LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER

FINANCE

MASTER´S FINAL WORK

DISSERTATION

SOCIO ECONOMIC DETERMINANTS OF HOMEOWNERSHIP

RAFAEL DE LOUÇÃO FIGUEIRA

OCTOBER-2018

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SUPERVISION:

MARIA TERESA MEDEIROS GARCIA

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Abstract

This thesis studies the determinants of homeownership using a logit model that predicts if an individual is homeowner or not based on their characteristics. To examine this the Wave 6 (2015) from the Survey of Health Ageing and Retirement in Europe (SHARE) is used. Using a sample of 46 003 respondents across all of Europe, the various determinants suggested by the literature review were tested and the results are compared with the literature. The results show that the following factors influence homeownership: geographic location, age, gender, number of children, marital status, job situation, household income, high education, years of education, political orientation and holding bonds, stocks, mutual funds, bank accounts, saving accounts, IRA and life insurance. The main determinant to homeownership is the respondent's geographical location and unexpectedly, political orientation is a determinant of homeownership. The model was also performed in four different samples constituted each with respondents from eastern, southern, northern and western Europe. The results obtained between them and the full sample test prove that the determinants of homeownership are not the same for every region, even considering only European countries.

***Keywords**: Homeowner, Homeownership, Home, SHARE, Europe, Logit, Determinants*

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1. Introduction

The net benefits of homeownership are unclear, but the increase of this rate has been a priority for public policy in many OECD countries. According to Andrews and Sánchez, (2011), this goal is usually reached by giving a preferential tax treatment in favour homeownership comparing with rent.

From an individual perspective, the decision of buying a home is one of the most important financial decisions to make in life considering that it affects the household both in their house consumption and investment decisions.

The decision that the household must make is how they will get a house for personal consumption, will they acquire it or rent it. This decision is affected by emotional, value expressive and ideological aspirations that are in turn usually influenced by culture and homeownership policies (Tabner, 2016). The different needs of different households can also determine which type of housing tenure they might prefer, since ownership and renting produce different output benefits.

To better understand homeownership, it is necessary to find the socio economic characteristics that determine if an individual is a homeowner or not. In order to do that, the micro data from SHARE database is used to test diverse individual characteristics that might affect homeownership. Therefore, the aim of this study is to identify which are the determinant characteristics of an adult homeowner and in which way these characteristics affect the probability of being an owner or not.

This study also analyses the effect that geography has in the willingness to buy a private house. To quantify this effect, geography is tested as a variable that explains homeownership, and after, if different geographic locations have different homeownership determinants.

Moreover, it is important to take into account that this study aims to be an update of previous studies as it is based in more recent data as well as a test of diverse types of individual characteristics in one single test. In contrast to previous studies, the

respondents are above 50 years old, which is also an opportunity to test the diverse variables suggested by previous studies on people that probably have reached their last stage of life. This means that the type of housing tenure chosen will probably be more unlikely to change in the future when compare to people from other age groups.

This study is divided in six different sections. The first section presents the problem within this study and subject of analysis. The second section gives an historical overview of homeownership in Europe and exposes findings from previous studies about homeownership determinants. In the third section there is an explanation of how the research question might be answered, displaying which model is used and the methodology. The fourth section contains the analysis of the data, presents the database, show the sample characteristics, and the variable statistics are given. The fifth section presents the empirical results obtained. Finally, in the sixth section, the conclusions, limitations and future perspectives of this study are demonstrated as well as reflective observations.

2. Homeownership

Homeownership or owner-occupancy is a type of housing tenure, where the dwelling is owned by the occupants, producing in this manner housing services for their own consumption (ILO *et al*, 2004).

In the 2000's, there was a big transformation in housing tenure patterns with a big growth of homeownership in most developed countries (Atterhog, 2006).

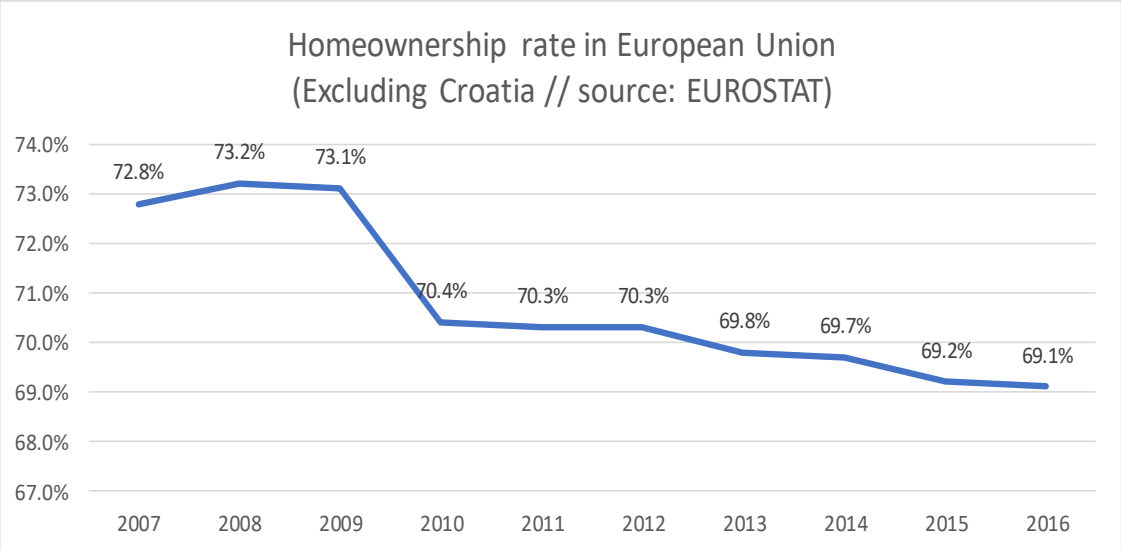

Figure 1: Homeownership rate in EU

Figure 1 shows the homeownership rate in European Union from 2007 to 2016. As it can be seen from the graph, from 2008, the homeownership rate has started to decrease in the European Union, changing the increasing tendency of the previous periods. From the beginning of the European debt crisis at the end of 2009, there was a considerable drop of 2.7 p.p. of homeownership rate until the end of 2010. The rate slowly decreases over the next six years until it reached its lowest point in 2016, 69,1%.

Sinai and Souleles (2005) studied the cost-benefit framework of a household's tenure choice. The decision whether to buy or rent a house exposes the household to different risks. On one hand, the homeowner faces the price risk, but they can use homeownership as a hedge against the risk of fluctuation in rent price by using it as a way to predict housing services payments. Furthermore, they have more flexibility to

change the house, as for an example, the colour of the walls. On the other hand, the renter is exposed to the rent price, but they prevent the responsibility of some maintenance costs. The results provide supportive evidence that the longer the household is expecting to stay in the house, the lower the risk of owning compared to renting.

Considering the two tenure modes, it is important to understand which one maximises the household's utility and identify the determinants of homeownership. Research has highlighted the social and financial benefits of homeownership to households and the importance of the housing sector.

In terms of financial benefits, homeownership can be a vehicle of wealth accumulation. This result in a higher accumulation for the owners when compared with non-holders (Andrews and Sánchez 2011). Moreover, the owner-occupied housing can benefit favoured tax treatment. For many OECD countries, mortgage interest costs are tax deductible and just few of them have tax imputed rent, where even those sometimes under-estimate the rental value.

In addition to financial benefits, homeownership brings social benefits. Haurin *et al.* (1994) state that homeownership is associated with better test scores and behaviour of children. This may be explained by the higher levels of geographical stability and better home environments of owners when compared with renters. Along this same line of thinking, Yun and Evangelou (2016) reinforce the positive impact of owning a home. A better performance of children education, higher civic participation, more volunteering activity, improved health care, reduced crime rates and reduced welfare dependency.

Additionally, homeowners are more informed and involved with the community (Di Pasquale and Glaeser, 1999), being more likely than renters to support long-run political choices that benefits their community. On the contrary, renters have more incentive for policies that bring short-run benefits (Richer, 1996; Andrews and Sánchez, 2011). In other words, a sense of belonging to the community is also created by homeownership as the owner has a financial stake in the neighbourhood.

In order to understand whether an individual will buy or rent a house, researchers have tried to understand individual, demographic and family characteristics of a homeowner (Hood, 1999).

Age has major importance in explaining the equilibrium of housing tenure outcomes (Hilber, 2007). Firstly, the certainty of income increases the likelihood to commit to homeownership (Hood, 1999). An increase of experience in the workforce or in a company reduces the likelihood of household income losses in the future. Moreover, due to possessing less wealth younger households need more time to accumulate the necessary savings to buy their first house. This investment is highly undiversified and represents higher proportion in the wealth of a younger household than in an older one. Another reason is mobility. Homeownership rate rises with the age because younger people are more likely to be single and to change their job. As they are more mobile, the homeownership rate is lower (Hood, 1999; The National Association of Realtors, 2011).

Marital status is important to explain homeownership as it has a strong correlation with mobility (The National Association of Realtors, 2011). In other words, married couples are more likely to own a home than a single individual as they are more willing to "settle down". Married couples are also more able to cross the income and wealth constrain than single individuals. The desire of couples to have children, increases the net benefits of owning a house in the future turning perhaps the purchase of a house a smart decision (Hood, 1999; Lauridsen and Skak, 2007).

