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Differences in Perceptions of the Housing Cost Burden Among European Countries

**Marco Brandolini¹, Federica Coroneo², Elena Giarda³, Cristiana Moriconi⁴
and Sarah Grace See⁵**

Abstract

In this article we perform a comparative analysis of the self-reported perception of the housing cost burden as an indicator of potential financial distress. We employ EU-SILC data on five European countries – France, Germany, Italy, Spain and the UK – for years from 2005 to 2010. Wide differences emerge between Germany, France and the UK on the one hand, and Italy and Spain on the other. Estimation of the housing cost burden by means of logit models allows us to relate the probability of a high burden to both micro and macro-economic variables and to identify differences among countries. As for socio-economic variables, our results reveal the existence of life-cycle effects and a lower burden for homeowners. As for aggregate variables, GDP growth and higher consumer confidence contribute to reducing the probability of a high burden, whereas high levels of unemployment and inequality contribute to increase it. At country level, we observe differences in the size of the impact of the explanatory variables on the probability of perceiving a high burden, especially for covariates such as age, homeownership status and education.

JEL classification numbers: D12, D14, C25.

Keywords: Housing cost burden, Perceived financial distress, Logit models, EU-SILC.

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1. Introduction

Household financial conditions started to become a rising concern of scholars and policy makers since household borrowing in most OECD countries started to increase considerably in the nineties, both in absolute terms and relative to household income. ‘The large size of these debt run-ups are estimated to have raised the sensitivity of the household sector to changes in interest rates, asset prices, and incomes. In this sense, the household sector may have become more vulnerable to adverse shifts in these variables.’ (OECD, 2006, p. 135).

With the occurrence of the 2007-2008 financial crisis, there has been more attention drawn to household financial problems. The crisis was followed by the recession in the second half of 2008 leading to a sharp contraction of production. Many countries had to face sharp drops in Gross Domestic Product (GDP) growth in 2009 and in 2010-2011, after a partial recovery, the crisis spread to sovereign debts and public finances in many countries, especially in the Euro Area, needing intervention to avoid default. The crisis was also a credit crisis.

Again, the current COVID-19 (2020-2022) pandemic has brought to the forefront the issue of household economic and financial conditions and sustainability of their budgets in the medium term because of the disruptive effects of the health emergency worldwide.

The assessment of households’ financial conditions may be made by means of both objective and subjective indicators (see Brunetti *et al.*, 2016, for a short review). In this paper we employ perceived housing cost burden as a possible indicator of economic distress and we position ourselves within the literature on subjective financial distress. The aim is to investigate whether aggregate indicators mirror the microeconomic evidence and whether dissimilarities in the perceived malaise may be determined by overall economic conditions. We also wish to explain burden’s cross-country differences and determinants.

To this end, we exploit attitudinal evidence contained in the European Union Survey on Income and Living Conditions (EU-SILC) data for the years 2005 to 2010 and concentrate on five countries: France, Germany, Italy, Spain and the United Kingdom. The survey includes a question about the subjective evaluation of the burden of housing costs in the household balance sheet, where housing costs consist of mortgage payments (for homeowners), rent payments (for tenants), structural insurance, services and charges, taxes on dwelling (if applicable), regular maintenance and repairs and finally the cost of utilities. Countries differ substantially in their perception of financial distress and actual housing conditions. For example, Italy and Spain seem to be seriously affected by outlays on housing, with 54.3% of households in Italy and 47.8% in Spain, compared to 21.2%, 23.8% and 25.7% in Germany, the UK and France, respectively, declaring it a huge drain on household budgets.

The rationale for studying housing cost burden perceptions lies in the literature on subjective indicators of financial distress. Knowing how people judge their own life, or aspects of their lives, is a necessary complement to the ‘objective’ measures of

well-being. 'Subjective' measures are important indicators of the progress of society because they provide information on aspects that other social and economic indicators do not address. They may help to explain individual and collective behaviour, and to identify areas of discomfort of specific sectors of society (Istat, 2013). The Commission on the Measurement of Economic Performance and Social Progress (2009) formally recognised the need for indicators of quality of life that go beyond the traditional economic indicators, such as GDP, and such vision is now widespread. The Eurofound (2010) remarks that a growing gap emerges between the picture painted by statistics and people's perceptions of their own living conditions, which needs to be addressed by policy. Indeed, subjective indicators can inform policy makers about public preferences. In spite of some criticism – such as their instability, incomparability, etc. – subjective indicators are indispensable in social policy, both for selecting policy goals and for assessing policy success (Veenhoven, 2002). If we include the perception of the housing cost burden among subjective indicators of well-being, and it looks like a reasonable choice to make, then its analysis becomes relevant. The indicator can be used a leading indicator of 'objective' financial distress. Moreover, it can provide an indication of households' willingness to spend: if increasing housing costs are considered as reducing wealth, households may curtail consumption of goods and services or shift their preferences. Finally, the housing cost burden may also be seen an indicator of vulnerability, i.e. an ex-ante measure of financial risk, 'which could be defined as the degree to which households would be able to cope with the adverse effects of a shock, should it crystallise' (ECB, 2005, p. 154).

