allows to substantially decrease costs both in terms of maintaining a separate dwelling and in terms of well known economies of scales. In addition, cohabitation makes it easier to pool financial resources thus, de facto, enacting financial flows equivalent to the monetary transfers analysed before. For this reason it seems relevant to evaluate the cohabitation of individuals with older family members in order to provide a more complete picture of family transfers and safety nets.

#### Descriptive evidence

Figure 3.6 shows the share of individuals across different age groups who are part of an household where at least one person older than 60 years is present. The overall share has been increasing overtime; this rise is also due to the fact that the difference in age between children and parents has become larger. In particular, while in 1995 about 1 young person out of 5 was living with at least one individual older than 60, the ratio went up to 1 out of 3 in 2012. The rise has concerned young people from 25 up to 40 years, with this older age group experiencing a relevant increase in 2012 compared to the previous years. The growth in this share took place in all the five geographical areas of Italy considered (North-

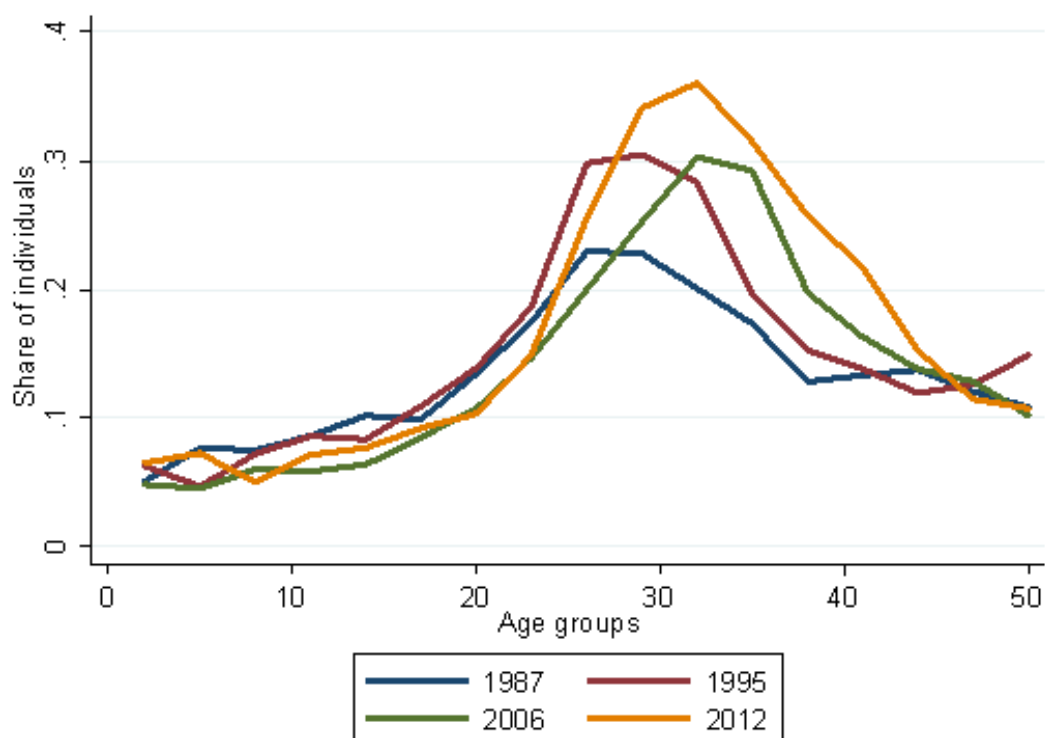


Figure 3.6: Share of individuals by age groups living with least one person older than 60

West, North-East, Center, South and the Islands) and has been particularly pronounced in South Italy. This means that relevant changes in cohabitation habits have occurred within Italian families and it is an interesting phenomenon to investigate.

