Homeownership Inequality and the Access to Credit Markets

(Can Credit Availability Explain Cross-country Differences in the Inequality of
Homeownership across Income of Young Households?)

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ABSTRACT

This paper focuses on the cross-country differences in homeownership rates and the extent this variation can be explained by differences in the degree of financial development of the mortgage market. Expecting that home ownership among the young is mostly driven by their ability to borrow (against their future income) to buy their homes we focus on households 18 to 40 years of age. We use the newly developed Luxembourg Wealth Study and focus on five countries: Finland, Germany, Italy, the UK and the US.

We find that aside from Italy, homeownership rates and inequality in the four countries more or less correspond to their mortgage take up rates and its distribution across income, reflecting the different degree of size and development of their respective mortgage markets. In Italy, however, alternative ways of financing a home such as family transfers substitute the limited mortgage availability and take up rates. The mortgage market in the UK is the most open (in terms of mortgage take up) and the most equal (in terms of the distribution of mortgage take-up across household income deciles), which leads to the highest and most equally distributed homeownership in this country as well. The mortgage market in Germany is on the other side of the spectrum with very low mortgage take-up rates and strong dependence of homeownership and mortgage take up on household income (high homeownership/mortgage income inequality). Finland and the US are in-between.

Counterfactual predictions suggest that although household characteristics play some role in explaining the observed (and predicted) variation in home ownership rates across the five countries, it is mostly the country specific effects of these characteristics determined by the institutional environment as well as the functioning of the housing and mortgage markets that drive the main result. We conclude that in the absence of alternative sources, mortgage availability is the main determinant of home ownership across countries and also across income deciles within countries.

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1. Introduction

One of the important decisions individuals make during the life-cycle is the amount they wish to spend on housing services and whether or not to combine it with ownership. Given that housing is a major component of both consumption and investment, it absorbs a large portion of the household budget and in many countries is the largest item of households' wealth portfolios. Homeownership does not necessarily have to be preferable to renting. Individuals may prefer not to carry the risks and costs related to owning their homes. Homeownership may also decrease mobility and migration and thus lead to inefficiencies in the labor market. Nevertheless, in many countries, homeownership is identified as the preferred form of living arrangement and receives preferential treatment over renting, for example, in the tax code. It is seen as the principal means by which households accumulate wealth, at the same time providing a flow of services. As a major private asset, housing may also serve as a source of financial security and income during retirement. When compared to other forms of living arrangements, homeownership brings higher housing satisfaction across individuals in several European countries (Diaz-Serrano 2006). Owning ones home in some countries is also considered an important signal of social status and economic success (Constant et al 2007). However, rates of homeownership vary substantially across countries. In a sub-sample of highly developed countries we find[1] cross-country variation in homeownership among young households, ranging from 21.4 % of homeowners in Germany to 63.9 % of homeowners in the UK. ,

Recent literature has highlighted credit access as one of the key determinants of homeownership, next to permanent income, the cost of owning relative to renting, and household characteristics (Chiuri and Jappelli 2003, 2007; Ortalo-Magne and Rady 1999). Meanwhile mortgage market development also varies cross-nationally and exhibits a range of characteristics. Unless households have accumulated enough savings or have access to informal loans, the ability to purchase homes is largely determined by access to formal credit, in this case, mortgage availability.

Given the importance of housing as a primary and preferred asset and source of security, the aim of this paper is to examine the cross-country variation in homeownership rates and homeownership-income inequality among the young. We also explore to what extent this variation can be explained by differences in the degree of financial development of the mortgage markets in these countries.

The analyses in this paper are in many ways original partly because we use the Luxembourg Wealth Study data, which are new (the database has just been finalized in November 2007) and partly because there are relatively few methodological conventions available for measuring and comparing housing wealth. As we explore the role of mortgage availability in determining the observed variation in homeownership rates, we focus our analysis on young households (18 to 40 years of age), who are most likely to depend on mortgage access to finance their home purchases. It is unlikely that these households have high enough savings from their short labor market career to be able to buy their home without other funds. Therefore, unless they have an initial endowment in the form of wealth or transfers from their parents, they have to take a mortgage to finance their home purchase. We therefore expect home ownership among the young to be mostly driven by their ability to borrow (against their future income) to buy their homes. As a result we would expect that in countries with more developed consumer credit markets, such as the US or the UK, higher home-ownership and lower homeownership-income

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[1] See Table 1.

inequality than observed elsewhere. In the latter part of the paper, we link our findings to country-specific institutional and regulatory environments and discuss the likely impacts of the currently proposed European mortgage market integration.

We find that the mortgage market in the UK is the most open (in terms of mortgage take up) and the most equal (in terms of the distribution of both homeownership and mortgage take-up across household income deciles). The mortgage market in Germany is on the other side of the spectrum, with very low mortgage take-up rates and strong dependence of homeownership and mortgage take up on household income (high homeownership/mortgage income inequality). Finland and the US are in between - both in terms of homeownership and mortgage take up inequality - with the Finnish mortgage market and homeownership distribution somewhat more equal than in the US. While it is possible that it is the high financial development of the mortgage market that ensures high homeownership rates and wide mortgage availability in the US, it is also the relatively small housing prices that lead to a similar result for Finland. The ranking of the four countries according to homeownership rates and inequality more or less correspond to their mortgage take up rates and its distribution across income, reflecting the different degrees of development of the markets for housing debt.

The only country that does not fit the rankings is Italy. While it has low use of mortgages, similar to Germany, homeownership there is almost as high and equal across income as in the UK. The data and qualitative evidence suggest that it is the alternative sources of home ownership funding, namely transfers (and possibly loans) from family (and friends) that substitute the highly underdeveloped mortgage market in Italy.

Our paper is organized as follows. The introduction is followed by a section that discusses the economic background of our analysis and surveys related previous research. We next describe the data and methods and sample characteristics. This is followed by a discussion of housing and mortgage market characteristics and institutions. The results section first presents results on homeownership and mortgage take up rates and their distribution across income. This is followed by homeownership-income inequality measures and a section with results for a full probability model showing differences in homeownership and mortgages rates across income deciles. The last section of the results decomposes the cross-country differences due to effects and those due to characteristics, and predicts counterfactual homeownership rates based on cross-country interactions of effects and characteristics. A section discussing policy implications of our main results comes next, followed by conclusions.

2. Economic Background and Selected Research

The standard economic theory suggests that what really matters for the current well being (consumption or leisure) of the forward-looking utility maximizing household, is the present value of the sum of the current household wealth and the expected lifetime income. With perfect financial markets, where individuals can borrow against their future earnings, the distribution of the current consumption (and asset holdings) reflects the "overall" economic inequality in population, as given by the present value of lifetime resources. This is not the case when there are liquidity constraints: two households that are at the beginning of their career and that have the same expected lifetime resources - one with higher initial assets but flatter labor income profile, the other with lower initial assets but higher expected future earnings - are no longer economically equal when measured by current consumption or asset holdings.

As pointed out in Bertola and Koeniger (2004), countries with higher income inequality and instability, like the US and the UK, have the most developed financial

3

markets, whereas countries where consumer credit is still limited, such as countries of continental Europe, tend to have a more compressed wage distribution and higher income stability due to labor market regulations. Therefore, some of the impact of income inequality in the US and the UK is likely to be mitigated by easier access to consumer credit, whereas this is less likely to happen in countries of continental Europe. Due to differences in financial market development, the differences in the "overall" economic inequality between US and UK on the one hand, and continental Europe countries on the other, might be effectively smaller than documented by the current earnings and income inequality measures. Krueger and Perri (2002) show that the substantial increase in income inequality in the US over the past 30 years was accompanied by only a minor increase in consumption inequality, which suggests that the main cause of increased income inequality was higher income volatility and that the growth of consumer credit market made consumption-smoothing easier. In this paper, we explore whether the same also holds for wealth inequality across different countries, and, in particular, for the distribution of homeownership across income groups among the young. That is to what extent does access to credit markets help explain homeownership inequality.

What drives the observed differences in home ownership across different countries? The cross-country variation may solely reflect country-specific personal preferences (possibly affected by cultural and historic traditions) for owning a house, for investment in equity and for mobility. The decision whether to own a home and when, is often related to the decision about marriage and child bearing. As the characteristics of the young differ across countries - in terms of demographic and human capital characteristics (such as family structure and schooling) – the household formation and therefore the need for one's own home varies as well. The choice of owning one's home also depend on the cost of home-ownership relative to the cost of renting, which also varies across countries. There are also cross-country differences in terms of economic characteristics of the young households (such as distribution of income and wealth). Finally, provided the young are the same in terms of personal preferences and characteristics, the observed variation may be driven by the differences in access to funds, namely, the access to credit.

In the context of the life-cycle model of borrowing and saving, we would expect that youngest households, which do not have other sources of funds, the need to finance the purchase of home through mortgage to be the greatest. Given the uneven pace of the development of financial markets, the cross-country differences in home ownership rate among the young may just reflect different mortgage availability. The size and efficiency of the mortgage market, terms of housing loans as well as transaction costs are likely to play a key role in explaining the cross-country variation in the home-ownership rate among young.

The same holds for cross-country differences in the relationship between homeownership and household income and therefore the homeownership-income inequality. In countries with less developed credit markets and lower mortgage availability, we would expect low homeownership rates, strong homeownership dependence on income and high homeownership-income inequality among the young as many of the young are likely to be credit constrained.

Preferences vs. Constraints

Homeownership does not necessarily have to be preferable to renting as suggested in the introduction. In terms of personal preferences that determine demand for home ownership as well as in terms of overall economic efficiency, renting may be preferred to owning one's home. Some people may prefer not to carry the risks and costs related to

owning their homes. Homeownership may decrease mobility and migration and therefore lead to inefficiencies in the labor market. This may not be so if housing and mortgage markets are efficient and keep the transaction costs of moving low. Nevertheless, in many countries, homeownership is identified as the preferred form of living arrangement and as will be seen in section 5 on Institutions receives preferential treatment over renting (for example, in the tax code) since it is seen as the principal means by which households accumulate wealth and obtain financial security.

The homeownership distribution that we observe in each country is an outcome of an interaction of supply and demand factors, such as personal preferences, risk attitudes, household composition, distribution of income, relative costs of renting versus home owning, liquidity constraints and mortgage availability on one side and supply of housing on the other. Our analysis does not make any explicit assumptions about which of the factors dominate. From the most conservative point of view, making the least assumptions, we document the homeownership rates and the distribution of home ownership across household income deciles across five different countries, regardless whether the observed patterns reflect, preferences or constraints. Although we proxy the preferences and needs, which drive the demand for home ownership, with demographic household characteristics and other factors, and carry the estimation separately by each country, we are not able to control for any unobserved attitudes towards homeownership that vary with income.

However, we need to explicitly state that in several respects, our analysis and conclusions do go a step further and assume home ownership is the preferred housing arrangement among young households. This is not only through the choice of the topic and the key question – as we focus on, analyze and explain probability of home ownership and inequality of its distribution across income – but in particular – through the interpretation that we give to our results.

Once we document the homeownership rates and the distribution of home ownership across household income deciles, we provide several measures of inequality in homeownership across income and compare them across the five countries. The interpretation we have in mind is to show the differences in the access to homeownership by different types of young households, based on their income status, and relate it to the inequality in the access to mortgage market across income. In this sense, we interpret our results as reflecting the constraints and assume that homeownership is the preferred housing arrangement. This assumption is also necessary to be able to make cross-country comparisons and draw conclusions about the inequality of the distribution of home-ownership and mortgage availability across income.

The same holds for the decision to take a mortgage versus using other funds in order to purchase one's home. When interpreting the documented mortgage rates and distribution of mortgage rates across income deciles, we conjecture that the outcomes reflect liquidity constraints (differences in the access to mortgage market) rather than cross-income differences in the attitudes toward taking a mortgage versus using other funds.

We kindly ask the reader to bear these considerations in mind when reading the interpretations of our results. A structural model of the joint decision of owning one's home and of taking a mortgage would be the adequate treatment of these considerations but is beyond the scope of this paper.

Previous research

Past literature on the demographics of homeownership has conventionally identified three main factors affecting tenure choice: permanent income, the cost of owning relative to renting, and household characteristics. In recent literature credit access has been brought to the forefront as one of the key determinants of homeownership. Chiuri and Jappelli (2003) is one of the first attempts to account for age differences in home ownership across countries. They find that the availability of mortgage finance, as measured by down payment ratios, mortgage equity withdrawal or reverse mortgages- affects the distribution of owner occupancy rates across age groups including the young. In countries with developed mortgage markets the home ownership profile is much more tilted towards the young. In single country studies, such as the one for the UK by Ortalo-Magne and Rady 1999, access to mortgage credit is also found to be crucial to the observed increase in homeownership in the 1980s. When Chiuri and Jappelli (2007) study homeownership trajectories in old age, they find that across countries they are highly correlated with the degree of mortgage market regulation.

A number of studies have also examined homeownership by race and by family types. Here again, the main barriers that stand out in purchasing a home are wealth, income and credit constraints (Bostic, Calem and Wachter (2004)). Quercia, McCarthy and Wachter identify that in the US populations associated with such constraints are those with lower incomes, city residents and the young. Sedo and Kossoudji (2004) examine homeownership by family types in the US and find that increases in income are more important to homeownership at lower income levels than at high income levels for each family type. Age, like income also exhibits a concave shape in all family types. Overall, they find that the impact of householder's characteristics on the probability of owning a home is similar for all the householders, regardless of gender and family type. When doing counterfactual predictions they find that each householder regardless of race and sex have the highest predicted probabilities of home ownership if they were to have coefficients form a married couple household. Marriage appears to be powerful enough to stimulate demand for housing and alter mortgage lenders decisions, or change behavior in a way that is more compatible with home ownership.

This also indicates that the most important aspect of the homeownership gap that exists across gender and family type is family type itself. It is not clear whether behavior on the part of the household or behavior on the part of mortgage lenders (or both) is the culprit. Combine this with limited credit availability and credit market development across countries and we find that the highest homeownership among young couples is the most prevalent in countries where there is the highest rate of married couples among the young or credit markets are very well developed.

