MASTER IN

MONETARY AND FINANCIAL ECONOMICS

DISSERTATION

HOUSEHOLD PORTFOLIO ALLOCATION, RISK ATTITUDES AND

CREDIT CONSTRAINTS: EVIDENCE FROM THE EUROZONE

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HOUSEHOLD PORTFOLIO ALLOCATION, RISK ATTITUDES AND CREDIT CONSTRAINTS: EVIDENCE FROM THE EUROZONE[1]

ABSTRACT

This dissertation investigates the effect that credit constraints and other factors have on the decisions of those aged 50 and above to participate in the bond and stock market. For credit constraints I use the credit availability as reported by banks from the Bank Lending Survey (BLS) as a proxy. I also use the micro data of five European countries from two waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), from 2007 and 2011. The resultant database includes the same individual for both years, which makes it possible to study the changes in behaviour before and after the crisis. I use Probit models, in which the dependent variable is a dichotomous variable representing investment (or not) in risky assets. The results show that credit constraints are statistically significant and negatively correlated with bond ownership in both years studied. However, being credit constrained is not statistically significant for stockownership. Other factors that reduce the probability of investing in the stock market are: being female, number of children, living in Italy or Spain, and low income. By contrast, being employed and wealth increase the probability of holding stocks. Bond ownership is positively related with age, living in Italy or Spain, being employed, and wealth; and negatively related with number of children, low income and inflation.

Keywords: *credit constraints, risky assets, stockownership, bond ownership, SHARE*

JEL code: D14; D81; G11; G21.

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ACKNOWLEDGMENTS

INTRODUCTION

Portfolio theory relates portfolio decisions with the expected return of the investment and the expected variance of return. While the investment decisions of a household may be affected by credit constraints, the decision to invest in risky assets can also be influenced by other types of uncertainty (Beaton 2009; Guiso et al. 2013; Vissing-Jorgensen 2002). In this dissertation, I will study the impact of the risk of credit constraints on the decision of the households, aged 50 or older, to hold risky assets in their financial portfolios Those aged fifty and above typically have higher stock market participation rates than the rest of the population, which makes it particularly interesting to study this age group (Christelis et al. 2015). With this dissertation I aim to expand the studies of portfolio choice and contribute to the advancement of knowledge on this subject by using a better proxy for the credit constraints, data from the Bank Lending Survey (BLS), and recent detailed information about the household from the Survey of Health, Ageing and Retirement (SHARE).

Credit constraints can influence bond and stock market participation for two reasons. The first reason is that credit constraints can reduce the investment in risky assets of individuals who are dependent on banks for credit (Beaton 2009). Second, because of the precautionary motive, credit constrained investors will prefer to save more and hold their assets in more liquid form. As a result, they will invest less in risky assets (Deaton 1989).

After the recent economic and financial crisis, there has been a resurgence of interest in the effects of credit constraints on economic and financial behaviour. Over

the last few years, because of the increase in the risk that the counterparty will not live up to its contractual obligations, banks considerably tightened credit standards, which made access to credit more difficult. In the Euro area, banks are the most important source of credit, accounting for more than 60% of total credit provided, while in United States it is just 30% (Tiftik 2014). In order to boost the economy, policymakers reduced the interest rate to make credit available for the banks and for the markets. This measure was taken not only by the European Central Bank but also by the Federal Reserve, Bank of England and Bank of Japan. These changes in policy are taken because it is assumed that aggregate demand is affected by the cost and the availability of credit (Beaton 2009). Thus, studying the effect that credit constraints have is particularly important.

Some authors have studied the effects of credit constraints at the theoretical level (Cocco, Gomes, Maenhout 2005; Heaton and Lucas 2000), but only a few studies use micro data to confirm the theoretical claims (Guiso, Jappelli and Terlizzese 1996; Vissing-Jorgensen 2002). Probably this happens because of the difficulty in isolating the effects of credit constraints as well as the lack of information about households' credit constraints.

In the absence of more objective data, many authors have used a proxy for the credit constraint variables, such as the unemployment rate or the mortgage credit growth (Bacchetta et al. 1997; Ludvigson 1999). In more recent years, the credit availability, as reported by banks, has been used (Beaton 2009). This type of measure

(i.e. the credit availability) is more closely related to the credit supply and is less dependent on factors that affect credit demand (Beaton 2009).

In my study, I will also use information regarding credit availability, using the Bank Lending Survey (BLS) as source data in order to analyze the effect of credit constraints on the decision to hold risky assets. For the financial asset ownership and explanatory factors, I will use data drawn from the Survey of Health, Ageing and Retirement (SHARE) for countries belonging to the Eurozone and International Monetary Fund.

My study builds on the previous studies. In particular, my research has the advantage of having more recent data and data about the same individuals in two different periods of time, because I use SHARE data from wave 2 (year 2007) and wave 4 (year 2011). Furthermore, these two moments correspond to a time before and after the crisis, which makes it possible to analyze the changes that this recession brought to the participation of the old individuals in the bond and stock market. Moreover, I use a better proxy variable to study the credit constraints since I use the credit availability as reported by banks (Beaton 2009).

The richness of the data of the SHARE, together with the data for the proxy of the credit constraints from the Bank Lending Survey (BLS) carried out by European Central Bank, and data about inflation from the database of the International Monetary Fund (IMF) enable me to introduce in the empirical explanation of financial asset ownership a large scope of predictors identified in the theoretical literature about investment in risky assets. Besides information on credit constraints, I have a range of demographic

controls, other variables that affect the budget constraints of the households, and data on the self-reported health, wealth, income and inflation.

The research aims to contribute to the research on decisions about portfolio composition in three different perspectives: (i) it analyzes the same individual at two moments in time (in year 2007 and in year 2011), which clarifies the impact of the crisis; (ii) it incorporates the credit constraints while studying countries of the Eurozone; and (iii) it studies the behavior of a population group, older individuals, whose relative share is growing across Europe.

The rest of this thesis is structured as follows. Section 2 briefly reviews the most important findings of previous studies about the factors that influence the decision to invest in risky assets. Section 3 explains the surveys used to compute my sample. Section 4 contains the description of variables used in the estimations and summary statistics of the data. Section 5 presents the empirical estimations and the results obtained. Finally, Section 6 summarizes the conclusions, identifies some limits of the present research, and suggests future lines of research.

1. LITERATURE REVIEW

In this section, considering the literature that exists related to borrowing constraints, I will describe some of the most important findings of the prior research related to this subject. I shall also present a brief literature review of the determinants that influence the choice of financial portfolio.

2.1 CREDIT CONSTRAINTS

Some authors have found evidence that borrowing constraints might reduce the demand for risky assets. Access to the credit market is important for many households because it enables them to smooth consumption over time, invest in capital and even lets them invest in risky assets. The largest share of wealth that households have is invested in illiquid assets, and, as a result, they are credit constrained. This reduces their ability to transfer resources inter-temporally and smooths consumption over time but also reduces their capacity to invest in financial assets. Households have even more limited access to credit market early in life because they do not have many assets to offer as a collateral (Guiso et al. 2013).

Davis et al. (2006) argue that credit constraint has a strong and negative effect on the probability of holding risky assets and when a household faces a very high level of borrowing rates, the demand for risky assets will drastically decrease. Cocco et al. (2005) solved a realistically calibrated life cycle model of consumption and portfolio choice with non-tradeable income risk and borrowing constraints. They show that investors who have a limited income and a positive endogenous borrowing limit tend to have negative wealth when they are young and do not invest in equities.

Vissing-Jorgensen (2002), in order to analyze the effect that borrowing constraints have on the decision of households to hold risky assets in their portfolio or not, used two cross sections of data from the 1995 and 1998 Survey of Consumer Finance (SCF). When she used the strongest measure of being credit constrained, by using the question of the survey that asked if the households, during the past five years, had thought of

applying for credit and worried it might be turned down, she found evidence that these households are less likely to hold stocks, for the data of both 1995 and 1998. When measuring this effect using "being turned down for credit" as a dummy variable, that is, if the household had been turned down for credit during the last five years, she found that borrowing constraints have a negative effect on the probability of holding risky assets only with the data from 1995.

Guiso et al. (1996) studied the effect that the expectations of future borrowing constraints on the share of risky assets in a household´s portfolio. In their research, which uses data of the Italian population, they find some evidence that borrowing constraints make people keep their wealth in a safer and more liquid form.

1.2 RELEVANT DETERMINANTS OF THE PORTFOLIO CHOICE

The previous studies have identified a series of determinants that are relevant to explaining household portfolio choice. They include demographic characteristics, such as age, gender and number of children, health status and indicators of household resources, such as wealth and income, and also institutions and countries. Several authors have found that these variables are usually statistically significant and relevant in the explanation for portfolio allocation (Bertaut et al. 2000, Guiso et. al 2002, Rosen et al. 2004).