The empirical analysis we conduct in this section aims at providing evidence on the role of pensions in the occurrence of intrahousehold transfers. Hence, for our purposes, it is essential to figure out the importance of the income share perceived by individuals who are older than 60 within the family, when they are cohabitating with a younger individual. The first graph on the left of Figure 3.7 depicts the pattern of the share of these individuals' income over time, from 1987 to 2012, and across the different age groups the younger individual may belong to. First of all, it is fairly clear that this share has been rising over time and has become larger than 60% in 2012. In 1987, the old individuals' income share was at its highest level when individuals aged 30 were present in the household. In this case, half of the family income was provided by the old person. The trend that we can observe for 1995 is similar but it is characterised by an increase in the share of pension income when individuals who cohabit are older than 30 and up to 40 years. In 2006, the shift towards older age is even more remarkable and the peak in the pension income share is observed when the individual living with the old person is 35 years old. In 2012, the peak moves on to individuals older than 40 and is

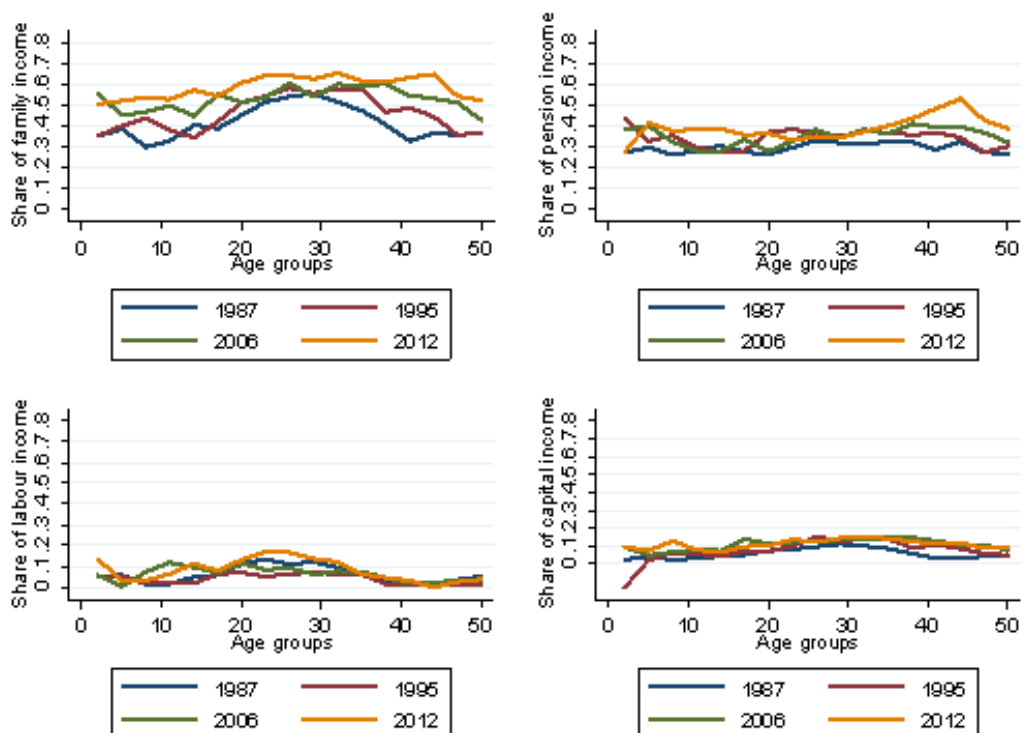


Figure 3.7: Income decomposition of households with an individual younger than 51 living at least with a person aged 60

constantly high for age groups ranging from 20 to 45 years. The other graphs of Figure 3.7 provide a decomposition of the income contribution according to its source. The income is divided into pension, labour and capital income.<sup>7</sup> Pensions represent the largest fraction of the individual's income and this holds consistently true from 1987 to 2012, ranging from 30% to 55%. Labour income, as expected, is by far less relevant, although its share has increased during the recent economic crisis, reaching a peak of 20%: this may be due to the fact that nowadays individuals tend to have children later on in their life and work longer compared to the past, as a result of the rising retirement age as well. The share of capital income has remained quite stable overtime, accounting for about 10% of total individual's income. Hence, when a person aged between 21 and 50 years lives together with at least one individual older than 60, the largest share of the latter's income is given by pensions.

Given the large share of income represented by older people in this kind of households, it may be worthy to understand the occupational status of the cohabitating individuals. Figure 3.8 clarifies the occupational status of people aged between 21 and 50 who are part of an household where at least one individual older than 60 is present. We distinguish

<sup>7</sup>Capital income includes rents, returns to capital, bonds and shares owned.