There is evidence that a given debt burden causes higher distress in Southern countries, such as France, where fewer households have a mortgage outstanding, compared to countries such as the UK, the Netherlands and Denmark (Georgarakos et al., 2010), where a sizeable part of the population uses mortgage debt. Boeri and Brandolini (2004) look into a number of possible reasons that can account for an increased perception of 'household impoverishment' in Italy despite the surprising stability of income distribution in the period 1993-2002, which include disappointed expectations, significant distributive changes across socio-economic groups, and higher income mobility not captured by static inequality indices. There is also sign that, amongst the indebted, the highest percentages of households with arrears on mortgages are in Italy and Spain (Magri, 2009). In addition, the percentage of households in Spain with an income gearing ratio above 40% has increased from 11.8% in 2005 to 16.6% in 2008 (Bank of Spain, 2011), while those in Italy with an income gearing ratio above 30% have risen from 8.7% in 2004 to 12.4% in 2010.⁶ Meanwhile, households in the UK with an income gearing ratio above 35% was around 13% in 2009 (Bank of England, 2010). In Germany, subjective debt burden of households is not only influenced by current income and debt service, but also by expectations of the personal and overall socio-economic environment in the

⁶ Own calculations on the Survey on Household Income and Wealth (SHIW) of the Bank of Italy.

future (especially unemployment), and further undetermined (and possibly non-financial) factors (Keese, 2010). Pudney (2008) models the dynamics of individuals' subjective assessments of their financial wellbeing in the UK. Lastly, underestimating the risk of not being able to meet their financial commitments is another element that can affect households' perceptions (Anderloni and Vandone, 2011). Manturuk *et al.* (2012, p. 276) find that 'although both renters and owners experienced similar levels of financial distress, the homeowners were less psychologically stressed overall and reported feeling more satisfied with their financial situation'. McCarthy (2011) uses a nationally representative survey of financial capability and experience in the UK and Ireland to investigate the key factors that cause individuals to experience financial distress. Between the first draft of this paper and the current version, new papers on perceived financial distress indicators have been published. Examples are Deidda (2015) on a selection of European countries, Cassard and Sloboda (2017), García-Gómez *et al.* (2021) and Acolin and Reina (2022) on EU households, and Hess *et al.* (2020) on the issue of racial discrimination and financial distress in the US.

As for the literature on objective indicators, most of the studies are concerned with over-indebtedness (for instance, Brown and Taylor, 2008; Jappelli *et al.*, 2008; Del Rio and Young, 2008; Georgarakos *et al.*, 2010), while others look at the overall household portfolio, namely net wealth (e.g. Brown and Taylor, 2008; Christelis *et al.*, 2009; Kees, 2009; Giarda, 2013). A review on financial distress indicators is reviewed and discussed in D'Alessio and Iezzi (2013). Finally, another strand of the literature looks at indicators that combine both subjective and objective indicators (e.g. Bialowolski and Weziak-Bialowolska, 2014), while others address the issue of accounting for both income and wealth in the definition of financial distress (see, among others, Lusardi *et al.* (2011) for the US, Brunetti *et al.* (2016), Michelangeli and Pietrunti (2014) and Bettocchi *et al.* (2018) for Italy, and Ampudia *et al.* (2016) for European countries).

To investigate the relationship between perceptions of this burden and households' socio-economic characteristics and country-specific factors, we estimate a set of logit models in which the dependent variable is the self-reported indicator of the housing costs burden. The unit of analysis is the household, and explanatory variables are at household (socio-economic characteristics of the household head) and country (Gini index, GDP growth rate, unemployment rate and economic sentiment index) levels. First, we estimate a pooled model on the six-year, five-country sample, taking account of country effects by means of either country dummies or aggregate (country specific) variables. The results show that country effects are well captured by macro-economic variables with the expected signs; estimated coefficients also reveal the existence of life-cycle effects. Second, since pooled models estimate average profiles, we move to single country models to examine how within-country variables affect the perception of the housing costs burden. We observe differences by country in the size of the impact of explanatory variables on the probability of perceiving a high burden.

The remainder of the article is organised as follows. Section 2 describes the dataset and presents descriptive statistics of the variables of interest and their relationships with household and country level variables. The econometric model is outlined in Section 3, while the results are reported and discussed in Section 4. Section 5 concludes with a summary of the main findings.

2. Data and descriptive statistics

The data used in this article are the 2005 to 2010 waves of the EU-SILC survey, which is carried out by Eurostat in Europe.⁷ Each wave contains an average of 60 thousand households. For the purpose of our analysis, we concentrate on five countries: Germany, Spain, France, Italy and the UK, excluding households with heads of household aged under 20 and over 80 years, and observations with missing information on any of the relevant variables for the econometric analysis. The resulting sample is composed of roughly 361 thousand households. Table 1 shows the sample composition for the years 2005 and 2010 by country, and the share composition of each country on the six years.⁸

Table 1: Sample composition: number of households by country, 2005-2010 (thousand)

	Number of households				% Composition
	Sample	Sample	Weighted	Weighted	
	2005	2010	2005	2010	2005-2010
Germany	12777	12358	37490	37304	30.8
Spain	11731	11824	13732	14932	12.3
France	9654	10128	25381	24717	21.0
Italy	21597	17238	23079	22366	19.2
UK	9759	6576	22820	20964	16.7
Total	65518	58124	122502	120283	100

Source: Authors' calculations on EU-SILC data.

The survey asks interviewees to evaluate their own personal financial condition answering a question how heavy the burden of housing costs is on the household balance sheet. Respondents can choose among: (a) A heavy burden, (b) Somewhat a burden/A slight burden, or (c) Not a burden at all.⁹ Housing costs consist of mortgage payments (for homeowners), rent payments (for tenants), structural

⁷ The datasets used are: EU-SILC Udb 2005, rev. 3, August 2009; EU-SILC Udb 2006, rev. 3, March 2010; EU-SILC Udb 2007, rev. 5, August 2011; EU-SILC Udb 2008, rev. 4, March 2012; EU-SILC Udb 2009, rev. 2, March 2012; and EU-SILC Udb 2010, March 2012.