- **Demographic Characteristics (Age; Gender; Number of Children)**

Age has a significant effect on the allocation of the household portfolio (Bertaut et al. 2000). However, the relation between age and investment in risky assets is still

unclear. While some authors have found that risk taking increases with age and others have found that it decreases with age, there is also evidence that the relation between both phenomena is non-linear. Bertaut et al. (2000), using data from the Survey of Consumer Finances (SCF), and Yoo et al. (1994), using three cross-sectional surveys conducted by the Federal Reserve in US, empirically show that the relation between age and investment in risky assets is not linear. More specifically, they find that prime-aged households have a higher proportion of risky assets in their portfolio than the young and old households. The authors present several explanations for that. Firstly, because the younger economic agents face more background risk in their human capital, they invest less in stocks. Then, when the economic agents are older, uncertainty about income declines and they can take more financial risks. Secondly, the young and the middle-aged investors have more labor supply flexibility, so they can work more hours to compensate for their losses or they even can decide to retire later. The fact that young households typically first invest in housing is another reason that makes them invest less in risky assets. Buying a house is a large and indivisible investment, and, by doing so, households use most of their cash flows to pay off their mortgages and are not willing to take additional risks. Older agents usually do not have to pay mortgages, so they can take more risk investing in risky financial assets. Notwithstanding, other types of uncertainty can influence risk aversion in older agents: length of life, the risk of ill health or even expenses with nursing care. Furthermore, compared with older agents, younger ones may still know little about the characteristics of risky investments and they have less financial literacy, which leads them to invest less in risky assets compared to older agents.

Guiso et al. (2013) argue that the variation in investments in risky assets over the life cycle can be explained by the background risk. They say that younger agents invest less in risky assets than older agents because they face higher risks and have an instable life in that period of life. For example, a young agent doesn´t have a stable job in this period of his life, and that means he doesn´t have a stable income profile, the probability of divorce is higher and his household size is uncertain.

Bertocchi et al. (2011) and Christelis et al. (2008) also found that investment in risky assets increases with age. A different argument is presented by Bodie et al. (1992), who argue that because the young have higher labor flexibility, they tend to invest more in risky assets than the older. The relation between age and ownership of risky assets is positive because in the case that they incur losses from those financial investments, young individuals will increase their labor input to compensate.

Guiso et al. (2013) argue that investment in risky assets changes with gender because men and women have different risk preferences. Using a dataset from 1989-2006 from the Bank of Italy for the Survey of Household Income and Wealth, Bertocchi et al. (2011) found that when the observable characteristics are controlled, women invest less in risky assets.

Jianakoplos et al. (1998) wanted to find empirically if females are more risk averse than males with regard to financial decisions. Using the SCF database, they found that women are in general more risk averse than men, and this occurs over most age ranges.

Love (2010) used data from the Health and Retirement Study (HRS) and the Panel Study of Income Dynamics (PSID) to study the effect of children on portfolio choice and

found that the younger households that have children tend to invest more in risky assets. This tendency reverses with the increase in age of the households. They suggest that, after retirement, adult children provide an incentive to maintain wealth for bequests so parents prefer to hold safer portfolios and liquid assets instead of risky portfolios.

Bertocchi et al. (2011), using a dataset that spans the period 1989 – 2006 for the Italian population, found that the number of children has a positive impact on the investment in risky assets. They suggest that this relation exists because having children induces a longer time horizon; thus, investment choices, despite being more risky, are more rewarding over the long run.

- **Health**

Health decreases with age and therefore health status is particularly important for the decisions of the elderly. Many authors have studied the relation between health and portfolio allocation decisions. Rosen et al. (2004) argue that poor health can affect the individuals' marginal utility of consumption, risk aversion, the rate of the preference and the labor income, and as a result influence the allocation of the portfolio. Using the Health and Retirement Study (HRS), they found that health status has a significant and negative effect on the portfolio allocation. Agents with poor health hold fewer risky assets in their portfolio even when controlling for the level of total wealth.

Edwards (2008) found that elderly households, who view significant risk in their future health, tend to hold safer financial portfolios. He suggests that because medical expenditure will absorb a large fraction of the household resources, the individuals will

prefer not to hold risky assets. Goldman et al. (2005) using micro-data (cross-sections data of the 1999 and 2000 Medicare Current Beneficiary Survey) found evidence that individuals that are at risk of more medical expenditure tend to invest less in risky assets. They measure medical expenditure risk by the enrollment of the individuals in a health insurance or a supplemental insurance policy.

Christelis et al. (2010) suggest that subjective health status (self-evaluated as is common in surveys such as the SHARE survey) might be even more relevant than objective health indicators for decisions on portfolio choice, because subjective data is related to the individual's perception about his own health status. They suggest that if individuals invest less in stocks because of health risks, it is the perception of such health risks and not necessarily their actual health risks that determines their financial decisions.

- **Household Resources (Wealth; Income and Inflation)**

Theory suggests that the level of total wealth is an important determinant of portfolio choice because it can influence absolute risk aversion and there are fixed costs associated with owning certain types of assets, either monetary or informational (Kurd 2002). Vissing-Jorgensen (2002), using Consumer Expenditure Survey (CES), and Bertaut et al. (2000), using aggregate data of the households from the United States, found that agents with higher financial wealth hold more risky assets in their portfolios.

McCarthy (2004), studying 6 OECD countries, found that the increase of wealth increases the probability of an investor holding risky assets in addition to being the owner of their home. He found that just the richest households will typically hold most

of their assets in risky assets. Guiso et al. (2003) also suggest that because of the entry cost in the financial market, only relatively wealthy households invest in financial markets. They also argue that poor households do not hold risky assets because the utility loss from nonparticipation in the stock market participation is too small to offset the fixed participation cost that an individual has on entering in a financial market.

Elderly households typically face less income risk, except for inflation risk associated with annuities (Christelis et al. 2010). Power (2013) argues that inflation decreases the purchasing power of money and that has a negative impact on most financial instruments. However, this impact is dependent on the duration of the investor's assets and liabilities. Guiso et al. (1996), using micro data from Italian households, found that inflation variability has a negative impact on the decision to invest in risky assets.

- **Institutions and Countries**

Many authors have found that many differences exist in the financials portfolio composition across countries of Europe. Therefore, controlling for the potential differences across countries is particularly important. Christelis et al. (2010) show that the level and composition of financial wealth vary widely across countries, where Switzerland is clearly the country that has the most financial wealth, while households from Italy, Spain and Greece have the lower levels of financial wealth. They also conclude that total financial wealth is generally higher in the North than in the South of Europe. The data from the SHARE that they use show that Sweden and Denmark have by the far the highest percentages of stockholding. By contrast, Austria, Spain, Greece, and Italy - note that Portugal is not studied - are the countries with lowest percentages

of stockholding. They suggest that country and institutional effects may be quite important in explaining the stockholding decisions of European investors. Christelis et al. (2005) argue that these differences across countries are due to the fact that real estate, and primary residence in particular, constitutes a large proportion of wealth in the Southern countries of Europe like Italy and Spain, and that these differences are a result of the transaction and information costs.

In a similar line, Guiso et al. (2013) identify considerable differences between stock market participation across countries: Sweden and United Kingdom exhibit the highest participation rate and Italy has the lowest participation rate in the set of European countries studied (Netherlands; Germany; Italy; Austria; Sweden; Spain; France; Denmark; Greece; Switzerland).

2. DATA SOURCES

The data used in this dissertation are from several sources. The main data are from the Survey of Health, Ageing and Retirement in Europe (SHARE). I also use data about the bank´s credit standards from the Bank Lending Survey Statistics of the European Central Bank, and from the International Monetary Fund I got information about the variation of inflation.

The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary and cross-national panel database that provides detailed information about health, socio-economic status and social and family networks. This survey contains data about households from 19 European countries and from Israel. The SHARE

global sample is composed of individuals aged 50 years or more, who speak the official language of the country and do not live abroad or in an institution such as a prison during the duration of the field work. The questionnaire is also answered by the partners, independent of their age.

Currently, there are five waves of the survey SHARE published: wave 1, whose data were collected between 2004 and 2005; wave 2, whose data were collected between 2006 and 2007; wave 3, whose data were collected between 2008 and 2009; wave 4, whose data were collected between 2010 and 2011; and wave 5, whose data were collected in 2013. Wave 3, SHARELIFE, collected retrospective information about the respondents. Each wave has more than twenty modules (e.g. Behavioral Risks, Housing, Assets, and Expectations). The questions of the survey are standardized across the countries, which makes comparison between them possible. Furthermore, the SHARE questions are harmonized with the United States Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA).

In my analysis I use wave 2 (release 2.6.0) and wave 4 (release 1.1.1). There are 12 European countries that are common for both waves: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Poland, Netherlands, Spain, Sweden and Switzerland. I use 8 modules that are similar for both waves: AS - Assets, DN - Demographics and Networks, EP - Employment and Pensions, EX - Expectation, FT - Financial Transfers, HH - Households Income; HO – Housing and PH - Physical Health. The database built includes the same individual for both years, which enables me to study the behavior before and

after the crisis. Because there are some data restrictions, only five countries are studied (Germany, Spain, France, Italy and Netherlands).