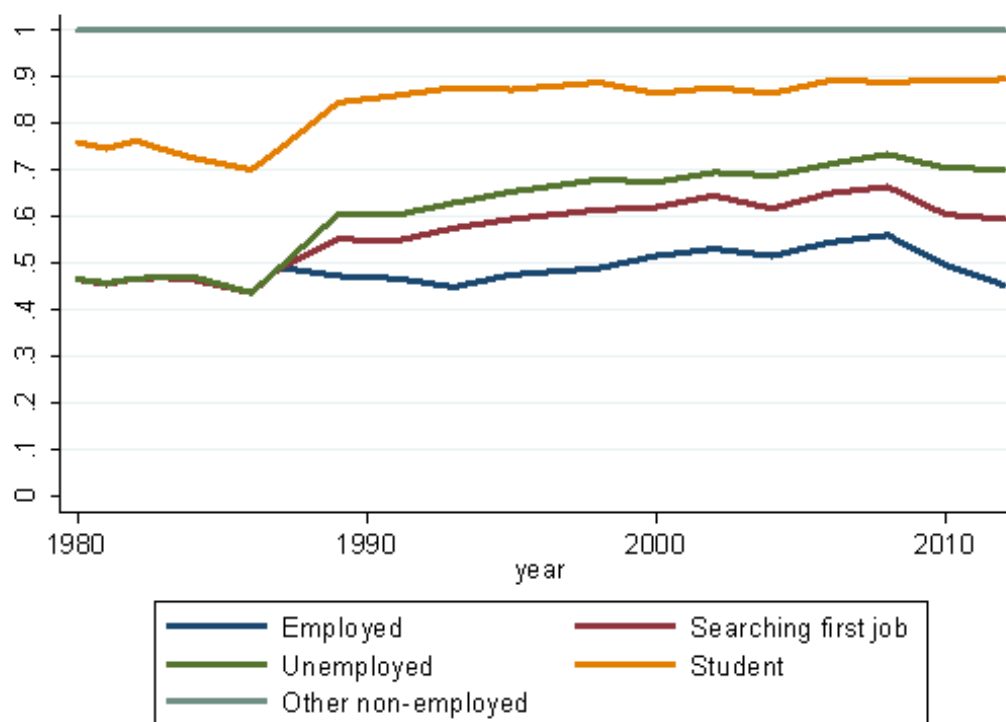


Figure 3.8: Occupational status of individuals aged 21-50 years who live with at least one individual older than 60

among employed, unemployed, individuals who report to be searching for their first job, students and the category including residual members of the households not employed and not classified in other categories. This last category is called *other non-employed* and is made up of housewives, wealthy people and baby pensioners who do not have a job. Before 1987, the data available did not allow to make a distinction among unemployed, people searching for their first job and the remaining category described above and they were all classified as simply being unemployed. The largest share is composed by employed individuals; they are probably young people who do not earn enough to be able to afford independence and, thus, decide not to leave the household. The share of students and of those searching for their first job have remained quite constant over time. Figure 3.12 in the Appendix provides information on the role of these younger individuals within the family. About 70% of young people who cohabit with an older person are actually sons or daughters.

As a result, this descriptive analysis points out that the age group of individuals who lives together with a person older than 60 has extended up to include people aged 40. This trend has deeply characterised the recent economic crisis. In most cases, pension income represents the main income source in these families and, thus, it is the most important source of intrahousehold transfers.

## Empirical estimation and findings

The objective of this second part of our empirical analysis is to understand which factors increase the probability of having an household characterised by the presence of both an individual aged between 25 and 50 and a person older than 60, or in other words, according to our assumption, the probability of an intrahousehold transfer to take place. In this second sample we keep the head of the family and the other members of the household. Our dependent variable is a dummy which takes the value of 1 if the cohabitation between the young and the old individual occurs, 0 otherwise.