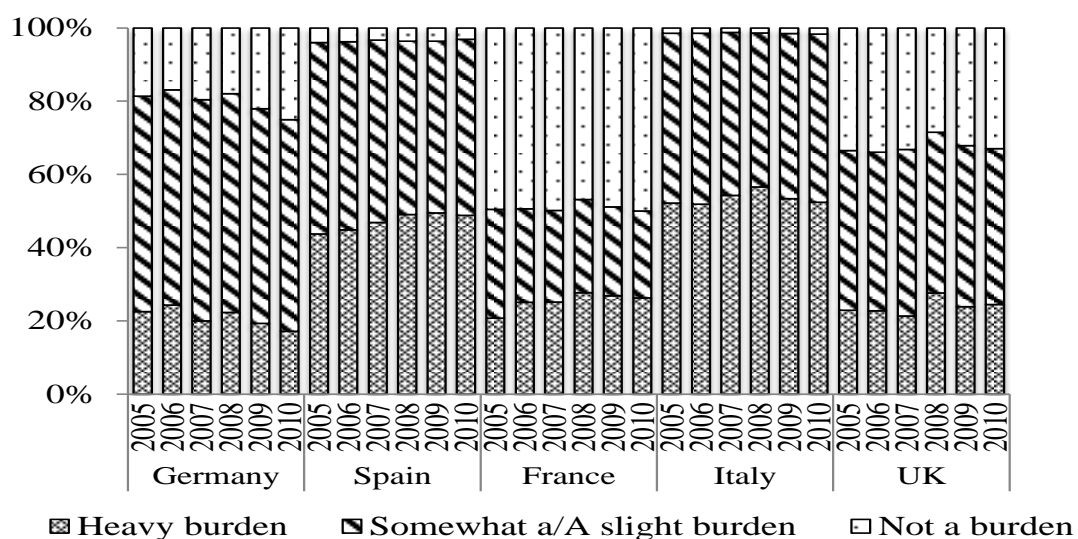
⁸ For the 2009 wave of the UK, after removing the observations with missing information - majority of which are due to missing data on arrears holdings - we are left with 3031 observations.

⁹ From 2009 the answer 'A slight burden' replaced the previous 'Somewhat a burden'.

insurance, services and charges, taxes on dwelling (if applicable), regular maintenance and repairs and the cost of utilities.

Countries differ substantially in their perception of housing financial burden and actual housing conditions. For example, Italy and Spain seem to be seriously affected by outlays on housing, with 54.3% of households in Italy and 47.8% in Spain, compared to 21.2%, 23.8%, and 25.7% in Germany, the UK and France respectively declaring it a huge drain on household budgets (Figure 1).

These differences may be due to several reasons which are difficult to disentangle. Indicators of economic distress can be both objective and subjective. Household-specific factors include incidence of housing costs on income (whether subjective factors reflect objective factors), age (existence of a life cycle effect), income (is the effect smaller for richer households?), etc. At the same time, national macroeconomic conditions may affect perceptions. Economic growth, falling unemployment, reduced inequality, smaller burden of property tax on GDP may all contribute to the perception of a smaller drain on households' budgets. Households' perceptions of their country's economic situation also have an effect: is an increasing confidence index increasing households' expectations of better economic and financial conditions in the future?



Source: Authors' calculations on EU-SILC data.

Figure 1: The housing cost burden, 2005-2010

There are differences among countries also in relation to actual housing conditions. Based on the share of housing costs in disposable income, we observe that Italian and Spanish households have the smallest housing cost shares relative to their disposable income: averages over the period are 20.5% and 17.8% for Italy and Spain respectively compared to 30.9%, 32.6% and 19.3% for the UK, Germany and France (Table 2). With respect to the relationship between income and size of the

housing cost burden, we see a pattern that is coherent with each country's expectations, with higher burdens associated with lower incomes.

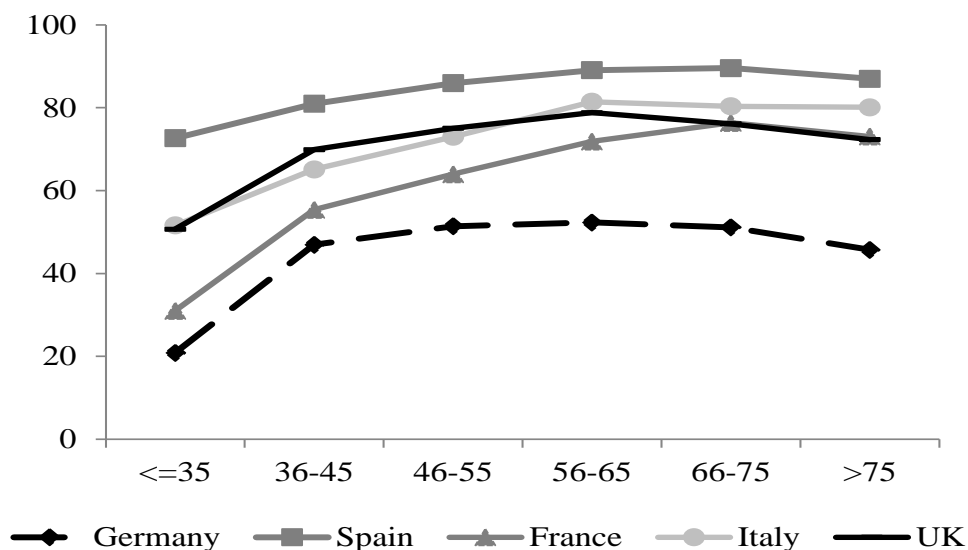
Table 2: Average equivalised household incomes by levels of housing costs

	Average equivalised income in PPP	Share of housing costs on income	Housing costs burden (euro)		
			Not a burden	Somewhat a burden	A heavy burden
Germany	19520	32.6%	23769	19473	15557
Spain	16333	17.8%	20343	18221	14060
France	19128	19.3%	21884	17391	15537
Italy	17796	20.5%	23243	20381	15463
UK	21400	30.9%	26134	20418	16740
Average	19029	25.4%	23403	19384	15398

Source: Authors' calculations on EU-SILC data.

Note: statistics are weighted with sample weights.

There is evidence also of high variability in homeownership with the highest rates in Spain (82.0%), followed by Italy and the UK (71.2% and 68.3% respectively), France (58.8%) and Germany (45.1%). A cross-check of information on homeownership and age yields a different distribution for the countries. The distribution is almost linear in Spain and Italy, while the homeownership rate increases, especially between the first and the second age classes, then decreases in Germany, France and the UK (Figure 2).



