



**ECONOMIC HARDSHIP, HOUSING COST BURDEN AND  
TENURE STATUS: EVIDENCE FROM EU-SILC**

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# Economic hardship, housing cost burden and tenure status: evidence from EU-SILC

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## Abstract

Although it is often asserted that the housing cost burden is one of the key determinants of household economic hardship, in practice the linkage between the two has been rarely explored. The focus has been instead on the role played by income or other socio-economic determinants of household hardship. However, housing costs represent one of the most significant outlays in a household balance. The burden represented by housing costs may indeed cause households to reduce non-housing expenditure such as health care, education, food and clothing, thus creating serious household economic hardship. The primary goal of this study is to contribute on the literature on poverty by looking at households economic hardship in relation to the housing cost burden. In particular, our focus is to relate economic hardship with home-ownership status, by jointly estimating the burden of housing costs for renters versus home-owners paying mortgage. Using microdata from the European Union Statistics on Income and Living Conditions dataset (EU-SILC) regarding five European countries (Italy, Germany, UK, Spain and France) we are able to exploit two indicators of housing cost burden and several indicators of household economic and financial hardship to examine the predictive power of housing costs in explaining family economic hardship. Furthermore, we jointly estimate the effect of the housing cost burden for renters versus home-owners paying mortgage. Results show that housing costs represent a non negligible burden in all the five European countries. Moreover, home ownership is found to significantly reduce household hardship status.

**Keywords:** financial distress, household finance, housing cost burden, tenure status

**JEL classification:** D12, D14, C24

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## 1. Introduction

Although it is often asserted that housing costs are one of the key determinants of household poverty status (Mimura, 2008; Kutty, 2005), in practice they have been rarely considered in relation to household economic hardship, and the focus has been on the role played by income or other socio-economic determinants of poverty. However, housing costs are among the most significant expense in a household balance (Stone 1993). Indeed, high housing costs may cause households to reduce non-housing expenditure such as health care, education, food and clothing (Stone 1993; Kutty, 2005). The gap between housing expenditure and income in some cases has increased to the point that many households ask for payday loans to pay for utilities (Melzer, 2004) or risk foreclosure (Bostic and Lee, 2008). Ignoring the housing cost burden may thus prevent a sound analysis of household poverty.

Within this context, tenure status is a crucial determinant of the housing cost burden. Monthly housing costs might be significantly higher for mortgage payers than renters, thus representing a significantly higher burden in the short term. However, home ownership represents a long term investment that may act as a form of private social insurance against future income uncertainty. Therefore, it may exert its effects beyond the short term. This may hold true especially in countries with low levels of social insurance protection (Conley and Gifford, 2006) or poor pension provision. In this regard, home ownership may help preventing poverty, especially among older generations (Venti and Wise, 2004; Yates and Bradbury, 2010).

This study contributes to the literature on poverty by looking at families' economic hardship in relation to their housing cost burden. We deviate from previous literature in several ways.

First of all, we go beyond the usage of traditional country-level measures of economic hardship based upon income thresholds. As observed by Lacomba et al. (2013), income is only one of the determinants of poverty. Factors such as poor accumulated resources, employment status, educational level and housing status, among others, may indeed affect living standards more than just income would do. Within this line of research, several proposals have appeared in the literature, which analyse household deprivation as a multidimensional phenomenon (Nolan and Whelan, 2011, 2010; Atkinson et al., 2002; Atkinson, 2003; Ayala et al., 2011). Furthermore, using solely income-based measures of hardship does not allow to take into account several forms of non-monetary benefits which could impact on household poverty. Since

housing represents one of the largest expenditure items in a household balance, living mortgage free, or with reduced rent, may significantly reduce households' economic burden (Coe, 1978). In this regard, looking at the impact of housing costs upon the probability of suffering from economic hardship would provide some useful insights and thus help develop a more comprehensive measure of hardship. This is in line with the definition of housing-induced poverty as a situation that arises when the burden of housing costs (rent, mortgage repayment) makes non housing goods not affordable (Kutty, 2005).

Secondly, we provide a re-examination of family economic hardship in relation to tenure status. Housing tenure choice represent one of the most crucial choice for individuals, involving consumption as well as investment choices (Banks et al., 2004). On one hand, housing services absorb a large fraction of the household budget, in terms of mortgage repayment or rent. On the other hand, housing represents a significant long term investment for households, which takes a large fraction of households' portfolio in most countries<sup>1</sup>. Further, tenure choices depend on household-level factors as well as country-level ones, so that a relatively poor household may encounter some difficulties in finding an accommodation that fits its budget requirements (Van den Bosch, 1998; Van Dam et al. 2003).

Beside the fact that renting may be relatively cheaper than paying mortgage in the short term, ownership represents a long term investment<sup>2</sup> that may act as a form of private social insurance against future income uncertainty in countries with low levels of social insurance protection (Conley and Gifford, 2006) or poor pension provision, thus preventing poverty, especially among older generations (Venti and Wise, 2004; Yates and Bradbury, 2010). Last but not least, the debate regarding housing vs. renting goes far beyond mere housing market issues, involving broader social, economic and demographic problems. In particular, homeownership issues should be taken into account when considering a broader concept of poverty that involves also non income-related determinants (Watson and Webb, 2009).

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<sup>1</sup> See, among others, Alessie et al. (2000) for the Netherlands, Banks and Blundell (2004) for the United Kingdom, Kessler and Wolff (1991) for France and the United States, and Wolff (1994) for the United States.

<sup>2</sup> In this regard, expectations for a high capital gain represent an incentive to become a home-owner (Goodman, 1990).

In order to avoid including a heterogeneous set of situations in the analysis, we focus on working households. Traditionally, hardship has been associated with disadvantaged categories such as the unemployed, homeless or people with disabilities. However, households today may be in a working status and nevertheless remain under the poverty threshold: according to the Eurofund Seminar Report on Working Poverty in the EU (2010), 18% of the self-employed and 6% of the employed in the EU15 can be classified as poor. From this perspective, the phenomenon of the so-called “working poor” has become a great concern for both economists and policy makers<sup>3</sup>.

Using micro data on five European countries taken from the European Union Statistics on Income and Living conditions (EU-SILC henceforth), we perform a cross country investigation on the mechanism of individual deprivation by relating several measures of material and financial deprivation to socio-economic variables at individual level, considering, at the same time, country characteristics such as the institutional environment and political interventions as the main candidates to explain variations in observed levels of household deprivation<sup>4</sup>. Furthermore, we are able to exploit several measures of economic hardship. The first one is a composite measure indicating severe material hardship combined with low work intensity and poverty risk. The second refers to financial hardship, defined as the self-reported difficulty to pay on time mortgage or rent payments, utility bills and other loans. Last but not least, the third measure is a self-reported measure regarding the ability to make ends meet. Using a self-reported measure of hardship, rather than conventional measures of material or financial destitution, helps to overcome any problem related to households’ unobserved preferences, and at the same time, to consider the role of comparison income effects on subjective well being (Labeaga et. al, 2007).

We use two measures of housing costs in our dataset. The first one is simply the ratio between household-related costs and household income,

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<sup>3</sup> According to the Eurofund Seminar Report on Working Poverty “workers living in a household where at least one member works and where the overall income of the household (including social transfers and after taxation) remain below the poverty line (60%of median equivalized income) are defined as working poor”.

<sup>4</sup> On this regard, this study allows to consider jointly institutional country-level factors and micro-level mechanisms.

while the second is a self-reported measure of the financial burden represented by housing costs. While the first represents the actual cost borne by households, the second is a subjective measure. Indeed, the first measure includes factors such as the cost of living and conditions related to the job market, while the second is more closely related to household perception of the housing burden, and thus is more affected by subjective factors such as comparisons with the reference group.

On the methodological side, we jointly estimate the probability of facing some kind of hardship and the probability of being a home owner by using an endogenous switching regression approach according to the procedure of Miranda et. al. (2006). This approach allows to deal with the endogeneity of an explanatory variable when it is a binary variable. Actually, the main challenge when estimating the causal effect of tenure status on economic hardship is that being owner rather than renter may be endogenous, since the allocation of households among home owners and renters is based on outcomes that have been endogenously chosen by households. Households choices regarding tenure status depend on several factors that can also affect the likelihood of facing hardship. Family background, for example, is likely to affect both the probability to be in hardship and the probability to be a home owner. Households might receive help from parents or friends in order to alleviate a situation of poverty, and, at the same time, wealthy relatives might help households with the down payment to obtain a mortgage. Similarly, someone expecting to be fired/have irregular contracts will probably not be a home-owner; at the same time, these households are more likely to experience some form of hardship. Thus, neglecting the potential endogeneity of the tenure status may result in biased and inconsistent estimators.

To our knowledge, our study is among the first to explicitly consider the extent to which effective and perceived housing costs affect economic hardship from a cross-country perspective. Moreover, we contribute to the existing research by simultaneously considering the effect of housing costs and tenure status upon household poverty. The paper is structured as follows. Section 2 deals with a brief literature review on the measurement of household hardship as well as the description of some of the main studies about ownership status. Section 2 describes the data used and the variables introduced in the study. Section 3 describes the method of analysis, while section 4 presents and discusses the results of our analysis. The final section reports concluding remarks, policy implications and avenues for future research.

## 2. Literature review

This paper relates to two strands of literature. First of all follows the contributions which have attempted, from an empirical perspective, to shed light on the determinants of household economic hardship. In particular, recent improvements in the poverty literature have placed into question the consistency of measures of deprivation based on mere income-based criteria (Layte *et al.*, 2001a, 2001b; Nolan and Whelan, 2011; Figari, 2012; Fusco, 2012)<sup>5</sup>.