According to Oswald (1996), the unemployment rate is higher for owner-occupants than renters. This can be explained by the higher transition costs associated with buying a home, since it reduces the mobility of the owners. This hypothesis has been subject to debate. Brunet and Lesueur (2003) through their study in France concluded that homeownership increases the unemployment duration. Other authors found a negative relationship between homeownership and unemployment. Munch *et al.* (2006) agreed that homeownership reduces mobility but on the other hand increases the likely of finding local jobs, since they are probably more willing to accept lower wages.

The family size has a positive effect on homeownership decision, as pointed by Haurin *et al.* (2002). Gyourko and Linneman (1996) concluded that there is an increase of 20% on the willingness to own a home when comparing those with children to those without. However, according to a study by Hood (1999) and Li (1977), the probability of owning a house increases with the family size up to a point, after that point adding a new member in the family decreases the probability of owning a house.

According to many studies, income has a positive relationship with homeownership (Lauridsen and Skak, 2007; Yun and Evangelou, 2016). However, Hood (1999) divides the effect to direct and indirect influences. Income is directly related because the opportunity of owning a house increase as the income rises since an individual with a higher salary has more potential to cover the initial costs incurred by ownership. It also is indirect in that as the income rises, the relative costs of ownership decreases. As the costs are constants, an increase of income will reduce the proportion of these costs in income. Furthermore, the better financing and credit conditions for higher income individuals and the lower number of houses in lower prices ranges are also a barrier to lower income households (Yun and Evangelou, 2016; Hood, 1999).

The gender of the household head also affects the likelihood of homeownership. A male head is more likely to own a house, since they are safe from some expected events that force them to leave the workforce, for example, due child bearing and rearing. This an advantage as they work constantly. They will gain more experience and easily maintain a certain level of income, therefore are more willing to commit to ownership as they are more likely to secure a loan or a mortgage (Hood, 1999).

There are several studies that show the positive relationship between education level and homeownership. Goodman and Mayer (2018) found that individuals with college degrees have higher probability of owning a house than those with a low educational level. Hood (1999) explains the reasons for that. First, an individual with a higher education level has more knowledge of how to purchase and maintain a house. Also, an individual with a higher education level knows more about future living expenses, and

for that reason will save more. Therefore, the creation of capital will increase the probability of having a loan approved.

Now looking at geography, Hilber (2007) on his study about homeownership across Europe concluded that the European integration on homeownership rate had not been achieved yet. Southern countries tend to present higher homeownership rates than continental countries, with exception of Ireland that has the highest homeownership rate.

The Gilderbloom and Markham (1995) study aims to test the conventional wisdom that homeownership has a conservative effect on political beliefs. The results of the study proved that homeownership has impact on the willingness to vote, but not on political attitudes. This finding challenges the traditional theoretical proposition such as Engels's theory (Engels [1935] 1975), notwithstanding accept the possibility of those theories been limited to certain geography or historical period.

Housing is usually the most important asset for households, making them hold a highly non-diversified portfolio (Fratantoni, 1998). By investing in housing and increasing the home value to wealth ratio, the exposure of the households to mortgage increases. This make households hold more conservative financial products then risky assets such stocks (Cho, 2014). The household investment portfolio is not equal in all life. Young families typically have a high-risk portfolio since they are highly leverage due to the large holding of real state comparing to their net wealth, so they usually invest more in bonds than stocks. Older households have more proneness to have stock since they have lower housing to net wealth ratio and had accumulated more wealth (Flavin and Yamashita, 2002).

3. Methodology

To answer the research question it is necessary to design a model that, based on individual characteristics, can predict if a person is a homeowner or not. Once the dependent variable takes restricted values (1 if respondent is a homeowner, 0 otherwise) the model becomes a limited dependent variable model (LDV).

$$P(y = 1|x) = G(\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k) = G(\beta_0 + x\beta)$$

G → function taking on values strictly between zero and one, where y is the dependent variable and x the independent variables.

Since maximum likelihood methods are indispensable to estimate an LDV, heteroskedasticity in Var(.x) is already accounted for, because the maximum likelihood estimation of y is based on the distribution of x (Wooldridge, 2012).

The use of logit regression does not need to respect the multivariate normality assumption. The relation between independent variables and the probability of owning a house is not linear, although it is linear with the log of the odds (Sharma, 1996). The normality of the error term does not need to be tested since the error term is symmetrically distributed about zero (Wooldridge, 2012).

The below equation is the logit regression model to analyse whether an individual is a homeowner or not:

(1) $\ln(odds(Homeowner|X)) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta X$

So, the probability of an individual owning a house with certain characteristics is given by the following equation:

(2) $p = \frac{1}{(1+e^{-\beta X})}$, where X_i are the considered independent variables and $\beta X = \sum_{i=1}^{n} \beta_i X_i$

To evaluate if the variables individually impact homeownership, the following hypotheses test must be carried out:

$$H_0: \beta_k = 0 \text{ vs } H_1: \beta_k \neq 0$$

If the null hypothesis is rejected, the variable is statistically significant. Meaning that there is evidence that the variable has effect on y.

This survey is divided into modules with different types of characteristics.

The dependent variable considered was the question dn002_, *"Your household is occupying this dwelling as*", from *Housing* module. The answers "*Owner*" and "*Member of a cooperative*" were categorized as owners, and "*Tenant*", "*Subtenant*" and "*Rent free*" as non-owners.

The independent variables come from diverse questionnaire modules, namely: *Demographic and Networks*; *Children*; *Employment and Pensions*; *Household Income*; *Assets*; and *Expectations*.

From the module *Demographics and Networks,* the variable *age* is extracted. Also, from this module, the variable *gender* is obtained, assuming 1 if the respondent is a male and 0 if is a female.

Regarding the country of the respondents and using the statistic standard M49, European countries were divided in 4 regions, (United Nations, 1999). The first one is the Western Europe, where is included Austria, Germany, Netherlands, France, Switzerland, Belgium, Ireland and Luxembourg. The second is the Northern Europe, with Sweden, Denmark and Estonia. The third, the Southern Europe with Spain, Italy, Greece and Portugal. The last one is Eastern Europe, including Czech Republic, Poland, Hungary, Slovenia, and Croatia.

Marital status can too be found in *Demographics and Networks* module. This variable was divided in 4 groups: married or proxy; divorced; widowed; and single.

From module *Employment and Pensions*, it is possible to extract *Job situation.* This variable was separated in 4 groups concerning their activity situation: The employed or

self-employed; the retired; the unemployed; homemaker; and permanently sick or disable and others.

In the *Household Income* module is possible to obtain the *household income* variable that represents the annual income earned by the total household.

The *Children* module contribute to the measure the family size, with the number of children of the respondent.

Education is different between countries, so it is necessary to convert the different education metrics to be possible an international comparison. UNESCO had created ISCED "as the official classification used to categorise and report cross-nationally comparable education statistics", (UNESCO Institute for Statistics, 2012). Therefore, to study education, it was used the generated variable-modules *gv_isced,* that included ISCED classification. This variable was divided in two groups, the ones with high education (ISCED 1997 classification at least 5), and the ones without high education (ISCED 1997 classification less than 5).

In the module *Expectations* the political orientation is questioned, in a scale of 10, here 0 is left extreme and 10 the right extreme. In this study, this variable is divided in 3 groups, the ones that respond values between 0 and 4 are left wing, the ones that said 5 are centre, and the responses between 6 and 10 are considered right wing.

Finally, the *Assets* module is used to find which types of financial product the respondents hold, more specifically, *bank accounts, saving accounts, life insurance, individual retirement accounts (IRA), bonds, mutual funds* and *stocks.*

In annex 1 the variables are described, and their expected test signs presented. This is sign represents the expected contribution of each variable to the probability of being a homeowner.

The following section presents the data source and the descriptive statistics of the data.

The software used to manipulate the data was Microsoft SQL Server Management Studio® 17. Stata® 14 was adopted in the construction of the regressions, descriptive statistics and statistical test.

4. Data

This study is based on micro data from the Survey of Health Ageing and Retirement in Europe, also known as SHARE. This project collects health, socio-economics and social network data on people above 50 years old. Started in 2004-2005 with wave 1 by collecting data from to several European countries, namely Austria, Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden, and Switzerland. In 2006-2007, Czech Republic, Ireland and Poland joined the SHARE project and it was compiled a first longitudinal follow-up. Then, in the wave 3, all antecedent respondents were questioned about their full life history data. Between wave 4 and wave 6, Israel, Luxembourg, Hungary, Portugal, Slovenia, Estonia and Croatia were added.

In order to find the current determinants of homeownership and compare with literature suggestions, the most recent data available, wave 6 with data from 2015, will be used.

The sample considered has 46 003 respondents, where the preferred type of occupying the household dwelling is as an owner, since 78% of the respondent are homeowners as is presented in annex 2.

The average age of respondents is 67.24 years old and the median value is equal to 67 years old. Comparing home owners with non-owners, this last group is older than owners. A home owner respondent is on average 66.97 years old while a non-owner is slightly older, 68.17 years old on average (annex 3,4 and 5).