Source: Authors' calculations on EU-SILC data.

Figure 2: Homeownership by age and country, average 2005-2010

Institutional factors can play a large role in affecting actual tax burdens. There is wide variability among European countries in terms of (recurrent) property taxes as a percentage of GDP (Eurostat, 2012). In 2005 to 2010, on average, the UK had the highest share (around 3.3%), followed by France (2.2%), Italy and Spain (both around 0.7%) and Germany (0.5%).¹⁰ Over this five-year period, some of these countries showed an increasing trend (the UK, France and Spain), while the trend in Italy reversed due to the abolition in 2007 of property tax on the main residence. However, these figures show a misalignment with the perception of the housing costs burden. This evidence is in line with the above-mentioned survey data on the ratio of housing costs to income.

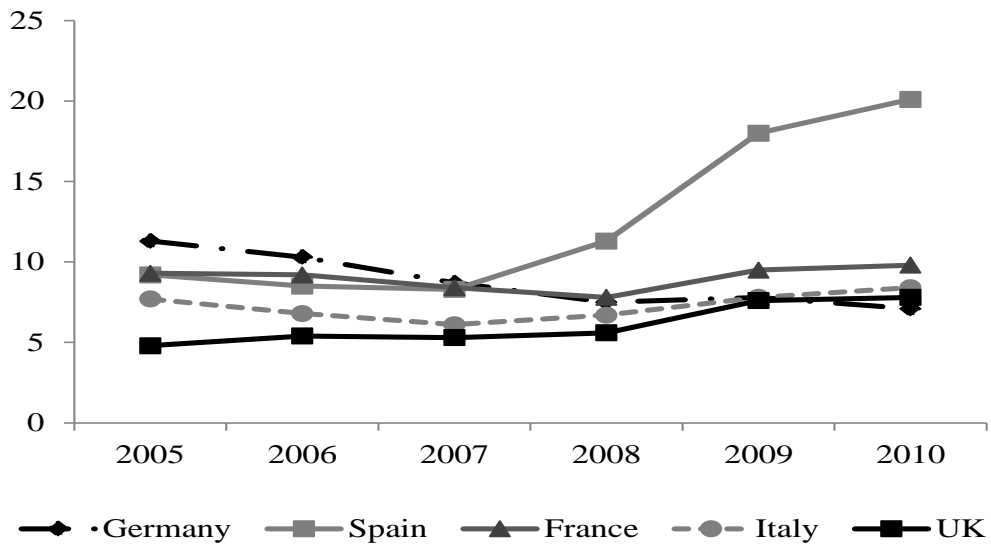
The average income of Spanish households is lower than that in all the other countries analysed, for all levels of intensity of the cost burden and especially for the 'heavy burden' outcome (Table 2).¹¹ In contrast, Italian households seem not to be exposed to any worse financial conditions than households in other countries, at least with respect to income. For income distribution, the evidence suggests that a higher burden is mostly reflected in a higher Gini index except in the case of the UK where inequality but not the perception of the burden is highest (32.7%). In Italy and Spain inequality on average is 31.1% and 30.9%, higher than France and Germany (for both countries the Gini index is 28.5%).

In addition to household-specific factors, overall economic conditions - expressed by unemployment and GDP growth rates - can affect households' perceptions of their housing costs burden. However, the data generally do not give a clear picture of the links between unemployment (Figure 3) and perception of a heavy burden except for Spain which has the highest unemployment levels and the highest levels of perceived distress. In terms of GDP growth (Figure 4) the evidence is mixed, with Italy showing lower growth but higher declared housing cost burden and Spain showing higher growth and a higher declared housing cost burden.

¹⁰ In the UK, and in part in France, property tax applies to housing used as the main residence, regardless of tenure.

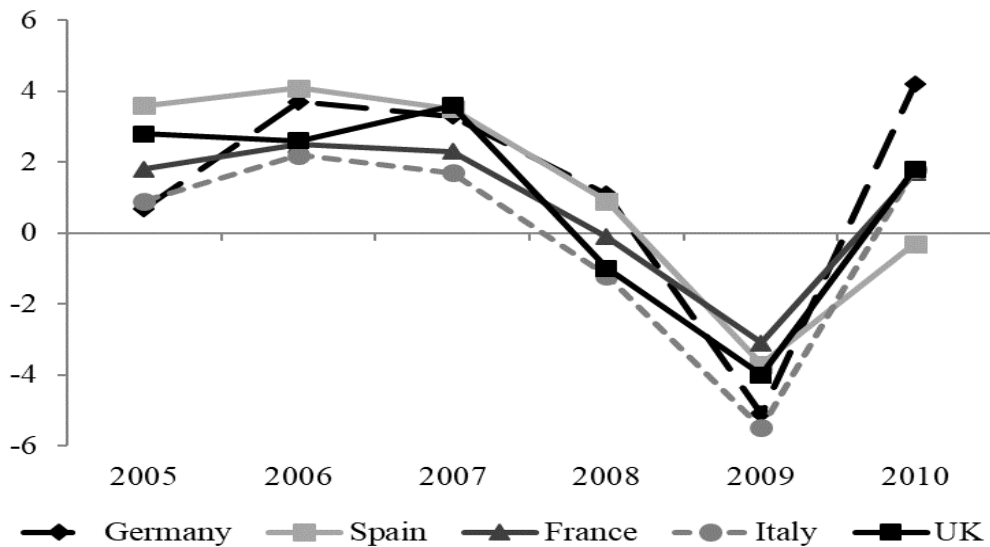
¹¹ Throughout the paper income values are expressed in euros adjusted for purchasing power parities (PPP). The reference country is Italy; therefore, incomes of other countries are expressed in terms of the purchasing power of Italy. UK values have been converted from pounds into euros. Moreover, incomes are expressed in real terms, with 2010 as the base, by using the consumer price index of each country. Finally, incomes are equivalised according to the OECD equivalence scale, which attributes a coefficient equal to 1 to the household head, 0.5 to the other household members aged 14 or above, and 0.3 to children aged less than 14.