Mimura (2008) analyses whether the burden of housing costs rather than poverty thresholds help explaining family economic hardship among low income US households. Using cross sectional data from the National Survey of America's Families, the author focuses on the analysis of differential effects of housing cost and poverty status upon household reported hardship according to race and ethnicity. The authors eventually found that poverty status has a higher explanatory power than housing cost burden in explaining the economic hardship of low-income White, Black and Hispanic households. Further, when considering families with children, poverty status, rather than housing cost burden, has been found to have a differential explanatory power among ethnic groups.

Georgarakos *et al.* (2010) use ECHP household survey data from 1994 to 2001 for twelve European countries to analyse the extent to which debt burdens affects households' reported financial distress. Their cross-country analysis highlights that households' reported distress tends to be higher in countries with a more expanded credit market. In line with Townsend (1979), household perceptions of their debt burden needs to be compared with the average of the reference group. Thus, households' assessment of their debt burden tends to be lower in countries with a relatively low number of mortgage holders.

Melzer (2004) considers the effects of payday loans on economic hardship. Using data from the National Survey of America's Families (NSAF) over three years, the author is able to use several measures of hardship: the delay or postponement of some kind of care of any household component; difficulty in paying bills, mortgage or rent; moving out of one's home or apartment due to financial difficulties;

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<sup>5</sup> Boarini and Mira d'Ercole (2006) found that the probability of experiencing material deprivation is twice as large among those in the lower quartile of the income distribution than for those in the middle quartile, although these differences vary greatly across countries.



reducing or skipping meals due to lack of money; going without telephone service for at least one month. Melzer (2004) eventually finds that, rather than improving households' ability to afford certain expenses, increased access to credit increases the probability that households find difficulties in paying mortgage and utility bills, and delay expenses related to medical and dental care.

Ayala et al. (2011), using Spanish data from EU-SILC, disaggregated at regional level, question the existence of country-level association between personal income and the probability of facing some kind of hardship. The contribution of their paper is twofold. First of all, the authors use a latent class model in order to construct a synthetic deprivation index. Second, they analyze the linkage between economic hardship and income-based poverty at regional level, in order to avoid intra-regions heterogeneity. The authors eventually found that poverty-level income does not seem to have a high explanatory power even at regional level, supporting the idea that peculiarities at regional levels may affect household deprivation more than income.

Barcena-Martin et al. (2013) join in the debate on whether household hardship should be considered as a mere microeconomic phenomenon, thus explained by individual drivers, or rather a macroeconomic phenomenon, driven by country-level aggregate factors. Using data from the 2007 wave of EU-SILC, the authors consider the phenomenon of multidimensional deprivation at both individual and aggregate level, eventually finding that institutional factors affect cross-country differences among households more than individual-level variables.

In the above context, several studies have put emphasis on the role of tenure status in preventing household hardship. Watson and Webb (2009) using data from the European Community Household panel survey from 2004 to 2006, emphasises the necessity to control for homeownership when performing poverty analysis. Regressing household poverty perception on homeownership (besides various socio economic characteristics) the authors eventually found that homeowners are less likely to report subjective poverty. In addition, a cross country analysis points out that the relative poverty level tend to increase in countries with a relatively higher owner-occupancy rate, thus supporting the idea that homeownership is used as a form of private insurance in countries that have greater income inequalities.

Yates and Bradbury (2010) focus on the role of home-ownership for the elderly. Renting households are indeed more likely to experience higher poverty rates than home-owners, due to lower non-housing

wealth, lower disposable incomes and higher housing costs in retirement. Similarly, Venti and Wise (2004), using several data sources regarding elderly US households, support the idea that housing represents a sort of buffer in case a unexpected event occurs. Albeit the authors do not consider housing equity as a part of saving made by households to keep the same standard of living of the pre-retirement period, they consider the non-negligible role played by housing in preventing potential hardship situations. Conley and Gifford (2006) also highlight the role of home-ownership as a substitute of social insurance, especially in countries with low level of social spending.

Our analysis is motivated by the literature examining the determinants of economic hardship, as well as the contributions which analyse the determinants of tenure status. After examining the extent to which effective and self-reported housing costs influence reported material and financial hardship, we go one step further by explicitly considering households' tenure status. Our focus tends to be broader than an assessment of the determinants of household economic hardship. On one hand, we consider the incidence of actual and self-reported housing costs upon several measures of hardship, thus controlling for the robustness of this linkage. On the other hand, given that housing related choices represent one of the most important choices in households' lifecycle, we reckon these need to be properly considered to provide a sound analysis of household hardship.

### **3. Data and descriptive evidence**

Our data are taken from the European Union Statistics on Income and Living conditions (EU-SILC henceforth), an international database coordinated by Eurostat that consists of harmonized data on income and living conditions in 27 EU member states. EU-SILC contains a cross sectional component and a longitudinal one. We work with data at cross sectional level for the year 2010.

The initial sample contained 476,705 observations with information on demographic and socio economic characteristics at household and individual level from 27 different countries<sup>6</sup>. Given that household members share the same standard of living (Nolan and Cantalon, 1998), we consider households as our unit of analysis. Particularly, we consider

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<sup>6</sup> Information as social exclusion and housing-condition is collected at household level, while labour, education and health information come at personal level.

the household reference person as the person responsible for the accommodation<sup>7</sup>. We restrict our analysis to five countries: Italy, UK, France, Germany and Spain. Furthermore, given the nature of our research question, we restrict our analysis to households whose head is aged 18-59<sup>8</sup>. Furthermore, we exclude from our sample those households declaring to be unemployed/not working in the reference period. Unlike similar papers that focus on the phenomenon of material and financial deprivation for traditionally disadvantaged categories such as the unemployed, disabled people or households belonging to minorities, we decide to analyse households which are working but still have a non negligible risk of facing hardship. Indeed, households may not be able to consume minimal levels of very basic goods and services such as food, housing and medical care even if they have a relatively stable source of income. In-work poverty has been analyzed empirically at national level as well as with some comparative studies (Marx and Verbist, 1998, Pena-Casas and Latta, 2004). Bardone and Guio (2005) observe that almost 7 per cent of the employed population is below the poverty line, thus indicating the need to tackle this problem through appropriate policy measures (EC, 2005). After excluding the unemployed and oldest households from our dataset, removing observations with missing values in the variables of interest and taking only five countries into account, we end up with a sample of more than 16,000 observations.

The strength of EU-SILC is that it provides us with data on income, poverty, social exclusion and living conditions in the EU, as well as information regarding household hardship. Specifically, in the empirical analysis we use three measures of household economic hardship. The first one, *H1*, is a variable assuming value 1 if the household experienced at least one of the following situations: risk of poverty, severe material deprivation and low work intensity<sup>9</sup>. The second indicator of hardship, *H2*, refers to financial hardship, that means that the household declares

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<sup>7</sup> The person responsible for the accommodation is the one owning or renting the accommodation. If the accommodation is provided at no cost, the person to whom the accommodation is provided is the responsible person. If two persons share responsibility for the accommodation, the oldest person is considered to be responsible.

<sup>8</sup> Indeed, the work intensity indicator that is used in order to calculate one of the indicator of hardship only refers to the population in the age range 18-59.

<sup>9</sup> See appendix for a detailed definition of material deprivation, low work intensity and risk of poverty according to EUROSTAT.

that in the last twelve months has not been able to pay on time due to financial difficulties for at least one of the following items: utility bills (heating, electricity, gas, water, etc.) for the main dwelling; mortgage or rent payments; hire purchase instalments or other loans. The third indicator that we will use in the empirical analysis, *H3*, uses information regarding the self-reported level of income a household would require to make ends meet<sup>10</sup>. In particular, households in each of the participant countries were asked to reply to the following question: “A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?” A household replying “with great difficulty” or “with difficulty” to the above question is considered to face hardship. Using a self reported measure of hardship, rather than conventional measures of material or financial hardship helps to overcome those problems related to households’ unobserved preferences.

The material deprivation considered by indicator *H2* takes a pre-defined set of items into account, but households may consider themselves to be deprived if they suffer from not having items that are not in the list defined by EUROSTAT. In this regard, using a subjective measure of hardship allows to take the role of income comparison effect on subjective well being into proper account. Indeed, according to a relatively well developed strand of literature<sup>11</sup>, individuals, other things being equal, evaluate their own level of welfare by comparing their level of income to that of the reference group. Furthermore, Christelis et. al (2009) notice that households’ self reported inability to make ends meet is correlated with households’ inability to borrow in order to support consumption, and thus with financial distress.

We use two measures of housing cost burden, <sup>12</sup>. The first one, *HC*, is the actual cost borne by households. In the case of homeowners, housing costs would include the mortgage payment (principal and interest), property taxes, insurance, utilities and maintenance costs. For

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<sup>10</sup> A similar measure of poverty has been used by Watson and Webb (2009)

<sup>11</sup> Peer group effects has been studied with reference to consumption (Childers and Rao 1992, and Charles, Hurst and Roussanov, 2007) and stock market participation (Hong, Kubik and Stein, 2004).