Bostic and Surette (2001) find that in the 1990s differences in homeownership between minority and non-minority families and between middle-income and lower-income families declined significantly. Additionally, changes in family-related characteristics explain homeownership trends only among the top two income quintiles. Their results suggest that favorable changes in mortgage and housing markets and changes in the regulations that govern those markets and have facilitated credit access help explain the increase in homeownership among lower-income families.

Di and Liu (2005), on the other hand, examine the importance of wealth and income on homeownership over time in the US and their effect on different racial groups. Their findings suggest that the proliferation of mortgage products that allowed for low down payments in the late 1990s may have contributed to a reduction in the importance of wealth for achieving homeownership and they do not find a reduction in the

6

importance of income, despite the fact that allowable ratios of debt-to-income have increased. Other studies have consistently found that wealth and to a lesser extent credit constraints are more important than income constraints in limiting access to homeownership (eg. Barakova et al (2003); others also point to the cost of owning relative to renting as a significant determinant (Haurin, Hendershott and Wachter 1997).

Another issue encountered in the literature on homeownership is the fact that there exists differential household formation across countries. Chiuri and Jappelli (2003) outline the problem of the Italian and Spanish young adults that tend to live with their parents well beyond the age of 25, due to higher unemployment and greater difficulty of having independent living arrangements. Martins and Villanueva (2006) examine whether differences in household structure can be traced back to restricted credit access for the young and find that access to a mortgage loan increases the probability that a young adult creates her/his household by between 31 and 54 percentage points in Portugal. Similar argument may possibly also explain the relatively older age of young households in Italy. Combining their estimates with cross-country data, they establish that differences in the availability of credit can explain up to 20% of the cross-European variance of nest leaving.

3. Data, Methods and Descriptive Characteristics

To analyze the impact of credit market development and mortgage availability on the differences between the distributions of homeownership across income we use the Luxembourg Wealth Study (LWS). This is a new project within the Luxembourg Income Study (LIS).[2] The LWS database contains harmonized wealth and income data from ten industrialized countries. The primary goal of the project has been to assemble and to organize existing micro-data on household wealth into a coherent database, in order to provide a sounder basis for comparative studies on household net worth, portfolio composition, and wealth distributions. It is the first cross-country comparable dataset, which includes information about households' assets and liabilities, necessary to identify homeownership and mortgage take-up, as well as expenditures and income and a range of other demographic and economic characteristics of the households. For more details see Sierminska, Brandolini and Smeeding 2006 and consult the LIS website. Detailed information about different types of debt (home-secured, non-home-secured, informal debt) also allows us to identify the cross-country differences in the role of informal credit, and to what extent this provides a substitute to the official credit, when credit markets are underdeveloped.

In this paper, we include five countries from the period of 1998-2002. These countries include two Anglophone countries, the United States (US) and the United Kingdom (UK); two continental European countries, Italy and Germany; and one Nordic country Finland. These countries have diverse economic outcomes and varying housing and mortgage systems.[3] In all countries considered the data period of analysis falls

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[2] LIS is a cross-national archive of harmonized datasets from the industrialized countries, which include income data at the household- and person-level, as well as extensive demographic and labor market data. Currently, the LIS database includes over 160 datasets from approximately thirty countries, covering the period 1967 to 2004. More information is available on the LIS website (http://www.lisproject.org).

[3] The original datasets that the LWS project harmonized, and that are included in this study, are: for the United States, the 2001 Survey of Consumer Finances (SCF); for the United Kingdom, the 2000 British Household Panel Study (BHPS); for Italy, the 2002 Survey of Household Income and Wealth (SHIW); for

during a time of positive house price growth, particularly in Finland, Italy, the UK and the US (Consult Appendix Figures A.2-A.6 for details). In Germany the change in house prices has been more moderate and not as strikingly positive.

Sample and Sample Selection

We select households, where the head and spouse are between 18 and 40 years old and are not students. We exclude extremely rich individuals that are defined as having financial assets greater then the 95th percentile of the distribution of financial assets.

The sample data for the US and Germany has undergone multiple imputation and consists of 5 replicates of the original data. Consequently, since the five implicates would be treated as independent observations and correspondingly inflate the reported significance of results[4] we have corrected the standard errors for multiple imputation.

Methods

We start our analysis by documenting the cross-country variation in homeownership rates and homeownership-income inequality among the young, and then we link it to mortgage take-up, mortgage availability, alternative sources of homeownership financing, and credit constraints of the young across the five countries under analysis. We first focus on cross-country differences in homeownership rates. We then analyze the relationship between home ownership and income, looking at the distribution of home owners across household income deciles. We develop several measures of homeownership-income inequality, such as homeownership in the lowest decile, various ratios of homeownership rates across deciles (the ninth to the fifth, the ninth to the first, the fifth to the first), and the rank of the first decile in which the home ownership rate exceeds half, and the cross country average, then we compare these measures across countries.

Next, we take into account the observed heterogeneity across different households, and estimate for each country separately a probability model of homeownership as a function of income, while controlling for other factors, such as age, education, family structure, presence of children, self-employment status and so on. We follow two specifications regarding the household income variable: first, the logarithmic function of household income, second (more flexible), the ten binary indicators reflecting the household income decile. The coefficient of the logarithm of income and the coefficients of the ten (nine with a constant) binary variables provide us with further and improved measures of homeownership-income inequality. We present the cross-country differences in the marginal effects of income variables on homeownership of the country-specific representative households, as well as the differences in the marginal effects of income variables for the same representative household across different countries, to document what drives the observed cross country variation in these effects: either it is due to the underlying distribution of endowments (income) and other factors, or due to the differences in the relationships between income and homeownership.

Germany, the 2002 Socio-Economic Panel Study (German SOEP); and for Finland, the 1998 Wealth Survey.

[4] The imputation procedure is described in Kennickell 1998.

We further explore this issue as follows: we predict cross-country counterfactual homeownership rates using the population (sample) of one country and the estimated coefficients from the other. The pair-wise cross-country comparisons allow us to identify whether it is the differences in the *characteristics* of the country-specific populations or the differences in the country-specific *effects* of these characteristics on homeownership, that drive the cross-country variation in homeownership rates. This procedure is similar in nature to the Oaxaca-Blinder decomposition, when applied to binary outcome models. As it is the case for the Oaxaca-Blinder decomposition, while the procedure is useful for identification of the two components of homeownership rates, it fully ignores any causality between them, i.e. the fact that the distribution of the characteristics may reflect their impact and vice versa. However, the question of causality cannot be addressed with data available for each country only for one point in time.

After providing a thorough cross-country comparison of homeownership-income inequality, we explore to what extent the observed variation in this inequality may be a result of cross-country differences in credit market development and mortgage availability. First, we look at cross-country differences in mortgage take-up rates among the young (18 to 40 years of age) and explore what percentage of owned homes is funded through mortgages. Next, we document the distribution of mortgage take-up rates across household income deciles and estimate a probability model of mortgage take-up. We control for financial wealth as well as for the risk aversion concerning the willingness to borrow by an indicator of whether a household has any other debt except for mortgage.[5] The marginal effects of income on having a mortgage and the predicted counterfactual homeownership rates complement our previous findings and indicate to what extent mortgage take up explains the documented cross-country variation in homeownership among young.

Sample Descriptives

Table 1 shows differences in homeownership in our sample of young households, ranging from 21.4 % of homeowners in Germany to 63.9 % of homeowners in the UK, with Finland (43.3 %), the US (47.9 %) and Italy (50.9 %) in between. In terms of mortgage financing, the UK has the highest mortgage rate (62 %), followed by the US (43 %) and Finland (39 %). Germany (19 %) and Italy (16 %) have much lower mortgage incidence than the other countries under analysis, and are similar in this respect, which sharply contrasts with the low homeownership rate in the first and high homeownership rate in the latter. Comparing the homeownership and mortgage take-up rates, we see that homeownership in four of the countries is mostly driven by housing loans. In Italy, home purchases by young households are much less mortgage dependent, which suggests that there exist alternative ways of obtaining homes other than mortgage and these compensate for the low mortgage availability. Past studies, have indicated that strong, intergenerational transfers (homes passed down from generation to generation or new homes bought for the young by their parents) provide a substitute for the limited supply of housing loans, with the result of homeownership rate among young households being comparable to those in countries with highly developed mortgage markets. [6] (This is also confirmed for the whole population. See Appendix for these results)

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[5] As discussed later, this coefficient may also reflect other factors than just risk aversion towards debt.

[6] In Italy, for instance, Guiso and Jappelli (2002) find that inter vivos transfers and bequests play a considerable role in home purchases, particularly in the case where there are credit market imperfections. Haliassos et al (2006) also find this strong cultural effect for Cyprus.

Table 1

Country	Home ownership	Mortgage (of all)	Mortgage financing	Sample size
Germany 2002	0.214	0.185	0.866	3,270
Finland 1998	0.433	0.386	0.891	1,102
USS 2001	0.479	0.427	0.891	1,130
Italy 2002	0.509	0.157	0.308	1,178
UK 2000	0.639	0.621	0.971	1,335

Note: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights, Sorted by home-ownership rates. Extremely rich individuals are defined as having financial assets greater then the 95th percentile of the distribution of financial assets.

Table 2 compares the country-specific datasets of young heads of household in terms of the key variables used in the analysis. The first set of factors that we assume to have an affect on homeownership, are demographic characteristics of the household. Young household heads are substantially older in Italy, and also somewhat older in the UK and Germany, when compared to the US and Finland. Besides the different demographic structure of the various populations, this may also reflect the propensity and timing of young individuals to leave home and form their own household. Such a decision is likely to be influenced by the situation on the labor market, housing market and also access to credit (Martins and Villaneuva 2006). In Appendix Figure A.1 we find the distribution of households across ages. The probability of forming a household varies a great deal across countries for the young and then for the older individuals.

In Italy individuals form households at a similar level as their counterparts in other countries in their thirties. The highest she of young households can be found in Finland followed by the US, Germany and the UK. At this point, we do not address the potential selection of the individuals to the samples of young heads, but we survey the typical country specific characteristics of young households in their respective populations in section 4.1.

The cross-country differences in the distribution of young household heads across the three education groups capture both the varying achievements of the national educational systems but may also suggest the limited comparability of the educational systems across countries. It suggests that there is substantially higher proportion of low-educated and substantially lower proportion of high-educated in Italy and in the UK, when compared to the rest of the countries. Household heads in Italy are more likely, while the ones in Germany are less likely to form couples, when compare to the other three countries.

Similar to headship, both marital status and children may be endogenous to the factors we are focusing on, in particular, to the situation in the housing market and mortgage availability. We discuss this issue later in the text. Young heads in Germany and Finland have fewer children younger than 15, compared to the US, the UK and Italian heads. The former two countries thus also form smaller households, compared to the household size of the rest.

Table 2

	Finland	Germany	Italy	UK	USS
age of hh head	31.02	31.97	34.04	32.07	31.19
low education	0.17	0.13	0.48	0.35	0.13
Medium education	0.49	0.59	0.41	0.44	0.58
high education	0.34	0.28	0.11	0.20	0.29
Couple	0.57	0.52	0.66	0.59	0.59
has children < 15	0.41	0.40	0.52	0.53	0.55
self-employed	0.11	0.08	0.30	0.12	0.05
hh size (in persons)	2.45	2.25	2.74	2.71	2.83
has other debt	0.58	0.22	0.19	0.69	0.78
income mean	25,905	25,950	26,011	35,618	36,513
income median	23,917	22,961	22,423	32,446	28,988
income min	797	298	290	337	453
income max	219,382	248,446	233,311	236,076	305,172
income SD	13,974	16,418	17,031	20,938	30,210
fin assets > 3000 USD	0.40	0.33	0.67	0.39	0.45
fin. assets mean	12,433	15,087	15,757	16,458	32,626
fin. assets median	8,113	11,004	11,690	10,866	11,792
fin. assets min	3,019	3,003	3,107	3,024	3,047
fin. assets max	56,602	44,297	62,135	60,773	329,290
fin. assets SD	10,645	10,389	13,339	14,743	52,326

Notes: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights, income is total disposable household income in 2002 USD, self-employed = head and/or spouse is self-employed, distribution of financial assets (last 5 rows) – only individuals with financial assets > 3000 USD

Self-employment and entrepreneurship and home ownership are also interlinked, although the effect may go in both directions. Self-employed, who typically have a less certain and more volatile income may either prefer renting to homeownership, or may be denied mortgages for that reason, and therefore credit constrained – excluded from the market. On the other hand, entrepreneurial activities may often be own-home dependent and positively related to housing tenure. In our sample, 30 % of the young households in Italy[7] are self-employed, it is 12% and 11 % in the UK and Finland, and less than 10 % in Germany and the US.

Having other (unsecured / consumer) debt may reflect both the willingness to take on the risks of borrowing on the one hand (demand) and the development of credit markets in general (supply) on the other. At the same time, it may capture the economic condition and the degree of credit constraints. Finally, individuals with mortgages may be less willing to add other forms of debt to their housing debt. Consistent with the credit market development story, the proportions of young households with other debt is much lower in Italy and Germany than elsewhere, with the highest proportion in the US. We do not find any striking differences among homeowners and non-homeowners holding other debt, except for the Italian renters and US homeowners. About 10 percentage more of the

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[7] The definition of self-employed household indicator is that either head and/or spouse is self self-employed.

Italian renters and US homeowners, hold other debt then their home-owning and renting counterparts, respectively.