Differences in Perceptions of the Housing Cost Burden Among European Countries



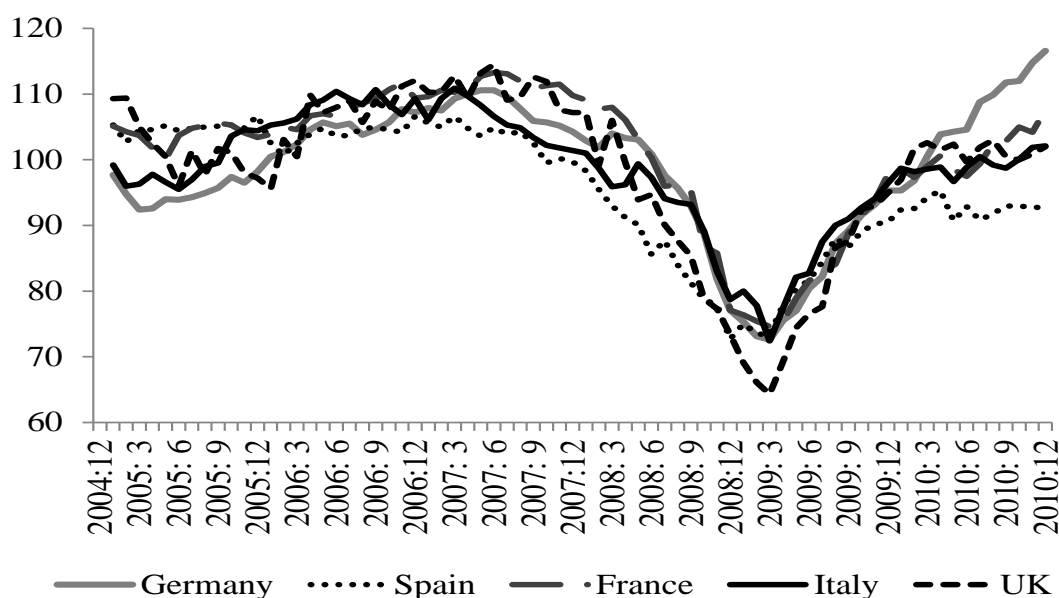
Source: Eurostat.

Figure 3: Unemployment rates, 2000-2010



Source: Eurostat.

Figure 4: Real GDP growth rates, 2000-2010



Source: Eurostat.

Figure 5: Monthly economic sentiment index, 2005-2010

As already remarked, households' perceptions depend on confidence, life style expectations, or more generally cultural aspects which are hard to identify. One indicator which can be taken as a proxy of these elements is the Eurostat economic sentiment index (Figure 5), which is used in the econometric analysis to capture subjective factors.¹²

¹² The Economic Sentiment Indicator (ESI) is a composite indicator made up of five sectoral confidence indicators with different weights: Industrial confidence indicator, Services confidence indicator, Consumer confidence indicator, and Construction confidence indicator Retail trade confidence indicator. Source: DG ECFIN <https://ec.europa.eu/eurostat/web/products-datasets/-/teibs010>.

3. The Model

The variable expressing the housing cost burden is an ordered variable, as answers go from low to high burden. Given the highly unequal distribution of responses as seen in Figure 1, we aggregate the two categories ‘not a burden’ and ‘somewhat a burden/a slight burden’ into one category.¹³ Our resulting dependent variable is binary, with 1 identifying households expressing ‘a heavy burden’, and 0 households declaring ‘not a burden’ or ‘somewhat a burden/a slight burden’.

The probability of the household i to experience a high burden is:

$$P\{y_i = 1\} = P\{y_i^* > 0\} = P\{x_i'\beta + \varepsilon_i > 0\} = P\{-\varepsilon_i \leq x_i'\beta\} = F(x_i'\beta) \quad (1)$$

where y_i is the binary outcome variable, y_i^* is the latent (unobserved) variable underlying the model, β is the vector of parameters to be estimated, x_i is the vector of explanatory variables, and $F(\cdot)$ is the distribution function of $-\varepsilon_i$. In a logit specification $F(x_i'\beta) = \Lambda(x_i'\beta)$ is the logistic distribution function, with variance of the error term $var(\varepsilon) = \pi^2/3$ (Verbeek, 2000).

To investigate the relationship between perceptions of this burden and households’ socio-economic characteristics and country-specific factors, we estimate a set of logit models in which the dependent variable is the self-reported indicator of the housing costs burden. The unit of analysis is the household, and explanatory variables are at household and country levels. First, we estimate two pooled models on the six-year, five-country sample, and then move to single-country models to examine the country-specific profiles.

The household-related variables included in the models are: household head’s age categorized into six groups (46-55 as the base category); household head gender (male as the base category); household head marital status (single, married/partnered, divorced/separated and widowed, with married/partnered as the reference group); household head education (up to lower secondary, upper secondary, and tertiary, with upper secondary as base category); household head economic activity status (self-employed, employee, unemployed, retired, and other status, with employee as the base); homeownership status (homeowner, tenant, and rent-free accommodation, with tenant as reference); quintiles of equivalised income (third quintile as reference); whether housing cost is more than half of household income; whether the household is in arrears (for mortgage, rent, utility bills, etc.); ratio of income earners to total household members.¹⁴ The set of aggregate

¹³ Our first choice was to model the probability of the housing cost burden by means of an ordered logit/probit model, but the Hausman test on the ordering of the variable was rejected. The estimation of an unordered model, such as the multinomial logit, was also unsatisfactory since the hypothesis of Independence of Irrelevant Alternatives was violated. Our choice is therefore of a binary model in which the three categories are collapsed into two.

¹⁴ We initially built a dummy variable indicating whether the family falls below the poverty

variables includes unemployment and GDP growth rates, Gini index and the monthly economic sentiment indicator which expresses residents' confidence in their country's economic situation.¹⁵ Table 3 displays descriptive statistics of the variables used in the models.