<sup>12</sup> For example, the U.S. Department of Housing and Urban Development (2007) considers households paying more than 30% of gross income for housing as cost burdened, while those paying 50% or more are considered severely cost burdened.

renters these costs include utilities and monthly rent. Thus, we define the actual cost burden as the ratio between household-related costs and household income. This is in line with official statistics, which often use income thresholds to define cost burdened households (Mimura, 2008; Stone, 2006). The second measure, *HBU*, is a self-reported measure of the financial burden represented by housing costs. Specifically, this measure is a binary variable, taking value 1 if the household reports total housing cost to be a heavy burden. While the first measure encompasses factors such as the cost of living and conditions related to the job market, the second is more related to household perception of the burden related to housing, and thus is more affected by subjective factors such as comparison with the reference group<sup>13</sup>.

Table 1a presents some descriptive statistics regarding the measures of economic hardship and measures of housing costs used in the empirical analysis. Overall, almost 13% of the households reported facing hardship according to the definition *H2*. This percentage is higher when considering *H3* and *H3* (19.6%). This is in line with the possibility that *H3*, being a subjective measure, is able to capture household-specific situations where economic hardship may arise. In this regard, *H1*, by encompassing standard situations of material hardship, may not be able to properly capture household heterogeneity.

Looking at cross-country statistics, we notice that UK shows the lowest percentage of households reporting hardship (it is always lower than 10%), while the highest percentage has been found in Spain and Italy. When looking at Italy, we notice that 71% of households reports having experienced financial distress. This is in line with the relatively thin mortgage market and high levels of down payment requirement (Chiuri and Jappelli, 2004).

Looking at cross-country distribution of measures of housing costs, table 1.b shows that there is not a great level of cross-country variability in the average level of housing cost over total income. In total, households report paying almost 40% out of their total income to pay for housing related expenses. When looking at the second indicator, we notice instead that it ranges from 20.97% in Germany to 81.90% in Italy. Again, high imperfections in credit markets may be considered as responsible for households' perceived burden.

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<sup>13</sup> Brandolini et al., analysing the determinants of perceived housing cost burden, found indeed this measure to be strongly correlated to the effective housing cost sustained by households.

#### 4. Empirical estimation

Following Mimura (2008) the linkage between housing hardship and housing cost is estimated, to determine the extent to which the burden represented by housing costs explains the likelihood of facing some kind of hardship. However, we go one step further by using measures of household hardship beyond material hardship, as well as two measures of housing cost burden.

In addition to HC and HBU, several demographic and socio-economic variables were included in the estimation. The set of demographic indicators includes age, sex, a dummy indicating whether the household head is married, two dummies indicating household composition, an indicator of tertiary education attainment, a dummy indicating household reporting good health. Further, it includes a set of variables regarding the job of the reference person: sectoral dummies, a dummy indicating whether the household head has a permanent contract, a dummy indicating change of job with respect to the previous year. Income quartile dummies and interaction terms between income quartile and levels of education are included as well in order to control for permanent income effects. Finally, country dummies are included in order to consider institutional country specific factors such as financial market level of regulation, subsidies and tax policy towards homeowner/renters<sup>14</sup>. This analysis allowed for a number of inferences about households' perceived hardship.

Table 2.1 and 2.2 show the results of a probit equation, where the dependent variables are H1 (model (1)), H2 (model (2)) and TARG (model (3)), and the main explanatory variables are HBU and HC, respectively. Results indicate that, overall, having relatively high housing costs increases the probability of facing economic hardship. The same holds when the subjective measure of housing cost burden is considered. When looking at the impact that several demographic and economic variables have upon households likelihood of perceiving hardship, we can notice that conditions related to the job market strongly affect the probability that households can face some kinds of hardship. Households with a permanent contract are indeed less likely to suffer from some kind of deprivation; similarly, the fact that households have changed the job since last year positively affect households probability to

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<sup>14</sup> On this regard, MacLennan et al. (2000) have noticed how different levels of financial market regulation affect differently housing market in different countries.

face hardship. In this regard, job market conditions that enhance job insecurity are found to be strongly related to hardship. Household composition affects hardship as well. Single parents and married couples have higher probability of perceiving hardship. Overall, it seems that socioeconomic variables are able to explain the complex phenomenon of household hardship better than only income.

Although the housing cost burden was found to be strongly correlated with several measures of hardship, previous probit regression might be plagued by an endogeneity problem. First, the housing cost burden may be correlated with unobserved factors, possibly related to household needs and thus house characteristics, which also affect household hardship. Intuitively, households with a relatively bigger family would probably need a bigger house. Further, households with children would probably choose a house close to the city centre, in order to have easier access to basic services (i.e. schools). Second, the perception of a burden related to housing costs may depend on households' material or financial hardship. In this sense, a reverse causality problem may arise, raising the need to use IV techniques to correct possible endogeneity. We assume the housing cost burden to be correlated with the size of the house, and with its location. Indeed, we use a dummy indicating whether the number of rooms is smaller than four (*DHSIZE*) and an interaction term between urban location and the presence of noise (*URBNOISE*) in the area as instruments of HC and HBU. Intuitively, a bigger house would cost more than a small one. On the other hand, households may decide to live in a relatively noisy area, if this imply a substantial saving in the housing costs. Results of the IV regression are presented in table 3.

In most cases, the overidentification test did not reject the model specification and the chosen instruments, thus suggesting that *DHSIZE* and *URBNOISE* have no direct effect upon household hardship. However, overidentification restriction was rejected in the final model (column VI), thus suggesting that the housing size and the presence of noise in the neighbourhood may have a direct effect upon the probability of facing hardship, when TARG is used as dependent variable and HC is used as a measure of housing cost burden. However, the Hausman test rejects the null hypothesis of exogeneity, thus indicating that probit regression provides better estimates than instrumental variable probit. Results seem to suggest that exogenous factors (i.e. banking sector conditions, which set the housing price and the monthly rent) are the

main determinants of the household cost burden<sup>15</sup>. This indeed is in line with the idea that factors related to imperfections in the housing market may indeed prevent households from choosing an accommodation whose quality/price profile is adequate with respect to their income level.

### **5. Household hardship and tenure status**

So far we have addressed the linkage between household economic hardship and housing cost burden without taking tenure status into account. However, home ownership needs to be explicitly taken into consideration, given the role that it may exert upon households well being, explaining cross country differences in social inclusion and social inequality (Kurz and Blossfeld, 2004; Watson and Webb, 2009). On one hand, since housing is a long-term investment, it would increase household wealth over time, eventually helping to alleviate poverty in old age, providing a “buffer stock wealth” in case of unexpected contingencies. However, in situations of volatile current housing environment, low and moderate income homeowners are likely to be at risk of distress and foreclosure (Bostic and Lee, 2008). On the other hand, even if renting may be a preferable choice for some categories of people (i.e. those people whose career requires flexibility), it represents a mere consumption good, exerting its utility in one period time. Thus, it does not act as a buffer, in case of unexpected drops in household income.

Table 4 provides figures on the tenure structure in the five European countries, distinguishing by homeowners, renters and those who benefit from some form of social renting<sup>16</sup>, while the rate of renters vs. owners paying mortgage as appears in EU SILC is shown in the bottom part of

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<sup>15</sup>Exogeneity of housing cost burden can be explained by the fact that households may not have complete freedom in housing choices. First of all, imperfections in the housing market may cause households to have incomplete information on the price/quality relation, so that it is not always the case that a higher rent/price does reflect a better housing quality. Moreover, in case a unexpected event (i.e. drop in income) occurs, it is not always possible for a household to move to a cheaper house in the short term (Van Dam et. al, 2003).

<sup>16</sup> The definition of social renting differs in the five countries taken into account (CECODHAS, 2011).



the table<sup>17</sup>. The table shows that the incidence of home ownership is quite dissimilar among European countries.

In particular, France and the UK appear to be the countries with the highest rate of social rent (17% and 18%, respectively), and a correspondingly lower rate of home ownership. This is in line with the idea that home ownership, as a long term investment, does not offer enough flexibility. Thus, where rent at reduced rates is available, one would expect that household would prefer renting to housing. Further, in the bottom part of the table one can notice that Italy shows the lowest rate of ownership (27%). This is not in contrast with the high rate of home ownership that characterizes Italy. We are only considering houses which are mortgage burdened, and in Italy only a minority of households have a mortgage (Georgarakos et al., 2010).

In order to take home ownership into account, we estimated the equation previously estimated in table 2.1 and 2.2, including the variable *owner* into our estimation. The variable takes value 1 if the household is a home owner paying mortgage, while it takes value 0 if the household is a renter (table 5). In our analysis only private renters are considered, while we do not take into account any form of social housing<sup>18</sup>.

When household hardship is re-estimated taking tenure status into proper account previous results are confirmed. Further, the negative coefficient associated to homeownership indicates that home owners, *ceteris paribus*, are less likely to report poverty than renters. This can be explained thinking about the role of housing as a “buffer”, i.e. an asset they would draw on in case an emergency occurs (Benito, 2007)<sup>19</sup>. In this regard, home ownership can be regarded as a form of “informal insurance” against future unexpected events, or poor pension provision.

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<sup>17</sup> The fact that home ownership rate in Italy is the lowest with respect to other countries is not surprising. Indeed, descriptive statistics only refer to households with outstanding mortgage, while in Italy the majority of households count on parental help. This is in line with statistics provided by Georgarakos et al (2010) using HCHP.

<sup>18</sup> Including social renters into the analysis would allow for a substantial degree of heterogeneity across countries. Social renting in EU countries differs indeed in terms of tenures, providers, beneficiaries and funding arrangements (Housing Europe Review, 2012).