Table 2a – Homeowners Only

	Finland	Germany	Italy	UK	USS
age of hh head	33.03	34.92	34.52	33.11	32.98
low education	0.13	0.07	0.43	0.30	0.09
medium education	0.46	0.55	0.43	0.47	0.52
high education	0.41	0.38	0.13	0.23	0.38
Couple	0.75	0.82	0.70	0.71	0.77
has children < 15	0.60	0.66	0.56	0.53	0.66
self-employed	0.16	0.11	0.36	0.14	0.08
hh size (in persons)	3.11	3.15	2.90	2.83	3.25
has other debt	0.57	0.20	0.15	0.69	0.83
income mean	33,387	37,942	28,831	40,988	49,373
income median	32,743	35,419	25,357	38,317	42,561
income min	797	1,822	290	337	1,016
income max	219,382	201,537	233,311	236,076	305,172
income SD	14,413	19,311	19,891	21,534	35,397
fin assets > 3000 USD	0.58	0.45	0.76	0.51	0.63
fin. assets mean	13,837	16,369	16,112	17,437	38,712
fin. assets median	8,880	14,305	12,282	11,052	14,728
fin. assets min	3,019	3,003	3,107	3,039	3,047
fin. assets max	56,602	44,297	62,135	60,773	329,290
fin. assets SD	11,763	9,960	13,316	15,392	57,923

Notes: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights, income is total disposable household income in 2002 USD, self-employed = head and/or spouse is self-employed, distribution of financial assets (last 5 rows) – only individuals with financial assets > 3000 USD

Tables 2a and 2b provide simple comparison of the key characteristics of home owners and not-homeowners. Consistently with our expectations, young heads in all the countries tend to be older, more educated, be married, have more children and a bigger household size than the heads who do not own their homes. Homeowners have higher disposable household income, and wealth in terms of the financial assets. In all countries, young homeowners are more likely to be self-employed, compared to renters.

Considering that typical mortgage down payments are in the range of 20-30% of home values we would expect homeowners to have less liquid assets compared to those that have not purchased their homes (yet), ceteris paribus.

Table 2b – Non-Homeowners Only

	Finland	Germany	Italy	UK	USS
age of hh head	29.48	31.17	33.54	30.20	29.57
low education	0.19	0.14	0.53	0.45	0.17
medium education	0.51	0.60	0.38	0.40	0.63
high education	0.29	0.26	0.09	0.15	0.21
Couple	0.43	0.44	0.61	0.36	0.42
has children < 15	0.27	0.33	0.47	0.52	0.46
self-employed	0.08	0.07	0.23	0.07	0.02
hh size (in persons)	1.95	2.01	2.57	2.52	2.44
has other debt	0.59	0.22	0.24	0.69	0.73
income mean	20,187	22,684	23,086	26,098	24,586
income median	18,200	20,445	19,974	24,003	21,627
income min	3,019	298	290	337	453
income max	99,572	248,446	129,297	132,426	167,831
income SD	10,509	13,841	12,812	15,885	17,368
fin assets > 3000 USD	0.26	0.30	0.58	0.16	0.28
fin. assets mean	10,057	14,563	15,269	10,759	20,160
fin. assets median	7,358	11,004	9,320	8,287	8,633
fin. assets min	3,019	3,026	3,107	3,024	3,047
fin. assets max	56,602	44,193	62,135	47,882	273,426
fin. assets SD	7,903	10,516	13,376	8,156	35,287

Notes: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights, income is total disposable household income in 2002 USD, self-employed = head and/or spouse is self-employed, distribution of financial assets (last 5 rows) – only individuals with financial assets > 3000 USD

4. Housing market characteristics

4.1. Home ownership, mortgage, home value and home equity across the population

Next we look in more detail at the housing market and examine homeownership, mortgage, home value and home equity for the whole population and our sample of the young households. We compare these across countries for different ages keeping in mind we are observing one cross-section for each country in different years. We use a smoothing technique, which regresses homeownership on a third-order age polynomial.

Differences in homeownership by age and across countries can be found in Figure 1. Once again we find that homeownership in Germany is the lowest at all ages in relation to the other countries. The highest homeownership among the young is in the UK and among the older population in the US. Actually, the US is the country where we observe the flattest decline in ownership later in life. This is most likely a reflection of the ability to extract value from home equity, which is in fact, confirmed when we look at mortgage by age in Figure 2.

Figure 1

Homeownership by age

Figure 2

Mortgage by age
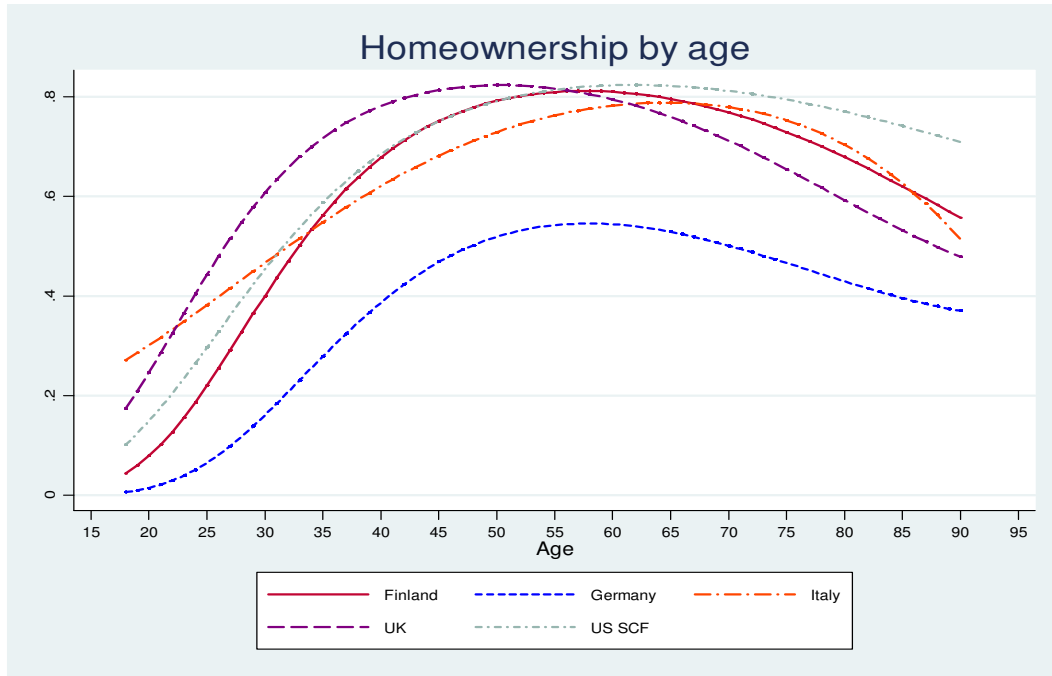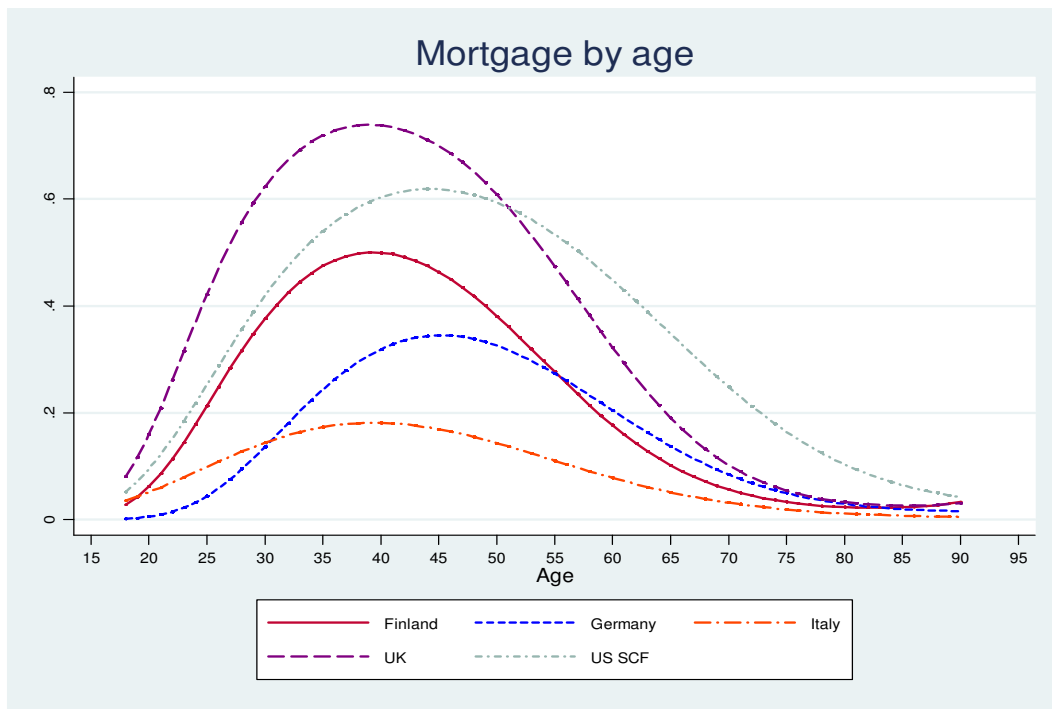
We find that the older population in the US has the highest rate of mortgage take-up. Peak homeownership occurs at different ages. In Italy and the US it takes place later in life, whereas in the UK, Finland and Germany, a bit earlier and in that order. Next, we examine the role of mortgage funding in homeownership. As previously indicated

14

homeownership among young households in Italy does not depend on mortgage availability to a great extent and this is true across the age distribution. The highest mortgage take-up is in the UK for the young and in the US for the elderly. According to Figure 3 mortgage is the biggest source of funding in the UK and the US. It provides about 80% of the funding for young homeowners in most countries and about 20% in Italy. This country is quite unique in having low debt and low mortgage take-up.

Figure 3

Homeowners with mortgage by age

Legend: Finland, Germany, Italy, UK, US SCF
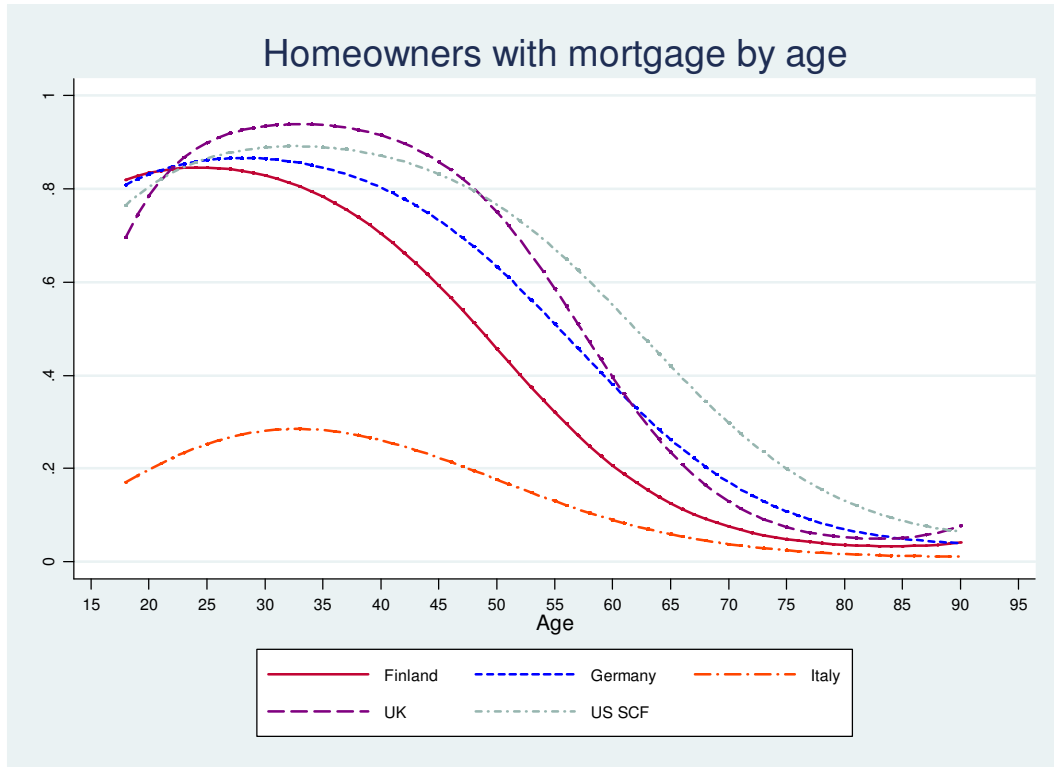
Table 3a. Home value, home equity and mortgage debt for homeowners for the whole sample.

		Finland	Germany	Italy	UK	USS
home value	mean	93,079	240,470	193,644	209,754	184,131
home value	median	75,469	218,308	155,337	156,538	124,931
home value	min	3,773	4,401	621	5,525	1,016
home value	max	1,132,039	8,252,641	2,485,398	1,841,619	20,300,000
home equity	mean	78,354	198,177	187,853	160,255	124,439
home equity	median	66,036	165,053	149,124	117,864	73,130
home equity	min	-179,240	-236,576	-124,270	-736,650	-648,017
home equity	max	1,132,039	3,576,145	2,485,398	1,565,378	20,300,000
home debt	mean	14,725	42,293	5,792	47,606	59,692
home debt	median	0	0	0	18,416	32,502
home debt	min	0	0	0	0	0
home debt	max	433,948	4,676,497	459,799	1,473,297	7,912,303

Looking at home values in the above tables for the whole population we find them to be the highest on average and at the median in Germany, the UK, Italy, the US and Finland. For the younger population the ranking is similar, with Italy moving to second place indicating that young homeowners in Italy own relatively more expensive homes across countries compared to the whole population.[8] One must not forget that even though Germany exhibits high home values, homeownership is only 20% versus 51% among the young in Italy. It may be the case that low home ownership in Germany is the result of high housing prices or due to selection – across income - only the very rich own their homes – that's why home value is high.

Home value is interesting in its own right as it can be used as a measure of long-run potential wealth. Home equity on the other hand is a good indicator of current wealth as housing is the main wealth portfolio component. In the whole population, the highest home equity is observed in countries with the lowest debt, in Germany and Italy, then in the UK, the US and Finland measured both by the mean and median. Among the young population we find a re-ranking among countries with the highest value of home equity. Italy has the highest home equity for the young followed by Germany, the UK, the US and Finland. Big gaps between home values and home equity are present in the UK and the US particularly for the young. In most countries we note the existence of negative home equity values indicating either a decline in home values since the purchase date (less likely since data is based on a self-assessed current value), or the ability to take additional loans using home as collateral (this could be the case in Finland and the UK, where mortgage information is combined with other housing debt).

Home debt for the whole population is the highest in the US, UK, Germany, Finland and Italy. Among the young it is a very important component of home equity in Germany, the UK, the US, Finland, and Italy.

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[8] This fact is confirmed in Guiso and Jappelli (2002) whose estimates indicate that young adults stay longer with their parents and as a result shorten the saving period before home ownership and increase the value of the house purchased.

Table 3b. Home value, home equity and mortgage debt for homeowners for the selected sample.