Most of questions of the survey are answered individually by the members of the household. However, questions related with the financial situation are answered by the household members most responsible for financial matters. This ensures more precise financial information and avoids duplications. If the finances of a couple are not jointly managed, each household member is treated as a separate financial unit.[2]

To better assess the relationship between credit constraints and investment in risky assets, and because the information is not collected in the Survey of Health, Ageing and Retirement in Europe (SHARE), I also use the Bank Lending Survey (BLS) for the euro area of the European Central Bank. The main objective of the survey is to make information about the financial conditions in the euro area available. This survey provides data about supply and demand conditions in the euro area, credit markets and the lending policies of euro area banks.

The questions in the Bank Lending Survey are answered by the senior loan officers of the most important banks of the euro area. The survey is answered by almost 140 banks from all the European countries, and it takes into account the characteristics of the banking structures of each country when it is setting up the sample of banks that participate in the survey in order to fully capture the specifics of the banking system in each Member State. The European Central Bank makes quarterly information about the

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[2] (*) Source: www.share-project.org

credit markets conditions available.[3] The Bank Lending Survey has information about the credit constraints for just five countries of the twelve countries that are common for the both waves from the SHARE survey. As a result, I have credit constraint information only for Germany, Spain, France, Italy and Netherlands.

In addition I include information about the variation of inflation, given that the literature indicates that it is a factor that may affect the decision to invest in risky assets or not (Guiso et al. 1996). I obtained information about inflation from the International Monetary Fund[4], which publishes data about several economic and financial indicators.

3. VARIABLES AND SUMMARY STATISTICS

In this section I shall describe the variables used to compute the model to explain the ownership of stocks and bonds. In order to create the variables, I selected information from several modules of SHARE for different years (waves) and then I merged the files of both waves taking into account the households' identifier. I also added to the database information about the credit constraints and inflation. These data were processed, analysed, transformed and recoded.

Taking into account the empirical literature related to this subject, (see section 2 of this dissertation), a range of factors that potentially impact on the decision to hold stocks or bonds in the financial portfolio are considered: credit constraints (*creditconst*), age (*age*), dummy for female (*fem*), number of children (*chldrn*), self-reported health

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[3] (*) Source: www.ecb.europa.eu

[4] (*) Source: www.imf.org

(*health*), dummy for the respondents from Italy and Spain (*south*), income quartiles

(*inc01; inc02; inc03; inc04*), dummies for the employment status of the respondent

(*emp; unemp; dsbld; hmmkr; ret; oth*), logarithm of the liquid wealth (*lnwlth*) as well as

information about inflation (*inf*). A detailed description of these variables is presented

in Table I. Some of these variables are common with Ponte (2013) research.

Other potential predictors for risky financial assets were tested in different model

specifications, but the statistical quality of the outcomes suggests that they are not

relevant for the years and sample studied. The factors that that have not been

introduced in the final model are: age squared, education, education squared, married,

interest or dividends received, interest from bank accounts, interest from bonds,

interest or dividends from mutual funds, dividends from stocks, permanent job contract,

employed in public sector, living will be better, living will be worse, retirement age will

raise, government will reduce pensions, job advancement, work after 63, frequency of

praying, and trust.

Dependent Variables

- **Bondholder (*bnds*) and Stockholder (*stcks*)**

In this study, I will consider the bonds and stocks that are held directly by the

households in their financial portfolios to be risky assets. This consideration of the bonds

and stocks as risky assets is based on the assumption that investors consider that these

assets have an uncertain return. Bondholder (*bnds*) and Stockholder (*stcks*) are binary

variables.

Throughout the paper, I shall consider a bondholder (*bnds*) to be a respondent that has bonds in his portfolio and a stockholder (*stcks*) to be a respondent who invests directly in stocks. I exclude the situation of ownership of mutual funds (also ascertained in SHARE) because their composition can be a mix of bonds and stocks. In the SHARE questionnaire, a *bond* refers to a debt instrument issued by the government or a corporation in order to generate capital by borrowing, and a *stock* refers to a financial instrument that allows a person to own a part of a corporation and gives him/her the right to receive dividends from it (SHARE Release Guide 2.6.0 Waves 1 & 2).

Independent Variables

In the brief literature review (section 2), the theoretical support for the use the following variables as predictors of financial assets ownership was presented. Next, the operationalization of each of the measures is clarified.

- **Credit Constraints (*creditconstr*)**

I measure credit constraints by using credit availability, as reported by banks. More specifically, I use a variable Net Percentage (*creditconstr*) from the Bank Lending Survey (BLS). The variable is constructed and provided by the European Central Bank with the following question: *"Over the past three months, how have your bank's credit standards as applied to the approval of loans to households changed?"* The credit constrained (*creditconstr*) variable represents the difference between the number of respondents who reported that credit standards of the approval of loans to households "*tightened considerably*" or "*tightened somewhat*" during the last three months, and those

respondents who reported that the standards *"eased considerably"* or *"eased somewhat"*, as a percentage of all respondents. Therefore, a positive net percentage indicates that a larger proportion of banks had tightened credit standards and a negative net percentage indicates that a larger proportion of banks had eased their credit standards during the prior three months.

- **Age (*age*)**

These variables give the age of the respondent. In my sample, after a careful analysis of the distribution of the data, just those respondents aged 50 years or above were considered. As a result, I have a more consistent sample of observations.

- **Female (*fem*)**

This variable is a dummy variable. This makes it possible to control for the possible differences between male and female investors concerning portfolio composition and risk aversion.

- **Children (*chldrn*)**

I also include the family composition in terms of the number of children. This variable indicates the number of children of the respondent that are still alive, including fostered, adopted and stepchildren and those of the husband/wife/partner.

- **Health (*health*)**

Elderly individuals have more uncertainty about their medical expenditure, so controlling for the potential effects of health status is particularly important in my

context. In order to control for the health status of the individuals, self-reported health status was considered. To study the effect of health on the portfolio decision self-reported health might be more relevant to use than objective health. The perception of the investor of a health risk, not necessarily its real presence, determines whether the investor is willing to hold more or fewer risky assets (Christelis et al. 2005; Atella et al. 2012).

- **Southern countries (south)**

A dummy variable was created for the respondents from Italy or Spain. This will capture the differences between the respondents that are resident in southern countries and those from the north of Europe.

- **Income (*inc01; inc02; inc03; inc04*) and Employment status (*emp*)**

The income variable was analyzed by the level of income that the entire household had in an average month in the previous year, that is, the year before the survey. I also control for those respondents that are employed or self-employed. These variables should capture the household budget constraints.

- **Wealth (*lnwlth*)**

The SHARE contains detailed information about the distribution of the financial and real wealth of the households. In this questionnaire, seven different types of financial assets are considered: bank and other transaction accounts, government and corporate bonds, stocks, mutual funds, individual retirement accounts, contractual savings for housing, and life insurance policies.

Liquid wealth is defined as the sum of all financial and real wealth, minus liabilities. These variables were constructed by following Christelis et al. (2005). A variable indicates all resources that are available to household members.

- **Inflation (*inf*)**

Variation in average consumer prices was also created as a variable because it affects the portfolio decisions.

Table I summarizes the dependent and independent variables that were created. The other variables that were tested and generated non-statistically significant results are presented in Table III. Supplementary details about construction of the variables that were used to compute these variables and about the SHARE survey are presented in Table IV.

TABLE I

VARIABLES DESCRIPTION

Dependent Variables		Description
Financial Assets	Bondholder(*bnds*)	= 1 has bonds; 0 otherwise.
	Stockholder(*stcks*)	= 1 has stocks or shares (listed or unlisted on stock market); 0 otherwise.

Independent Variables		Description
Credit Constraints	Credit Constraints (*creditconstr*)	= difference between the number of senior loan officers that reported that their Banks credit standards, applied to the approval of loans to households, "tightened considerably" or "tightened somewhat" and those reported that they "eased considerably" or "eased somewhat" as a percentage of all respondents.
Age	Age (*age*)	= age of the respondent (years).
Gender	Female (*fem*)	= 1 if the respondent is female; 0 otherwise.
Children	Children (*chldrn*)	= number of children that the respondent have.
Health	Health (*health*)	= 1 excellent; = 2 very good; = 3 good; = 4 fair; = 5 poor (self-evaluation).
Country	South Europe Countries (*south*)	= 1 if the respondent is from Italy or Spain; 0 if the respondent is from Germany, France or Netherlands.
Income	Income quantile 1 (*inc01*)	= 1 if total income received by all household members in an average month in previous year belongs to quantile 1 (0 thru 1100€).
	Income quantile 2 (*inc02*)	= 1 if total income received by all household members in an average month in previous year belongs to quantile 2 (1100€ thru 1800€).
	Income quantile 3 (*inc03*)	= 1 if total income received by all household members in an average month in previous year belongs to quantile 3 (1800€ thru 3200€).
	Income quantile 4 (*inc04*)	= 1 if total income received by all household members in an average month in previous year belongs to quantile 4 (3200€ thru highest).
Employment status	Employed (*emp*)	= 1 employed or self-employed; 0 otherwise.
	Unemployed (*unemp*)	= 1 unemployed; 0 otherwise.
	Disabled (*dsbld***)	= 1 disabled or permanently sick; 0 otherwise.
	Homemaker (*hmmkr***)	= 1 homemaker; 0 otherwise.
	Retired (*ret***)	= 1 retired; 0 otherwise.
	Other (*oth***)	= 1 rentier, living off own property, student, doing voluntary work; 0 otherwise.
Wealth	Logarithm of Liquid Wealth (*lnwlth*)	= logarithm of liquid wealth of the respondent.
	Financial Wealth (*wlthF*)	= financial wealth of the respondent (bank accounts, bonds, stocks, mutual funds, retirement accounts, contractual savings for housing, life insurance).
	Real Wealth (*wlthR*)	= real wealth of the respondent (properties, businesses, cars).
	Total Wealth (*wlthT*)	= total wealth of the respondent (financial wealth and real wealth).
	Liquid Wealth (*wlthLIQ*)	= liquid wealth of the respondent.
	Amount of liabilities (*libil*)	= amount of liabilities of the respondent.
Inflation	Inflation (*inf*)	= average consumer prices.