<sup>19</sup> Households who are not homeowners would probably allocate money in private pension plans, saving account or private insurance, thus limiting their spending capacity.

### 5.1 *Switching regression estimation*

The main challenge in estimating the causal effect of tenure status on economic hardship is that the owner vs. renter status may be endogenous: unobservables in the hardship equation may be correlated with unobservables in the tenure status equation. For example, we may have that family background is likely to affect both the probability to be in hardship and the probability to be a home owner. Households with relatively wealthy relatives will probably be less likely to face hardship, and simultaneously will be able to pay the down payment required for a mortgage.

Neglecting the potential endogeneity of the tenure status may therefore result in biased and inconsistent estimators. Thus, we need to consider a model where hardship is observed for two categories of households: home-owners paying mortgage and renters. Moreover, there may be a self selection problem, so that households who apply for a mortgage are those with relatively greater wealth, who may be less burdened by housing costs. In order to cope with this problem in the empirical estimation I will rely on a switching regression framework in order to differentiate households' response to housing cost burden among renters and home owners<sup>20</sup>. The model allows to take into account unobservable individual characteristics, influencing at the same time households' hardship, housing cost burden and the probability of being a home owner.

In particular, I will rely on the procedure developed by Miranda et. al (2006), which allows to estimate jointly household hardship and tenure status by a maximum likelihood approach. In this way it is possible to model a switching regression, taking explicitly into account the fact that the outcome variable is binary and needs to be modelled with a nonlinear model<sup>21</sup>.

Considering two different groups of households (renters and home-owners paying mortgage), we need to specify two equations. The first one is an equation where the response variable,  $Hardship_i$  is a binary variable assuming value 1 if the household is experiencing some form of

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<sup>20</sup> Roy (1951) considered, informally, this situation in the labour market, but in this case, the outcome variable is continuous; Maddala (1996) called it switching regression model with endogenous switching Amemiya (1978) suggested bivariate probit models to correct endogeneity in the case of binary models.

<sup>21</sup> Two stage procedures such as Heckman (1979) are approximate, since they do not allow to make distributional assumptions regarding estimators.

hardship according to the hardship criteria previously defined (H1, H2, TARG). We assume  $Hardship_i$  to depend on tenure status, and on a vector of explanatory variables, which we assume to be the demographic and financial variables previously defined. In the second equation, the dependent variable,  $Owner_i$  is a dummy variable assuming value 1 if the household is a owner paying mortgage, and 0 otherwise. It depends upon a set of explanatory variables: determinants of household permanent income (the product of household wage income and series of age dummy variables and education dummy variables for the household head), and a series of demographic variables (race, gender, household size, marital status).

The model can be formulated as a system of equations for two unobserved responses, as follows:

$$(1) \quad y_i = x_i' \beta + \delta Owner_i + u_i$$

$y_i^*$  is a latent continuous variable, such that:

$$(2) \quad \begin{aligned} Hardship_i &= 1 \text{ if } y_i^* > 0 \\ Hardship_i &= 0 \text{ otherwise} \end{aligned}$$

$u_i$  is a residual term, and  $x_i'$  is a matrix of explanatory variables.

$Owner_i$  is a switching dummy, and it can be modelled as well as a latent response model:

$$(3) \quad S_i^* = z_i' \gamma + v_i$$

$S_i^*$  is a latent continuous variable, such that:

$$(4) \quad \begin{aligned} Owner_i &= 1 \text{ if } S_i^* > 0 \\ Owner_i &= 0 \text{ otherwise} \end{aligned}$$

Where  $z$  is a matrix of explanatory variables in the switching equation, and  $v_i$  is an error term. Error terms in equations (1) and (3) are assumed

to be correlated<sup>22</sup>. However, this assumption should be tested, by looking at the *Rbo* coefficient, estimated in the switching equation.

Tables 6.1 (a-c) and 6.2 (a-c) show switching regression results when *HC* and *HBU* are used, respectively, as main explanatory variables and *H1*, *H2* and *TARG* are used as dependent variables.

In the tenure status equation a set of variables which are not included in the main equation are included. Miranda et. al (2006) notice that explanatory variables of the main equation may be the same as those of the selection equation. However, since it would be of use to a proper estimation, we specify exclusion restrictions. Specifically, we include a dummy taking value 1 if the household reports that the area where they live is characterized by pollution, grime, or other environmental problems (*pollution*), country levels dummy indicating the average change in property value<sup>23</sup> (*pval*), and an interaction term between property value and a dummy indicating whether the household lives in a urban area (*urbval*). Country-level property value indicators represent indeed an important factor into an individual decision of whether to buy (Handbook of Residential Property Prices, 2013). Furthermore, they include the property evaluation in households' portfolio, thus providing useful insights regarding the value of households real wealth.

Looking at the relation between housing costs and tenure status, we notice that as housing costs (or the housing cost burden) increase, the probability of being a renter decreases. Households reckon that high housing costs (rent vs. mortgage) are worth paying only in the perspective of becoming home-owner. On this regard, a higher housing cost burden is valuable only if the burden represented by housing costs exerts its utility for more than one period of time, thus confirming the idea of housing as an investment good.

Last but not least, *Rbo* is significantly different from zero in all the specifications, thus justifying the usage of a switching regression approach rather than estimating an ordinary probit regression<sup>24</sup>. In this

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<sup>22</sup> Miranda et. al (2006) notice that their method differs from bivariate probit for the parametrization of the variance-covariance matrix, where the variances of the errors are set to be 1.

<sup>23</sup> Particularly, it is an indicator regarding price changes of residential properties purchased by households (flats, detached houses, terraced houses, etc.), both newly-built and existing ones, independently of their final use and independently of their previous owners. Data come from ECB statistical warehouse.

<sup>24</sup> Furthermore, there is evidence that ignoring endogeneity of tenure status lead to biased coefficients. In the specification with *H2* and *HBU*, when endogeneity

regard, it's a good practice to assume that unobservables in the hardship equation are also correlated with unobservables in the tenure status equation. Households with strong family ties, for example, may have a lower than average propensity to face material or financial hardship and, at the same time, a higher than average propensity to satisfy down payment requirements and thus being a mortgage payer.

## 6. Conclusions

In this study we have explored the linkage between household hardship and housing costs. We estimate the extent to which housing costs affect household poverty, using several measures of material and financial deprivation and two measures of housing cost burden indicating to what extent costs related to the main dwelling are onerous for households. We first estimate a model of household hardship, where the housing cost burden was found to have a high predictive power in explaining household well-being. Furthermore, we use a switching regression approach in order to control for housing related choices, explicitly controlling for the endogeneity of tenure status with respect to hardship. The results show that the inclusion of the homeownership variable is crucial in the explanation of subjective poverty. In line with the idea that poverty analysis should control for home ownership, those owning their house are less likely to report subjective poverty.

This paper has non negligible policy implications. On one hand, the usage of appropriate indicators to measure and monitor poverty becomes of primary importance for the policy makers. Reducing poverty for at least 20 million people who are below the poverty threshold and promoting social inclusion is indeed included in the targets of the EU 2020 strategy for smart, sustainable and inclusive growth. On the other hand, when explicitly considering tenure status in the relation between housing cost burden and economic hardship, a policy maker should take into consideration that policies aimed at reducing poverty should not be disentangled from those directed towards alleviating the financial burden related to housing costs. In this regard, when analysing policies towards more affordable housing, one should consider macro-level effects besides consequences to individual well being. From this perspective,

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is not considered being a home owner reduces the probability to face material hardship (H2) of 18%. This probability is almost 60% when endogeneity is taken into account. Similar results hold when other specifications are considered.

housing policies trends have changed dramatically since 2007, when the global financial crisis led to the subprime crisis, enhancing housing unaffordability. While in the pre-crisis period housing policies were directed towards supporting private home-ownership and construction of new housing, in the post-crisis period housing policies have shifted towards the construction of social housing (CECODHAS, 2012).

Further analysis is needed to better understand the determinants of home ownership vs. renting, in order to implement adequate policy interventions. For example, rather than only the level of income, income uncertainty would need to be properly investigated in determining the choice between ownership and renting. Finding a negative correlation between ownership rates and unstable income flows would point to policy interventions that reduce job insecurity.

## **Appendix**

### **(A1) Variables definition**

#### Housing cost (HC)

Monthly housing cost sustained by owners include the following components: mortgage principal repayment, mortgage interest payments (net of any tax relief), gross of housing benefits, (i.e. housing benefits should not be deducted from the total housing cost), structural insurance, mandatory services and charges (sewage removal, refuse removal, etc.), regular maintenance and repairs, taxes, and the cost of utilities (water, electricity, gas and heating).

Monthly housing cost sustained by renters include the following components: rent payments, gross of housing benefits (i.e. housing benefits should not be deducted from the total housing cost), structural insurance (if paid by the tenants), services and charges (sewage removal, refuse removal, etc.) (if paid by the tenants), taxes on dwelling (if applicable), regular maintenance and repairs and the cost of utilities (water, electricity, gas and heating).

#### Housing cost financial burden (HBU)

Households were asked the following question: “Please think your total housing costs including mortgage repayment (instalment and interest) or

rent, insurance and service charges (sewage removal, refuse removal, regular maintenance, repairs and other charges). To what extent are these costs a financial burden to you?" Households are considered to perceive high financial burden if they declare housing costs to be a heavy burden.