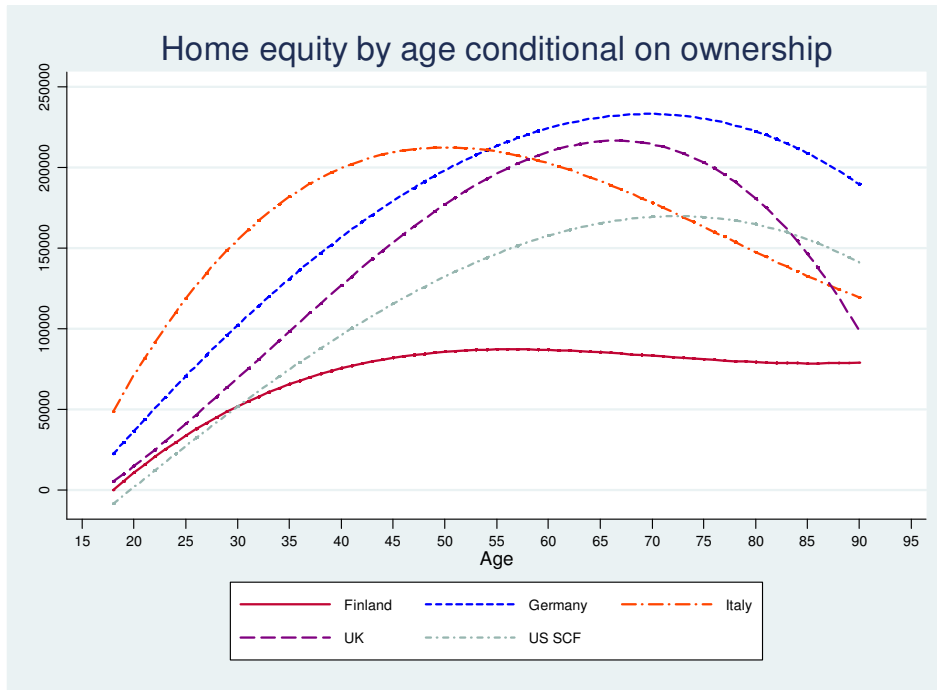|		Finland	Germany	Italy	UK	USS
home value	mean	91,183	219,262	175,220	168,317	138,545
home value	median	81,129	198,063	149,124	138,122	101,570
home value	min	3,773	13,754	12,427	31,308	1,219
home value	max	660,356	2,200,704	745,620	1,473,297	2,031,400
home equity	mean	53,428	123,390	161,045	75,027	56,130
home equity	median	43,584	100,257	136,697	49,724	30,471
home equity	min	-132,071	-105,422	0	-139,963	-30,471
home equity	max	653,753	2,135,381	745,620	1,473,297	1,157,898
home debt	mean	37,755	95,872	14,174	93,337	82,415
home debt	median	33,018	88,028	0	82,873	73,130
home debt	min	0	0	0	0	0
home debt	max	207,541	585,311	248,540	478,821	873,502

Note:

Figure 4 and Figure 5 present a complete picture of the age distribution of home values and home equity. Home values are the highest in Germany and then UK. This is followed by Italy for the young and the US for the older populations. Home values are the lowest in Finland. Home equity is the highest in Germany, the UK, Italy and the US for the older population and Italy Germany, the UK, the US for the younger part of the population. These rankings reflect different combinations of house prices and mortgage take-up in each of the countries. Apart from the very young, where Finland surpasses the US, it has the lowest values for home equity among the five countries.

Figure 4

Home value by age conditional on ownership

Figure 5

Home equity by age conditional on ownership
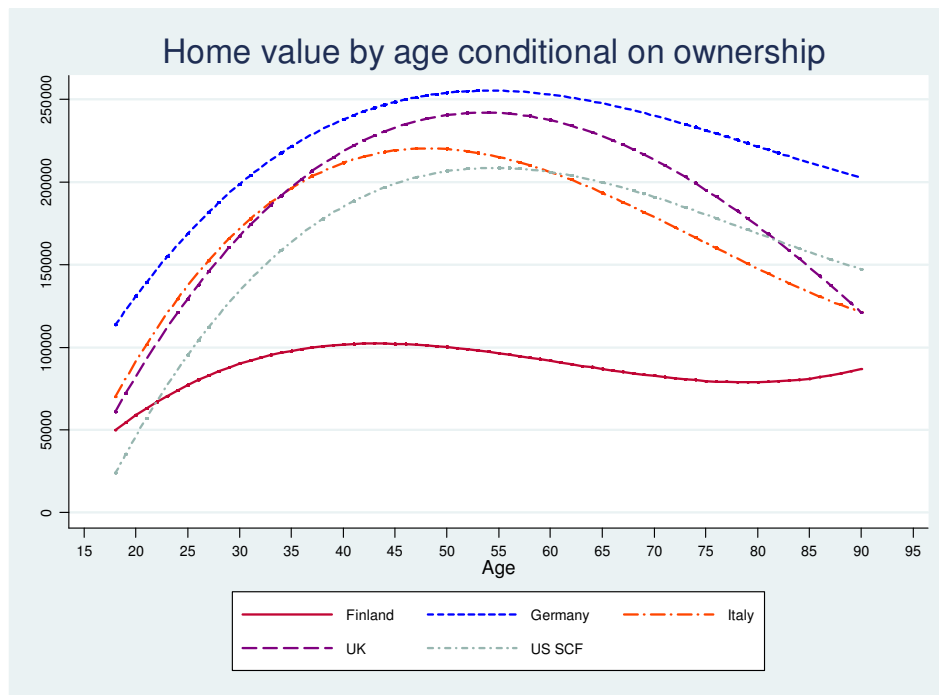
Table 4. Home value and income ratios by income quantiles for homeowners in the selected sample.

Income quantiles			Finland	Germany	Italy	UK	US
	1	Mean	4.06	15.26	15.44	12.15	8.11
		Median	3.54	12.46	13.11	7.87	6.00
		ranking	5	2	1	3	4
	2	Mean	3.05	8.46	7.95	5.14	3.57
		Median	2.80	8.15	7.61	4.27	2.98
		ranking	5	1	2	3	4
	3	Mean	2.61	6.91	7.25	3.92	3.07
		Median	2.39	6.44	5.64	3.44	2.89
		ranking	5	1	2	3	4
	4	Mean	2.65	5.64	5.62	3.88	2.66
		Median	2.49	5.22	4.68	3.33	2.26
		ranking	4	1	2	3	5
	5	Mean	2.43	4.73	3.89	3.33	2.65
		Median	2.42	4.45	3.98	2.99	2.35
		ranking	4	1	2	3	5

Next we look at home value-income ratios by income quantiles for homeowners, which is an indicator for home affordability. We divide the income distribution into quantiles and within these quantiles calculate mean and median home values and incomes for homeowners. The ratios of these values are presented in the following table. First, we find that the housing wealth/income ratios diminish for all countries as we move up the income distribution. Second, the rankings across countries in terms of the highest home value to income ratios are quite consistent across the quantiles with Germany and Italy exhibiting the highest ratios (being the least affordable), followed by the UK and the US and Finland. The highest ratios are in countries with the highest home values and lower incomes, the lowest where there are lower incomes and low home values. The wealth-income ratios are quite similar in all countries for the top quantile.

4.2. Institutions

Homeownership is substantially affected by the country-specific institutions and various market regulations. We next discuss the main institutions that affect housing and mortgage markets in the countries under analysis and discuss the implications they are likely to have in explaining the documented homeownership and mortgage take-up differences.

The tax system has a substantial impact on the incentives to purchase a home, to finance the purchase through a mortgage, as well as an impact on transaction costs related to housing turnover, i.e. the conditions of buying and selling one's home. In addition to the general wealth and property taxes, there are taxes and implicit tax treatments that directly affect homeownership. Compared to other forms of housing, homeowners benefit from not paying rent and from increases in the value of their homes. The neutral tax treatment implies that imputed rent be taxed as additional income and capital gains (i.e. home value appreciation) be subject to capital gains tax. This is, however, rarely the case, suggesting that most of the tax system implicitly favor homeownership over renting. In addition, in some cases mortgage interest payments are fully deductible.[9]

As reported in Table 5, none of the countries we analyze, imputed rents are taxed. In Italy, however, this is the case only for principal owner-occupied dwellings. While, capital gains on housing assets are taxable in all five countries, most of the principal homes of long term homeowners are exempt from this tax. The only exception is Italy, where while the owner-occupied homes are not exempted, they are subject only to 50 % of the value. There are differences across countries in the definition of the long term occupancy, ranging from more than 2 years ownership in Finland and the US[10] to 10 years in Germany. In the UK, all owner-occupied homes are exempt from the capital gain tax. Mortgage interest payments are tax deductible in Finland, Italy and the US but there is no tax relief on the interest payments in Germany and the UK.

In this paper, we focus on the degree of development of the mortgage market as a crucial determinant of homeownership. Mortgage market maturity depends on the general legal environment (such as the contract enforcement, judicial efficiency, collateral and bankruptcy laws), and on credit information availability and information sharing on one hand, and on the direct mortgage market regulations on the other. More specifically, the first three rows of Table 5 referring to enforcing contracts, report the number of procedures from the moment the plaintiff files a lawsuit in court until the moment of

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[9] In our case, this applies to landlords in Finland and in the US.

[10] This was the case in the US until 2002.

payment, the time in calendar days required to resolve a dispute, and the cost of court fees and attorney fees expressed as a percentage of debt. According to all three criteria, in Italy, contract enforcement is by far the most difficult among the five countries. Germany follows, in terms of the number of procedures, time and then the direct cost. The rest of the countries fare similarly well, with Finland having more procedures but the lowest cost, while the UK and the US exhibit the opposite.

In the next section of Table 5 on getting credit, the legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index includes 7 aspects related to legal rights in collateral law and 3 aspects in bankruptcy law. The index ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit.[11] The legal environment is the most favourable to lending in the UK, then Germany, the US, Finland and finally, again the least favourable in Italy.

The next three rows indicate the coverage, scope, quality and accessibility of credit information available through public and private credit registries. Credit Information Index ranges from 0 to 6, with higher values indicating the availability of more credit information.[12] Credit information is somewhat less available in Italy and Finland than in the other countries, in terms of both the index and the coverage. The index of mortgage market regulations in a straightforward manner ranks the countries from Italy with the most regulated mortgage market, followed by Germany and Finland, to the US and the UK with the most deregulated mortgage market.

The mortgage market characteristics are consistent with the analyzed institutional and regulatory environments. Mortgage market development, as measured by overall mortgage take-up, and the dependence of mortgage on household income, closely corresponds to the degree of mortgage market regulation in the five countries: countries with the most regulated mortgage markets such as Italy and Germany have the least developed mortgage markets.

In the five countries we analyze, one clear pattern emerges from the institutional information that we survey: the legal as well as regulatory environment in Italy are by far the least favorable for the development of the mortgage market, while those in the UK are the most supportive. While the legal institutions and information sharing possibly facilitates lending in Germany, the strong mortgage market regulations work in the opposite direction.

Less regulated markets are likely to be more competitive and offer greater variety and flexibility. As regards to collateral requirements and the mortgage length, reported in Table 5, the typical loan to value ratio and the duration ranges from 78 % and 30 years in the US, to 55 % and 15 years in Italy. The mortgage market completeness index describes the supply side of the mortgage markets both in terms of the range of products offered, the choice of the alternative repayment schemes and the period over which interest rates are fixed. It also contains information on the typical age, income and economic status of the borrowers that are granted mortgage. The much lower value of the index for Italy and Germany (57 and 58 respectively) suggest a rather limited supply of mortgages when compared to the UK (value 86).[13]

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[11] See Appendix for details.

[12] See Appendix for details.

[13] Unfortunately, comparable index is not available for Finland and the US.

Table 5

	Finland	Germany	Italy	UK	US
Tax System					
Tax on Imputed Rents	N	N	N*	N Y**	N
Tax on Capital Gains	Y < 2 yr	Y < 10 yr	Y **	*	Y < 2yr
Enforcing contracts					
Procedures (number)	27	30	40	19	17
Time (days)	228	394	1210	229	300
Cost (% of debt)	5.9	10.5	17.6	16.8	7.7
Getting Credit					
Legal Rights Index	6	8	3	10	7
Credit Information Index	5	6	5	6	6
Public registry coverage (% adults)	0	0.5	7	0	0
Private bureau coverage (% adults)	14.9	93.9	67.8	86.1	100
Mortgage Market Regulation	0.5	0.7	0.9	0.1	0.3
Mortgage Market Terms					
Loan-to-value ratios (%) Typical	75	67	55	69	78
Maximum	80	80	80	110	NA
Typical loan term (years)	15-18	25-30	15	25	30
Mortgage Market Completeness	NA	58	57	86	NA
Mortgage and Housing Market Characteristics					
Share of owner-occupied housing (%) in approx. 2002	58	42	80	69	68
Residential mortgage debt in % of GDP in 2002	31.8	54	11.4	64.3	58

Source: http://www.doingbusiness.org/; Catte et al.(2004); Jappelli and Chiuri (2007); Tsatsaronis and Zhu (2004); * Not for principle owner-occupied homes. ** 50 % of the value for principal
*** Yes, but primary owner-occupied dwellings are exempted.

The aggregate housing and mortgage market characteristics reported in the last two rows seem to be consistent with the institutional environments described. The aggregate homeownership rates follow the same ranking as the share of residential mortgage debt in GDP and also correspond to the legal and regulatory conditions in the five countries. The UK with the most favorable and the least regulated conditions has the highest homeownership rate of 69 % and the 64.4 share of debt in GDP, whereas Germany with one of the most regulated and least developed mortgage markets has the lowest homeownership rate of 42 %. The only country for which the homeownership

rate does not correspond to its mortgage take up ranking is Italy. While Italy, with the most regulated mortgage market and least favorable conditions has indeed the lowest share of debt in GDP of 11.4 %, it has the highest occupancy rate of 80 %. This finding is consistent with our aggregate figures for the young households. It confirms that in Italy housing is fairly independent of the mortgage market, due to other means of home acquisition such as family transfers and passing of the property from generation to generation.

In the policy section of the paper we also discuss to what extent other institutions, such as labor market regulation and housing subsidies can be related to the observed cross-country differences in homeownership. For example, employment protection and the variation in the length of the employment contracts of the young individuals are likely to affect the decisions of credit institutions to grant a mortgage.