Looking at the gender, in this sample, 55.69% are females, although the homeownership rate is slightly lower than males, 76.72% against 79.69% for males (annex 6).

Based on annex 7, the most representative region is Western Europe with almost two fifty of the respondents (36.94%), despise this, this group has the lower homeownership rate (68.94%). The second lowest rate is the Northern, which represents 15.81% of the population, with a homeownership rate of 80.55%. Easton Europe represents 21.32% of the respondents having a homeownership rate equal to 82.31%. The respondents with

highest likelihood of owning a home are the ones from Southern Europe. They represent 25.90% of the population and have a homeownership rate of 85.98%.

The marital status statistics can be found in annex 8. Married respondent represents 72.07% of respondents and are the most likely group to own a home, with a rate of 83.27%. With a similar homeownership rate level are the widowed and never married people, with 68.76% and 64.67%, representing together 19.21% of the sample. The respondents with lowest probability of owning a home are the divorced. They represent 8.72% of the population, and their homeownership rate is 25.33 p.p. lower than the married.

Using annex 9 it is possible to see that more than half people are retired (59.67%), notwithstanding that is not the group with highest homeownership rate, only 77.76%. The employed and homeworkers are groups with higher probabilities of owning a home, 80.64% and 81.83% respectively. In terms of representation, the employed are 23.95% of the sample and the homeworkers 8.86%. The population with the lowest homeownership rates are the unemployed and the permanent sick or disable and others, with approximately 64.59% and 69.66% correspondingly. These two groups together only represent 7.52% of the sample.

Regarding the household income, the mean value of this variable is 36 539.98€ where the median is situated on the 21 600€. With a skewness of 7.77 is possible to conclude that the distribution is right-skewed, represented by a long right tail, and the mass of the observations are concentrated on the left part of the distribution. If we look to the descriptive statistics in annex 10, the situation described can be verified. Around 47% of the respondents have an annual income below 20 000€, creating a high concentration on the left, and the maximum value is 1 101 124€, making a long right tail.

Concerning the number of children, on average, each respondent has 2.1 children, the median is equal to 2 and 70.11% of the sample has 2 or less children (annex 11 and 12). So, like in household income, the distribution of the number of children is right-skewed.

Only 22.11% of the respondents have higher education. Even though, people with higher education are slightly more probable to own a home, 82.2% comparing with the 76.85%

from respondents without high education (annex 13). If we look to the number of years that a respondent has been studying (annex 14), on average, 10.8 years of their life, and the median value of this variable is 11 years.

In terms of political orientation, the distribution of these three groups is not that different, 30.84% are left wing, 39.08% centre and 30.08% are right wing. This reflects a symmetrical distribution, as the skewness shows (value near zero) in annex 15. In terms of homeownership, left wing is less probable to own a home, since their homeownership is 76.78%, against 77% for centre and 80.69% for right wings respondents (annex 16).

The statistics about financial products is available on annexes 17 to 23. For almost all financial products, the respondents that hold them are slightly more likely to own a home than the ones that don't hold them. The homeownership rate between those that have a bank account is not very different compared to the ones without a bank account, 78.31% and 76.08% correspondingly. The holders of bank account are 87.81% of the respondents. Saving accounts are the exception in terms of homeownership rate. The non-holder of a saving account is more likely to own a home by 1.51 p.p. than a holder. In the opposite trend to bank accounts, 88.41% of the sample do not possess saving accounts. Another type of savings are the individual retirement accounts and this one is not very attractive to the respondents, only 22.82% of them hold them. The homeownership rate is 8.25 p.p. higher for IRA holders compared to those that do not have IRA. Looking at another type of product, only 21.74% of the population have life insurance. From those, 82.41% are homeowners, meaning that the holders of life insurance have higher probability than the non-holders, since the last ones have a homeownership rate of 76.26%.

For the securities, the results are similar. Starting with bonds, a holder has 8.36 p.p. greater probability of owning a home than a non-holder. The difference between mutual funds holders and non-holders is slightly lower, 7.63 p.p.. Regarding stocks, the homeownership rate for a holder is 86.62% against 76.9% for the ones that do not invest in stocks. The number of respondents that hold these products, stocks and mutual funds

are 11.73% and 13.41%, and the safer product, bonds, are only invested in 4.51% of the sample.

5. Results

The empirical results from this study and the comparison with literature results are presented in the following section.

The following table 1 presents the results from the final logit model for homeownership. Compared to the base model (annex 25) only two variables were manipulated in order to obtain a better output. These manipulations will be explained when the results of the corresponding variables are demonstrated.

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	0.9905	-0.00958	0.00166	-5.720	0.00	***
d_male	1.0457	0.04471	0.02702	1.730	0.08	*
d_euroe	2.9506	1.08202	0.11680	27.330	0.00	***
d_euron	1.6317	0.48959	0.06167	12.950	0.00	***
d_euros	4.1921	1.43321	0.15802	38.020	0.00	***
d_married	2.4464	0.89461	0.11446	19.120	0.00	***
d_divorced	0.8199	-0.19855	0.04526	-3.600	0.00	***
d_widowed	1.4060	0.34074	0.07744	6.190	0.00	***
d_kids4	1.6627	0.50845	0.08982	9.410	0.00	***
d_highedu	1.1591	0.14767	0.04075	4.200	0.00	***
yedu	1.0336	0.03300	0.00348	9.810	0.00	***
lhhincome	1.1042	0.09909	0.01821	6.010	0.00	***
d_empl	1.2156	0.19526	0.07156	3.320	0.00	***
d_unempl	0.6689	-0.40218	0.05322	-5.050	0.00	***
d_homework	1.6128	0.47795	0.11064	6.970	0.00	***
d_ret	1.4859	0.39600	0.08320	7.070	0.00	***
d_lefttwing	0.8645	-0.14561	0.02477	-5.080	0.00	***
d_rightwing	1.1161	0.10983	0.03324	3.690	0.00	***
d_bankacc	1.3777	0.32043	0.05285	8.350	0.00	***
d_bonds	1.2473	0.22101	0.08533	3.230	0.00	***
d_ira	1.5019	0.40671	0.05136	11.890	0.00	***
d_lifeins	1.3061	0.26706	0.04255	8.200	0.00	***
d_mutfunds	1.4244	0.35377	0.05934	8.490	0.00	***
d_savacc	1.0802	0.07719	0.04156	2.010	0.05	**
d_stocks	1.5038	0.40799	0.06989	8.780	0.00	***
_cons	0.1341	-2.00926	0.02932	-9.190	0.00	***
Number of observations					46,003	
Log likelihood					-21,828.19	
Pseudo R^2					0.09870	
LR statistic					4,780.10	
Prob(LR statistic)					0.0000	

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 1: Final model output

The results from age variable are the opposite of the expected. Although age is statistically significant, an increase in one unit in age of the individual will cause a

reduction of 1% in the probability of owning a home. A possible reason for this result might be the fact that the survey is only applied for respondents over 50 years old, contrary to the literature data used.

The gender of the individual affects the homeownership rate. A male individual is 1.046 times more likely to own a home then a female individual. This result is consistent with the literature.

Looking at the geographic variables, these have a higher impact on homeownership probability. The probability of an individual being a homeowner is highest when this individual is from southern Europe, then eastern, followed by northern Europe, and then western Europe. Looking at respondents from southern Europe, these individuals are 4.19 times more likely to own a home than a western one, meaning that this result is consistent with Hilber (2007).

Marital status also plays an important role in explaining homeownership. As expected, marriage has a strong positive contribution to owning a home, as supported by the literature. A married individual is 2.45 times more likely to own a home than a single individual. A widowed individual is still more likely than a single person to be a homeowner and divorcees are 18% less probable to own a home than singles.

The variable number of children in the base model (annex 25) had a different impact than the expected (an increase in number of children reduces the probability of owning a home). So, in the final model it was substituted by d_kids4. This is a binary variable that assumes 1 if the respondent has 4 or less children and 0 otherwise. This decision is supported by the studies of Hood (1999) and Li (1977) that found that the probability of owning a house, due the increase of family size, is crescent until a certain point. The results of this manipulation are the in line with the literature. Unlike the number of children, d_kids4 has a positive contribution to the probability of owning a home. An individual that has 4 or less children is 1.66 times more likely to own a home than one with more than 4 children.

In terms of education, the results are coherent with the literature. An individual with higher education is 1.16 times more likely to own a home than an individual without

higher education. If we look at the impact of adding a year of education, it is possible to see that one additional year result in an increase of 3.35% on the homeownership probability.

The household income was the second variable manipulated. This variable in the base model (annex 25) was not statistically significant. Wooldridge (2012) explained that in most countries, income is skewed towards the upper tail, so it does not follow a normal distribution. In this case the natural log transformation can be applied to positive random variables to archive normality. Meanwhile, since household income is right skewed it makes sense to take the natural log. With this transformation, the variable turns statistically significant in every level, and an increase of 1% in annual household income, results in an increase of 0.1% in the probability of owning a home.

Regarding job situation, the results are more in line with Munch *et al.* (2006) than Oswald (1996). Although employed is not the job situation with higher contribution to the likelihood of being a homeowner, the unemployed characteristic has a negative impact on that probability. The homeworkers and the retired are the most probable to own a home, 1.61 and 1.49 times respectively when compared to permanent sick or disabled and others. After that, in terms of homeownership, we have the employed individual, and the lower rate goes to the unemployed individuals, being 33.12% less likely than permanent sick or disable and others.