The sample ranges from 1987 to 2012. We impose the following sample restrictions: we include individuals aged between 25 and 50 years; among them we keep those who either declare to be living with at least one parent and those who do not cohabit with parents but have at least one parent alive. In both cases individuals have at least one parent aged 60 years or older. The equation we estimate, using a linear probability model, is the following:

$$Cohabitation\ Old - Young = \beta_0 + \beta_1 Parents' Pensions + \beta_2 X + \alpha_{jt} + \gamma Cohort + \varepsilon$$

The probability of making a intrahousehold transfer is regressed on the individual's characteristics and on the variable parent's pensions which takes the value of zero when neither the father nor the father receives a pension; it is equal to 1 when one of the two is a retiree and it is equal to two when both of them are entitled to receive a pension.<sup>8</sup> Table 3.10 presents the descriptive statistics of this sample.

Table ?? presents the results. Parent's pensions has a positive and significant effect in all specifications: the higher the number of pensions that parents receive, the higher the probability of intrahousehold transfers. In particular, if only one parent receives a pension benefit, the increase in the probability of having intrahousehold transfers ranges between 9% and 11%. It doubles if both parents are entitled to benefit from a pension. As far as the characteristics of the individual aged between 25 and 60 are concerned, being married, widowed and divorced significantly decreases the probability of intrahousehold

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<sup>8</sup>If the identification of a retired parent is straightforward in case of cohabitation, it is actually less easy in case the parent is not in the household. It could be possible, in fact, that parents are no longer alive and this of course excludes the possibility of this kind of transfers to occur. In order to do overcome at least partially this problem, we extract data from the annual file that reports if the father and the mother of the household head and of the spouse are alive and their year of birth. It should be reminded that the information for the spouse is reported only in some years and the reporting of this information changed in 2010 and we are no longer able to evaluate the status of one of the two parents. More specifically, the new variables deliver information on the fact that at least one of the two parents is alive. For this reason, we exclude the last years from the present analysis. In addition, we proxy the fact that the parent receives a pension assigning a pensioner status to non-cohabitating parents if they are older than 60. The pervasive issue of missing values and the fact that information on the spouse parents are asked only to a subsample of the households further reduces the sample size for the regression analysis.



Table 3.10: Descriptive Statistics - Second Sample

	(1)	(2)	(3)	(4)	(5)
	N	Mean	SD	Min	Max
Cohabitation old-young	32,497	0.261	0.439	0	1
Parent's pensions	32,426	1.098	0.726	0	2
Total net disposable income	32,426	18,749	16,724	-14,518	826,230
Age	32,426	36.31	7.457	25	50
Male	32,497	0.587	0.492	0	1
Married	32,426	0.508	0.500	0	1
Divorced	32,426	0.0451	0.208	0	1
Widow/Widower	32,497	0.008	0.0874	0	1
Primary education	32,497	0.055	0.228	0	1
Secondary education	32,497	0.331	0.471	0	1
High school	32,497	0.453	0.498	0	1
University degree	32,497	0.148	0.355	0	1
Master or above	32,497	0.005	0.072	0	1
Employed	32,497	0.905	0.293	0	1
Searching for first job	32,497	0.005	0.0730	0	1
Unemployed	32,497	0.0234	0.151	0	1
Student	32,497	0.006	0.076	0	1
Other non-employed	32,497	0.060	0.238	0	1

transfers to occur. The effect is larger for married individuals, as expected. For them, the probability of cohabitation with an older individual and, hence, of intrahousehold transfers is lower. As for education, the excluded category is no education at all. The probability of cohabitation is decreasing in the level of education: the more educated the young individual is, the less likely are intrahousehold transfers to take place. The occupational status does not seem to have a large effect. The excluded category is made up by employed individuals. Only individuals belonging to the other non-employed category, have a positive and insignificant effect on intrahousehold transfer probability, compared to people who are employed.

### 3.6 Conclusions

This paper analyses the role that pension income plays in inducing families to be actively involved in intergenerational transfers, both at interhousehold and intrahousehold levels. Today's demographic trends, characterised by worldwide population ageing in developed countries, make it necessary to critically rethink the notion of older people being a burden to family and society. Understanding the impact of older people's contribution in family support as a safety net and the dynamics of family transfer patterns is, therefore, crucial.

We use data from the Bank of Italy's Survey on Household Income and Wealth (SHIW), a representative survey of Italian households. We investigate both the occurrence of family downward interhousehold and intrahousehold transfers. The former kind of transfers occurs when resources are transferred by an old family member to a younger family member or a friend who lives in another household. The latter regards transfers which take place between family members belonging to the same household. We find that pension income significantly affects the probability of both transfers to occur. In the case of interhousehold transfers, we investigate the impact of the number of pensioners present in the household, the share of family income given by pensions and the relevance of the weighted replacement rate both on the transfer probability and on their amount.