5. Results

5.1. Distribution of Homeownership across Household Income Deciles

Next, we look at the variation of homeownership across the income distribution. We find a wide variation of rates as we move up the income distribution. The biggest range is in Finland (from 9% in the lowest decile to 90% in the highest) and the lowest in Italy (from 40% in the lowest decile to 74% in the highest). Across all the decile we find the highest homeownership in the top decile. The highest in the UK (92%) followed by Finland (90%), the US (87%), Italy (74%) and Germany (60%).

Table 6a. Homeownership by income deciles.

Income Deciles	Finland	Germany	Italy	UK	US	Total
1	0.092	0.053	0.404	0.338	0.133	0.132
2	0.278	0.075	0.397	0.365	0.200	0.184
3	0.314	0.100	0.405	0.500	0.284	0.249
4	0.472	0.112	0.511	0.602	0.295	0.270
5	0.472	0.160	0.410	0.597	0.414	0.361
6	0.612	0.297	0.590	0.784	0.516	0.481
7	0.692	0.337	0.597	0.810	0.705	0.636
8	0.779	0.389	0.593	0.797	0.686	0.631
9	0.788	0.520	0.541	0.851	0.878	0.790
10	0.898	0.593	0.736	0.919	0.871	0.788
Total	0.433	0.214	0.509	0.639	0.479	0.424

P(H=1)>50%

P(H=1)>mean(country)

Using the table above we next identify at which stage in the income distribution the probability of becoming a homeowner exceeds 50%. This is highlighted with the light shading. As expected this occurs fairly early in the income distribution in a country with high ownership rates (the UK) and fairly late in the distribution in a country with low ownership rates (Germany). For the other countries this occurs in the 6th decile. We also determine when the probability of ownership exceeds the country average. This happens in the 4th decile in Finland and Italy and in the 6th decile in the other countries.

Table 6b. Mortgage by income deciles

Income Deciles	Finland	Germany	Italy	UK	US	Total
1	0.052	0.024	0.028	0.319	0.062	0.048
2	0.231	0.058	0.084	0.326	0.153	0.124
3	0.290	0.075	0.165	0.470	0.193	0.165
4	0.364	0.100	0.102	0.570	0.236	0.194
5	0.411	0.135	0.114	0.573	0.340	0.279
6	0.567	0.240	0.188	0.778	0.500	0.427
7	0.686	0.304	0.144	0.775	0.660	0.562
8	0.736	0.355	0.228	0.837	0.628	0.554
9	0.751	0.485	0.246	0.829	0.853	0.742
10	0.817	0.556	0.364	0.911	0.861	0.727
Total	0.386	0.185	0.157	0.621	0.427	0.352

▢ (light)	P(M=1)>50%
▢ (dark)	P(M=1)>mean(country)

Next, we examine whether the mortgage take-up among homeowners is evenly distributed across the income distribution. An even mortgage distribution would suggest that credit constraints are not binding, as access to credit is not limited by the current income. This is found to be the case in the UK, where mortgage take-up is nearly 90% throughout the income distribution. In the other countries there is more variation in the mortgage take-up, but in all countries except Italy it exceeds 80% past the 3rd and 4th decile. In all countries mortgage take-up increases as we move up the income distribution. Italy is the only country where this is not the case and there is a lot more variation.

Table 6c. Mortgage among homeowners by income deciles

Income Deciles	Finland	Germany	Italy	UK	US	Total
1	0.545	0.447	0.061	0.897	0.465	0.366
2	0.749	0.768	0.155	0.893	0.714	0.624
3	0.834	0.731	0.407	0.894	0.679	0.657
4	0.741	0.786	0.2	0.932	0.802	0.707
5	0.836	0.814	0.251	0.943	0.823	0.767
6	0.806	0.762	0.316	0.988	0.971	0.88
7	0.892	0.893	0.234	0.947	0.936	0.881
8	0.903	0.903	0.378	0.995	0.916	0.876
9	0.845	0.924	0.43	0.95	0.971	0.935
10	0.858	0.929	0.418	0.962	0.989	0.911
Total	0.82	0.845	0.288	0.947	0.889	0.825

▢ (light)	P(M=1/H=1)>50%
▢ (dark)	P(M=1/H=1)>mean(country)

To examine homeownership profiles across the income distribution for the whole population (Figure 6), we use a smoothing technique, which regresses homeownership on a third-order indicator for income percentiles Finland has the steepest profile and Italy is at the other extreme with the flattest profile throughout the income distribution. In terms of homeownership rates the highest are in the UK and the lowest in Germany at nearly all percentiles. This closely resembles the results for the younger population only.

Figure 6
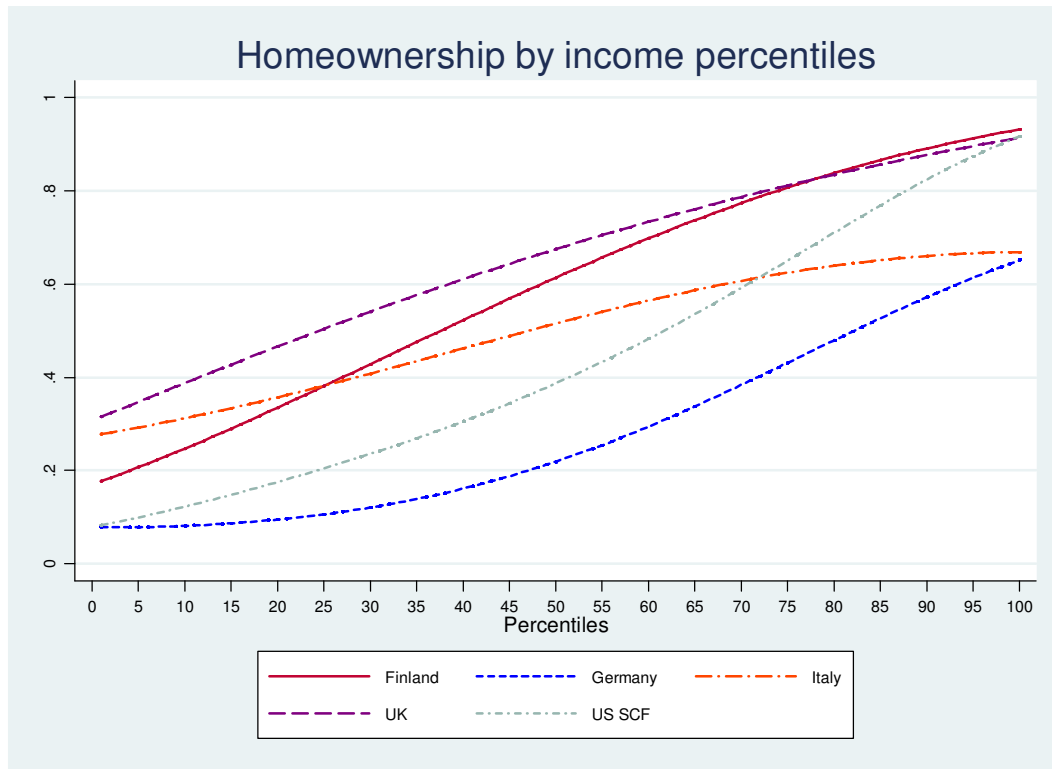
5.2. Homeownership-income inequality measures

In order to pin point the differences in the distribution of homeownership across income we reach for a few summary inequality measures. First, we look at decile ratios for homeownership. Clearly, the highest differences between the 90th and 10th percentile are in Germany, Finland and the US. In Finland and the US more of the differences are taking place between the bottom decile and the median then between the top decile and the median. In Germany and the other countries it is more or less evenly distributed between the top and the bottom of the distribution.

Table 7a. Homeownership-inequality measures

Income Deciles	Finland	Germany	Italy	UK	US
P90/p10	8.57	9.81	1.34	2.52	6.60
P90/p50	1.67	3.25	1.32	1.43	2.12
P50/p10	5.13	3.02	1.01	1.77	3.11
Prob. coefficient on log income (not weighted)	1.110	0.960	0.382	0.404	0.964

Table 7b. Mortgage-inequality measures

Income Deciles	Finland	Germany	Italy	UK	US
P90/p10	14.44	20.21	8.79	2.60	13.76
P90/p50	1.83	3.59	2.16	1.45	2.51
P50/p10	7.90	5.63	4.07	1.80	5.48
Prob. coefficient on log income (not weighted)	1.170	1.025	0.511	0.490	1.108

Table 7c. Mortgage-financed home-ownership

Income Deciles	Finland	Germany	Italy	UK	US
P90/p10	1.55	2.07	7.05	1.06	2.09
P90/p50	1.01	1.14	1.71	1.01	1.18
P50/p10	1.53	1.82	4.11	1.05	1.77
Prob. coefficient on log income (not weighted)	.315	.444	.261	.268	.703

The inequality rankings in mortgage holdings follow those in homeownership. The only difference is that a majority of the inequality is taking place at the bottom of the distribution, where there is bigger homeownership variation across the income deciles compared to the top half of the income distribution.

For homeowners the inequality in mortgage holding is more or less evenly distributed across the top and bottom of the distribution in all countries except Italy. Here we find more variation among homeowners in the bottom half of the income distribution.

Further we estimate a probit model of the probability of homeownership as a function of log of income and find the strongest effect to be in Finland, Germany and the US. This is also the case when we repeat this exercise for mortgage. The strongest effect of income on mortgage for homeowners is in the US, followed by Germany, Finland, the UK

and Italy. The low coefficient in Italy supports the fact that homeownership in this country relies on other means of financing besides mortgages.

5.3. Conditioning on other factors - Marginal effects

In the previous sections, we have focused on the homeownership and mortgage rates and how they are related to household income. We next take also into account other household characteristics to control for other aspects of the probability of home ownership, namely household preferences. We estimate a full probit model of the probability of home ownership and mortgage respectively, as a function of several demographic and economic characteristics of the household, as well as the set of binary indicators for household income deciles. Once again, we are primarily interested in the differences in homeownership and mortgage rates across the income deciles.[14]

Most of the effects of the demographic characteristics are similar across countries and in line with our expectations. When the household head forms a couple, household has children below 15 years old, as well as the household size increase the probability of homeownership (with only few exceptions where the effect is negative but always not significant). Probability of homeownership increases with age but in a decreasing way and the effect is often not significant. The insignificance of some of the demographic variables may be also caused by the substantial homogeneity of our sample of the young.

Education increases the probability of owning ones home. Self-employed are also more likely to own their homes, in particular in Finland, but to some extent in all the countries except for Germany where the effect is not significant. Having financial assets greater than 3000 EUR is associated with higher probability of homeownership in all countries. Interestingly, having other (unsecured) consumer debt decreases the probability of homeownership everywhere except for the US.

The key effects of interest – the marginal effects of being in income decile *n* rather than in the first income decile - are presented in the table below and in Figure 7. The size of the coefficient is the increase in homeownership probability relative to the first income decile. The extent to which they grow across the income deciles (how steep the lines in the figure are) further reveals the inter-decile differences in home ownership.

After controlling for individual specific characteristic, we observe that homeownership is distributed most unequally in the US and Germany, although all other deciles are closer to the first income decile in Germany compared to the US. Finland comes next; while Italy and the UK are have homeownership most evenly distributed across income.

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[14] Both probit regression output and marginal effects are available from the authors upon request.

Table 8a. Marginal Effects of Income Deciles - Homeownership

	Finland		Germany		Italy		UK		USS	
	ME	t-st	ME	t-st	ME	t-st	ME	t-st	ME	t-st
d2	0.05	0.65	0.00	0.04	0.04	0.62	0.00	0.05	0.05	0.56
d3	0.03	0.42	0.01	0.18	0.10	1.43	0.05	0.91	0.15	1.75
d4	0.18	2.88	0.01	0.20	0.14	2.05	0.09	1.64	0.09	1.04
d5	0.11	1.48	0.05	1.10	0.11	1.58	0.05	0.86	0.17	1.98
d6	0.22	3.50	0.12	2.64	0.20	3.16	0.17	3.68	0.26	2.96
d7	0.24	3.93	0.14	2.98	0.21	3.26	0.19	4.23	0.37	4.27
d8	0.33	7.17	0.22	4.59	0.27	4.38	0.13	2.41	0.34	3.91
d9	0.31	5.84	0.34	6.35	0.17	2.46	0.17	3.41	0.50	5.66
d10	0.35	8.67	0.35	6.33	0.24	3.56	0.21	4.22	0.51	5.15

Note: t-statistics in Germany and the US have been corrected for multiple imputations.