#### Material deprivation (H2)

Material deprivation refers to households' inability to afford at least three of the following items:

- pay their rent, mortgage or utility bills;
- to keep their home adequately warm;
- to face unexpected expenses;
- to eat meat or proteins regularly;
- to go on holiday;
- a television set;
- a washing machine;
- a car;
- a telephone.

When the household cannot afford at least four of the above items it comes to be severe material deprivation. Material deprivation does not refer to the case when the household does not own the item for reason different from their affordability (i.e. the household does not need the good).

#### Work intensity

Eurostat defines work intensity as the the ratio of the total number of months that all working-age household members have worked during the income reference year and the total number of months the same household members theoretically could have worked in the same period. A working-age person is a person aged 18-59 years, with the exclusion of students in the age group between 18 and 24 years.

#### Risk of poverty

An household is at risk of poverty if her income is relatively low compared with other residents in the country where she lives. In particular, risk of poverty refers to having an equivalized disposable income below the risk of poverty threshold, set at 60 % of the national median equivalised disposable income after social transfers.

(A2) Probit regression, by country,

(a) HBU used as main explanatory variable

H1 VARIABLES	(1) DE	(2) ES	(3) FR	(4) IT	(5) UK
<b>HBU</b>	<b>0.0306***</b>	<b>0.00320***</b>	<b>0.0363***</b>	<b>0.0571***</b>	<b>0.0007</b>
	<b>(0.0089)</b>	<b>(0.0011)</b>	<b>(0.0095)</b>	<b>(0.0100)</b>	<b>(0.0006)</b>
education	0.0078	-0.0015	-0.0095	-0.0238*	-0.0010
	(0.00751)	(0.00106)	(0.00874)	(0.0142)	(0.000633)
good health	-0.0179	-0.00899	0.0146**	-0.00235	0.000425
	(0.0191)	(0.00907)	(0.00718)	(0.0219)	(0.000572)
permanent contract	-0.0161*	-0.00532**	-0.0119	-0.0664***	-0.000584
	(0.00899)	(0.00216)	(0.00941)	(0.0186)	(0.00171)
change of job since last year	0.0214*	-0.000625	0.00616	-0.000665	-4.79e-05
	(0.0113)	(0.000788)	(0.0107)	(0.0112)	(0.000446)
age	-0.000609**	-3.95e-05	-3.38e-05	0.000657	1.30e-05
	(0.000247)	(4.37e-05)	(0.000281)	(0.000490)	(1.68e-05)
<i>Household composition:</i>					
no children	-0.0135**	-0.000932	-0.00475	0.00510	0.00127*
	(0.00548)	(0.000720)	(0.00631)	(0.0104)	(0.000714)
<i>Household composition:</i>					
single parent with children	0.0389***	0.00462	0.0348**	0.0438*	-3.32e-05
	(0.0135)	(0.00338)	(0.0164)	(0.0252)	(0.000476)
Married	0.0114*	0.00391***	0.0271***	0.0458***	0.000761*
	(0.00627)	(0.000980)	(0.00705)	(0.00916)	(0.000417)
Male	0.00541	-0.00112	0.00319	0.00217	0.000541
	(0.00540)	(0.000872)	(0.00609)	(0.0101)	(0.000352)
Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
sectoral dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	4,206	2,382	2,776	2,387	1,608

H2 VARIABLES	(1) DE	(2) ES	(3) FR	(4) IT	(5) UK
<b>HBU</b>	<b>0.0811***</b>	<b>0.142***</b>	<b>0.111***</b>	<b>0.365***</b>	<b>0.0946***</b>
	<b>(0.0173)</b>	<b>(0.0291)</b>	<b>(0.0201)</b>	<b>(0.0613)</b>	<b>(0.0209)</b>
education	-0.0378*	-0.0316	-0.0765**	0.0125	0.0285
	(0.0220)	(0.0504)	(0.0329)	(0.100)	(0.0306)
good health	-0.0473	-0.171	-0.0537	-0.221***	0.00850
	(0.0352)	(0.137)	(0.0500)	(0.0527)	(0.0541)
permanent contract	-0.00956	-0.0971**	-0.0523	-0.00981	0.0169



	(0.0189)	(0.0463)	(0.0326)	(0.0548)	(0.0413)
change of job since last year	0.0296	0.0305	0.000580	0.150***	0.0527*
	(0.0241)	(0.0502)	(0.0324)	(0.0462)	(0.0273)
age	-0.00300***	0.00388**	-0.00125	-0.00552**	-0.000897
	(0.000560)	(0.00185)	(0.000905)	(0.00271)	(0.000746)
<i>Household composition:</i>					
no children	-0.0193*	-0.0164	-0.00513	-0.00551	-0.00300
	(0.0107)	(0.0332)	(0.0194)	(0.0508)	(0.0152)
<i>Household composition:</i>					
single parent with children	-0.00499	-0.0570	0.00293	0.115*	-0.00761
	(0.0178)	(0.0548)	(0.0328)	(0.0644)	(0.0205)
Married	-0.00976	-0.0822**	-0.00348	0.231***	0.0139
	(0.0123)	(0.0357)	(0.0172)	(0.0484)	(0.0152)
Male	0.0131	-0.0408	0.0553***	-0.0185	-0.0102
	(0.0114)	(0.0381)	(0.0166)	(0.0520)	(0.0153)
Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Sector dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	2,059	930	1,686	532	1,101

<b>TARG</b>	(1)	(2)	(3)	(4)	(5)
<b>VARIABLES</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
<b>HBU</b>	<b>0.0995***</b>	<b>0.334***</b>	<b>0.270***</b>	<b>0.430***</b>	<b>0.257***</b>
	<b>(0.0125)</b>	<b>(0.0170)</b>	<b>(0.0196)</b>	<b>(0.0178)</b>	<b>(0.0257)</b>
education	-0.0104	-0.0730**	-0.0701***	-0.104*	0.0312
	(0.00935)	(0.0286)	(0.0269)	(0.0541)	(0.0237)
good health	-0.0347	-0.259**	-0.0821*	-0.140**	-0.0376
	(0.0219)	(0.110)	(0.0446)	(0.0650)	(0.0830)
permanent contract	-0.00665	-0.0698***	0.000945	-0.0880**	0.0360*
	(0.00927)	(0.0270)	(0.0220)	(0.0387)	(0.0185)
change of job since last year	0.0133	0.0185	0.0236	-0.0304	0.0188
	(0.0118)	(0.0286)	(0.0316)	(0.0339)	(0.0183)
age	0.000635**	0.00220**	0.000782	0.000961	3.54e-05
	(0.000271)	(0.00104)	(0.000745)	(0.00142)	(0.000613)
<i>Household composition:</i>					
no children	-0.00572	-0.0134	-0.0233	-0.00347	-0.00985
	(0.00573)	(0.0190)	(0.0156)	(0.0267)	(0.0127)
<i>Household composition:</i>					
single parent with children	0.00391	0.0880**	0.0198	0.0758	0.0322
	(0.00888)	(0.0427)	(0.0261)	(0.0515)	(0.0249)
Married	0.0107*	0.00160	0.0156	0.0974***	0.0224*
	(0.00643)	(0.0183)	(0.0146)	(0.0252)	(0.0132)
Male	-0.00811	-0.0441**	-0.0110	0.0226	-0.0158
	(0.00650)	(0.0203)	(0.0164)	(0.0283)	(0.0140)

Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Sector dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	4,201	2,464	2,775	2,387	1,605

**(b) HC used as main explanatory variable**

H1	(1)	(2)	(3)	(4)	(5)
VARIABLES	DE	ES	FR	IT	UK
<b>HC</b>	<b>0.0450***</b>	<b>0.00598***</b>	<b>0.0178***</b>	<b>0.0706***</b>	<b>0.00131***</b>
	<b>(0.00530)</b>	<b>(0.00160)</b>	<b>(0.00557)</b>	<b>(0.0125)</b>	<b>(0.000429)</b>
education	0.00772	-0.00184*	-0.00673	-0.0371***	-0.000615
	(0.00715)	(0.00105)	(0.00928)	(0.0121)	(0.000441)
good health	-0.0213	-0.00465	0.0114	-0.00224	0.000366**
	(0.0195)	(0.00664)	(0.00965)	(0.0227)	(0.000176)
permanent contract	-0.0131	-0.00384**	-0.00674	-0.0684***	5.88e-05
	(0.00856)	(0.00190)	(0.00882)	(0.0187)	(0.000546)
change of job since last year	0.0160	-0.00131**	0.00773	0.00283	0.000124
	(0.0106)	(0.000601)	(0.0117)	(0.0126)	(0.000339)
age	-0.000535**	1.64e-06	0.000157	0.00120**	1.37e-05
	(0.000237)	(3.99e-05)	(0.000296)	(0.000540)	(1.15e-05)
<i>Household composition:</i>					
no children	-0.0101*	-0.000642	-0.00467	0.0118	0.000723
	(0.00545)	(0.000751)	(0.00681)	(0.0117)	(0.000473)
<i>Household composition:</i>					
single parent with children	0.0202*	0.00612	0.0375**	0.0480*	-0.000322*
	(0.0108)	(0.00413)	(0.0178)	(0.0266)	(0.000168)
Married	-0.00321	0.00412***	0.0291***	0.0507***	0.000348
	(0.00629)	(0.00116)	(0.00751)	(0.00987)	(0.000282)
Male	0.00562	-0.000294	0.00299	0.00856	0.000265
	(0.00512)	(0.000798)	(0.00648)	(0.0103)	(0.000224)
Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Sector dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	4,206	2,382	2,776	2,387	1,608