There is statistical evidence that political orientation affects the probability of an individual owning a home contrary to Gilderbloom and Markham (1995) results. A left-wing orientated individual has a lower homeownership probability of 13.55% compared with a centre individual. If we look at the right-wing, the result is the opposite. A right-winger is 1.12 times more likely to own a home than a centre one.

Looking at the financial products, the results are the same for all products tested, owning a product will increase the probability of being a homeowner. Starting with banks accounts, the owners of an account are 37.77% more probable to own a home compared with those without. Holding a saving account also has a positive contribute,

but only 8%. Life Insurance and IRA owners are 1.31 and 1.50 times more probable to own a home, respectively, compared with non-owners of those products.

Concerning securities, holding them increases the homeownership probability. Quantifying the impact of holding these products on homeownership, the riskier products are the ones with higher impact. This result can be found by looking at the odds ratio, where the owner of bonds are 1.25 times more probable to own a home than a non-owner, the owner of mutual funds are 1.42 times, and the owner of stocks are 1.50 times.

Logistic model for d_homeowner

	True		
Classified	D	~D	Total
+	34967	8644	43611
-	932	1460	2392
Total	35899	10104	46003

Classified + if predicted Pr(D) >= .5
True D defined as d_homeowner != 0

Sensitivity	Pr(+| D)	97.40%
Specificity	Pr(-|~D)	14.45%
Positive predictive value	Pr(D| +)	80.18%
Negative predictive value	Pr(~D| -)	61.04%
False + rate for true ~D	Pr(+|~D)	85.55%
False - rate for true D	Pr(-| D)	2.60%
False + rate for classified +	Pr(~D| +)	19.82%
False - rate for classified -	Pr(D| -)	38.96%
Correctly classified		79.18%

Table 2: Classification table of the final model

This model explains 9.87% of homeownership due to pseudo R-squared of 0.0987 (Table 1). In terms of estimation quality, this model can predict correctly 79.18% whether an individual is a homeowner or not (Table 2).

Considering the big impact of geography on homeownership, it is important to understand if geography has impact on the determinants of homeownership. To check this, the model will be tested with four different samples, one for each regions of Europe with only respondents from that region. Table 3 represents the test for eastern Europe

sample, table 4 for southern Europe, table 5 northern Europe and table 6 western Europe.

Table 2 allow us to analyse results from the determinants of homeownership for respondents from in eastern Europe.

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	0.9809	-0.01932	0.00370	-5.120	0.00	***
d_male	1.0382	0.03752	0.06244	0.620	0.53	
d_married	2.0656	0.72543	0.27670	5.420	0.00	***
d_divorced	0.8871	-0.11979	0.13675	-0.780	0.44	
d_widowed	1.1922	0.17580	0.17440	1.200	0.23	
d_kids4	2.0058	0.69605	0.25859	5.400	0.00	***
d_highedu	1.6255	0.48580	0.18259	4.320	0.00	***
yedu	1.0080	0.00801	0.01035	0.780	0.44	
lhhincome	1.1184	0.11194	0.04393	2.850	0.00	***
d_empl	1.0502	0.04903	0.16131	0.320	0.75	
d_unempl	0.7175	0.57034	0.12935	-1.840	0.07	*
d_homework	1.7689	-0.33195	0.35707	2.830	0.01	***
d_ret	1.1234	0.11638	0.14744	0.890	0.38	
d_lefttwing	0.8368	-0.17812	0.05439	-2.740	0.01	***
d_rightwing	1.0258	0.02547	0.07180	0.360	0.72	
d_bankacc	1.6144	0.47895	0.10198	7.580	0.00	***
d_bonds	1.4002	0.33660	0.56864	0.830	0.41	
d_ira	0.7889	-0.23709	0.05925	-3.160	0.00	***
d_lifeins	1.3743	0.31796	0.10668	4.100	0.00	***
d_mutfunds	1.0005	0.00050	0.16714	0.000	1.00	
d_savacc	1.2777	0.24506	0.13614	2.300	0.02	**
d_stocks	1.3052	0.26637	0.22104	1.570	0.12	
_cons	1.0647	0.06273	0.50209	0.130	0.89	
Number of observations					9,809	
Log likelihood					-4,296.26	
Pseudo R^2					0.06140	
LR statistic					561.76	
Prob(LR statistic)					0.0000	

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 3: Final model output for eastern European

Age is a determinant to homeownership in eastern Europe, with a negative contribution. An increase of 1 year on the age of an individual represents a reduction of 1.91% on the probability of owning a home.

The gender of the respondent does not affect the probability of owning a home since it was found to be not statistically significant either a 1%, 5% or 10% level of significance.

Marital status remains as an important determinant of homeownership, being the most important in this sample. A married individual is 2.07 times more likely to own a home than a single person. Widowed and divorced are not relevant to explain homeownership when compared with singles in eastern Europe since they are not statistically significant at any level.

Family size, in this case the number of children, plays an important role. A respondent with four children or less is 2.06 times more probable of owning a home, compared with those with more than 4 children.

The results of education in Eastern Europe are a bit different from the final model. Owning a high education level is more important to explain homeownership than in the final model, although the number of years that the respondent had studied for are not relevant, once this variable is not statistically significant.

Concerning the income of the household, as expected the income is statistically significant in explaining homeownership and has a positive effect. The probability of owning a home increases 0.12% when the household income increases 1%.

One unexpected result is related to the job situation. Even though unemployed and homeworkers remain statistically significant, employed and retired are not when compared to permanent sick or disable and others.

In terms of political orientation, the results are slightly different from the final model. Left-wing orientation remains less probable than centre orientation in owning a home and right-wing was found to be not statistically significant. This means that being a right-wing person is not more likely to own a home than a centre orientated individual.

Looking at financial products, Eastern Europe presents different results. First, the securities, namely bonds, stocks and mutual funds are not statistically significant in the explication of homeownership. Second, the holders of IRA are 21.11% less likely to own a home than the non-holders. The possession of a bank account, life insurance and saving accounts, like in the final model, increase the likelihood of the respondents in being a homeowner.

The determinants of homeownership in southern Europe can be analysed on table 4.

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	1.0252	0.02491	0.00384	6.650	0.00	***
d_male	0.9364	-0.06573	0.05937	-1.040	0.30	
d_married	2.5318	0.92895	0.25964	9.060	0.00	***
d_divorced	0.9184	-0.08514	0.13101	-0.600	0.55	
d_widowed	1.3705	0.31515	0.16901	2.560	0.01	**
d_kids4	1.8864	0.63468	0.22910	5.230	0.00	***
d_highedu	0.8340	-0.18148	0.07565	-2.000	0.05	**
yedu	1.0362	0.03556	0.00771	4.780	0.00	***
lhhincome	1.2141	0.19399	0.04990	4.720	0.00	***
d_empl	1.4532	0.37373	0.18105	3.000	0.00	***
d_unempl	0.8592	0.41615	0.12986	-1.000	0.32	
d_homework	1.5161	-0.15170	0.18296	3.450	0.00	***
d_ret	1.5220	0.42003	0.17143	3.730	0.00	***
d_lefttwing	0.9051	-0.09967	0.05833	-1.550	0.12	
d_rightwing	0.9830	-0.01716	0.06666	-0.250	0.80	
d_bankacc	1.2290	0.20620	0.07695	3.290	0.00	***
d_bonds	1.3575	0.30561	0.20821	1.990	0.05	**
d_ira	1.2933	0.25723	0.18903	1.760	0.08	*
d_lifeins	1.2401	0.21523	0.17320	1.540	0.12	
d_mutfunds	1.6596	0.50659	0.32452	2.590	0.01	***
d_savacc	1.0733	0.07078	0.30451	0.250	0.80	
d_stocks	1.6155	0.47967	0.33647	2.300	0.02	**
_cons	0.0213	-3.85033	0.01075	-7.620	0.00	***
Number of observations					11,915	
Log likelihood					-4,592.59	
Pseudo R^2					0.04920	
LR statistic					475.62	
Prob(LR statistic)					0.0000	

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 4: Final model output for southern European

Age plays a different role in the explanation of homeownership in Southern Europe than the final model. An increase of 1 year in the age of an individual cause an increase of 2.52% in the probability of being a home owner.

Also for southern Europe, gender is not statistically significant either a 1%, 5% or 10% level of significance, meaning that there is not statistical evidence that gender is an explanatory variable of homeownership.

Another important determinant of homeownership in Southern Europe is marital status. A married individual is 2.53 times more likely to own a home than a single individual. Widow variable remains statistically significant like in the final model, where a widowed individual is 1.37 times more likely than a single one to be a homeowner. Divorced

variable is not statistically significant in all level of significance considered, meaning that it is not relevant in explaining homeownership when compared with single individuals.

Family size in southern Europe is consistent with the final model. A respondent with four children or less is 1.88 times more probable to own a home then one with more than 4 children.

The results from education variables are different in southern Europe when compared with the final model. Higher education is only statistically significant at a 10% and 5% significance level, and an individual with higher education is less likely to own a home in 17% then one without. Regarding years of education, the result is the opposite to higher education, an individual with 1 one more year of study, is 0.03% more probable to own a home.