Figure 7

Full probit ydec coefficients relative to 1st decile (homeownership probability)
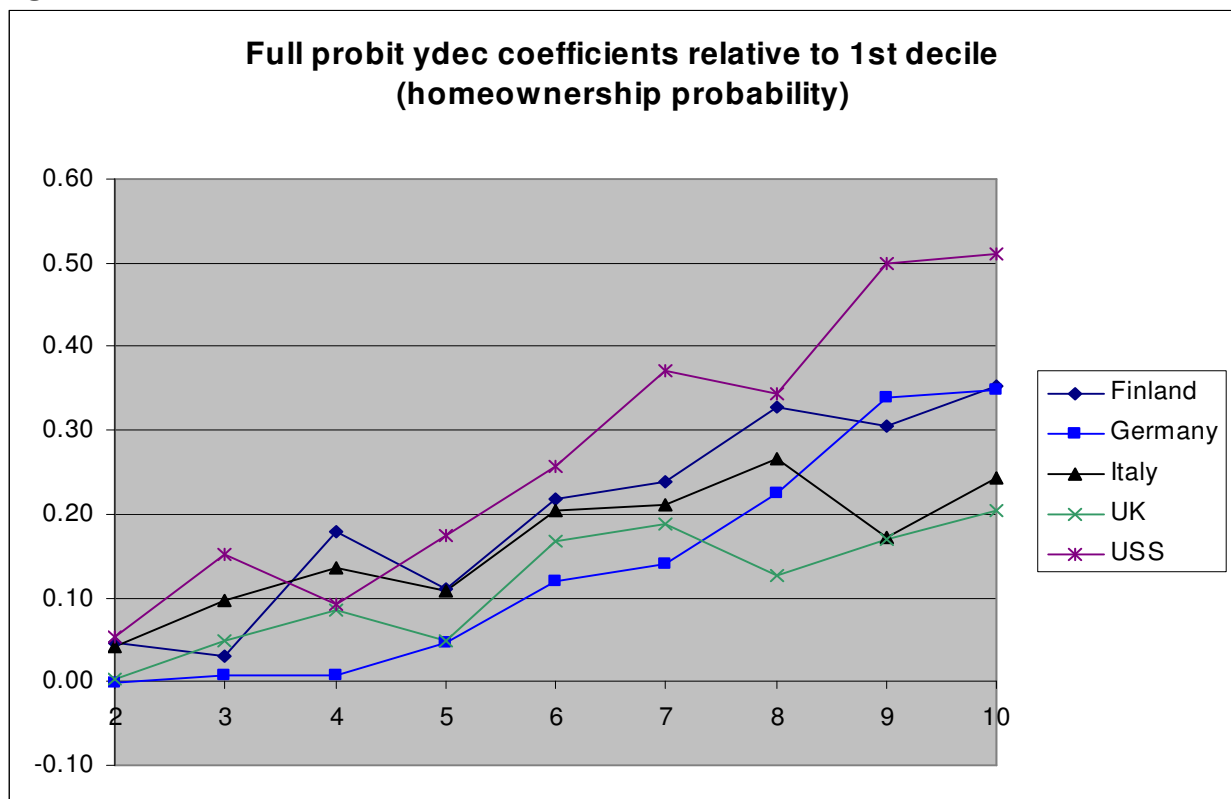
When we focus on the effects of being in particular income deciles relative to the first decile on probability of having a mortgage, the results are fairly similar. As expected, the differences between all deciles (but in particular between the first decile and the rest) increase for most of the countries, as home-ownership sponsored by other funds such as private transfers that may be less dependent on income than being granted a mortgage are ruled out. In addition, in two countries, Italy and Finland, although homeownership probability is highest in the very top decile, the mortgage probability is smaller than in the ninth decile, possibly suggesting that individuals with very high income have also greater access to other resources (wealth, private transfers) to become home owners.

Table 8b. Marginal Effects of Income Deciles – Mortgage Probability

	Finland		Germany		Italy		UK		US S	
	ME	t-st	ME	t-st	ME	t-st	ME	t-st	ME	t-st
D2	0.12	1.47	0.06	1.19	0.04	0.62	0.01	0.12	0.19	1.75
D3	0.11	1.33	0.06	1.18	0.10	1.28	0.08	1.37	0.19	1.79
D4	0.22	2.77	0.09	1.92	0.15	1.91	0.12	2.42	0.17	1.68
D5	0.19	2.25	0.13	2.57	0.12	1.51	0.10	1.89	0.27	2.70
D6	0.27	3.38	0.17	3.45	0.19	2.29	0.21	4.83	0.40	4.00
D7	0.40	6.45	0.22	4.34	0.17	2.04	0.21	4.69	0.48	4.72
D8	0.40	6.33	0.31	5.81	0.19	2.23	0.21	4.68	0.45	4.52
D9	0.41	6.52	0.43	7.44	0.27	2.97	0.19	3.78	0.60	6.09
D10	0.38	5.56	0.45	7.44	0.26	2.73	0.27	6.29	0.61	5.66

Note: t-statistics in Germany and the US have been corrected for multiple imputations.

Figure 8
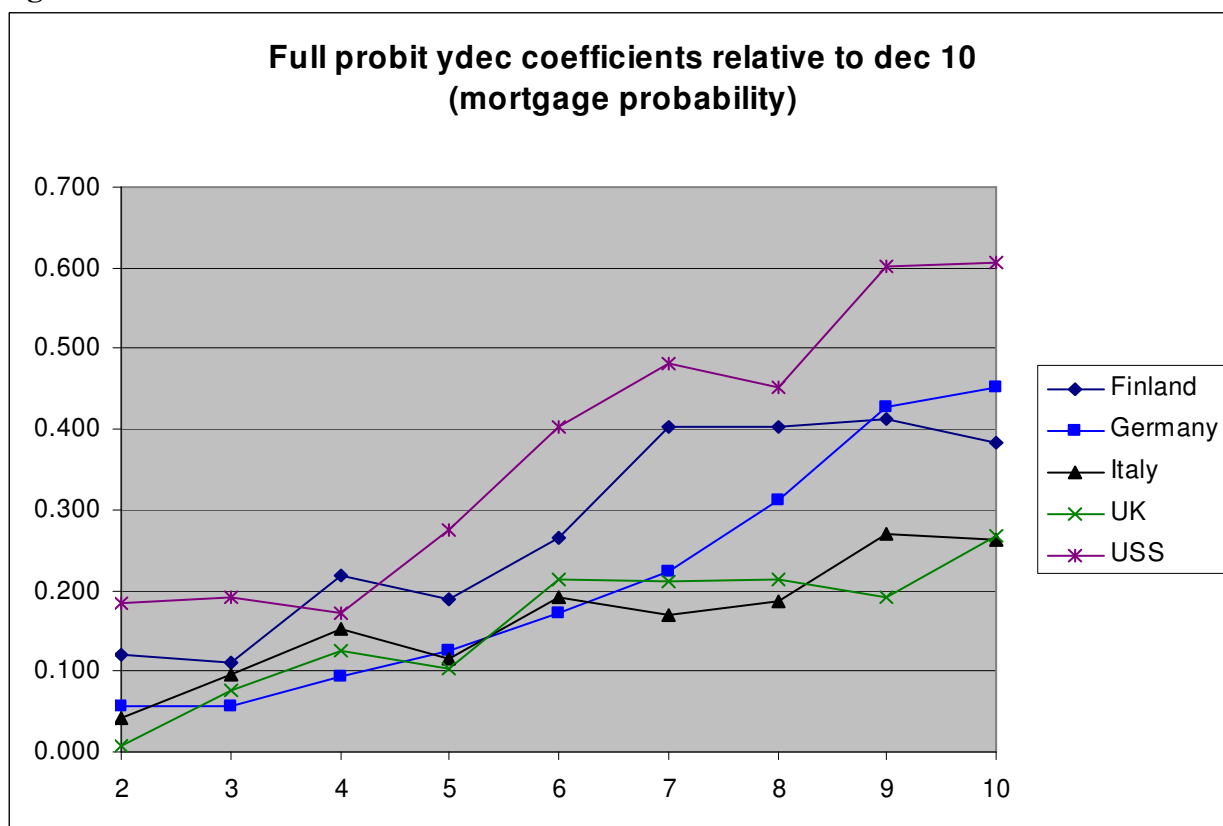
5.4. Decomposition of the Key Determinants -Counterfactual Predictions

Finally, we try to identify the cross-country differences in household characteristics (right hand side variables) from the cross-country differences in the effect of these characteristics (coefficients and marginal effects), in order to reveal how the two of them contribute to explaining the cross-country variation in home ownership and mortgage rates. We do so by simulating counterfactual predictions of the home ownership rates and mortgage rates, using the household characteristics from one country and combining

28

them with the coefficients - estimated in the full probit model – from another country. Table 9a and 9b show the results. While rows correspond to the household characteristics from the country specified in the first column, columns correspond to the respective sets of country-specific coefficients, with the exception of the first column that gives the actual homeownership rate in each of the countries for comparison. The fit of our models can be read from the table by comparing the true value with the corresponding cell where household characteristics and estimated coefficients from the same country are combined, yielding the prediction of the model.

Table 9a – Counterfactual Predictions – Home-ownership

Xs	TRUE	Xbhat(FI)	Xbhat(GE)	Xbhat(IT)	Xbhat(UK)	Xbhat(US)
Finland	0.433	0.459	0.195	0.404	0.662	0.366
Germany	0.214	0.394	0.228	0.386	0.605	0.258
Italy	0.509	0.642	0.288	0.499	0.772	0.535
UK	0.639	0.489	0.221	0.393	0.644	0.423
US	0.481	0.521	0.223	0.428	0.67	0.438

Notes: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights,

First, we observe, that although the UK has the highest actual home ownership rates, it is the household characteristics in Italy that lead to the highest predicted counterfactual rates when combined with coefficients from other countries. In other words, Italian household have the highest predicted home ownership regardless in which countries (environments, institutions, mortgage markets and housing markets) they are. US households come next (except in Germany), while the ranking of the UK and the Finish households alternate. German households, on the other hand, have the lowest predicted home ownership rate everywhere except for Germany.

In terms of the effect household characteristics have in different countries, as reflected by the estimated coefficients, we find that the predicted homeownership rates are the highest in the UK for households from all five countries. It is interesting to observe, that it is Finland that follows. It is the "unfavorable" ranking of the homeownership-enhancing household characteristics in Finland (compared to other countries) that is responsible for the observed Finish home ownership rate ranking only fourth. In terms of the environments and institutions, Finland ranks as second. The opposite holds for the US, where household characteristics are more favorable, while regime ranks as third or fourth. Germany is at the other end of the spectrum: no matter what the household characteristics are (irrespective of the country), any of the five samples reaches the lowest homeownership rate in Germany.

In addition, it is interesting to notice that in the case of Germany, favorable household characteristics do relatively better in unfavorable regime, as German households rank second in Germany after Italy.

To summarize, we find that while it is the Italian households that are –in terms of their characteristics - most likely to own their homes, it is in the UK where the regime is the most favorable. In Germany, both household characteristics and the regime is the least favorable. While household's characteristics in Finland are relatively less favorable

than in the US, Finish regime fares better than the one in the US, so the ranking of the two countries vary in these two respects. The regime in Italy on the other hand is comparable to that of the US, and fares better for Finish and German households but worse for the US and the UK.

We conclude that although household characteristics play some role in explaining the observed (and predicted) variation in home ownership rates across the five countries, it is mostly the country specific effects (market evaluations) of these characteristics determined by the institutional environment as well as the functioning of the housing and mortgage markets that drive the main result (i.e. the observed ranking of the five countries).

Table 9b – counterfactual predictions – has mortgage

Xs	TRUE	Xbhat(FI)	Xbhat(GE)	Xbhat(IT)	Xbhat(UK)	Xbhat(US)
Finland	0.386	0.397	0.159	0.129	0.624	0.318
Germany	0.185	0.381	0.194	0.107	0.577	0.227
Italy	0.157	0.479	0.229	0.164	0.719	0.463
UK	0.620	0.434	0.187	0.131	0.624	0.378
US	0.429	0.46	0.187	0.149	0.646	0.391

Notes: Estimation Sample (head and spouse 18-40 years old, extremely rich individuals excluded), Weighted with sample weights,

We next look at the respective roles of household characteristics and country specific regimes in the variation in the mortgage rates. Interestingly, characteristics of the Italian households again yield the highest mortgage rates despite the fact that Italy has the lowest actual mortgage rate among the five countries. The ranking of the other countries in terms of the effect of the different household characteristics is also the same as for the home ownership rate. In terms of the regimes, the UK coefficients are again the most favorable. The second most favorable regime is again in Finland, but the unfavorable household characteristics bring the country in the ranking of the actual mortgage rate behind the US, where the regime and the characteristics rank again in the opposite way than in Finland. The Italian regime however is now the least favorable to the mortgage take up, followed by the German one. To summarize, with the exception of the Italian regime, the results in the last two tables give similar answers.

6. Policy Implications

Our findings suggest that in four out of the five countries, mortgage is the key financial tool used by young households to purchase their homes. In these countries the observed homeownership rates, as well as, the distribution of homeownership across household income levels are determined by the degree of the mortgage market development. Mortgage market development, as measured by overall mortgage take-up, and the dependence of mortgage on household income, closely corresponds to the degree of mortgage market regulation in the five countries: countries with the most regulated mortgage markets such as Italy and Germany have the least developed mortgage markets.

The legal environment, such as contract enforcement and judicial efficiency, and information sharing are also crucial for the development of the mortgage market.

Integration of the European mortgage markets, one of the topics widely discussed at the European Commission (see for example European Commission 2006), presupposes harmonization of the mortgage market regulation across its member countries. Such harmonization would require substantial mortgage market deregulation in countries like Italy or Germany, when compared to their current regulatory environment.

In the section below we will discuss possible policy implications of our findings in light of further deregulation and integration of the mortgage market on homeownership, geographical labor mobility and labor contracts.

Homeownership rates and homeownership-income inequality

It is likely that deregulation and opening up of the mortgage markets will increase the overall access and access across income levels of young households to mortgage loans. Based on our findings, we expect further mortgage market development in countries with less developed mortgage markets to increase homeownership rates and reduce homeownership income inequality among young households. Our results suggest that mortgage market integration will enhance convergence of homeownership rates and homeownership income inequality across countries. However, as our findings point out, it is not only the mortgage market regulation and legal environment which affect mortgage market development. Demand for homeownership and therefore the need for mortgages also depends on other aspects of the housing market such as alternative forms of housing and how their costs compare with the price of homeownership. The analysis of the five substantially different countries undergone in this paper enables us to lay down, discuss and assess the likely impact of these additional factors as well.

The effect of mortgage market development resulting from mortgage market integration is therefore likely to differ across countries. While in Germany, a fairly developed (and regulated) rental market offers renting as an attractive alternative to homeownership (Ditch et al 2001), this is not the case in Italy, where the major housing alternative of the young individuals is to postpone marriage and household formation and stay with parents until they accumulate necessary savings or until they acquire homes from parents in the form of transfers. As a result, as suggested by Martins and Villanueva (2006), the effect of increased mortgage availability on nest leaving is expected to be particularly high in the Southern European countries. Besides the relative cost of homeownership and renting within the considered countries, cross-country differences in housing prices relative to average income (house affordability) will be both affected by but also will itself alter the impact of the integration of mortgage markets on homeownership rates and their distribution across income particularly at the bottom of the income distribution where these differences are the greatest (see Table 4 on housing affordability and Table 6a on homeownership across income deciles).