H2	(1)	(2)	(3)	(4)	(5)
VARIABLES	DE	ES	FR	IT	UK
<b>HC</b>	<b>0.0329***</b>	<b>0.203***</b>	<b>-0.0106</b>	<b>0.146***</b>	<b>0.0522***</b>

	<b>(0.0109)</b>	<b>(0.0379)</b>	<b>(0.0136)</b>	<b>(0.0499)</b>	<b>(0.0182)</b>
education	-0.0413*	-0.0456	-0.0747**	-0.0228	0.0478
	(0.0231)	(0.0503)	(0.0338)	(0.103)	(0.0335)
good health	-0.0689*	-0.117	-0.0814	-0.200***	-0.00344
	(0.0400)	(0.151)	(0.0548)	(0.0608)	(0.0658)
permanent contract	-0.00687	-0.0818*	-0.0497	-0.0116	0.0234
	(0.0193)	(0.0460)	(0.0332)	(0.0555)	(0.0428)
change of job since last year	0.0287	0.0149	0.00400	0.131***	0.0510*
	(0.0252)	(0.0497)	(0.0335)	(0.0485)	(0.0278)
age	-0.00284***	0.00443**	-0.00111	-0.00452*	-0.000629
	(0.000578)	(0.00182)	(0.000913)	(0.00263)	(0.000788)
<i>Household composition:</i>					
no children	-0.0204*	-0.00600	-0.00977	-0.00900	-0.00799
	(0.0113)	(0.0340)	(0.0195)	(0.0499)	(0.0153)
<i>Household composition:</i>					
single parent with children	-0.00663	-0.0440	0.0189	0.124*	-0.0182
	(0.0185)	(0.0580)	(0.0366)	(0.0655)	(0.0192)
Married	-0.0129	-0.0718**	0.00692	0.232***	0.0137
	(0.0129)	(0.0362)	(0.0174)	(0.0464)	(0.0159)
Male	0.0115	-0.0286	0.0536***	-0.0312	-0.0217
	(0.0119)	(0.0375)	(0.0172)	(0.0494)	(0.0161)
Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Sector dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	2,059	930	1,686	532	1,101

<b>TARG</b>	(1)	(2)	(3)	(4)	(5)
<b>VARIABLES</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
<b>HC</b>	<b>0.0265***</b>	<b>0.161***</b>	<b>0.0282**</b>	<b>0.0917***</b>	<b>0.0926***</b>
	<b>(0.00568)</b>	<b>(0.0226)</b>	<b>(0.0124)</b>	<b>(0.0273)</b>	<b>(0.0183)</b>
education	-0.0121	-0.102***	-0.0562*	-0.113**	0.0507*
	(0.0105)	(0.0305)	(0.0293)	(0.0528)	(0.0290)
good health	-0.0583**	-0.377***	-0.141***	-0.170***	-0.0264
	(0.0279)	(0.106)	(0.0526)	(0.0628)	(0.0847)
permanent contract	-0.00827	-0.0558**	0.00938	-0.0986***	0.0569**
	(0.0104)	(0.0268)	(0.0230)	(0.0362)	(0.0230)
change of job since last year	0.0159	-0.00318	0.0327	0.000548	0.0300
	(0.0130)	(0.0291)	(0.0337)	(0.0337)	(0.0227)
age	0.00100***	0.00324***	0.00163**	0.00183	0.000991
	(0.000301)	(0.00109)	(0.000793)	(0.00137)	(0.000743)
<i>Household composition:</i>					
no children	-0.00777	-0.0139	-0.0309*	-0.0140	-0.0130
	(0.00648)	(0.0201)	(0.0163)	(0.0256)	(0.0151)

<i>Household composition:</i>					
single parent with children	0.00867 (0.0111)	0.148*** (0.0478)	0.0577* (0.0307)	0.0921* (0.0505)	0.0272 (0.0290)
Married	0.0128* (0.00722)	0.0371* (0.0193)	0.0364** (0.0156)	0.115*** (0.0241)	0.0297* (0.0154)
Male	-0.0110 (0.00736)	-0.0474** (0.0212)	-0.0147 (0.0172)	0.0291 (0.0269)	-0.0414** (0.0161)
Income quartile	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Income quartile*education	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Sector dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	4,201	2,464	2,775	2,387	1,605

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## TABLES AND FIGURES

Table 1.a Descriptive statistics, Economic Hardship

<b>H1</b>	<b>TOTAL</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
0	87.01	88.03	83.22	88.43	84.48	91.35
1	12.99	11.97	16.78	11.57	15.52	8.65
<b>H2</b>	<b>TOTAL</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
0	80.36	90.54	69.86	84.44	28.49	91.22
1	19.64	9.46	30.14	15.56	71.51	8.78
<b>H3</b>	<b>TOTAL</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
0	80.32	96.97	72.82	81.21	60.52	88.17
1	19.68	6.03	27.18	18.79	39.48	11.83

Table 1.b Descriptive statistics, Housing cost burden

<b>Housing cost (mean value)</b>	<b>TOTAL</b>	<b>DE</b>	<b>ES</b>	<b>FR</b>	<b>IT</b>	<b>UK</b>
Housing cost/Income	39.07%	37.70%	40.65%	37.51%	42.42%	40.52%
Perceived housing cost burden	36.04%	20.97%	61.32%	29.70%	81.90%	26.14%



**Table 2.1 Determinants of household economic hardship, probit regression using HBU**

VARIABLES	(1) H1		(2) H2		(3) TARG	
<b>HBU</b>	<b>0.0317</b>	<b>***</b>	<b>0.1170</b>	<b>***</b>	<b>0.2270</b>	<b>***</b>
	<b>(0.0053)</b>		<b>(0.0127)</b>		<b>(0.0099)</b>	
II income quart*educ	-0.0084		0.0178		-0.0190	
	(0.0068)		(0.0225)		(0.0125)	
III income quart*educ	-0.0106		0.0098		-0.0014	
	(0.0097)		(0.0233)		(0.0134)	
IV income quart*educ	-0.0330	**	0.00294		-0.0340	**
	(0.0132)		(0.0301)		(0.0169)	
education	-0.00618		-0.0488	***	-0.0179	*
	(0.0046)		(0.0181)		(0.0108)	
good health	0.00401		-0.0608	*	-0.0571	**
	(0.0067)		(0.0315)		(0.0235)	
permanent contract	-0.0204	***	-0.0337	*	-0.0177	*
	(0.0061)		(0.0181)		(0.0235)	
change of job since last year	0.0148	**	0.0439	**	0.0201	*
	(0.0064)		(0.0200)		(0.0109)	
I income quartile	0.0769		0.2120	*	0.0701	
	(0.0765)		(0.121)		(0.0554)	
II income quartile	-0.0124		0.0509		0.0612	
	(0.0283)		(0.0812)		(0.0517)	
III income quartile	-0.0371	*	0.00883		-0.0324	
	(0.0223)		(0.0738)		(0.0354)	
age	-0.0003	*	-0.0022	***	0.0009	***
	(0.0002)		(0.0005)		(0.0003)	
<i>Household composition:</i>						
no children	-0.00230		-0.0113		-0.00686	
	(0.00372)		(0.0103)		(0.0065)	
<i>Household composition:</i>						
single parent with children	0.0371	***	0.00277		0.0275	**
	(0.0091)		(0.0169)		(0.012)	
Married	0.0265	***	0.00835		0.0184	***
	(0.0039)		(0.0104)		(0.0063)	
Male	0.00361		0.0139		-0.0124	*
	(0.0034)		(0.0107)		(0.007)	
Country dummies	<i>yes</i>		<i>yes</i>		<i>yes</i>	
Sector dummies	<i>yes</i>		<i>yes</i>		<i>yes</i>	
Observations	13,447		6,308		13,438	

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2.2 Determinants of household economic hardship, probit regression using HC**

VARIABLES	(1) H1		(2) H2		(3) targ	
<b>HC</b>	<b>0.038</b>	<b>***</b>	<b>0.0330</b>	<b>***</b>	<b>0.0465</b>	<b>***</b>
	<b>(0.00366)</b>		<b>(0.0101)</b>		<b>(0.00658)</b>	
II income quart*educ	-0.0080		0.0190		-0.0234	*
	(0.0069)		(0.0232)		(0.0142)	
III income quart*educ	-0.0122		0.0050		-0.0115	
	(0.0094)		(0.0235)		(0.0152)	
IV income quart*educ	-0.0395	<b>***</b>	-0.0086		-0.0580	<b>***</b>
	(0.0139)		(0.0307)		(0.0190)	
education	-0.0063		-0.0491	<b>***</b>	-0.0176	
	(0.0044)		(0.0185)		(0.0121)	
good health	0.0018		-0.0893	<b>***</b>	-0.107	<b>***</b>
	-0.0069		(0.0342)		(0.0271)	
permanent contract	-0.0156	<b>***</b>	-0.0331	*	-0.0206	*
	-0.0056		(0.0181)		(0.0113)	
change of job since last year	0.01	<b>**</b>	0.04	<b>**</b>	0.03	<b>**</b>
	-0.0061		-0.0203		(0.0125)	
I income quartile	-0.0005		0.1491		-0.0029	
	(0.0346)		-0.11		(0.0456)	
II income quartile	-0.0343		0.0143		0.0096	
	(0.0218)		(0.0748)		(0.0481)	
III income quartile	-0.0478	<b>**</b>	-0.0121		-0.0616	*
	(0.0218)		(0.0703)		(0.0370)	
age	-0.0001		-0.0018	<b>***</b>	0.0017	<b>***</b>
	(0.0002)		(0.0005)		(0.0003)	
<i>Household composition:</i>						
no children	-0.00119		-0.0159		-0.0139	<b>**</b>
	(0.0037)		(0.0105)		(0.0070)	
<i>Household composition:</i>						
single parent with children	0.0245	<b>***</b>	0.0047		0.0498	<b>***</b>
	(0.0079)		(0.0179)		(0.0146)	
Married	0.0202	<b>***</b>	0.0111		0.0302	<b>***</b>
	(0.0036)		(0.0106)		(0.0069)	
Male	0.0037		0.0072		-0.0194	<b>***</b>
	(0.0033)		(0.0110)		(0.0075)	
Country dummies	<i>yes</i>		<i>yes</i>		<i>yes</i>	
Sector dummies	<i>yes</i>		<i>yes</i>		<i>yes</i>	
Observations	13,447		6,308		13,438	