Analysing the income variable, this one is statistically significant to explain homeownership with a positive effect. When a household from a southern country increase their household income by 1%, the probability of them owning a home increases 0.1%.

As expected, an employed respondent is more likely to be a homeowner than permanent sick or disable and others, 1.45 times more precisely. But, like in the final model, the most likely to own a home are the retired and homeworkers, 1.52 and 1.51 times more than a permanent disable or sick and others. Unemployed variable is not statistically significant when compared to permanent sick or disable and others.

Political orientation does not affect homeownership in southern Europe, considering that both left-wing and right-wing are not statistically significant, at all significance levels considered, when compared with centre orientated respondent.

Besides saving accounts and life insurance that are not statistically significant at 1%, 5% and 10% significance level, all other financial products are statistically significant with a positive contribution. This means that, a southern European that holds a bank account, bonds, IRA, mutual funds or stocks, is more likely to own a home than one that does not hold these products. Highlighting mutual funds and stocks since they are the products

with highest contribution to the probability of owning a home. A holder of stocks is 1.62 times more likely to own a home than a non-holder, and a holder of mutual funds 1.66 times more.

The homeownership determinants for northern European respondents is displayed on table 5.

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	0.9701	-0.03035	0.00481	-6.120	0.00	***
d_male	1.1813	0.16659	0.07725	2.550	0.01	**
d_married	3.1420	1.14487	0.35222	10.210	0.00	***
d_divorced	0.8009	-0.22206	0.10074	-1.770	0.08	*
d_widowed	1.4752	0.38879	0.19955	2.870	0.00	***
d_kids4	1.6688	0.51213	0.22445	3.810	0.00	***
d_highedu	1.1823	0.16749	0.10339	1.920	0.06	*
yedu	1.0163	0.01615	0.01095	1.500	0.13	
lhhincome	0.7580	-0.27704	0.03430	-6.120	0.00	***
d_empl	1.6018	0.47116	0.24938	3.030	0.00	***
d_unempl	0.8184	0.34187	0.21215	-0.770	0.44	
d_homework	1.4076	-0.20046	0.83056	0.580	0.56	
d_ret	1.8337	0.60634	0.29933	3.710	0.00	***
d_lefttwing	0.8894	-0.11719	0.07122	-1.460	0.14	
d_rightwing	1.0684	0.06616	0.08291	0.850	0.39	
d_bankacc	1.0896	0.08585	0.15869	0.590	0.56	
d_bonds	1.2825	0.24884	0.20188	1.580	0.11	
d_ira	1.9747	0.68042	0.15410	8.720	0.00	***
d_lifeins	1.1391	0.13020	0.08596	1.730	0.08	*
d_mutfunds	1.2491	0.22242	0.09664	2.870	0.00	***
d_savacc	1.2432	0.21770	0.27992	0.970	0.33	
d_stocks	1.5211	0.41941	0.12163	5.250	0.00	***
_cons	42.3972	3.74708	25.53865	6.220	0.00	***
Number of observations					7,275	
Log likelihood					-3,215.28	
Pseudo R^2					0.10300	
LR statistic					738.01	
Prob(LR statistic)					0.0000	

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 5: Final model output for northern European

Like in the final model, homeownership in northern Europe is negatively affected by age. An increase of 1 year on the age of a respondent results in a decrease of 3% on the probability of being a home owner.

The gender also affects the homeownership rate. A male individual is 1.18 times more likely to own a home then a female individual.

The variable with more relevance to homeownership probability in northern Europe is the marital status. A marriage individual is 3.14 times more likely to be a home owner than a single one. A Widowed individual is 1.48 times more likely than single to own a home and a divorce one is 20% less probable to be a home owner than singles.

Family size results in northern Europe are consistent with the final model. A respondent with four children or less is 1.66 times more probable to be a home owner then one with more than 4 children.

Looking at the impact of education on homeownership of northern Europe respondents, it is possible to see that a respondent with higher education is more likely to own a home, 1.18 times more precisely. Regarding the number of years studied, this variable is not statistically significant at all significance levels considered.

The income of the household is statistically significant to explain homeownership, although with a different contribution than the final model. When the household income increases 1%, the probability of owning a home decreases -0.28%.

About job situation, an employed respondent is more likely to be a home owner than a permanent sick or disable and others, 1.60 times more precisely. Also retired are more probable to be a homeowner than permanent sick or disabled and others (1.83 times). Unemployed and homeworker variables are not statistically significant when compared to permanent sick or disabled and others.

Also in northern Europe, homeownership is not affected by political orientation. Left-wing and right-wing variables are not statistically significant at all significance levels considered, when compared with centre orientated respondent.

All financial products are statistically significant with a positive contribution to the probability of being a homeowner, except bank account, saving accounts and bonds. The financial products with higher contribute to homeownership probability are IRA and stocks. A holder of IRA is 1.97 times more likely to own a home than a non-holder, and a holder of mutual funds 1.52 times more than a non-holder.

Finally, we have the homeownership determinants for western European respondents in table 6.

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	0.9822	-0.01794	0.00250	-7.050	0.00	***
d_male	1.0179	0.01771	0.03850	0.470	0.64	
d_married	2.4838	0.90979	0.17046	13.260	0.00	***
d_divorced	0.8305	-0.18572	0.06598	-2.340	0.02	**
d_widowed	1.5300	0.42529	0.12583	5.170	0.00	***
d_kids4	1.4908	0.39931	0.12047	4.940	0.00	***
d_highedu	1.1603	0.14864	0.05494	3.140	0.00	***
yedu	1.0528	0.05144	0.00482	11.230	0.00	***
lhhincome	1.1831	0.16814	0.02861	6.950	0.00	***
d_empl	1.2272	0.20471	0.10811	2.320	0.02	**
d_unempl	0.6000	0.65688	0.07899	-3.880	0.00	***
d_homework	1.9288	-0.51086	0.20880	6.070	0.00	***
d_ret	1.9060	0.64501	0.16954	7.250	0.00	***
d_lefttwing	0.8747	-0.13384	0.03723	-3.140	0.00	***
d_rightwing	1.2613	0.23212	0.05549	5.280	0.00	***
d_bankacc	1.5307	0.42570	0.16763	3.890	0.00	***
d_bonds	1.1202	0.11355	0.10321	1.230	0.22	
d_ira	1.7995	0.58753	0.08754	12.080	0.00	***
d_lifeins	1.3195	0.27727	0.05759	6.350	0.00	***
d_mutfunds	1.5552	0.44158	0.08522	8.060	0.00	***
d_savacc	1.0927	0.08864	0.04760	2.030	0.04	**
d_stocks	1.5733	0.45318	0.10296	6.930	0.00	***
_cons	0.0724	-2.62623	0.02448	-7.760	0.00	***
Number of observations						17,004
Log likelihood						-9,452.60
Pseudo R^2						0.10200
LR statistic						2,167.96
Prob(LR statistic)						0.0000

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 6: Final model output for western European

Age is consistent with the final model, where this variable has a negative effect on homeownership probability. An increase of 1 year on the age of a respondent results in a decrease of 1.8% on homeownership probability.

Like in the global test, in western Europe gender is not statistically significant either a 1%, 5% or 10% levels of significance, so there is no statistical evidence that gender is an explanatory variable of homeownership.

Also, the more relevant variable to explain homeownership probability is marital status. A married individual is 2.48 times more probable to live in an owned house than a single person. A windowed individual is 1.53 times more likely than single to own a home and a divorcee is the least likely to live in an owned house, 16.95% less probable than singles.

In western Europe, the respondents with four children or less are 1.49 times more likely to be a home owner then the ones with more than 4 children, being consistent with the final model.

The results from education are also consistent with the final model. The presence of higher education increases the likelihood of a western European respondent being a homeowner, 1.16 times more precisely. Regarding years of education the results are also in line, an individual with 1 one more year of study is 0.05% more probable to own a home.

About the household income, this variable effects positively the likelihood of being a homeowner. When the household income increases 1%, the probability of owning a home increase 0.17%.

Considering the job situation, the results shows that homeworkers and the retired are the most probable to own a home, 1.93 and 1.91 times respectively when comparing with permanent sick or disable and others. After we have the employed individual and the lower rate goes to the unemployed individuals, that are 40% less likely to own a home than permanent sick or disable and others.

In western Europe, there is statistically evidence that political orientation has an effect on the probability of an individual own a home. A left-wing orientated individual has a homeownership probability 12.53% lower than a centre individual. If we look at the right-wing, the result is the opposite. A right-wing is 1.26 times more likely to live in a own house than a centre orientated individual.

All financial products are statistically significant with a positive contribution to the probability of being a homeowner, except bonds. The financial product that affect the probability of owning a home more is IRA. A holder of IRA is 1.8 times more likely to own a home than a non-holder.

6. Conclusion

This thesis examines the determinants of homeownership from a sample of 46 003 respondents over 50 years old. Through the results of the regression analyses we find different contributions for the variables geographic location, age, gender, number of children, marital status, job situation, household income, high education, years of education, political orientation and holding bonds, stocks, mutual funds, bank accounts, saving accounts, IRA and life insurance. The tests performed allowed an analysis of how the determinants affect the willingness of being a homeowner.