The pooled model is estimated in two specifications, according to how the country-specific effects are taken account of: in model A such effects are accounted for by means of country dummy variables; in model B, country aggregate variables, such as GDP growth rates, Gini indices and unemployment rates are used. The rationale for including country-specific variables in the estimation, instead of country dummies, is that the latter would not provide a direct identification of the macroeconomic events that affect the household burden perception. With regard to the link between inequality and household economic distress, we follow Boushey and Weller (2008), providing evidence that the growth in income inequality led to a rise in households' economic distress in the US in 1980-2004. Meanwhile, we follow Whitley *et al.* (2004) and May and Tudela (2005) with regard to unemployment, who introduced this variable as one of the macroeconomic explanatory variables.

The country models include only specific factors of the household; the macro variables and the economic sentiment index are excluded because they are constant across households in each country and year.¹⁶ All models include time dummies. In the estimation, the reference household has a head of 36-45 years, male, married, with high school education, who is in employment but is not a homeowner, with a median level of income, and with arrears.

threshold, but then did not include it in the final model, given its very high correlation with household income. In fact, poor households are concentrated in the first two income quintiles.

¹⁵ We refer to the index for the 6 months before the interview with the household to avoid capturing reverse causality of the housing costs burden affecting the economic sentiment index.

¹⁶ The variable sentiment, although taken with respect to the household, is excluded from the per-country estimation, because the interview months are concentrated on a specific period in each country. This causes the variable to be highly correlated with the year dummies.

Table 3: Descriptive statistics (pooled sample)

	Mean	St. Dev.	Min	Max
Dependent variable				
Burden	0.32	0.47	0	1
Explanatory variables				
Age	51.36	15.71	21	80
Income (in PPP and at 2010 prices)	19922	15242	0.67	1309907
Housing costs/income > 0.5	0.13	0.33	0	1
Homeowner	1.43	0.58	1	3
Level of education: up to lower secondary	0.32	0.46	0	1
Level of education: upper secondary	0.36	0.48	0	1
Level of education: university	0.32	0.47	0	1
Gender: Female	0.51	0.50	0	1
Marital status: single	0.25	0.43	0	1
Marital status: married	0.52	0.50	0	1
Marital status: divorced or separated	0.13	0.34	0	1
Marital status: widowed	0.10	0.30	0	1
Income earners/components	0.80	0.28	0	1
Economic Activity: Self-employed	0.07	0.25	0	1
Economic Activity: Employed	0.47	0.50	0	1
Economic Activity: Unemployed	0.06	0.23	0	1
Economic Activity: Retired	0.27	0.44	0	1
Economic Activity: Other	0.14	0.35	0	1
Household has arrears	0.08	0.27	0	1
Economic sentiment	99.65	8.74	77.60	112.60
GDP growth rate	0.99	2.70	-5.50	4.20
Gini index	30.01	2.01	26.26	34.06
Unemployment rate	8.53	2.75	4.80	20.10

Source: Authors' calculations on EU-SILC data.

4. Estimation Results

4.1 Pooled models

Table 4 reports the estimated marginal effects of the two pooled models, which differ in how country effects are dealt with, by means of dummy variables in model A and by means of country-level aggregate variables in model B.^{17 18} With regard to the overall goodness of fit and model selection criteria, the two models do not differ substantially. The pseudo- R^2 is 0.138 in model A and 0.103 in model B, while the predictive powers are 70.1% and 68.4% for model A and B, respectively. The information criteria (AIC and BIC) are slightly in favour of model A, even though the values are relatively close in both models. This evidence supports the choice of specifying model B beside model A to disentangle the country effects by introducing macroeconomic variables.

In both models, the results reveal the existence of life-cycle effects, with younger households more like to perceive housing costs as a major burden, while the opposite is true for households with household heads aged over 56 years. Income has a strong impact on the probability of indicating a higher burden with all income quintiles highly significant, positive for the two lower quintiles and negative for the two upper quintiles. Having relatively high housing costs increases the probability of distress, which shows consistency between subjective and actual burden of housing costs, although Italian and Spanish households, who declared the highest burden, are among those with the smallest shares. The same holds for being in arrears with some payments, which has the greatest impact on the probability of expressing a heavy housing costs burden (23.9% for model A and 25.6% for model B).

Education levels are significant with their marginal effects indicating that having a high education level increases the probability of perceiving no burden by 2.5% relative to a mid-level of education, as estimated in model A (4.6% in model B). There is also evidence of gender effects, as a household with a female head shows a higher probability of the burden (3.1% for model A and 3.5% for model B). The probability of having housing costs burden is heavier for divorced compared to married household heads (3.6% in Model A and 0.7% in Model B) and widowed household heads (around 2.5% in both models), while the opposite is true for household heads who are single. This may be due to the correlation of age with marital status, as singles may tend to be younger and may not have offspring. As for employment status, being unemployed increases the probability of perceiving a high burden by 6.0% in model A and 7.7% in model B. The coefficients of the self-employed and retired dummies are negative.

¹⁷ Marginal effects are computed as the weighted average of the marginal change in each household's probability when each of the explanatory variables changes from 0 to 1 if dichotomous, or by a marginal amount if continuous.

¹⁸ Although Moulton (1990) emphasizes the need to account for within-group disturbance correlation, in model B we do not use the clustering option to correct for standard errors because of a lack of an appropriate number of clusters (see, for instance, Kézdi, 2004).