* variables computed only for wave 2
** variables computed only for wave 4
Source: Variables were computed using the data from the SHARE survey.

In Table V and Table VI in the appendix, the summary statistics for the variables used in the empirical analysis are presented for both waves, wave 2 and wave 4, respectively. These statistics are based on a sample with 5 countries and N = 1309 observations for 2007 and N = 1049 observations for 2011. In the sample from wave 2, around 8% of households hold bonds and about 19% hold stocks in their financial portfolios. About 1.9% of my sample is credit constrained, using the credit availability as reported by banks. The average financial respondent is around 55 years old and has 13 years of education. About 46% of the respondents in the sample are female and about 53% are married. The average household has 2 children. The average liquid wealth of the households is €548 361 and around 10% have an annual income between 0 and €1100, 17% have an annual income between €1100 and €1800, 34% have an annual income between €1800 and €3200 and about 39% of our sample have an annual income higher than €3200 (our own calculations based on microdata SHARE). 14% of the households in the sample live in Spain and Italy. Almost all of the respondents reported that their health status is good. About 90% of the households are employed and about 10% are unemployed.

The summary statistics computed from wave 4 (2010) data are similar to those obtained from wave 2 (2007). In 2007 around 9% of households hold bonds and about 16% hold stocks in their financial portfolios. About 6.75% of our sample is credit constrained, using the credit availability as reported by banks. The average financial respondent is around 59 years old and has 14 years of education. About 48% of the respondents in the sample are female and about 48% of the respondents are married. The average household has almost 2 children. The average liquid wealth of the

households is €326 852 and around 10% have an annual income between 0 and €1100, 19% have an annual income between €1100 and €1800, 37% have an annual income between €1800 and €3200 and about 35% of our sample have an annual income higher than €3200. 27% of the households in the sample live in Spain and Italy. Almost all of the respondents reported that their health status is good. About 59% of the households are employed, 7% are unemployed, 2% disabled, 3% are homeworkers, 28% retired and 1% of the respondents of the sample is a rentier, living off own property, a student or is doing voluntary work.

In Figure 1 and Figure 2 the distribution of the stocks and bonds across the countries studied are presented for both waves. In the global sample the distribution of risky assets is heterogeneous across countries. In the case of bonds, the countries that have the highest amount invested in bonds, in both years, are Germany and Italy. In 2011, comparing with 2006, there is an increase in bonds in almost all the countries with the exception of Germany. Regarding the stocks, the results show that investors from France and Netherlands hold higher amounts invested in these assets in their financial portfolio in 2006 and 2011. Furthermore, contrary to the expectations due the crisis in Europe between the two waves, the ownership of risky assets increased slightly from 2007 to 2011.
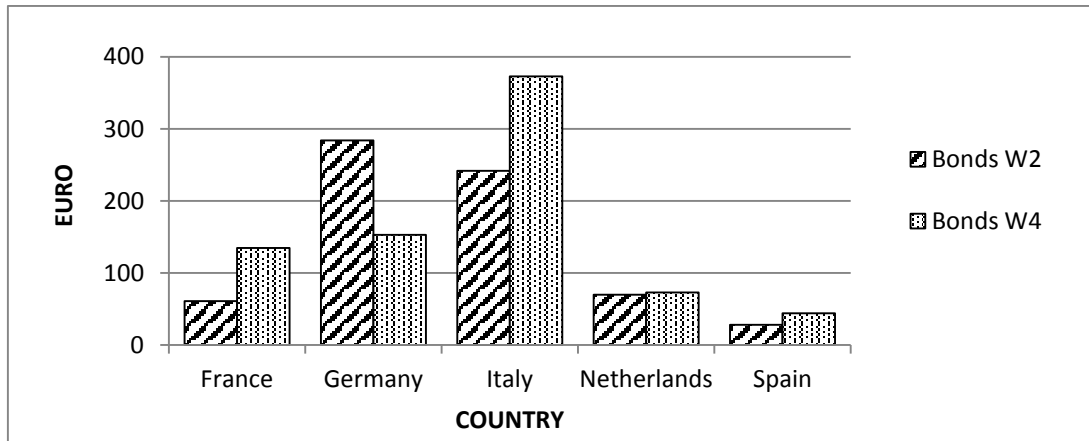
Figure 1 – Distribution of the bonds across countries for both the waves studied

Source: Variables were computed using the data from the SHARE survey.
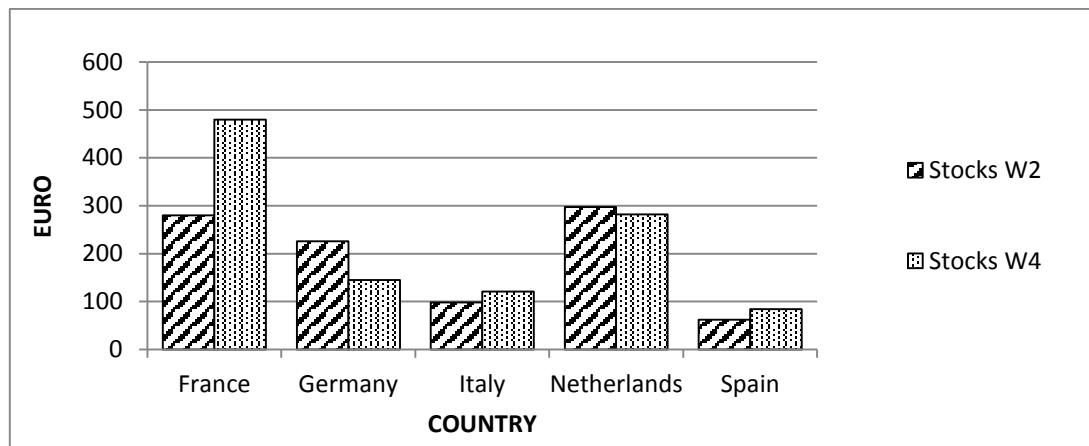
Figure 2 – Distribution of the stocks across countries for both the waves studied

Source: Variables were computed using the data from the SHARE survey.

Table VII and Table VIII, in the appendix, show the Pearson´s correlation coefficient

for wave 2 and wave 4, respectively. None of the relationships between the presented

variables seems to be especially correlated or has unexpected directions of correlation.

Table VII shows that having stocks in wave 2 has a positive correlation with age (*age*),

being employed (*emp*) and with liquid wealth (*lnwlth*) and negative correlations with the

other variables, such as being female (*fem*), number of children (*chldrn*), income

quartiles (*inc01; inc02; inc03*), self-reported health status (*health*), being credit

constrained (*credconstr*), inflation (*inf*), and the fact that the respondent is from Italy or Spain (*south*). In wave 2 having bonds also has a positive correlation with age (*age*), being female (*fem*), being employed (*emp*), income quartile 3 (*inc03*), liquid wealth (*lnwlth*), self-reported health status (*health*), and with inflation (*inf*), and a negative correlation with the number of children (*chldrn*), income quartiles 1 and 2 (*inc01; inc02*), being credit constrained (*credconstr*), and with the fact that the respondent is from Italy or Spain (*south*).

In wave 4, having stocks (*stcks*) has a positive correlation with being employed (*emp*), liquid wealth (*lnwlth*) and being credit constrained (*credconstr*), and a negative correlation with age (*age*), female (*fem*), number of children (*chldrn*), income quartiles (*inc01; Inc02; inc03*), self-reported health status (*health*), inflation (*inf*), and the fact of being from Italy or Spain (*south*). Also, in wave 4, having bonds has a positive correlation with age (*age*), being employed (*emp*), income quartile 3 (*inc03*), liquid wealth (*lnwlth*), being credit constrained (*credconstr*), inflation (*inf*), and being from Italy or Spain (*south*), and a negative correlation with all the others variables, i.e. being female (*fem*) number of children (*chldrn*), income quartiles 1 and 2 (*inc01; inc02*), and self-reported health status (*health*).

4. EMPIRICAL ESTIMATIONS AND RESULTS

In this section, I will analyze how the credit constraints and other factors influenced the investment in stock and bonds by older individuals in the Euro Zone using data from

wave 2 and wave 4 of the SHARE survey, that is, from 2007 and 2011[5]. Following

Christelis, Jappelli and Padula (2005) and because the dependent variable has a binary

outcome, studying the determinants of the decision to invest in risky assets or not relies

on the use of a Probit model. The description of the dependent and independent

variables is in Table I.

$$(1) \qquad y^* = \beta_0 + x\beta + e, \quad y = 1[y^* > 0],$$

where y^* is a binary variable that represents investment by the households in risky

assets. The function $1[\cdot]$ is an indicator function, which takes value one if the household

holds any risky assets in their financial portfolio, and zero otherwise. That is, y is one if

the household holds risky assets, $y^* > 0$, and y is zero if the household doesn´t have

risky assets, $y^* \leq 0$ (Wooldridge 2012).