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3 Instrumental variable probit regression**

VARIABLES	(1) H1	(2) H2	(3) TARG	(4) H1	(5) H2	(6) TARG
<b>HBU</b>	<b>1.058*</b> (0.552)	<b>1.098*</b> (0.604)	<b>1.346***</b> (0.433)			
<b>HC</b>				<b>0.570**</b> (0.235)	<b>0.175</b> (0.248)	<b>0.102</b> (0.175)
II income quart*educ	-0.100 (0.0981)	-0.0250 (0.106)	-0.0999 (0.0753)	-0.133 (0.0934)	-0.0412 (0.104)	-0.149** (0.0683)
III income quart*educ	-0.0887 (0.140)	-0.00977 (0.116)	0.103 (0.0801)	-0.139 (0.137)	-0.0518 (0.112)	0.0361 (0.0737)
IV income quart*educ	-0.314* (0.169)	-0.0549 (0.138)	-0.176* (0.0976)	-0.433*** (0.163)	-0.123 (0.133)	-0.249*** (0.0883)
education	-0.105 (0.0673)	-0.200** (0.0932)	-0.188*** (0.0634)	-0.122* (0.0676)	-0.195** (0.0912)	-0.171*** (0.0599)
good health	0.0668 (0.140)	-0.263* (0.156)	-0.365*** (0.112)	-0.0666 (0.108)	-0.435*** (0.120)	-0.541*** (0.0846)
permanent contract	-0.336*** (0.0554)	-0.151** (0.0725)	-0.158*** (0.0503)	-0.292*** (0.0568)	-0.133* (0.0718)	-0.142*** (0.0484)
change of job since last year	0.0556 (0.0645)	0.227*** (0.0763)	0.0478 (0.0550)	0.0662 (0.0637)	0.231*** (0.0750)	0.0847* (0.0512)
I income quartile	1.249*** (0.397)	0.590* (0.336)	0.546** (0.229)	0.664 (0.443)	0.453 (0.397)	0.414 (0.268)
II income quartile	0.181 (0.424)	0.285 (0.336)	0.433* (0.237)	-0.133 (0.426)	0.201 (0.347)	0.412* (0.233)
III income quartile	-0.453 (0.478)	0.0110 (0.345)	-0.349 (0.240)	-0.689 (0.468)	-0.0519 (0.340)	-0.349 (0.225)
age	-0.00289 (0.00236)	-0.0111*** (0.00280)	0.00504*** (0.00194)	0.00106 (0.00243)	-0.00785*** (0.00275)	0.00772*** (0.00185)
<i>Household composition: no children</i>	-0.0656 (0.0552)	-0.0435 (0.0577)	-0.0560 (0.0404)	-0.0615 (0.0545)	-0.0748 (0.0553)	-0.0939** (0.0376)
<i>Household composition: single parent with children</i>	0.270*** (0.0973)	-0.0442 (0.108)	0.125 (0.0806)	0.298*** (0.0767)	0.0273 (0.0967)	0.263*** (0.0624)
Married	0.372*** (0.0675)	-0.0133 (0.0668)	0.116** (0.0503)	0.389*** (0.0541)	0.0508 (0.0586)	0.217*** (0.0376)
Male	0.0429 (0.0500)	0.0837 (0.0625)	-0.0557 (0.0381)	0.0480 (0.0493)	0.0204 (0.0528)	-0.0765** (0.0350)
<i>Instruments: n. rooms&lt;4; urb*noise</i>						
<i>Wald test of exogeneity (p-value)</i>						
	0.2732	0.3875	0.667	0.922	0.9141	0.2724
<i>Test of overidentifying restrictions (p-value)</i>						
	0.2266	0.4564	0.2438	0.6081	0.1352	0.0012
Observations	13,447	6,308	13,438	13,447	6,308	13,438

**Table 4: ownership rates**

	<b>Owner occupied</b>	<b>Private rent</b>	<b>Social rent</b>
<b>FRANCE</b>	57%	22%	17%
<b>GERMANY</b>	42%	53%	5%
<b>ITALY</b>	69%	14%	5%
<b>SPAIN</b>	85%	11%	2%
<b>UNITED KINGDOM</b>	66%	16%	18%

Source: CECODHAS Housing Europe's Observatory (2011)

	<b>Owner occupied</b>	<b>Private rent</b>
<b>FRANCE</b>	66%	34%
<b>GERMANY</b>	47%	53%
<b>ITALY</b>	27%	73%
<b>SPAIN</b>	84%	16%
<b>UNITED KINGDOM</b>	83%	17%

Source: EU SILC

**Table 5 Probit regression including tenure status**

VARIABLES	(1)	(2)	(3)	(1)	(2)	(3)
	hardship2	hardship3	targ2	hardship2	hardship3	targ2
<b>hbu</b>	<b>0.0324</b> ***	<b>0.1210</b> ***	<b>0.2300</b> ***			
	<b>-0.0054</b>	<b>(0.0127)</b>	<b>(0.0100)</b>			
<b>hc</b>				<b>0.0413</b> ***	<b>0.0415</b> ***	<b>0.0513</b> ***
				<b>(0.0039)</b>	<b>(0.0110)</b>	<b>(0.0069)</b>
<b>owner</b>	<b>-0.0129</b> ***	<b>-0.0608</b> ***	<b>-0.0335</b> ***	<b>-0.0202</b> ***	<b>-0.0611</b> ***	<b>-0.0351</b> ***
	<b>(0.0036)</b>	<b>(0.0118)</b>	<b>(0.0068)</b>	<b>(0.0039)</b>	<b>(0.0123)</b>	<b>(0.0076)</b>
II income quart*educ	-0.0087	0.0191	-0.0184	-0.00845	0.0206	-0.0227
	(0.0067)	(0.0220)	(0.0125)	(0.0067)	(0.0227)	(0.0142)
III income quart*educ	-0.0106	0.0123	-0.0011	-0.0119	0.0070	-0.0115
	(0.0096)	(0.0229)	(0.0134)	(0.0092)	(0.0231)	(0.0152)
IV income quart*educ	-0.0324 **	0.00454	-0.0333 **	-0.0389 ***	-0.0081	-0.0581 ***
	(0.0131)	(0.0294)	(0.0168)	(0.0138)	(0.0302)	(0.0190)
education	-0.0061	-0.0481 ***	-0.0182 *	-0.0064	-0.0489 ***	-0.0179
	(0.0046)	(0.0177)	(0.0108)	(0.0044)	(0.0182)	(0.0121)
good health	0.0044	-0.0552 *	-0.0545 **	0.0025	-0.0835 **	-0.1050 ***
	(0.00668)	(0.0304)	(0.0236)	(0.00686)	(0.0332)	(0.0272)
permanent contract	-0.0189 ***	-0.0266	-0.0144	-0.0133 **	-0.0254	-0.0169
	(0.0059)	(0.0173)	(0.0102)	(0.0053)	(0.0173)	(0.0111)
change of job since last year	0.0144 **	0.0403 **	0.0196 *	0.0122 **	0.0397 **	0.0254 **
	(0.0063)	(0.0192)	(0.0108)	(0.0059)	(0.0195)	(0.0124)
I income quartile	0.0690	0.1850	0.0559	-0.0087	0.1110	-0.0193
	(0.0720)	(0.1160)	(0.0522)	(0.0290)	(0.1020)	(0.0422)
II income quartile	-0.0131	0.0396	0.0536	-0.0365 *	-0.00269	-0.00130
	(0.0277)	(0.0771)	(0.0500)	(0.0212)	(0.0698)	(0.0462)
III income quartile	-0.0370 *	0.0033	-0.0332	-0.0490 **	-0.0206	-0.0642 *
	(0.0220)	(0.0708)	(0.0350)	(0.0216)	(0.0671)	(0.0365)
age	-0.0002	-0.0018 ***	0.0010 ***	0.0000	-0.0014 ***	0.0019 ***
	(0.0002)	(0.0005)	(0.0003)	(0.0002)	(0.0005)	(0.0003)
<i>Household composition :</i>						
no children	-0.0030	-0.0155	-0.0092	-0.0021	-0.0197 *	-0.0162 **
	(0.0037)	(0.0101)	(0.0064)	(0.0036)	(0.0103)	(0.0069)
<i>Household composition :</i>						
single parent with children	0.0376 ***	0.00373	0.0284 **	0.0241 ***	0.0031	0.0493 ***
	(0.0091)	(0.0167)	(0.0121)	(0.0079)	(0.0175)	(0.0146)
Married	0.0286 ***	0.0198 *	0.0232 ***	0.0231 ***	0.0216 **	0.0350 ***
	(0.0040)	(0.0103)	(0.0064)	(0.0037)	(0.0105)	(0.0070)
Male	0.0036	0.0138	-0.0125 *	0.0037	0.0071	-0.0198 ***
	(0.0034)	(0.0105)	(0.0069)	(0.0032)	(0.0108)	(0.0074)
Country dummies	yes	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes	yes
Observations	13,447	6,308	13,438	13,447	6,308	13,438