As far as intrahousehold transfers are concerned, in the dataset we do not have specific information neither on their occurrence nor on their amount. This is the reason why we investigate the probability for a person aged between 25 and 50 years to live together with a person older than 60, assuming that, when this is the case, the old individual makes intrahousehold transfers in favour of the younger one. The role of pensions appears to be crucial: the number of pensions perceived by the younger individual's parents has a positive and significant effect. The more pensions parents are entitled to receive, the higher the probability of intrahousehold transfers to occur. The presence of only one parent receiving a pension benefit leads to a rise in the probability of having intrahousehold transfers ranging between 9% and 11%; this probability doubles when both parents are

Table 3.11: Estimation Results: Intrahousehol Transfers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parents' pensions	0.090*** (0.003)	0.107*** (0.003)	0.086*** (0.003)	0.087*** (0.003)	0.087*** (0.003)	0.087*** (0.003)	0.087*** (0.003)
Total net disposable income			-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Male	0.058*** (0.004)	-0.001 (0.004)	0.013*** (0.004)	0.013*** (0.004)	0.016*** (0.004)	0.016*** (0.004)	0.016*** (0.004)
Married		-0.545*** (0.005)	-0.519*** (0.006)	-0.517*** (0.006)	-0.517*** (0.006)	-0.517*** (0.006)	-0.517*** (0.006)
Widow/Widower		-0.443*** (0.023)	-0.438*** (0.022)	-0.440*** (0.022)	-0.449*** (0.022)	-0.449*** (0.022)	-0.449*** (0.022)
Divorced		-0.357*** (0.011)	-0.382*** (0.011)	-0.379*** (0.012)	-0.378*** (0.012)	-0.378*** (0.012)	-0.378*** (0.012)
Primary educ.				-0.113*** (0.023)	-0.096*** (0.023)	-0.096*** (0.023)	-0.096*** (0.023)
Secondary educ.				-0.129*** (0.022)	-0.108*** (0.022)	-0.108*** (0.022)	-0.108*** (0.022)
High school				-0.136*** (0.022)	-0.114*** (0.022)	-0.114*** (0.022)	-0.114*** (0.022)
University degree				-0.120*** (0.022)	-0.097*** (0.022)	-0.097*** (0.022)	-0.097*** (0.022)
Master or above				-0.157*** (0.033)	-0.134*** (0.033)	-0.134*** (0.033)	-0.134*** (0.033)
Student					-0.006 (0.032)	-0.006 (0.032)	-0.006 (0.032)
Searching for first job					-0.004 (0.030)	-0.004 (0.030)	-0.004 (0.030)
Unemployed					-0.015 (0.013)	-0.015 (0.013)	-0.015 (0.013)
Other non-employed					0.040*** (0.008)	0.040*** (0.008)	0.040*** (0.008)
Observations	43,205	43,205	32,426	32,426	32,426	32,426	32,426
R-squared	0.061	0.378	0.400	0.401	0.401	0.401	0.401
RegionXyear FE	NO	YES	YES	YES	YES	YES	YES
Cohort FE	NO	YES	YES	YES	YES	YES	YES
Age Polynomial	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

pensioners.

Our analysis confirms that families remain a primary source of support for individuals in all societies by means of transfers of resources between generations. Furthermore, intergenerational transfers do have important policy implications. The flow of assets within the family from one age group to another both in the forms of monetary wealth and time may reduce the burden on public resources and provide an alternative, prompt and efficient support mechanism. The relevance of pensions within this welfare mechanism should be seriously taken into account when reforming social security systems.

Tesi di dottorato "Gender, Family Structure and Pension System Design"

di DE MICCO PATRICE

discussa presso Università Commerciale Luigi Bocconi-Milano nell'anno 2015

La tesi è tutelata dalla normativa sul diritto d'autore (Legge 22 aprile 1941, n.633 e successive integrazioni e modifiche).