Thus, the ownership of the bonds and stocks will take the following specifications:

$$(2) \quad P(stcks = 1|X) = \beta_0 + \beta_1\,crediconstr + \beta_2\,age + \beta_3\,fem + \beta_4\,chldrn + \beta_5\,health$$

$$+ \beta_6\,south + \beta_7\,inc01 + \beta_8\,inc02 + \beta_9\,inc03 + \beta_{10}\,emp + \beta_{11}\,lnwealth + \beta_{12}\,inf + e$$

and

$$(3) \quad P(bnds = 1|X) = \beta_0 + \beta_1\,crediconstr + \beta_2\,age + \beta_3\,fem + \beta_4\,chldrn + \beta_5\,health$$

$$+ \beta_6\,south + \beta_7\,inc01 + \beta_8\,inc02 + \beta_9\,inc03 + \beta_{10}\,emp + \beta_{11}\,lnwealth + \beta_{12}\,inf + e$$

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[5] The SHARE survey was applied in years 2006 and 2007 (wave 2) and years 2010 and 2011 (wave 4). For simplification wave 2 is associated with 2007 and wave 4 with 2011. The wave 3 survey (SHARELIFE) is a different questionnaire that is not comparable with waves 2 and 4.

Table II reports the Probit estimates of the investments in risky assets for both years studied. In the first two regressions, I use *stockownership* as a dependent variable. Model 1 uses 2007 data and Model 2 uses 2011 data. Model 3 and Model 4, based on data from 2007 and 2011 respectively, have bond ownership as a dependent dummy variable.

TABLE II

PROBIT REGRESSIONS

Independent Variables	Model 1		Model 2		Model 3		Model 4	
	Has stocks (Wave 2)		Has stocks (Wave 4)		Has bonds (Wave 2)		Has bonds (Wave 4)	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
Credit constrained (*creditconstr*)	-0,065	0,045	-0,001	0,002	-0,007	0,001 ***	-0,011	0 ,002 ***
Age (*age*)	0,004	-0,003	0,001	-0,003	0,003	0,002 *	0,001	0 ,002
Female (*female*)	-0,065	0,020 ***	-0,035	0,021 *	0,01	-0,013	0,001	0 ,015
Number of children (*chldrn*)	-0,017	0,009	-0,021	0,009 *	-0,004	0,005	-0,026	0,007 ***
Health status (*health*)	-0,009	0,011	-0,001	0,011	-0,001	0,007	-0,000	0 ,008
South countries (*south*)	-0,001	0,001	-0,092	0,039 **	0,620	0,400	0,510	0,082 ***
Income quantile 1 (*inc01*)	-0,109	0,027 ***	-0,117	0,020 ***	-0,016	0,026	-0,048	0 ,016 ***
Income quantile 2 (*inc02*)	-0,109	0,023 ***	-0,106	0,021 ***	-0,018	0,018	-0,047	0 ,015 ***
Income quantile 3 (*inc03*)	-0,063	0,021 ***	-0,055	0,022 ***	-0,006	0,014	-0,012	0 ,016
Employed (*emp*)	0,085	0,030***	0,023	0,024	0,041	0,014 ***	-0,001	-0,017
Wealth (*lnwlth*)	0,043	0,007 ***	0,033	0,007 ***	0,013	0,004 ***	0,008	0 ,005 *
Inflation (*inf*)	-0,042	0,043	-0,013	0,094	-0,029	0,073	-0,443	0,065 ***
Constant	-3,452	0,788	-2,433	1,242	-4,412	1,510	2,793	-1,348
Number of observations	1307		1046		1309		1049	
Percentage correctly predicted	81,33%		83,94%		91,83%		90,56%	
Log-likelihood value	-558,208		-411,112		-316,736		-282,185	
Pseudo R2	0,123		0,1113		0,145		0,139	

The dependent variables take value of one if the respondent invest in risky assets and zero otherwise.

Notes: Standard errors are shown in parentheses.

The * represent the significance at 10%; **significance at 5%; *** significance at 1%;

Source: Author's calculation based on the data of SHARE

The results show that being credit constrained is not statistically significant for stock ownership but that it is statistically significant for investment in bonds. The coefficient of the proxy for liquidity constraints is negative as expected for the investments in bonds. The results indicate that being credit constrained reduces the probability of investing in bonds by 0.7% for the data from 2007 and 1.1% for the data from 2011. The marginal effects have the expected sign, but the values are very low. However, the results also show that, after the crisis, being credit constrained reduces significantly, in relative terms, the probability of having risky assets compared to the period before the crisis.

The theoretical effect of age on the risk exposure is ambiguous. Even if the financial advice is to reduce the exposure with age, there are no compelling theoretical reasons to do so according to Christelis et al. (2008). The effect of age is statistically significant just for bond ownership in 2007. The effect is positive for investment in stocks and bonds but not statistically different from zero. These results are consistent with those obtained by Christelis et al. (2008), who used the same database, as well as with the result obtained by other authors like Guiso et al. (2013). The increase in investment in risky assets with age can be explained by the background risk, i.e., elderly individuals face lower risks and have more stable earnings than younger individuals, and consequently this allows them to take more risks (Guiso et al. 2013).

My results show that in 2007 and 2011, being female reduces the probability of investing in stocks in comparison with being male. This outcome converges with those obtained by Christelis et al. (2005) and Bertocchi et al. (2011) and is explained by the higher risk aversion in financial decisions of females compared to men (Jianakoplos et al. 1998; Guiso et al. 2013). However, my results show that being female is not statistically significant for investment in bonds. One explanation for this result is the fact that bonds are less risky than stocks.

With regards to the number of children of the households, this variable is statistically significant only in 2011. The results indicate that households that have more children invest less in risky assets. These results were expected, because households with more children are more budget constrained that households that have fewer children (Love

2010). These results also indicate that the households became more risk averse after the crisis.

In my analysis, self-evaluated health status is not significant in either year. One explanation for this result can be the fact that the model includes variables that capture risk like wealth, income and also credit constraints (Cardak 2009), and poor health can be associated with higher health risk, risk aversion or low wealth.

Living in Italy or Spain - countries that represent the 'South' in my sample - affects both stock and bond ownership in the year 2011. Living in these two countries reduces the probability of investing in stocks but increases the probability of investing in bonds. The fact that the households from Italy or Spain invest less in stocks is consistent with the results that were obtained by Christelis et al. (2005) and has been observed consistently across time. One explanation for this result may be that transaction costs are higher in Mediterranean countries. The result that being from Italy or Spain increases the probability of investing in bonds can be explained by the fact that the Italian investors typically hold the biggest amount of bonds among all the European countries, which can be seen in Figure 1. The opposite effects in 2011 on stocks (negative, marginal effect 9.2%) and bonds (positive, marginal effect 51%) could be explained by the general crisis and debt crisis in both countries and the real estate crisis in Spain. It is likely that the individuals in those countries move from more risky assets to safer assets.

In the regressions, income quartile dummies (taking the top income quartile as the reference category) are significant for the investment in stocks in both years and also in

bonds in 2011 for the two bottom income quartiles. The results, identical to others reported in the literature for different countries and periods (Guiso et al. 2013), reflect the evidence that those who belong to the lower quartiles of income invest less in risky assets. It results from the level of resources availability and financial risk attitude.

Being employed positively predicts the ownership of the two kinds of financial assets (stocks and bonds) but only in the year before the crisis (2007). This suggests that, after the crisis, individuals became more risk averse, and even those employed - maybe because of the instability in the labor market - prefer safer assets.

Liquid wealth influences the ownership of stocks and bonds positively. This is consistent with the presence of fixed transaction and information costs in acquiring risky assets (Guiso et al. 1996).

5. CONCLUSIONS

My dissertation analyzes the effect that the credit constraints and other factors (e.g. demographic, economic, institutional) have on the financial portfolio decisions of those aged 50 or more in European countries, based on data from five countries belonging to the Eurozone (Germany, Spain, France, Italy and Netherlands) and considering two waves from SHARE survey, wave 2 (year 2007) and wave 4 (year 2011). I also use data from the Bank Lending Survey (BLS) and International Monetary Fund (IMF). I estimate Probit models, in which the dependent variables are binary variables representing the ownership of two financial assets (stocks and bonds).

The results from the empirical research show that:

First, the probability of owning bonds is lower among investors who are credit constrained. Being credit constrained reduces the probability of participating in the bond market. The effect of credit constraints is greater in wave 2, which suggests that the investors became more risk averse after the crisis of 2007. Notwithstanding, being credit constrained is not statistically significant for the decision of the households to hold stocks in their financial portfolios.

Second, being female and having lower income makes the individuals less prone to invest in stock. Conversely, wealth increases the probability of stock ownership.