Geographic variables have a higher impact on homeownership. Respondents from southern, eastern or northern Europe (decreasing in likelihood) are more likely to be a homeowner than a respondent from western Europe.

Another main determinant is the marital status of the respondent. As expected, married and widowed individuals are more likely to own a home than a single one. Contrarily, divorced individuals are less likely than singles.

Regarding the variable job situation, homeworkers and retired individuals are more likely to own a house. The employed individual remains more likely than permanent sick or disable and others, while the unemployed are even less likely than this last group.

Although homeownership was predicted to have a positive relation with age, the findings of this paper seem to refute this hypothesis. The negative relation determined for age can be explained by the small range of ages in this survey.

Also, political orientation wasn't expected to be a determinant. A right-wing individual is more probable to live in an own home than a centre orientated one, while a left-wing is less likely than a centre. This supports the claim brought by Gilderbloom and Markham (1995) that these studies might be too limited to certain regions or historical periods.

The variables gender, education and household income, all have a positive impact on the probability of an individual being a homeowner. A male is more probable to be a

homeowner than a woman. A higher level of education and also income increases the probability of being an owner.

Regarding the number of children, this variable increases the probability of being a homeowner until a certain point, more precisely 4 children.

In terms of financial products, holding them has a positive impact on homeownership. Highlighting the fact that the products with higher impact on homeownership are the riskier ones, namely stocks and mutual funds, as expected.

The model was also performed on respondents from specific regions. The results indicate that homeownership is affected by different determinants compared to the entire sample and have different influences.

The marital status results are consistent with the full sample in northern and western Europe. In southern Europe, divorced characteristic is not significant when compared with singles, and in eastern Europe both divorced and widowed are not significant when compared with the singles.

Regarding job situation, besides western Europe, all other regions have different results. In northern Europe, only employed and retired are relevant when compared with permanent sick or disable and others, while in southern Europe only unemployed are not significant when comparing with the same group. In eastern Europe, the results are the opposite of northern Europe, with only unemployed and homeworkers as significant when compared with permanent sick or disable and others.

The gender of an individual doesn't have impact on the likelihood of owning a home in southern and western European countries. Contrarily, a male individual from northern or eastern Europe is more probable to own a home than a female one.

Concerning family size, in all European regions, an individual with 4 or less children is more likely to live in an own home then one with more than 4 children.

The tests about education, prove that in eastern and northern countries, higher education increases the probability of being a homeowner while an additional year of

education is not significant to explain homeownership. In western Europe, both higher education and an additional year have a positive impact on the probability of homeownership. The results from southern Europe are different, since holding a higher education diploma reduces the probability of living in an own home, while an additional year increases the probability.

About the household income, all the regions have the expected result except northern Europe, where an increase on the household income reduces the probability of this individual be a homeowner.

In northern and southern Europe, the political orientation of an individual has no effect on the homeownership probability. Left-wing individuals from eastern Europe are less likely to be a homeowner than a centre one, but there is no statistical difference in terms of probability when comparing a right-wing to a centre one. In western Europe, the results are in line with the first test.

Holding financial products increases the probability of owning a home in all regions, with some exceptions. In eastern Europe, holding bonds, mutual funds or stocks have no effect on the probability of owning a home, while holding IRA reduces that probability. In the southern countries, life insurance and saving accounts are not relevant to the probability of homeownership. In northern countries, bonds, back accounts and saving accounts, and looking to western European countries, only bonds are not relevant.

Despite some characteristics were proven as determinants of homeownership, the geographical differences prove that is difficult to design a general model that can predict if an individual is homeowner or not for any region, even for Europe.

One of the main limitations of this research is the small range of the age of the sample, which can bias some results of some determinants.

However, these results could be a starting point for many studies about individual determinants of homeownership. For example, to test these determinants in different age range or to a specific geographic region to produce a model that can predict homeowners per region.

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8. Annex

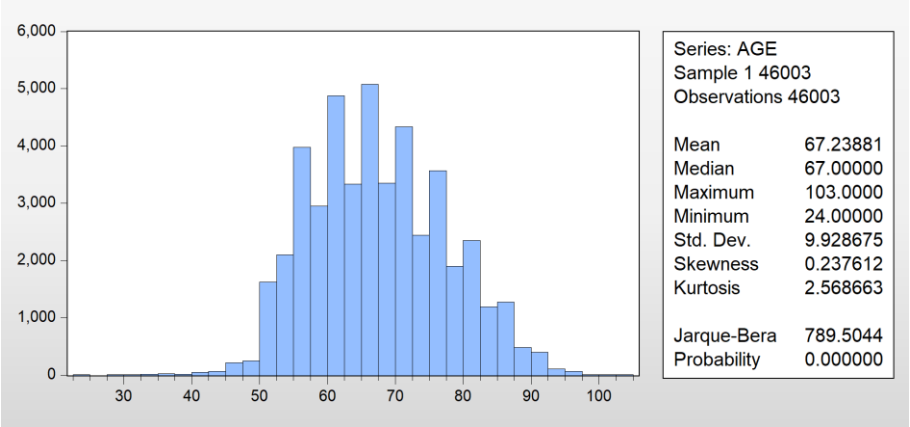
Annex 1 – Variables table

Question	Variable	Values	Expected Signal
Dependent variable			
Homeowner	d_homeowner	1 if own a house // 0 otherwise	
Independent variable			
Age	age	Number of years of the individual	+
Gender	d_male	1 if male // 0 if female	+
Country	d_eurs	1 if in Southern Europe	+
	d_eurn	1 if in Northern Europe	+
	d_eure	1 if in Eastern Europe	?
	Otherwise	Is in Western Europe	-
Marital Status	d_married	1 if is married or proxy	+
	d_divorced	1 if is divorced	-
	d_widowed	1 if is widowed	?
	Otherwise	Otherwise is single	-
Household Income	hhincome	Last year total household income	+
Job situation	d_empl	1 if is employed or self-employed	?
	d_unempl	1 if is unemployed	?
	d_ret	1 if respondent is retired	?
	d_homework	1 if respondent is homeworker	?
	Otherwise	Is permanently sick or disable and others	?
#Children	Nchild	Number of children of the responded	+
Education	d_higheduc	1 if has higher education // 0 otherwise	+
Bank accounts	d_bankacc	1 if holds a bank account	?
Saving accounts	d_savacc	1 if holds a saving account	?
Life Insurance	d_lifeins	1 if holds a life insurance	?
IRA	d_ira	1 if holds an IRA	?
Bonds	d_bond	1 if holds bonds	?
Mutual Funds	d_mutfunds	1 if holds mutual funds	?
Stocks	d_stocks	1 if holds stocks	?
Political Orientation	d_leftwing	1 if answer less than 5 is left-wing	-
	d_rightwing	1 if answer more than 5 is right-wing	+
	Otherwise	If is answer 5 is centre	?

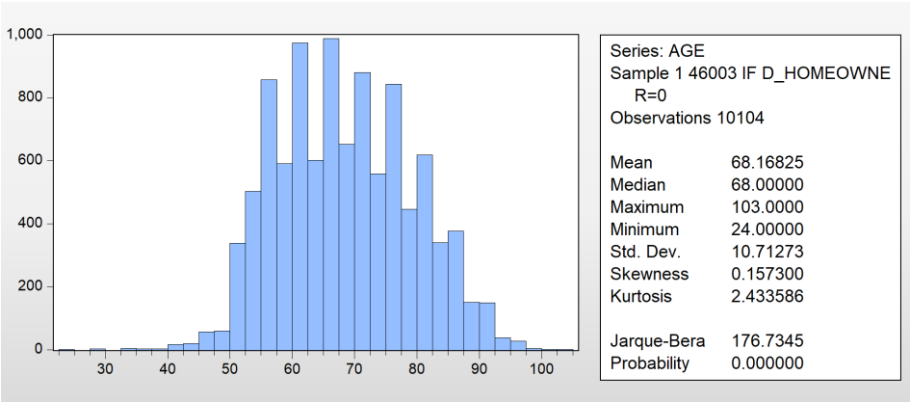
Annex 2 - Homeownership descriptive statistics

	D_HOMEOWNER
Mean	0.780362
Median	1.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.414006
Skewness	-1.354402
Kurtosis	2.834406
Jarque-Bera	14117.26
Probability	0.000000
Sum	35899.00
Sum Sq. Dev.	7884.779
Observations	46003

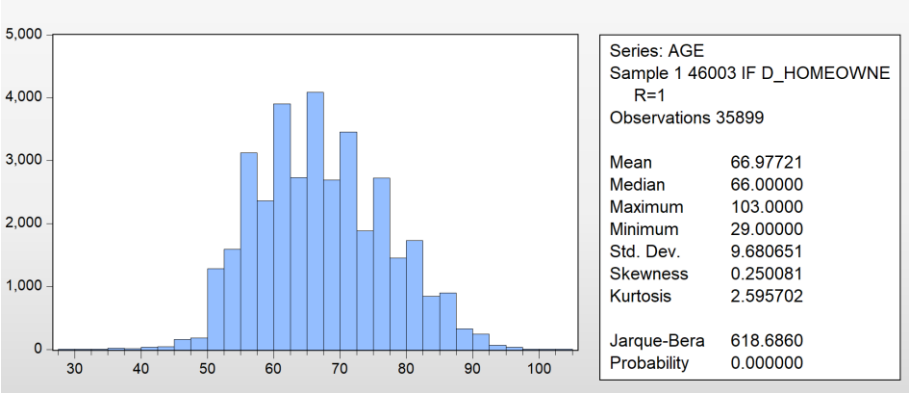
Annex 3 - Age descriptive statistics



Annex 4 – Age descriptive statistics for a non-homeowner



Annex 5 – Age descriptive statistics for homeowners



Annex 6 – Gender and homeownership (%)