Table 4: Pooled models: marginal effects

	model A	model B		model A	model B
age: ≤35	-0.0046	0.004	Employment status: Self-employed	-0.057***	-0.0209***
	(-0.0027)	(-0.0028)		(-0.0027)	(-0.0029)
age: 36-45	0.0119***	0.0168***	Unemployed	0.0599***	0.0771***
	(-0.0023)	(-0.0024)		(-0.0036)	(-0.0038)
age: 56-65	-0.0181***	-0.0306***	Retired	-0.0312***	-0.0253***
	(-0.0026)	(-0.0027)		(-0.0028)	(-0.0029)
age: 66-75	-0.0308***	-0.0438***	Other	0.0018	0.0324***
	(-0.0033)	(-0.0034)		(-0.0025)	(-0.0026)
age: >75	-0.0674***	-0.08***	Household has arrears	0.2387***	0.256***
	(-0.0038)	(-0.0038)		(-0.0031)	(-0.0031)
Income: 1st quintile	0.0655***	0.0567***	year: 2006	0.0044	0.0677***
	(-0.0026)	(-0.0027)		(-0.0025)	(-0.0027)
Income: 2nd quintile	0.0393***	0.0329***	year: 2007	0.0113***	0.0669***
	(-0.0024)	(-0.0025)		(-0.0026)	(-0.0026)
Income: 4th quintile	-0.0415***	-0.0336***	year: 2008	0.0368***	-0.0225***
	(-0.0024)	(-0.0024)		(-0.0026)	(-0.0029)
Income: 5th quintile	-0.1186***	-0.103***	year: 2009	-0.0126**	-0.2405***
	(-0.0024)	(-0.0025)		(-0.0041)	(-0.0037)
Housing costs/income > 0.5	0.0891***	0.061***	year: 2010	-0.0233***	-0.0822***
	(-0.0027)	(-0.0027)		(-0.0043)	(-0.0039)
Homeownership: Homeowner	-0.0306***	0.0101***	Aggregate variables: Economic sentiment	-0.0016***	-0.0046***
	(-0.002)	(-0.002)		(-0.0002)	(-0.0002)
Free Renter	-0.1216***	-0.0469***	GDP growth rate		-0.0404***
	(-0.0032)	(-0.0035)			(-0.0007)

Education: Up to lower secondary	0.0461*** (-0.002)	0.1079*** (-0.002)	Gini index		0.0303*** (-0.0005)
Tertiary	-0.0255*** (-0.002)	-0.0462*** (-0.002)	Unemployment rate		0.0048*** (-0.0003)
Gender: Female	0.0311*** (-0.0016)	0.0355*** (-0.0017)	Country: Germany	-0.3144*** (-0.0023)	
Marital status: Single	-0.0315*** (-0.0021)	-0.0318*** (-0.0022)	Country: Spain	-0.0727*** (-0.0024)	
Divorced or separated	0.0364*** (-0.0026)	0.0074** (-0.0027)	Country: France	-0.2739*** (-0.0024)	
Widow	0.0257*** (-0.0028)	0.025*** (-0.0029)	Country: UK	-0.2863*** (-0.0025)	
Income earners/comp.	-0.0468*** (-0.0032)	-0.0628*** (-0.0033)			
Number of observations	361,263	361,263	AIC	409,443	426,202
Pseudo-R2	0.1378	0.1025	BIC	409,821	426,569

Source: Authors' calculations on EU-SILC data.

Note: Standard errors in parentheses. Significance levels: *** p<0.001, ** p<0.05, * p<0.1.

As for the remaining household-level variables, results are comparable across models, except for the homeownership status, which presents a negative probability of expressing heavy burden in Model A, but a positive probability in Model B. Since we lack information for Germany and the UK on whether homeowners hold a mortgage on their property, we are not able to investigate further the relationship of being a homeowner with respect to expressing a high burden.¹⁹ In both models, those provided with rent-free accommodation display a lower probability of high burden.

The year dummies capture the trend of the response variable, including the decrease in the high burden answer between 2008 and 2009, possibly due to the rephrasing of the question in the survey, as previously observed. This may also reflect institutional changes, such as the abolition of taxation on housing property for the main residence in the Italian case.

Country effects are strong, with all country dummies being significant and with a ranking of the countries coherent with the descriptive statistics. Italy (the reference country) and Spain have a similar structure of the burden perception, with the smallest but negative marginal effect in absolute value (-7.2%), while Germany has the highest and positive effect (31.4%). Country effects are captured very well by the macro-economic variables of Model B. The probability of perceiving a large burden is higher with greater inequality and unemployment, while increase in GDP is associated with a lower likelihood of perceiving a heavy burden. The family's economic sentiment towards the country has a negative relationship with this probability: positive feelings about the country's political and economic situation make families more optimistic and decrease the probability of perceiving a high housing costs burden.

4.2 Country models

This section investigates how within-country variables affect the perception of the housing cost burden through per-country estimations. The estimation of these models allows to quantify the different impacts of the explanatory variables on the burden perception of each country. At country level we observe differences in the size of the impact of explanatory variables on the probability of perceiving a high burden. However, in general, like the sign and significance of the household-level variables, the results are similar to those for the pooled models, although with some exceptions, such as homeownership status which is not statistically significant for German and UK households, while is positive for Spain and negative for France and Italy (Table 5).

The impact of income on the probability of a high burden is analogous in sign and magnitude in all countries, expressing a decreasing relationship between the burden and income. As expected, housing costs positively affect the burden perception,

¹⁹ This aspect, however, is analysed when estimating country models, specifically for France, Italy and Spain, for which this piece of information is available.

with France showing the lowest impact (6.3%), while Germany the highest (9.6%). Italy is the country where being a homeowner most lowers the probability of perception of a high burden (-11.0%). Rent-free accommodation displays a negative marginal effect in all countries, with Italy and France showing the strongest negative impact (-19.7% and -13.8%, respectively). Education is not significant in Germany and the UK, while has the expected sign in the other three countries. There is evidence of gender effects in all countries, with stronger impacts in Italy and Spain (with a marginal effect of 5.1% and 4.8%, respectively). Being single has a negative sign, being divorced/separated is positive, while widowhood does not have a clear-cut impact. Having an unemployed household head raises the probability of a high burden by 8.2% in Spain and 7.4% in France. On the contrary, self-employment and retirement both lower such probability. Finally, the dummy on having arrears positively affects the burden, especially in Italy (28.9%) and Spain (25.6%).