Third, being employed is positively related to stock ownership in 2007 while the results for 2011 are inconclusive. Moreover, those that have more children are less likely to participate in the stock market in 2011.

All things equal, I found that age, being employed and wealth are positively related to bond ownership for 2007. In 2011, wealth positively predicts bond market participation while the number of children, lower income and inflation variation reduce bond ownership.

Furthermore, several factors present in the literature as influential to the ownership of stocks and bonds were tested in different model specifications, but the statistical quality of the outcomes suggests that they are not relevant for the years and sample studied. The potential predictors of risky financial assets that were tested but not introduced in the final model are: age squared, education, education squared, married, interest or dividends received, interest from bank accounts, interest from bonds, interest or dividends from mutual funds, dividends from stocks, permanent job contract,

employed in public sector, living will be better, living will be worse, retirement age will rise, government will reduce pensions, job advancement, work after 63, frequency of praying, and trust.

Finally, in general, the outcomes about the investment in risky assets suggest that after the crisis, individuals became more risk averse.

During the research process, several avenues for future research were identified. One of them is to study the countries' specificities, such as details about credit constraints and participation in the financial market. This would help to understand the heterogeneity across countries regarding the investment in risky assets. Because wave 5 of SHARE was published in March of 2015 and because of the limitation of time, it was not possible to study these data. However, they can provide other results for the decision to invest in risky assets. Also, the methodology used can be improved by using panel data since I have observations of the same individuals in different periods of time.

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APPENDIX

TABLE III

VARIABLE DESCRIPTION

Independent Variables		Description
Age	Age squared (*age2*)	= age squared of the respondent (years).
Education	Education (*educ*)	= number of years of education of the respondent.
	Education squared (*educ2*)	= number of years of education squared of the respondent.
Marital Status	Married (*married*)	= 1 if the respondent is married; 0 otherwise.
Specific Revenue	Interest or dividend received (*interdivid*)	= amount of interest or dividend income that the respondent and his partner received from their savings in bank accounts, bonds, stocks or mutual funds in last year.
	Interest from banks accounts (*i_bnk**)	= amount of interest income received by respondent and his partner from bank accounts in previous year.
	Interest from bonds (*i_bond**)	= amount of interest income that the respondent and his partner received from bonds in previous year after taxes.
	Interest or dividend from mutual funds (*intmf**)	= amount of interest or dividend income that the respondent and his partner received from mutual funds in previous year after taxes.
	Dividends from stocks (*divstk**)	= dividends from stocks.
Job	Permanent job contract (*permjob*)	= 1 respondent have a permanent-term contract; 0 otherwise.
	Employed in public sector (*firmpubsect*)	= 1 if the respondent is employed in the public sector; 0 otherwise.
Risk attitude	Risk aversion (*riskaversion**)	= 1 not willing to take any financial risks; 0 otherwise.
Expectation	Living will be better (*livingbebetter**)	= chances that standard of living will be better.
	Living will be worse (*livingbeworse**)	= chances that standard of living will be worse.
	Retirement age will raise (*raiseretage*)	= probability of government raises retirement age.
	Government will reduce pensions (*redpension*)	= probability of government reduces pensions before the retirement of the respondent.
	Job Advancement (*jobadvance*)	= 1 respondent strongly agree that prospects for job advancement are poor; = 2 respondent agree that prospects for job advancement are poor; = 3 respondent disagree that prospects for job advancement are poor; = 4 respondent strongly disagree that prospects for job advancement are poor.
	Work after 63 (*workafter63*)	= chance to work after age of 63.
Religion	Frequency of praying (*freqpraying*)	= 1 pray more than once a day; = 2 pray once daily; = 3 pray a couple of times a week; = 4 pray once a week; = 5 pray less than once a week; = 6 never pray.
Trust	Trust (*trust*)	= the level of trust of the respondent in other people where 0 means you can't be too careful and 10 means that most people can be trusted.

* variables computed only for wave 2

** variables computed only for wave 4

Source: Variables were computed using the data from the SHARE survey.

TABLE IV

VARIABLES CONSTRUCTION

	Dependent Variables	Description
Financial Assets	Bondholder (*bnds*)	***bnds*** = 1 if the respondent has bonds in his financial portfolio; 0 otherwise.
	Stockholder (stcks)	***stcks*** = 1 if the respondent has stocks or shares in his financial portfolio (listed or unlisted on stock market); 0 otherwise.

	Dependent Variables	Description
Credit Constraints	Credit Constraints (*creditconstr*)	Is a quastion from the Bank Lending Survey of the European Central Bank. ***netperc*** = difference between the share of banks reporting that credit standards have been tightened and the share of banks reporting that they have been eased.
Age	Age (*age*) (*age2*)	These variables give the age of the respondent. Were created both in linear and quadratic terms to capture the life-cycle effect. ***age*** = age of the respondent (years). ***age2*** = age squared of the respondent (years).
Gender	Female (*fem*)	These variable was transformed in a dummy variable. ***fem*** = 1 if the respondent is female; 0 otherwise.
Children	Children (*chldrn*)	This variable indicates the number of children of the respondetchldrn that are still alive, including fostered, adopted and stepchildren and those of his husband/wife/partner. ***chldrn*** = number of children that the respondent have.
Health	Health (*health*)	To study the effect of health on the portfolio decision might be more relevant to use the self-reported health than objective health. The perception of the investor of his health risk, not necessarily their real presence, determines the investor to hold more or less risky assets. (Christelis et al. 2005) ***health*** = 1 excellent; = 2 very good; = 3 good; = 4 fair; = 5 poor (self-evaluation).
Country	South countries (*south*)	Dummy variable was created for the respondents from Italy or Spain. This will capture the differences between the respondents that are resident in south countries and those from north of Europe.
Income	Income quantile: Quantile 1 (*inc01*) Quantile 2 (*inc02*) Quantile 3 (*inc03*) Quantile 4 (*inc04*)	This variable was analyzed by the level of income that the entire household had in an average month in previous year. ***inc01*** = 1 if total income received by all household members in an average month in previous year belongs to quantile 1 (0 thru 1100€). ***inc02*** = 1 if total income received by all household members in an average month in previous year belongs to quantile 2 (1100€ thru 1800€). ***inc03*** = 1 if total income received by all household members in an average month in previous year belongs to quantile 3 (1800€ thru 3200€). ***inc04*** = 1 if total income received by all household members in an average month in previous year belongs to quantile 4 (3200€ thru highest).
Employment status	Employment status: Employed (*emp*) Unemployed (*unemp*) Disabled (*dsbld***) Homemaker (*hmmkr***) Retired (*ret***) Other (*oth***)	***emp*** = 1 employed or self-employed; 0 otherwise. ***unemp*** = 1 unemployed; 0 otherwise. ***dsbld*** = 1 disabled or permanently sick; 0 otherwise. ***hmmkr*** = 1 homemaker; 0 otherwise. ***ret*** = 1 retired; 0 otherwise. ***oth*** = 1 rentier, living off own property, student, doing voluntary work; 0 otherwise.
Wealth	Wealth: Logarithm of Liquid wealth (*lnwlth*) Financial wealth (*wlthF*) Real wealth (*wlthR*) Total wealth (*wlthT*) Liquid wealth (*wlthLIQ*) Amount of liabilities (*libil*)	These variables were constructed by following Christelis et al. (2005). Financial wealth is the sum of the seven categories of financial assets: bank and other transaction accounts, government and corporate bonds, stocks, mutual funds, individual retirement accounts, contractual savings for housing and life insurance policies owned by the household. Real wealth is the sum of the value of the primary residence net of the mortgage on it, the value of other real estate, the owned share of own business and the owned cars Amount of liabilities is defined as the sum of all household debts. A variable is a difference between a gross financial assets and financial liabilities of the respondent. Liquid wealth, defined as the sum of all financial and real wealth, minus liabilities. This variable is an indicator of all resources that are available to household members. ***lnwlth*** = logarithm of liquid wealth of the respondent. ***wlthF*** = financial wealth of the respondent (bank accounts, bonds, stocks, mutual funds, retirement accounts, contractual savings for housing, life insurance). ***wlthR*** = real wealth of the respondent (properties, businesses, cars). ***wlthT*** = total wealth of the respondent (financial wealth and real wealth). ***wlthLIQ*** = liquid wealth of the respondent. ***libil*** = amount of liabilities of the respondent.
Inflation	Inflation (*inf*)	***inf*** = variation of average consumer prices.

* variables computed only for wave 2
** variables computed only for wave 4
Source: Variables were computed using the data from the SHARE survey.

TABLE IV

VARIABLES CONSTRUCTION (cont.)