% Total		D_MALE		
% conditional		0	1	Total
D_HOMEOWNER	0	12,96	9,00	21,96
		23,28	20,31	21,96
	1	42,73	35,31	78,04
		76,72	79,69	78,04
	Total	55,69	44,31	100,00
		100,00	100,00	100,00

Annex 7 – Geography and homeownership (%)

% Total		Geography				
% conditional		EuroW	D_EUROS	D_EURON	D_EUROE	Total
D_HOMEOWNER	0	11,48	3,63	3,08	3,77	21,96
		31,06	14,02	19,45	17,69	21,96
	1	25,48	22,27	12,74	17,55	78,04
		68,94	85,98	80,55	82,31	78,04
	Total	36,96	25,90	15,81	21,32	100,00
		100,00	100,00	100,00	100,00	100,00

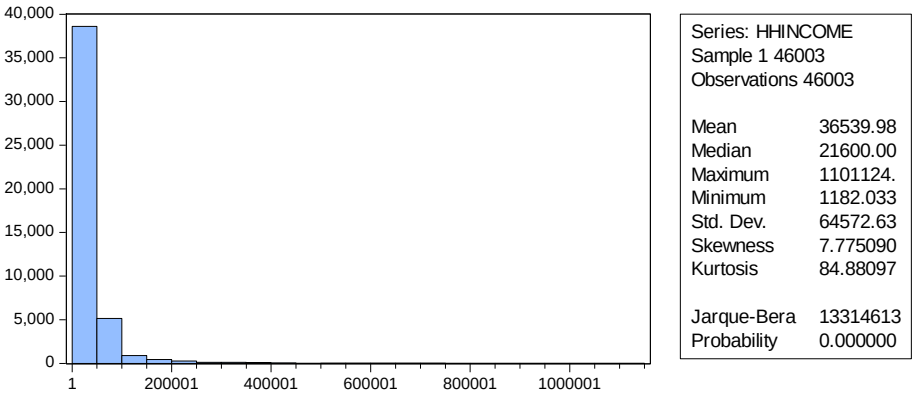
Annex 8 – Marital Status and homeownership (%)

% Total		Marital Status				
% conditional		D_MARRIED	D_DIVORCED	D_WIDOWED	Others	Total
D_HOMEOWNER	0	12.06	3.67	4.28	1.95	21.96
		16.73	42.06	31.24	35.33	21.96
	1	60.01	5.05	9.41	3.57	78.04
		83.27	57.94	68.76	64.67	78.04
	Total	72.07	8.72	13.69	5.52	100.00
		100.00	100.00	100.00	100.00	100.00

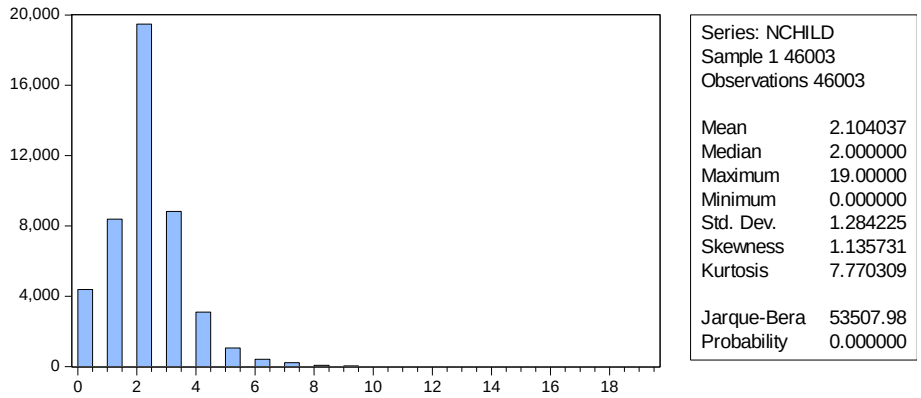
Annex 9 – Job situation and homeownership (%)

% Total		Job Situation					
% conditional		D_EMPL	D_UNEMPL	D_HOMEWORK	D_RET	Others	Total
D_HOMEOWNER	0	4.64	1.09	1.61	13.27	1.35	21.96
		19.36	35.41	18.17	22.24	30.34	21.96
	1	19.31	1.98	7.25	46.40	3.10	78.04
		80.64	64.59	81.83	77.76	69.66	78.04
	Total	23.95	3.07	8.86	59.67	4.45	100.00
		100.00	100.00	100.00	100.00	100.00	100.00

Annex 10 – Annual household income descriptive statistics



Annex 11 – Number of children descriptive statistics



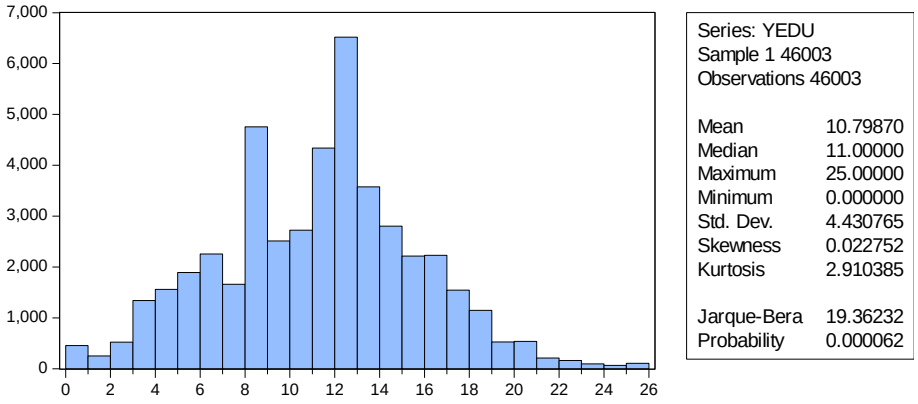
Annex 12 – Number of children distribution

Number of children				
Value			Cumulative	Cumulative
	Count	Percent	Count	Percent
0	4386	9.53	4386	9.53
1	8390	18.24	12776	27.77
2	19476	42.34	32252	70.11
3	8825	19.18	41077	89.29
4	3095	6.73	44172	96.02
5	1056	2.3	45228	98.32
6	409	0.89	45637	99.2
7	222	0.48	45859	99.69
8	74	0.16	45933	99.85
9	35	0.08	45968	99.92
10	15	0.03	45983	99.96
11	8	0.02	45991	99.97
12	5	0.01	45996	99.98
13	4	0.01	46000	99.99
14	1	0	46001	100
17	1	0	46002	100
19	1	0	46003	100
Total	46003	100	46003	100

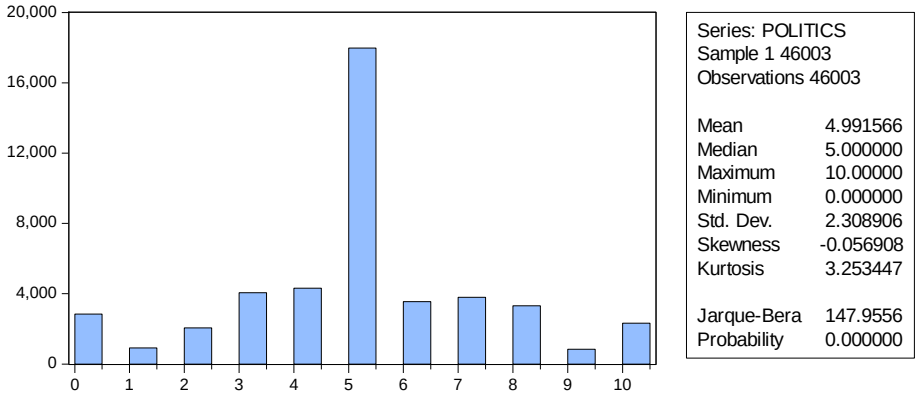
Annex 13 – High education and homeownership (%)

% Total		High Education		
% conditional		0	1	Total
D_HOMEOWNER	0	18.03	3.93	21.96
		23.15	17.80	21.96
	1	59.87	18.17	78.04
		76.85	82.20	78.04
	Total	77.89	22.11	100.00
		100.00	100.00	100.00

Annex 14 – Years of education descriptive statistics



Annex 15 – Political orientation descriptive statistics



Annex 16 – Political orientation and homeownership (%)

% Total		Political Orientation			
% conditional		Centre	D_LEFTTWING	D_RIGHTWING	Total
D_HOMEOWNER	0	8.99	7.16	5.81	21.96
		23.00	23.22	19.31	21.96
	1	30.09	23.68	24.27	78.04
		77.00	76.78	80.69	78.04
	Total	39.08	30.84	30.08	100.00
		100.00	100.00	100.00	100.00