Sono comunque fatti salvi i diritti dell'università Commerciale Luigi Bocconi di riproduzione per scopi di ricerca e didattici, con citazione della fonte.

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### 3.7 Appendix: Tables and Graphs

Table 3.12: Italian regions by geographical area

North-West	North-East	Center	South	Islands
Piedmont	Trentino Alto Adige	Tuscany	Abruzzo	Sicily
Aosta Valley	Veneto	Umbria	Molise	Sardinia
Lombardy	Friuli Venezia Giulia	Marche	Campania	
Liguria	Emilia Romagna	Lazio	Apulia	
			Basilicata	
			Calabria	

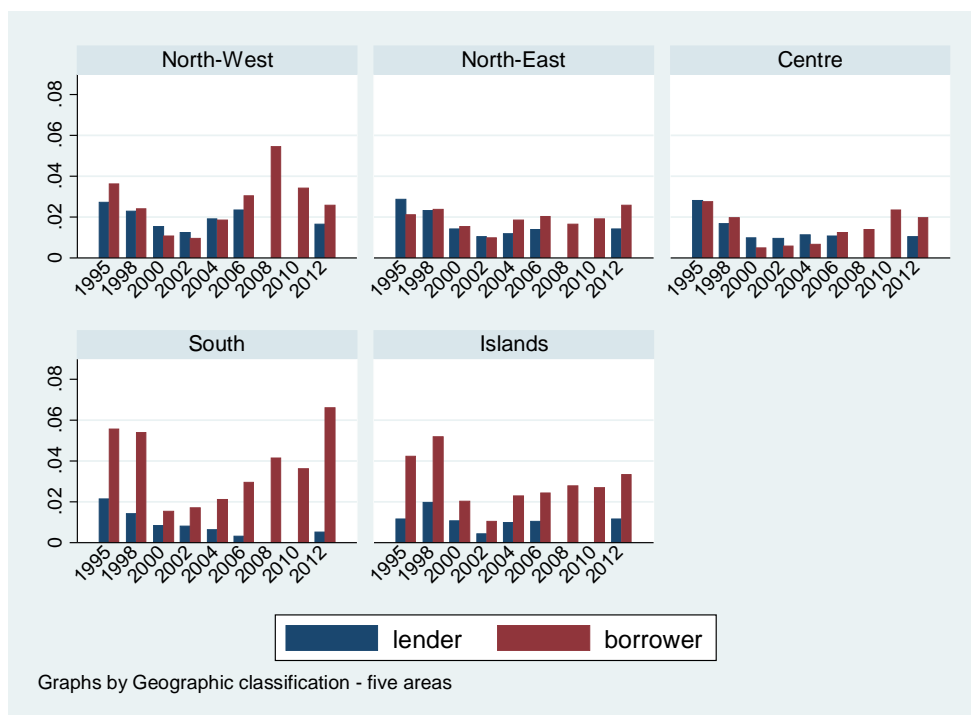


Figure 3.9: Shares of lenders and borrowers by geographical area, 1995-2012.

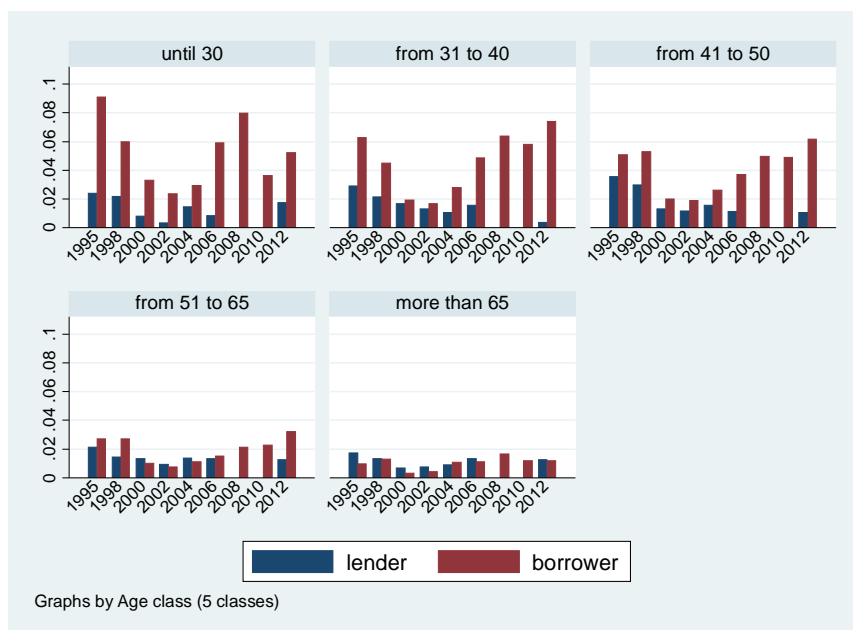


Figure 3.10: Shares of lenders and borrowers by age groups, 1995-2012.