	Independent Variables	Description
Marital Status	Married (*married*)	These variable was transformed in a dummy variable to distinguih between married and not married respondents. ***married*** = 1 if the respondent is married; 0 otherwise.
Education	Education: (*educ*) (*educ2*)	To construct the education variable, we follow Atella et al.(2012) The education systems are different between the countries of SHARE, direct comparison between educational qualifications of the individuals is difficult. Therefore, for the education indicator, we will consider the years of education.. Represent the number of years of education of the respondent/of his partner. ***educ*** = number of years of education of the respondent. ***educ2*** = number of years of education squared of the respondent.
Specific Revenue	Interest or dividend received (*interdivid*)	***interdivid**** = amount of interest or dividend income that the respondent and his partner received from their savings in bank accounts, bonds, stocks or mutual funds in last year.
	Interest from banks accounts (*i_bnk**)	***i_bnk**** = amount of interest income received by respondent and his partner from bank accounts in previous year.
	Interest from bonds (*i_bond**)	***i_bond**** = amount of interest income that the respondent and his partner received from bonds in previous year after taxes.
	Interest or dividend from mutual funds (*intmf**)	***intmf**** = amount of interest or dividend income that the respondent and his partner received from mutual funds in previous year after taxes.
	Dividends from stocks (*divstk**)	***divstk*** = dividends from stocks.
Job Situation	Permanent job contract (*permjob*)	***permjob*** = 1 respondent have a permanent-term contract; 0 otherwise.
	Employed in public sector (*firmpubsect*)	***firmpubsect*** = 1 if the respondent is employed in the public sector; 0 otherwise.
Risk attitude	Risk aversion (*riskaversion**)	Dummy variable was created to distinguis between that respondent that is not willing to take any financial risk and others respondents. ***riskaversion**** = 1 not willing to take any financial risks; 0 the other respondents that is willing to take some risks.
Income	Earnings from employment per year after taxes (*incemp*) Logarithm of earnings from employment per year after taxes (*logincemp**)	***incemp*** = earnings from employment per year after taxes. ***logincemp*** = logarithm of earnings employment per year after taxes.
	Earnings from self-employment per year after taxes (*incsem*)	***incsem*** = earnings per year after taxes from self-employment.
Expectation	Living will be better (*livingbebetter**) Living will be worse (*livingbeworse**)	Is a continuous variable. The answer is between 0 and 100. By standard of living they mean the ability to buy goods and services. ***livingbebetter**** = chances that standard of living will be better. ***livingbeworse**** = chances standard of living will be worse.
	Retirement age will raise (*raiseretage*) Government will reduce pensions (*redpension*)	The chances that retirement age will raise are betwen 0 and 100. ***raiseretage*** = probability of government raises retirement age. ***redpension*** = probability of government reduces pensions before the retirement of the respondent.
	Job Advancement (*jobadvance*)	These variable represent the expectation of the repondent of a job advancement. ***jobadvance*** = 1 respondent strongly agree that prospects for job advancement are poor; = 2 respondent agree that prospects for job advancement are poor; = 3 respondent disagree that prospects for job advancement are poor; = 4 respondent strongly disagree that prospects for job advancement are poor.
	Work after 63 (*workafter63*)	These variable represent the expectation of the respondent that he will work after 63. ***workafter63*** = chance to work after age of 63.
Religion	Frequency of praying (*freqpraying*)	***freqpraying*** = 1 pray more than once a day; = 2 pray once daily; = 3 pray a couple of times a week; = 4 pray once a week; = 5 pray less than once a week; = 6 never pray.
Trust	Trust (*trust*)	The answer is on a scale from 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted. ***trust*** = the level of trust of the respondent in other people where 0 means you can't be too careful and 10 means that most people can be trusted.

* variables computed only for wave 2
** variables computed only for wave 4
Source: Variables were computed using the data from the SHARE survey.

TABLE V

SUMMARY STATISTICS FOR THE DATA FROM WAVE 2 (2007)

	Dependent Variables	Mean	Std. Deviation	Minimum	Maximum
Financial Assets	Bondholder (*bnds*)	0,08	-	0	1
	Stockholder (*stcks*)	0,19	-	0	1

	Dependent Variables	Mean	Std. Deviation	Minimum	Maximum
Credit Constraints	Credit Constraints (*creditconstr*)	1,90	13,34	-14,29	30,00
Age	Age (*age*)	55,18	3,94	50	78
	Age squared (*age2*)	3060,48	449,59	2500	6084
Gender	Female (*fem*)	0,46	-	0	1
Education	Years education (*educ*)	12,88	4,01	0	25
	Years education squared (*educ2*)	182,00	108,81	0	625
Marital Status	Married (*married*)	0,53	-	0	1
Children	Children (*chldrn*)	1,90	1,26	0	9
Health	Health (*health*)	2,77	0,93	1	5
Country	South Europe Countries (*south*)	0,14	-	0	1
Income	Income quantile: 0 thru 1100€ (*inc01*)	0,10	-	0	1
	Income quantile: 1100€ thru 1800€ (*inc02*)	0,17	-	0	1
	Income quantile: 1800€ thru 3200€ (*inc03*)	0,34	-	0	1
	Income quantile: 3200€ thru highest (*inc04*)	0,39	-	0	1
Employment status	Employed (*emp*)	0,90	-	0	1
	Unemployed (*unemp*)	0,10	-	0	1
Wealth	Logarithm of Liquid wealth (*lnwlth*)	11,64	1,93	4,61	18,42
	Liquid wealth (*wlthLIQ*)	548361,23	4314808,56	100,00	100042000
	Financial wealth (*wlthF*)	57194,22	142388,75	0	2620000
	Real wealth (*wlthR*)	533008,52	4396663,21	0	100006000
	Total wealth (*wlthT*)	553132,08	4314777,91	100	100042000
	Amount of liabilities (*libil*)	-22303,72	40358,64	-250000	0
Specific Revenue	Interest or dividend received (*interdivid*)	479,99	1470,20	0	20000
	Interest from banks accounts (*i_bnk**)	479,99	1470,20	0	20000
	Interest from bonds (*i_bond**)	982,19	1583,85	0	7500
	Interest or dividend from mutual funds (*intmf**)	1000,28	4351,14	0	45000
	Dividends from stocks (*divstk**)	1132,32	4019,36	0	40000
Job Situation	Permanent job contract (*permjob*)	0,89	-	0	1
	Employed in public sector (*firmpubsect*)	0,24	-	0	1
Risk attitude	Risk aversion (*riskaversion**)	0,65	-	0	1
Expectation	Living will be better (*livingbebetter**)	31,86	30,63	0	100
	Living will be worse (livingbeworse*)	45,71	33,77	0	100
	Retirement age will raise (*raiseretage*)	53,52	37,21	0	100
	Government will reduce pensions (*redpension*)	49,12	36,10	0	100
	Job Advancement (*jobadvance*)	2,21	0,87	1	4
	Work after 63 (*workafter63*)	35,47	38,27	0	100
Religion	Frequency of praying (*freqpraying*)	2,38	1,75	1	6
Trust	Trust (*trust*)	5,63	2,45	0	10
Inflation	Inflation (*inf*)	1,94	0,46	1,58	2,84

Number of observations: 1309

Source: Autor´s calculation based on the data of the Wave 4 of SHARE

TABLE VI

SUMMARY STATISTICS FOR THE DATA FROM WAVE 4 (2011)

	Dependent Variables	Mean	Std. Deviation	Minimum	Maximum
Financial Assets	Bondholder (*bnds*)	0,09	-	0	1
	Stockholder (*stcks*)	0,16	-	0	1

	Dependent Variables	Mean	Std. Deviation	Minimum	Maximum
Credit Constraints	Credit Constraints (*creditconstr*)	6,75	11,71	-7,63	24,41
Age	Age (*age*)	59,09	4,11	50	82
	Age squared (*age2*)	3508,33	501,66	2500	6724
Gender	Female (*fem*)	0,48	-	0	1
Education	Years education (*educ*)	14,17	5,56	7	20
	Years education squared (*educ2*)	226,50	153,09	49	400
Marital Status	Married (*married*)	0,48	-	0	1
Children	Children (*chldrn*)	1,94	1,24	0	9
Health	Health (*health*)	2,89	0,97	1	5
Country	South Europe Countries (*South*)	0,27	-	0	1
Income	Income quantile: 0 thru 1100€ (*inc01*)	0,10	-	0	1
	Income quantile: 1100€ thru 1800€ (*inc02*)	0,19	-	0	1
	Income quantile: 1800€ thru 3200€ (*inc03*)	0,37	-	0	1
	Income quantile: 3200€ thru highest (*inc04*)	0,35	-	0	1
Employment status	Employed (*emp*)	0,59	-	0	1
	Unemployed (*unemp*)	0,07	-	0	1
	Disabled (*dsbld***)	0,02	-	0	1
	Homemaker (*hmmkr***)	0,03	-	0	1
	Retired (*ret***)	0,28	-	0	1
	Other (*oth***)	0,01	-	0	1
Wealth	Logarithm of Liquid wealth (*lnwlth*)	11,73	1,92	3,91	16,23
	Liquid wealth (*wlthLIQ*)	326852,44	513327,33	100	11247000
	Financial wealth (*wlthF*)	323435,90	511881,27	50	11237000
	Real wealth (*wlthR*)	52003,56	109287,92	0	1605000
	Total wealth (*wlthT*)	298780,84	472007,08	0	10220000
	Amount of liabilities (*libil*)	-15913,48	36860,73	-293000	0
Specific Revenue	Interest or dividend received (*interdivid*)	1579,09	2941,62	0	16000
Job Situation	Permanent job contract (*permjob*)	0,78	-	0	1
	Employed in public sector (*firmpubsect*)	0,39	-	0	1
Expectation	Retirement age will raise (*raiseretage*)	33,33	57,74	0	100
	Government will reduce pensions (*redpension*)	30,00	43,59	0	80
	Job Advancement (*jobadvance*)	2,13	0,94	1	4
	Work after 63 (*workafter63*)	50,00	70,71	0	100
Religion	Frequency of praying (*freqpraying*)	3,33	2,58	1	6
Trust	Trust (*trust*)	5,17	0,98	4	7
Inflation	Inflation (*inf*)	1,42	0,39	0,93	2,04