Geographical mobility and labor market

It is not straightforward what effect would mortgage market deregulation, increased mortgage availability and a subsequent increase in homeownership have on geographical labor mobility. While a developed mortgage market and a well-functioning housing market is expected to enhance geographical mobility, as is the case in the US, there are microeconomic studies such as (Henley 1998), that find in the case of the unemployed, that homeownership may reduce mobility and therefore preserve regional

variation in unemployment. The conditions of the housing market turnover also determine the relationship between homeownership and geographical mobility. High transaction costs in the housing market, for example, reduce home turnover and consequently may reduce geographical mobility.

In our five country study, we see a positive relationship between mortgage financed homeownership and geographic mobility (Table 10). Among the five countries we consider, Italy is clearly the one with the lowest across-region geographical mobility (10 %), while Finland is the highest (36 %). Germany has the second lowest mobility after Italy (19 %). The UK follows with about 25 %. These patterns are confirmed when within EU and outside EU mobility is considered. For comparison over 40% of the US population has been defined as movers (Schachter, Franklin and Perry 2003, Table 1).This shows that in countries with high homeownership rates financed through mortgages we observe high geographical mobility.

Table 10. Past mobility, by destination and by country (%)

	Within city/town or region	Across regions	Within EU	Outside EU
Finland	68	36	5	3
Italy	46	8	2	0
Germany	62	19	5	4
Luxembourg	57	21	14	3
Sweden	70	44	8	5
UK	55	25	7	6

Source: European Foundation for the Improvement of Living and Working Conditions, 2006, Table 2

The most frequent reason for geographical mobility among prime age individuals is moving to a new job. Geographical mobility therefore also reflects labor mobility which is crucial for efficient matching of job searchers to vacancies. As a result, a well-functioning housing market, i.e. market with low transaction cost and high turnover (where it is easy to buy and sell one's home) is a key prerequisites of labor mobility. Increased access to housing and less frictions to geographical mobility could therefore also result in higher labor market efficiency. When we look at labor mobility across the five countries, they rank exactly the same as when compared to geographical mobility: over 30 % of Italians have never changed their employer after the age of 35, around 20 % of Germans, 14 % of Finns and less than 10 % of British people (see European Foundation for the Improvement of Living and Working Conditions, 2006, Figure 18 and 23). It has been well documented that US has much higher geographical and labor mobility compared to the rest of the countries in our analysis. The important finding is that it is not the homeownership per se that is positively correlated with high geographical and labor mobility but only the mortgage financed homeownership, which does not restrict the location of one's home, as has been shown for the case of Italy-- the least mobile country, with the smallest mortgage take-up and the second highest homeownership rate in our sample. The effect of mortgage market deregulation on labor mobility and labor market efficiency is once again likely to vary across countries, depending on other housing alternatives. In the presence of high transaction cost of buying and selling one's home, a substantial rental market (and rent subsidies (Ditch et al

2001)) in Germany may imply that renting enhances higher labor mobility than housing tenure. On the other hand, mortgage market development in Italy that enables homeownership among young individuals, is likely to be crucial for the increase in geographical and labor mobility there.

Cross-border mobility and integrated labor market

While mortgage market development is likely to increase regional mobility within countries, the integration of the mortgage markets is likely to enhance cross-border mobility as well. Immigrants are typically in a worse situation as mortgage market applicants due to for example, the lack of credit history information or shorter labor contract than natives. The latter has also been an issue for young individuals entering the job market, where temporary instead of regular contracts have been offered (see for example Blau and Kahn (2002)). As most of the cross-border mobility within EU takes place among the young households, the increase in mortgage access to the young across countries is likely to enhance the integrated European labor market as well.

7. Conclusion

This paper uses the newly constructed Luxembourg Wealth Study Database to bring detailed evidence on homeownership and homeownership-income inequality among young households in Finland, Germany, Italy, the UK, and the US. We explore the role of mortgage finance in the cross-country variation in homeownership among young households and in the distribution of homeownership across their income. We find that, with the exception of Italy, where family transfers substitute the limited access to credit, the observed patterns of homeownership among young are mostly driven by mortgage take-up as the primary source of finance for a home purchase. Our results show that countries with mature mortgage markets such as the UK, have higher homeownership rates and lower homeownership-income inequality among young households than countries with less developed mortgage markets such as Germany. Even in countries with highly developed mortgage markets, like in the US, homeownership and mortgage availability among the lower income deciles are limited (homeownership rate is distributed more unequally), compared to the UK or Finland. Policies supporting home ownership among young households may then need to target specifically the low-income groups.

Although the small number of countries does not allow us to show any quantitative evidence on the effect of institutions and policies on the homeownership among the young, the observed variation in homeownership rates, mortgage market maturity, and size of the rental market, which the five countries represent, enables us to draw the following qualitative conclusions: Mortgage market regulation hinders mortgage market development, decreases homeownership rates among the young and increases the homeownership-income inequality. As the discussed integration of the European mortgage markets would also involve mortgage market deregulation in countries with limited mortgage availability, it is likely that it will enhance the homeownership rates among the young households there, and therefore lead to further convergence of the homeownership patterns in Europe. The impact of the integration will, however, depend on the housing alternatives available to the young in these countries, namely the size and the terms of the rental market. The discussion about the mortgage market integration and deregulation should therefore also consider these alternatives, and in particular, the current country-specific rental market regulations. If

low transaction costs at the housing and mortgage market are assured by the regulatory environment, mortgage market integration may also enhance labor market efficiency through increased within-country and cross-border mobility.

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Appendix

Table A. 1

Country	Home ownership	Mortgage (of all)	Mortgage financing	Sample size
Germany 2002	.408	.193	.477	12308
Finland 1998	.638	.283	.417	3893
USS 2001	.676	.434	.641	4442
Italy 2002	.688	.102	.133	8011
UK 2000	.705	.415	.571	4750

Note: Estimation Sample (Whole population), Weighted with sample weights, Sorted by home-ownership rates

Details of Table 5:

Legal Rights Index

measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index includes 7 aspects related to legal rights in collateral law and 3 aspects in bankruptcy law. A score of 1 is assigned for each of the following features of the laws:
• General rather than specific description of assets is permitted in collateral agreements.
• General rather than specific description of debt is permitted in collateral agreements.
• Any legal or natural person may grant or take security in the property.
• A unified registry operates that includes charges over movable property.
• Secured creditors have priority outside of bankruptcy.
• Secured creditors, rather than other parties such as government or workers, are paid first out of the proceeds from liquidating a bankrupt firm.
• Secured creditors are able to seize their collateral when a debtor enters reorganization; there is no "automatic stay" or "asset freeze" imposed by the court.
• Management does not stay during reorganization. An administrator is responsible for managing the business during reorganization.
• Parties may agree on enforcement procedures by contract.
• Creditors may both seize and sell collateral out of court without restriction.
The index ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit.

Credit Information Index

measures rules affecting the scope, accessibility and quality of credit information available through either public or private credit registries. A score of 1 is assigned for each of the following 6 features of the credit information system:

• Both positive (for example, amount of loan and on-time repayment pattern) and negative (for instance, number and amount of defaults, late payments, bankruptcies) credit information is distributed.
• Data on both firms and individuals are distributed.
• Data from retailers, trade creditors or utilities as well as financial institutions are distributed.
• More than 2 years of historical data are distributed.
• Data on loans above 1% of income per capita are distributed.
• By law, borrowers have the right to access their data.

The index ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.

Index of Mortgage Market Regulation

The index score adds one point for fulfilling each of the following five criteria:
- Mortgage rate arrangements are primarily extended on the basis of fixed rate contracts.
- Mortgage equity withdrawal is absent or limited.
- LTV ratio does not exceed 75 %.
- Valuation methods of property is based on historical values, rather than based on market values.
- Mortgage backed securitization is absent or limited.

The index is then normalized to one.

Appendix. Figure A.1

Distribution of households across age
(unweighted)

Finland — Germany — Italy — UK — US SCF

Distribution of households across age
(weighted)

Finland — Germany — Italy — UK — US SCF
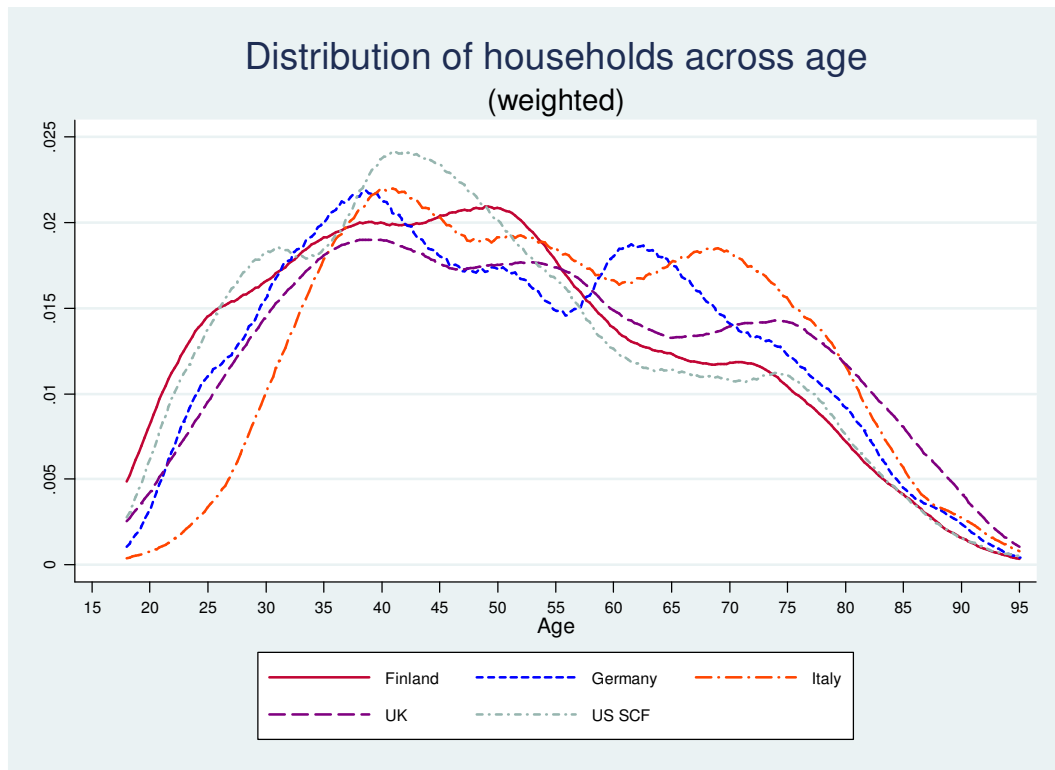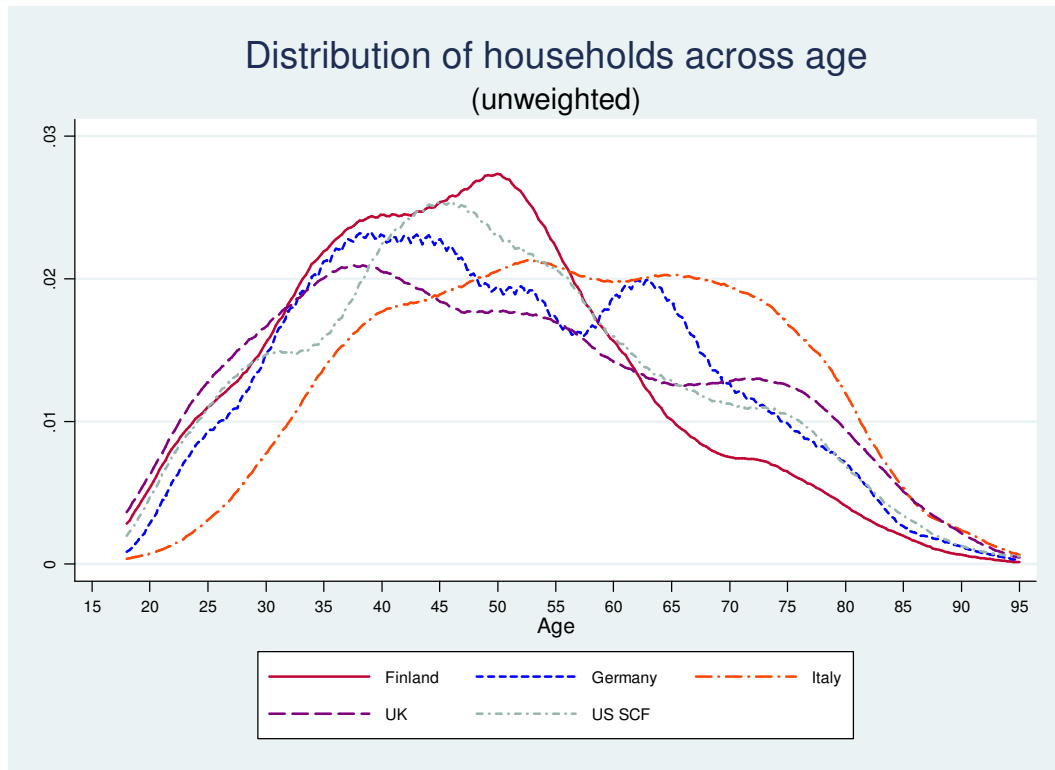
Figure A.2 Real price index of dwellings in old blocks of flats by quarter I/1970-III/2007, 1970=100 (according to the Cost-of-living index) in Finland.
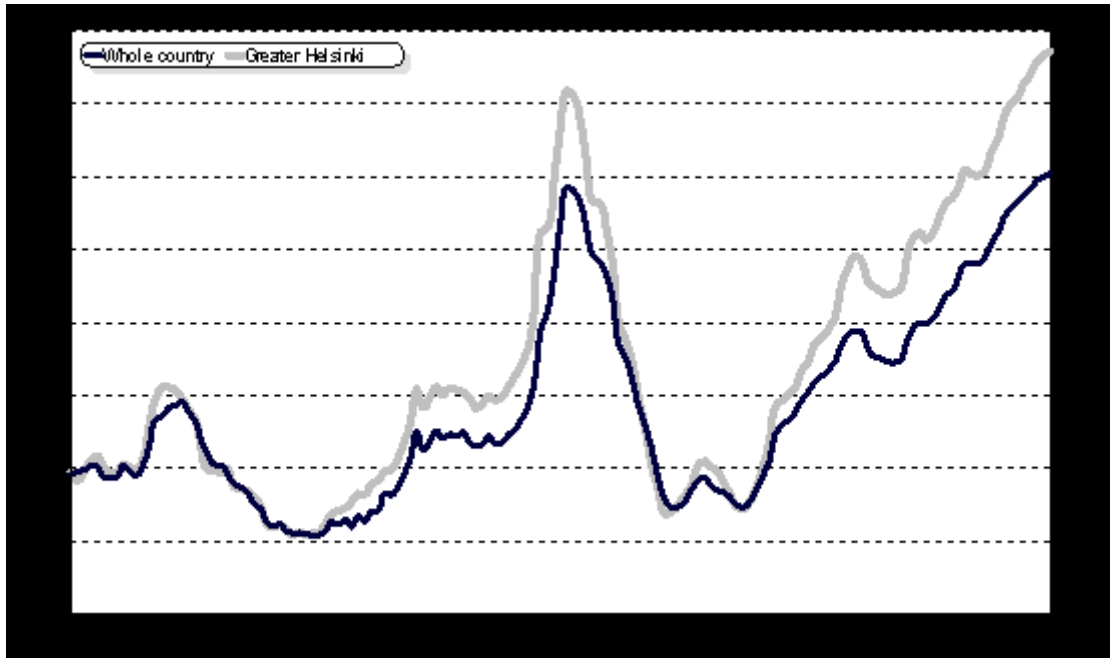
Source: Statistics Finland (http://www.stat.fi/til/ashi/2007/03/ashi_2007_03_2007-10-30_tie_001_en.html)

House price change and average price of dwellings in Finland.
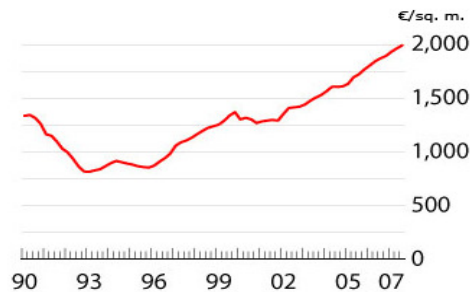
Source: Global Property Guide (http://www.globalpropertyguide.com/real-estate-house-prices/F)

Figure A. 3 House price change and average price of residential properties in 13 urban areas in Italy.