Annex 17 – Bank accounts and homeownership (%)

% Total		Bank Account		
% conditional		0	1	Total
D_HOMEOWNER	0	2.92	19.05	21.96
		23.92	21.69	21.96
	1	9.27	68.76	78.04
		76.08	78.31	78.04
	Total	12.19	87.81	100.00
		100.00	100.00	100.00

Annex 18 – Saving accounts and homeownership (%)

% Total		Saving Account		
% conditional		0	1	Total
D_HOMEOWNER	0	19.26	2.70	21.96
		21.79	23.30	21.96
	1	69.15	8.89	78.04
		78.21	76.70	78.04
	Total	88.41	11.59	100.00
		100.00	100.00	100.00

Annex 19 – IRA and homeownership (%)

% Total		IRA		
% conditional		0	1	Total
D_HOMEOWNER	0	18.41	3.56	21.96
		23.85	15.60	21.96
	1	58.78	19.26	78.04
		76.15	84.40	78.04
	Total	77.18	22.82	100.00
		100.00	100.00	100.00

Annex 20 – Life insurance and homeownership (%)

% Total		Life Insurance		
% conditional		0	1	Total
D_HOMEOWNER	0	18.14	3.82	21.96
		23.18	17.59	21.96
	1	60.12	17.91	78.04
		76.82	82.41	78.04
	Total	78.26	21.74	100.00
		100.00	100.00	100.00

Annex 21 – Bonds and homeownership (%)

% Total		Bonds		
% conditional		0	1	Total
D_HOMEOWNER	0	21.33	0.63	21.96
		22.34	13.98	21.96
	1	74.16	3.88	78.04
		77.66	86.02	78.04
	Total	95.49	4.51	100.00
		100.00	100.00	100.00

Annex 22 – Mutual funds and homeownership (%)

% Total		Mutual Funds		
% conditional		0	1	Total
D_HOMEOWNER	0	19.91	2.06	21.96
		22.99	15.36	21.96
	1	66.69	11.35	78.04
		77.01	84.64	78.04
	Total	86.59	13.41	100.00
		100.00	100.00	100.00

Annex 23 – Stocks and homeownership (%)

% Total		Stocks		
% conditional		0	1	Total
D_HOMEOWNER	0	20.39	1.57	21.96
		23.10	13.38	21.96
	1	67.88	10.16	78.04
		76.90	86.62	78.04
	Total	88.27	11.73	100.00
		100.00	100.00	100.00

Annex 24– Correlation variables table

	age	d_male	d_euroe	d_euron	d_euros	d_married	d_divorced	d_widowed	d_kids4	d_highedu	yedu	lhhincome	d_empl
age	1.00												
d_male	0.05	1.00											
d_euroe	0.01	-0.03	1.00										
d_euron	0.02	0.01	-0.23	1.00									
d_euros	0.02	0.00	-0.31	-0.26	1.00								
d_married	-0.16	0.16	0.00	-0.02	0.08	1.00							
d_divorced	-0.09	-0.04	-0.02	0.04	-0.10	-0.50	1.00						
d_widowed	0.34	-0.20	0.06	-0.03	-0.01	-0.64	-0.12	1.00					
d_kids4	-0.04	0.00	0.02	-0.01	0.01	0.01	-0.01	-0.03	1.00				
d_highedu	-0.11	0.05	-0.11	0.14	-0.12	0.03	0.04	-0.09	0.03	1.00			
yedu	-0.24	0.07	0.02	0.17	-0.28	0.04	0.07	-0.14	0.07	0.52	1.00		
lhhincome	-0.17	0.08	-0.43	0.19	-0.16	0.17	-0.03	-0.18	0.02	0.24	0.23	1.00	
d_empl	-0.56	0.03	-0.10	0.11	-0.05	0.06	0.06	-0.17	0.03	0.16	0.24	0.26	1.00
d_unempl	-0.18	0.01	0.02	-0.04	0.03	-0.01	0.04	-0.05	-0.02	-0.03	-0.01	-0.09	-0.10
d_homework	0.00	-0.27	-0.09	-0.13	0.24	0.04	-0.08	0.05	-0.02	-0.12	-0.17	-0.09	-0.17
d_ret	0.59	0.14	0.13	0.00	-0.11	-0.05	-0.04	0.13	0.00	-0.05	-0.09	-0.12	-0.68
d_lefttwing	-0.05	0.04	-0.01	0.00	0.04	0.00	0.03	-0.04	0.01	0.08	0.08	0.02	0.04
d_rightwing	0.05	0.04	-0.06	0.10	-0.01	0.02	-0.02	0.00	-0.01	0.02	0.02	0.05	-0.01
d_bankacc	-0.04	0.02	-0.17	0.11	-0.18	0.04	0.03	-0.08	0.02	0.10	0.12	0.25	0.08
d_bonds	0.01	0.02	-0.09	0.02	0.02	0.03	-0.02	-0.03	0.02	0.07	0.06	0.11	0.01
d_ira	-0.25	0.03	0.01	0.23	-0.25	0.06	0.03	-0.11	0.03	0.17	0.24	0.22	0.30
d_lifeins	-0.20	0.02	0.01	0.12	-0.23	0.07	0.01	-0.09	0.00	0.13	0.18	0.18	0.21
d_mutfunds	0.00	0.04	-0.15	0.20	-0.16	0.04	-0.01	-0.05	0.02	0.15	0.16	0.23	0.05
d_savacc	-0.06	0.01	-0.01	-0.12	-0.20	0.03	0.00	-0.04	0.03	0.05	0.09	0.07	0.05
d_stocks	-0.01	0.04	-0.12	0.26	-0.15	0.06	-0.01	-0.06	0.02	0.17	0.16	0.23	0.07

	d_unempl	d_homework	d_ret	d_lefttwing	d_rightwing	d_bankacc	d_bonds	d_ira	d_lifeins	d_mutfunds	d_savacc	d_stocks
d_unempl	1.00											
d_homework	-0.06	1.00										
d_ret	-0.22	-0.38	1.00									
d_lefttwing	0.02	-0.04	-0.01	1.00								
d_rightwing	-0.03	0.01	0.02	-0.44	1.00							
d_bankacc	-0.06	-0.08	0.01	0.02	-0.01	1.00						
d_bonds	-0.03	-0.01	0.01	0.01	0.02	0.07	1.00					
d_ira	-0.02	-0.11	-0.18	0.03	0.04	0.14	0.04	1.00				
d_lifeins	-0.02	-0.10	-0.12	0.02	0.00	0.14	0.02	0.27	1.00			
d_mutfunds	-0.04	-0.05	0.02	-0.01	0.07	0.13	0.18	0.18	0.13	1.00		
d_savacc	-0.03	-0.05	0.01	0.02	-0.01	0.10	0.01	0.12	0.14	0.05	1.00	
d_stocks	-0.04	-0.06	0.00	-0.03	0.09	0.12	0.17	0.20	0.14	0.33	0.02	1.00

Annex 25– Base model for homeownership

Variable	Odds ratio	coef.	str. Error	Z	Prob	
age	0.9901	-0.01000	0.00166	-5.970	0.00	***
d_male	1.0485	0.04739	0.02706	1.840	0.07	*
d_euroe	2.6935	0.99083	0.09655	27.640	0.00	***
d_euron	1.6177	0.48101	0.06096	12.760	0.00	***
d_euros	3.9867	1.38297	0.14697	37.510	0.00	***
d_married	2.7785	1.02190	0.13534	20.980	0.00	***
d_divorced	0.8939	-0.11215	0.05063	-1.980	0.05	**
d_widowed	1.5422	0.43320	0.08748	7.640	0.00	***
nchild	0.9297	-0.07288	0.00857	-7.910	0.00	***
d_highedu	1.1796	0.16517	0.04138	4.710	0.00	***
yedu	1.0341	0.03354	0.00348	9.970	0.00	***
hhincome	1.0000	0.00000	0.00000	1.590	0.11	
d_empl	1.2478	0.22142	0.07324	3.770	0.00	***
d_unempl	0.6512	-0.42899	0.05174	-5.400	0.00	***
d_homework	1.6300	0.48858	0.11177	7.130	0.00	***
d_ret	1.4981	0.40422	0.08381	7.230	0.00	***
d_lefttwing	0.8661	-0.14378	0.02479	-5.020	0.00	***
d_rightwing	1.1186	0.11211	0.03329	3.770	0.00	***
d_bankacc	1.4071	0.34153	0.05371	8.950	0.00	***
d_bonds	1.2552	0.22733	0.08585	3.320	0.00	***
d_ira	1.5259	0.42255	0.05210	12.370	0.00	***
d_lifeins	1.3207	0.27817	0.04298	8.550	0.00	***
d_mutfunds	1.4459	0.36873	0.06012	8.870	0.00	***
d_savacc	1.0789	0.07592	0.04151	1.970	0.05	**
d_stocks	1.5308	0.42580	0.07098	9.180	0.00	***
_cons	0.6121	-0.49086	0.08353	-3.600	0.00	***
Number of observations					46,003	
Log likelihood					-21,857.22	
Pseudo R^2					0.09700	
LR statistic					4,722.06	
Prob(LR statistic)					0.0000	

Note: The standard errors are in parentheses.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.