Number of observations:1049

Source: Autor´s calculation based on the data of the Wave 4 of SHARE

Table VII

CORRELATIONS FOR THE DATA FROM WAVE 2 (2007)

		Stockholder (stcks)	Bondholder (bnds)	Age (age)	Female (fema0le)	Number of children (chldrn)	Employed (emp)	Income quantile 1 (inc01)	Income quantile 2 (inc02)	Income quantile 3 (inc03)	Wealth (lnwlth)	Health status (health)	Credit constrained (creditconstr)	Inflation (inf)	South countries (south)	Trust in other people (trust)	Risk aversion (risk)
Stockholder (stcks)	Pearson Correlation	1															
	Sig. (2-tailed)																
Bondholder (bnds)	Pearson Correlation	0,200**	1														
	Sig. (2-tailed)	0,00															
Age (age)	Pearson Correlation	0,03	0,074**	1													
	Sig. (2-tailed)	0,28	0,01														
Female (female)	Pearson Correlation	-0,105**	0,01	-0,04	1												
	Sig. (2-tailed)	0,00	0,62	0,19													
Number of children (chldrn)	Pearson Correlation	-0,03	-0,03	0,04	-0,02	1											
	Sig. (2-tailed)	0,27	0,25	0,17	0,37												
Employed (emp)	Pearson Correlation	0,113**	0,055*	-0,117**	0,04	-0,05	1										
	Sig. (2-tailed)	0,00	0,05	0,00	0,14	0,08											
Income quantile 1 (inc01)	Pearson Correlation	-0,112**	-0,04	0,05	0,05	0,02	-0,253**	1									
	Sig. (2-tailed)	0,00	0,10	0,10	0,08	0,38	0,00										
Income quantile 2 (inc02)	Pearson Correlation	-0,130**	-0,063*	0,03	0,03	-0,05	-0,119**	-0,154**	1								
	Sig. (2-tailed)	0,00	0,02	0,21	0,22	0,09	0,00	0,00									
Income quantile 3 (inc03)	Pearson Correlation	-0,03	0,00	-0,03	0,03	-0,03	0,125**	-0,241**	-0,328**	1							
	Sig. (2-tailed)	0,30	0,89	0,22	0,24	0,26	0,00	0,00	0,00								
Liquid Wealth (lnwlth)	Pearson Correlation	0,237**	0,083**	0,03	-0,04	0,00	0,191**	-0,211**	-0,179**	0,04	1						
	Sig. (2-tailed)	0,00	0,00	0,25	0,11	0,91	0,00	0,00	0,00	0,14							
Health status (health)	Pearson Correlation	-0,081**	0,00	,068*	-0,02	-0,03	-0,142**	0,125**	0,05	-0,02	-0,175**	1					
	Sig. (2-tailed)	0,00	0,98	0,01	0,53	0,25	0,00	0,00	0,08	0,45	0,00						
Credit constrained (creditconstr)	Pearson Correlation	-0,070*	-0,181**	-0,058*	-0,05	0,04	0,04	0,088**	0,079**	-0,04	,087**	-0,03	1				
	Sig. (2-tailed)	0,01	0,00	0,03	0,07	0,15	0,16	0,00	0,00	0,17	0,00	0,36					
Inflation (inf)	Pearson Correlation	-0,109**	,119**	0,03	-0,04	-0,088**	-0,135**	0,169**	0,04	-0,098**	-0,057**	0,116**	0,317**	1			
	Sig. (2-tailed)	0,00	0,00	0,33	0,14	0,00	0,00	0,00	0,11	0,00	0,04	0,00	0,00				
South countries (south)	Pearson Correlation	-0,110**	-0,054*	-0,03	-0,055*	-0,02	-0,055*	0,159**	0,076**	-0,081**	0,02	0,05	0,841**	0,776**	1		
	Sig. (2-tailed)	0,00	0,05	0,34	0,05	0,40	0,04	0,00	0,01	0,00	0,48	0,06	0,00	0,00			
Trust in other people (trust)	Pearson Correlation	0,073**	0,00	0,01	-0,03	-0,05	0,057*	-0,057*	-0,062*	-0,02	,066*	-0,147**	0,097**	-0,01	0,04	1	
	Sig. (2-tailed)	0,01	0,99	0,82	0,23	0,08	0,04	0,04	0,03	0,51	0,02	0,00	0,00	0,74	0,14		
Risk aversion (risk)	Pearson Correlation	-0,393**	-0,152**	0,01	0,125**	0,05	-0,065*	0,146**	0,098**	-0,03	-0,207**	0,080**	0,133**	0,133**	0,168**	-0,094**	1
	Sig. (2-tailed)	0,00	0,00	0,60	0,00	0,08	0,02	0,00	0,00	0,28	0,00	0,00	0,00	0,00	0,00	0,00	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Number of observations:1309

Source: Author's calculation based on the data of SHARE

TABLE VIII

CORRELATIONS FOR THE DATA FROM WAVE 4 (2011)

		Stockholder (stcks)	Bondholder (bnds)	Age (age)	Female (female)	Number of children (chldrn)	Employed (emp)	Income quantile 1 (inc01)	Income quantile 2 (inc02)	Income quantile 3 (inc03)	Wealth (lnwlth)	Health status (health)	Credit constrained (creditconstr)	Inflation (inf)	South countries (south)
Stockholder (stcks)	Pearson Correlation	1													
	Sig. (2-tailed)														
Bondholder (bnds)	Pearson Correlation	0,202**	1												
	Sig. (2-tailed)	0,00													
Age (age)	Pearson Correlation	-0,01	0,01	1											
	Sig. (2-tailed)	0,80	0,73												
Female (female)	Pearson Correlation	-0,07	-0,03	-0,10	1										
	Sig. (2-tailed)	0,03	0,41	0,00											
Number of children (chldrn)	Pearson Correlation	-0,05	-0,117**	0,072*	0,01	1									
	Sig. (2-tailed)	0,13	0,00	0,02	0,84										
Employed (emp)	Pearson Correlation	0,063*	0,01	-0,468**	0,05	-0,05	1								
	Sig. (2-tailed)	0,04	0,77	0,00	0,09	0,11									
Income quantile 1 (inc01)	Pearson Correlation	-0,105**	-0,06	0,02	-0,02	-0,01	-0,124**	1							
	Sig. (2-tailed)	0,00	0,07	0,46	0,57	0,86	0,00								
Income quantile 2 (inc02)	Pearson Correlation	-0,121**	-0,05	0,121**	0,02	-0,02	-0,105**	-0,161**	1						
	Sig. (2-tailed)	0,00	0,09	0,00	0,62	0,43	0,00	0,00							
Income quantile 3 (inc03)	Pearson Correlation	-0,03	0,02	-0,063*	0,078*	-0,03	0,02	-0,256**	-0,362**	1					
	Sig. (2-tailed)	0,30	0,54	0,04	0,01	0,33	0,60	0,00	0,00						
Liquid Wealth (lnwlth)	Pearson Correlation	0,187**	0,072*	-0,01	-0,073*	-0,01	0,074*	-0,253**	-0,153**	-0,01	1				
	Sig. (2-tailed)	0,00	0,02	0,69	0,02	0,85	0,02	0,00	0,00	0,70					
Health status (health)	Pearson Correlation	-0,06	-0,01	,068*	0,03	0,01	-0,125**	0,203**	0,112**	-0,109**	-0,173**	1			
	Sig. (2-tailed)	0,06	0,73	0,03	0,30	0,63	0,00	0,00	0,00	0,00	0,00				
Credit constrained (creditconstr)	Pearson Correlation	0,02	0,01	0,06	-0,073*	0,06	0,065*	-0,093**	-0,03	0,04	0,127**	-0,128**	1		
	Sig. (2-tailed)	0,60	0,69	0,06	0,02	0,06	0,04	0,00	0,37	0,22	0,00	0,00			
Inflation (inf)	Pearson Correlation	-0,080**	0,00	-0,094**	0,03	-0,05	-0,04	0,065*	0,061*	-0,04	-0,062*	0,081**	-0,785**	1	
	Sig. (2-tailed)	0,01	0,89	0,00	0,41	0,12	0,23	0,03	0,05	0,25	0,05	0,01	0,00		
South countries (south)	Pearson Correlation	-0,127**	0,117**	-0,05	-0,062*	-0,04	0,00	0,01	0,100**	-0,03	0,04	0,01	-0,05	0,589**	1
	Sig. (2-tailed)	0,00	0,00	0,08	0,05	0,20	0,94	0,68	0,00	0,28	0,24	0,66	0,10	0,00	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Number of observations:1049

Source: Author's calculation based on the data of SHARE