Source: Global Property Guide (http://www.globalpropertyguide.com/real-estate-house-prices/I)
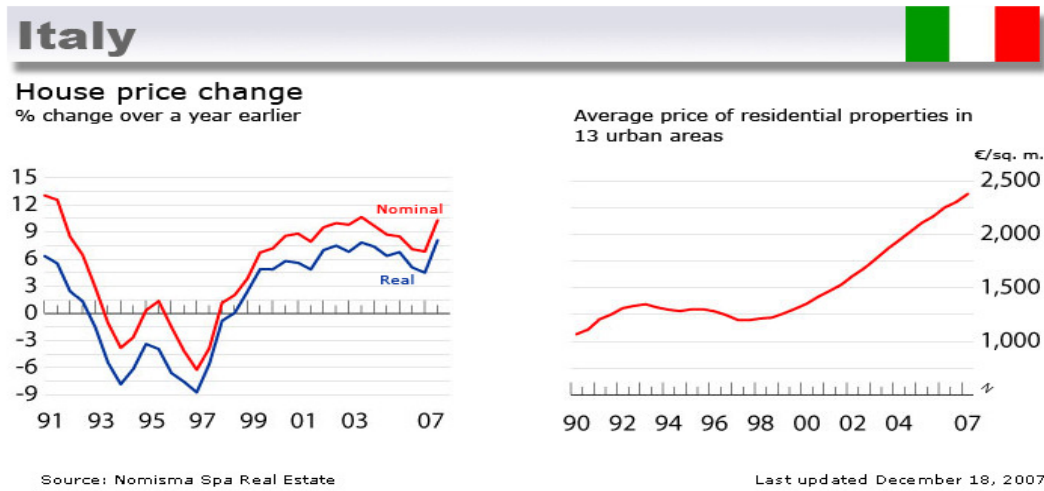
Figure A. 4 House price change and average price of owner-occupied flats in Germany.

Source: Global Property Guide (http://www.globalpropertyguide.com/real-estate-house-prices/G)
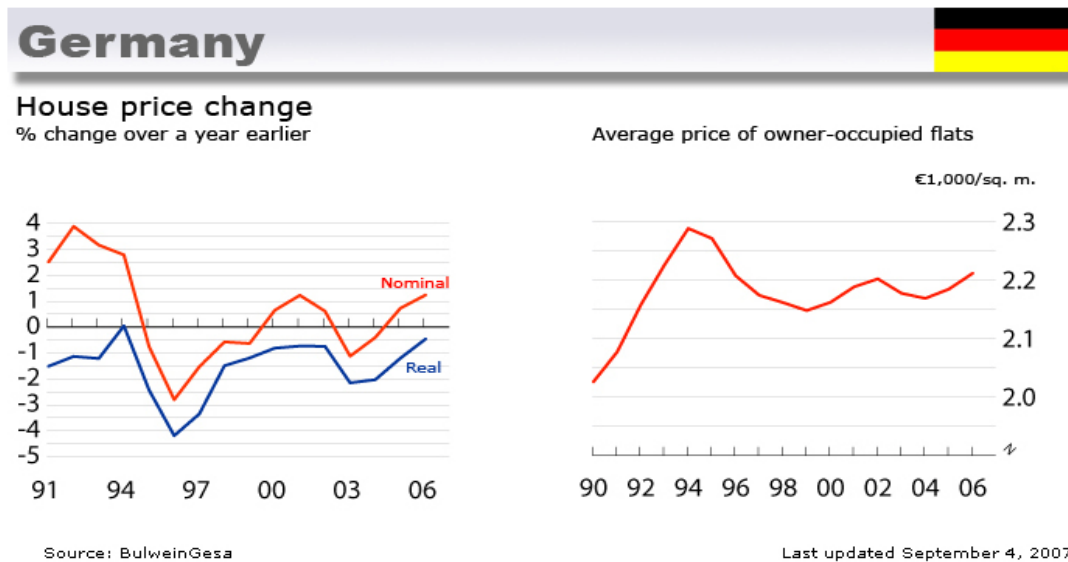
Figure A. 4 House price change and average price of homes in the UK.

Source: Global Property Guide (http://www.globalpropertyguide.com/real-estate-house-prices/U)
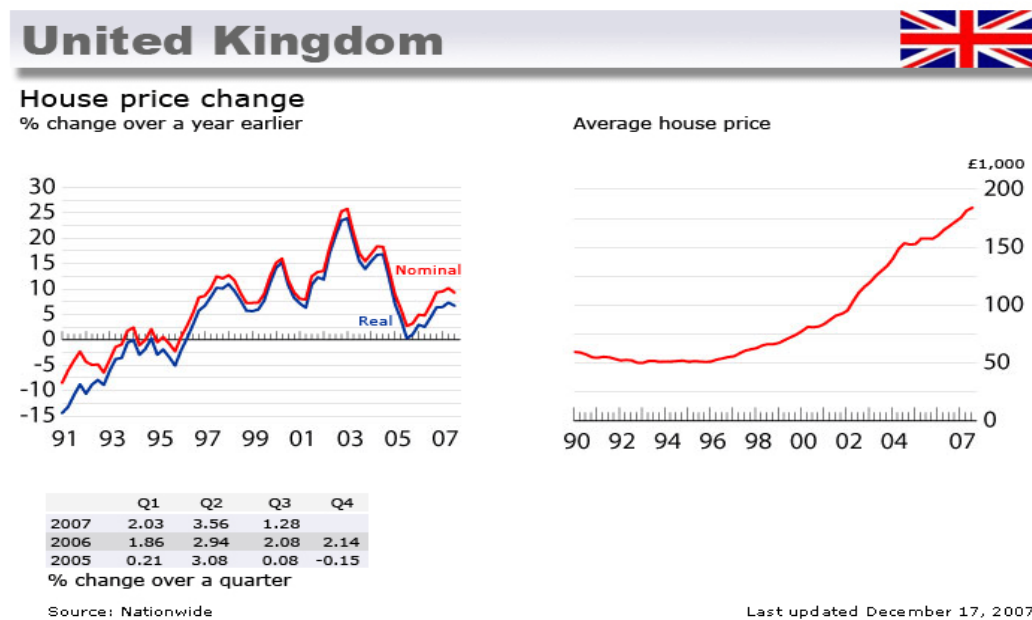
Housing Price Index Series in the UK IV/1973-IV/2006.
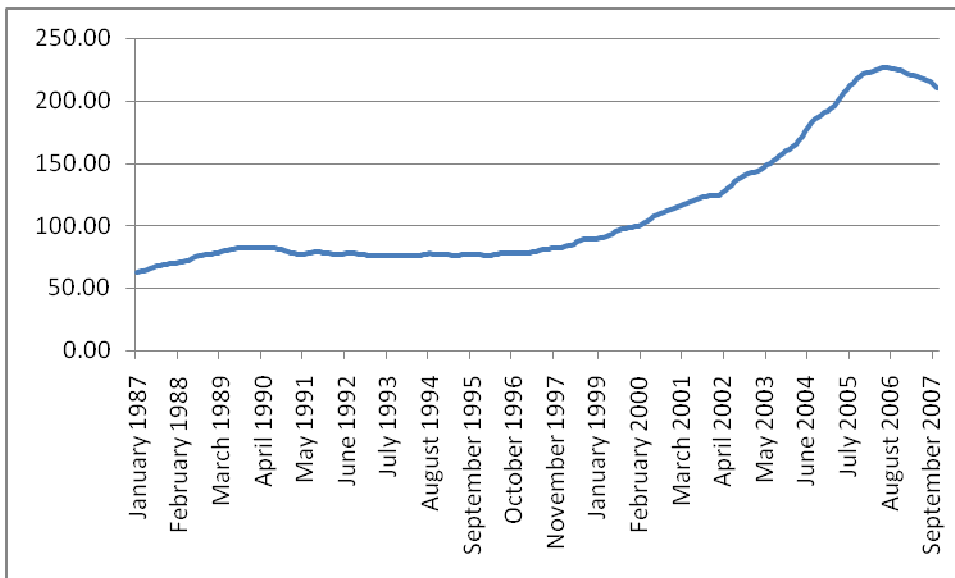

Source: Nationwide (http://www.nationwide.co.uk/hpi/default.asp)
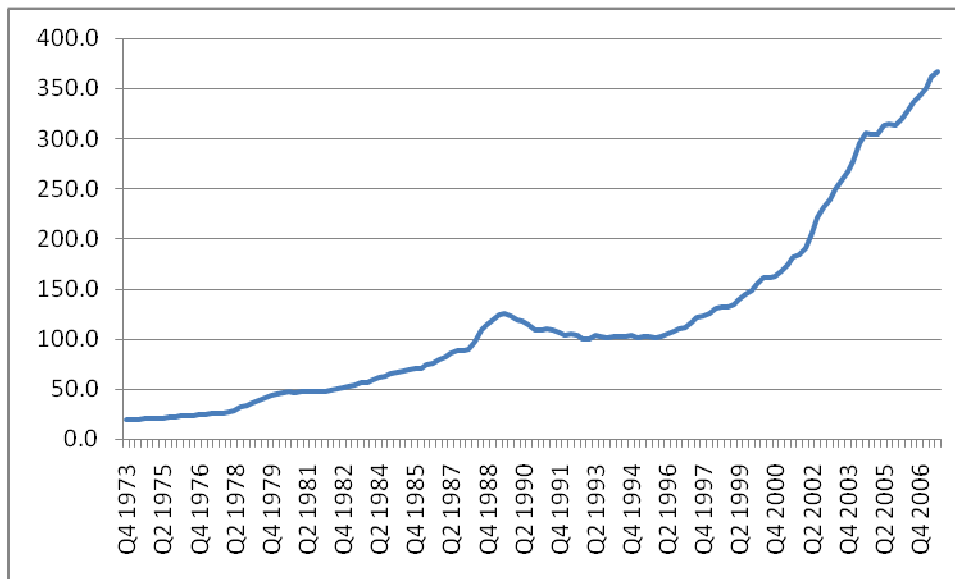
Figure A.6 House price change and average purchase price of homes in the United States.

Source: Global Property Guide (http://www.globalpropertyguide.com/real-estate-house-prices/U)
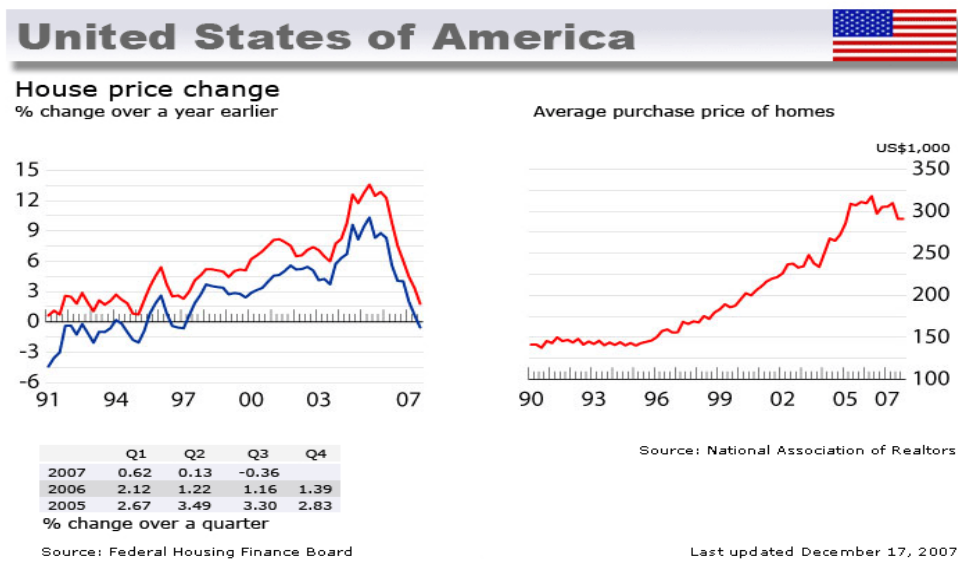
Housing Price Index Series in the US 1987-2007.

Source: S&P/Case-Shiller® Home Price Indices
(http://www2.standardandpoors.com/portal/site/sp/en/us/page.topic/indices_csmahp/2,3,4,0,0,0,0,0,0,0,0,0,0,0,0,0.html)