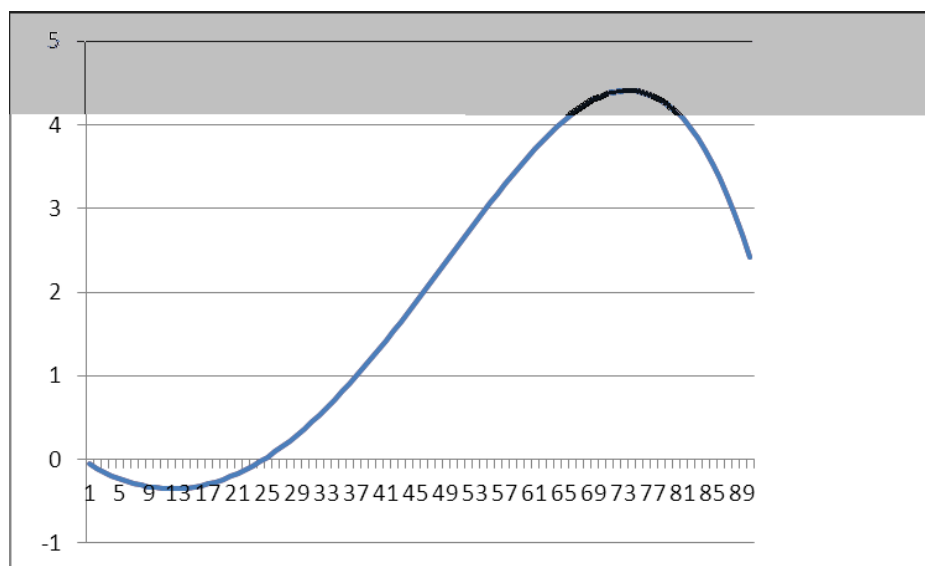


Figure 3.11: Transfer Probability and Number of Pensioners: The Pattern of Age

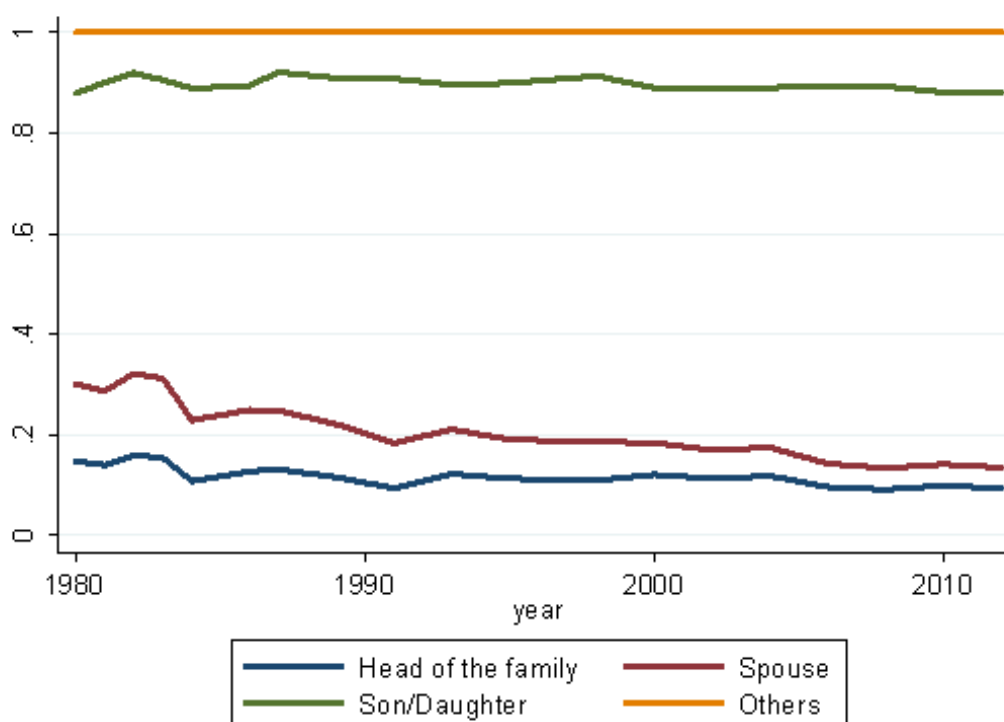


Figure 3.12: Individuals aged between 21 and 50 who live with at least one person older than 60

Table 3.13: Probit Estimation Results

	(1)	(2)	(3)	(4)	(5)	(6)
N. Pensioners	0.125*** (0.022)			0.123*** (0.022)		
% Share income due to pension		-0.059 (0.040)			0.033 (0.042)	
Weighted replacement rate			0.341*** (0.074)			0.372*** (0.074)
Net family income	0.040*** (0.004)	0.039*** (0.004)	0.070*** (0.008)	0.034*** (0.003)	0.033*** (0.003)	0.049*** (0.006)
Wealth	-0.001 (0.002)	-0.002 (0.002)	-0.007* (0.004)	0.022*** (0.005)	0.024*** (0.005)	0.045*** (0.009)
Male	0.064*** (0.017)	0.063*** (0.017)	-0.023 (0.030)	0.066*** (0.017)	0.065*** (0.017)	-0.027 (0.031)
Married	0.250*** (0.028)	0.244*** (0.028)	0.293*** (0.055)	0.245*** (0.029)	0.239*** (0.029)	0.281*** (0.055)
Divorced	0.532*** (0.034)	0.527*** (0.034)	0.289*** (0.070)	0.563*** (0.035)	0.561*** (0.035)	0.303*** (0.071)
Widow/Widower	0.174*** (0.033)	0.179*** (0.034)	0.250*** (0.050)	0.192*** (0.034)	0.189*** (0.034)	0.264*** (0.051)
N. disab. pensions	-0.091*** (0.033)	-0.078** (0.033)	-0.009 (0.060)	-0.071** (0.033)	-0.060* (0.033)	0.005 (0.060)