**Table 6.1a Switching regression, H1, HC.**

H1	Coef.	Std. Err.	Significance
<b>HC</b>	<b>0.7156</b>	<b>0.0446</b>	<b>***</b>
<b>owner</b>	<b>-0.7904</b>	<b>0.1559</b>	<b>***</b>
I income quart*education	-0.1272	0.0908	
II income quart*education	-0.1280	0.1328	
III income quart*education	-0.4161	0.1602	***
permanent contract	-0.2020	0.0583	***
change of job since last year	0.0587	0.0616	
I income quartile	0.2695	0.3861	
II income quartile	-0.3559	0.4019	
III income quartile	-0.7796	0.4546	*
<i>Household composition:</i>			
no children	-0.1179	0.0519	**
<i>Household composition:</i>			
single parent with children	0.2750	0.0669	***
_cons	-0.2528	0.4866	
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HC	0.5572	0.0259	***
permanent contract	0.2900	0.0422	***
change of job since last year	0.0055	0.0440	
income	0.0000	0.0000	***
age*income quart.	0.0062	0.0009	***
education*income quart.	0.0387	0.0149	**
Male	-0.0615	0.0287	**
urbval	-0.0035	0.0002	***
pval	0.0232	0.0044	***
pollution	-0.3013	0.0326	***
_cons	-2.2205	0.4804	***
<b>rbo</b>	<b>0.2934</b>	<b>0.0949</b>	<b>***</b>
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

Notes: Demographic controls include tertiary education(yes); good health (yes); age; married (yes), Household composition (no children; single parent with children) sex.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6.1b Switching regression, H2, HC.**

<b>H2</b>	Coef.	Std. Err.	Significance
<b>HC</b>	0.2998	0.0523	***
<b>owner</b>	-0.6647	0.2146	
I income quart*education	-0.0209	0.1013	
II income quart*education	-0.0256	0.1103	
III income quart*education	-0.1034	0.1310	
permanent contract	-0.0573	0.0746	
change of job since last year	0.2072	0.0738	***
I income quartile	0.1762	0.3306	
II income quartile	0.0071	0.3245	
III income quartile	-0.1520	0.3303	
<i>Household composition:</i>			
no children	-0.1166	0.0528	**
<i>Household composition:</i>			
single parent with children	0.0111	0.0851	
_cons	0.2856	0.4374	
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HC	0.5357	0.0366	***
permanent contract	0.2904	0.0641	***
change of job since last year	-0.0766	0.0645	
income	0.0000	0.0000	***
age*income quart.	0.0047	0.0013	***
education*income quart.	0.0655	0.0227	***
Male	-0.0910	0.0425	**
urbval	-0.0031	0.0004	***
pval	-0.0078	0.0063	
pollution	-0.2964	0.0476	***
_cons	0.1315	0.6813	
<b>rbo</b>	0.2980	0.1282	**
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

Notes: Demographic controls include tertiary education(yes); good health (yes); age; married (yes), Household composition (no children; single parent with children) sex.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6.1c Switching regression, TARG, HC.**

<b>TARG</b>	Coef.	Std. Err.	Significance
<b>HC</b>	0.3829	0.0364	<b>***</b>
<b>owner</b>	-0.6155	0.1423	<b>***</b>
I income quart*education	-0.1349	0.0671	<b>**</b>
II income quart*education	0.0388	0.0723	
III income quart*education	-0.2466	0.0873	<b>*</b>
permanent contract	-0.0603	0.0493	
change of job since last year	0.0814	0.0497	
I income quartile	-0.0590	0.2189	
II income quartile	0.1123	0.2171	
III income quartile	-0.4837	0.2191	<b>**</b>
<i>Household composition:</i>			
no children	-0.1229	0.0362	<b>***</b>
<i>Household composition:</i>			
single parent with children	0.2164	0.0562	<b>***</b>
_cons	-0.1084	0.3097	
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HC	0.5559	0.0259	<b>***</b>
permanent contract	0.2896	0.0422	<b>***</b>
change of job since last year	0.0036	0.0440	
income	0.0000	0.0000	
age*income quart.	0.0062	0.0009	<b>***</b>
education*income quart.	0.0426	0.0149	<b>***</b>
Male	-0.0612	0.0287	<b>**</b>
urbval	-0.0035	0.0002	<b>***</b>
pval	0.0229	0.0044	<b>***</b>
pollution	-0.3068	0.0327	<b>***</b>
_cons	-2.1838	0.4793	<b>***</b>
<b>rbo</b>	0.2468	0.0863	<b>***</b>
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

Notes: Demographic controls include tertiary education(yes); good health (yes); age; married (yes), Household composition (no children; single parent with children) sex.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table 6.2a Switching regression, H1, HBU.**

<b>H1</b>	Coef.	Std. Err.	Significance
<b>HBU</b>	0.4904	0.0401	<b>***</b>
<b>owner</b>	-0.9099	0.1540	<b>***</b>
I income quart*education	-0.1193	0.0846	
II income quart*education	-0.1447	0.1275	
III income quart*education	-0.3863	0.1524	<b>**</b>
permanent contract	-0.2971	0.0552	<b>***</b>
change of job since last year	0.0887	0.0557	
I income quartile	0.8159	0.3653	<b>**</b>
II income quartile	-0.1108	0.3806	
III income quartile	-0.5592	0.4344	
<i>Household composition:</i>			
no children	-0.1710	0.0482	<b>***</b>
<i>Household composition:</i>			
single parent with children	0.3132	0.0616	<b>***</b>
_cons	-0.8408	0.4563	<b>*</b>
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HBU	0.2991	0.0260	<b>***</b>
permanent contract	0.2620	0.0405	<b>***</b>
change of job since last year	0.0356	0.0422	
income	0.0000	0.0000	<b>***</b>
age*income quart.	0.0038	0.0008	<b>***</b>
education*income quart.	0.0396	0.0146	<b>***</b>
Male	-0.0551	0.0279	<b>**</b>
urbval	-0.0030	0.0002	<b>***</b>
pval	-0.0020	0.0043	
pollution	-0.3110	0.0313	<b>***</b>
_cons	-0.3451	0.4669	
<b>rbo</b>	0.4392	0.0913	<b>***</b>
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

**Table 6.2b Switching regression, H2, HBU.**

<b>H2</b>	Coef.	Std. Err.	Significance
<b>HBU</b>	0.6324	0.0453	***
<b>owner</b>	-0.7595	0.2208	***
I income quart*education	0.0256	0.0997	
II income quart*education	0.0354	0.1088	
III income quart*education	-0.0054	0.1304	
permanent contract	-0.1054	0.0737	
change of job since last year	0.1913	0.0710	***
I income quartile	0.5525	0.3237	*
II income quartile	0.1934	0.3223	
III income quartile	0.0028	0.3301	
<i>Household composition:</i>			
no children	-0.1085	0.0523	**
<i>Household composition:</i>			
single parent with children	0.0539	0.0818	
_cons	-0.5318	0.4250	
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HBU	0.2670	0.0381	***
permanent contract	0.2712	0.0616	***
change of job since last year	-0.0341	0.0615	
income	0.0000	0.0000	***
age*income quart.	0.0025	0.0012	**
education*income quart.	0.0698	0.0217	***
Male	-0.0823	0.0412	*
urbval	-0.0027	0.0003	***
pval	-0.0325	0.0061	***
pollution	-0.2906	0.0458	***
_cons	-2.1838	0.4793	
<b>rbo</b>	0.3508	0.1310	***
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

**Table 6.2c Switching regression, TARG, HBU.**

<b>TARG</b>	Coef.	Std. Err.	Significance
<b>HBU</b>	1.1930	0.0330	***
<b>owner</b>	-0.5356	0.1646	***
I income quart*education	-0.1017	0.0716	
II income quart*education	0.1019	0.0781	
III income quart*education	-0.1766	0.0954	*
permanent contract	-0.1058	0.0521	**
change of job since last year	0.0614	0.0532	
I income quartile	0.3773	0.2323	
II income quartile	0.3428	0.2332	
III income quartile	-0.3865	0.2394	
<i>Household composition:</i>			
no children	-0.1036	0.0398	***
<i>Household composition:</i>			
single parent with children	0.1467	0.0594	**
_cons	-1.1868	0.3226	***
Demographic controls	<i>yes</i>		
Country dummies	<i>yes</i>		
Sectoral dummies	<i>yes</i>		
<b>switching equation</b>			
HBU	0.3026	0.0265	***
permanent contract	0.2524	0.0420	***
change of job since last year	0.0208	0.0439	
income	0.0000	0.0000	***
age*income quart.	0.0044	0.0008	***
education*income quart.	0.0462	0.0148	***
Male	-0.0578	0.0284	**
urbval	-0.0032	0.0002	***
pval	0.0033	0.0044	
pollution	-0.3211	0.0324	***
_cons	-0.7731	0.4767	
<b>rbo</b>	0.1761	0.0996	*
Demographic controls	<i>yes</i>		
Sectoral dummies	<i>yes</i>		

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