N. of components	-0.297*** (0.037)	-0.159*** (0.032)	-0.159*** (0.054)	-0.281*** (0.038)	-0.168*** (0.033)	-0.142*** (0.054)
N. of kids < 6	0.155*** (0.044)	0.020 (0.040)	0.333** (0.134)	0.148*** (0.045)	0.037 (0.041)	0.284** (0.137)
N. of kids > 5 and < 13	0.109*** (0.041)	-0.028 (0.037)	0.128 (0.125)	0.102** (0.041)	-0.009 (0.037)	0.107 (0.124)
N. of kids > 12 and < 19	0.153*** (0.041)	0.018 (0.037)	-0.024 (0.096)	0.141*** (0.041)	0.032 (0.037)	-0.023 (0.096)
N. of indiv. > 60 and < 81	0.107*** (0.031)	0.061** (0.031)	0.030 (0.048)	0.093*** (0.031)	0.062** (0.031)	0.021 (0.048)
N. of indiv. > 80	0.085** (0.041)	0.057 (0.042)	0.034 (0.060)	0.071* (0.042)	0.054 (0.042)	0.023 (0.060)
N. of unemployed	-0.013 (0.041)	-0.150*** (0.037)	-0.188*** (0.069)	-0.018 (0.042)	-0.128*** (0.039)	-0.204*** (0.070)
N. of inactive	0.080** (0.038)	-0.059* (0.034)	-0.060 (0.056)	0.071* (0.039)	-0.040 (0.035)	-0.073 (0.056)
N. of employed	0.108*** (0.036)	-0.038 (0.033)	-0.145*** (0.054)	0.087** (0.037)	-0.023 (0.033)	-0.144*** (0.054)
Observations	62,993	62,736	22,326	60,161	60,023	21,920
RegionXyear FE	YES	YES	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES	YES	YES
Age, educ. controls	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1