The age effect is addressed by drawing probability curves (based on estimation of a model in which age dummies are replaced by an age polynomial of order 2). We then draw probability curves by age, such that each country's probability of having a heavy burden with respect to age suggest wide differences among countries (Figure 6). The relationship is concave for Germany, France and the UK: the probability of perceiving a heavy burden increases up to 40 to 50 years, and then decreases. Germany and the UK show a much more rapid decrease than France. On the contrary, Italy and Spain show a descending pattern: with increasing age, the likelihood of perceiving a heavy burden decreases. This is possibly influenced by the interrelation of homeownership and age as depicted in Figure 2, where Italy and Spain have higher percentages of young households owning their property, making the curve flatter and therefore weakening the life-cycle effects. This aspect can be further investigated by looking at homeowners with a mortgage, as presented in the next section.

Table 5: Country models: marginal effects

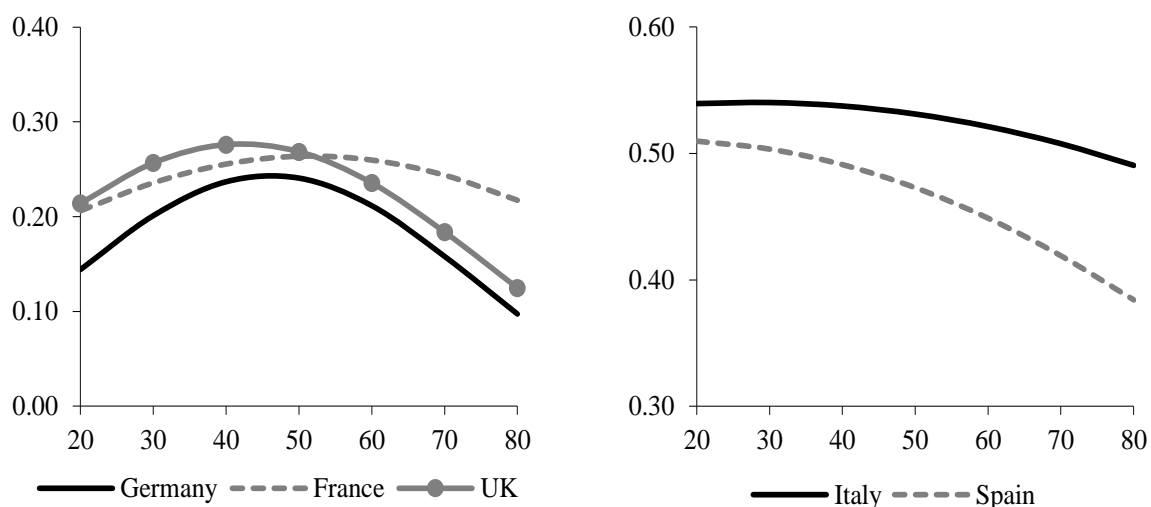
	Germany	Spain	France	Italy	UK		Germany	Spain	France	Italy	UK
age: <=35	-0.0516***	0.0375***	-0.0165**	0.0167**	-0.0234**	Marital status: Single	-0.0389***	-0.0356***	-0.0062	-0.0345***	-0.0315***
	(-0.0055)	(-0.0064)	(-0.006)	(-0.0053)	(-0.0074)		(-0.004)	(-0.0055)	(-0.0047)	(-0.0042)	(-0.0055)
age: 36-45	0.0084	0.0204***	-0.0025	0.0119**	0.0193**	Divorced/separated	0.0307***	0.0844***	0.0632***	0.0112	0.0113
	(-0.0048)	(-0.0055)	(-0.0055)	(-0.0044)	(-0.0068)		(-0.0044)	(-0.0077)	(-0.0059)	(-0.006)	(-0.0061)
age: 56-65	-0.0421***	-0.0264***	0.0008	-0.002	-0.0489***	Widow	-0.0113	0.0648***	0.0454***	0.0064	0.005
	(-0.0052)	(-0.0061)	(-0.0065)	(-0.0051)	(-0.0069)		(-0.0062)	(-0.0072)	(-0.0072)	(-0.005)	(-0.007)
age: 66-75	-0.0736***	-0.0294***	0.0087	-0.0124*	-0.058***	Income earners/components	-0.0304***	-0.0213*	-0.0618***	-0.0644***	-0.0252**
	(-0.0071)	(-0.008)	(-0.009)	(-0.0061)	(-0.0096)		(-0.006)	(-0.0085)	(-0.0076)	(-0.0066)	(-0.0078)
age: >75	-0.1093***	-0.0814***	-0.0261**	-0.0295***	-0.1255***	Occupational status: Self-employed	-0.0164*	-0.0849***	-0.0232**	-0.0732***	-0.028***
	(-0.0081)	(-0.0094)	(-0.0098)	(-0.007)	(-0.0095)		(-0.0072)	(-0.0069)	(-0.0088)	(-0.0047)	(-0.0074)
Income: 1st quintile	0.0732***	0.0814***	0.0777***	0.067***	0.0538***	Unemployed	0.0251***	0.0821***	0.0744***	0.0605***	0.0484**
	(-0.0055)	(-0.0063)	(-0.0064)	(-0.0048)	(-0.0075)		(-0.006)	(-0.0073)	(-0.008)	(-0.0086)	(-0.0157)
Income: 2nd quintile	0.0535***	0.0481***	0.0452***	0.0313***	0.0375***	Retired	-0.0135*	-0.0203**	-0.0135	-0.0352***	-0.0601***
	(-0.0049)	(-0.0059)	(-0.0057)	(-0.0045)	(-0.0067)		(-0.0063)	(-0.0076)	(-0.0069)	(-0.0053)	(-0.0077)
Income: 4th quintile	-0.0392***	-0.0494***	-0.0495***	-0.0357***	-0.0413***	Other	0.0028	-0.0091	0.0241***	-0.0138**	0.0236**
	(-0.0045)	(-0.0059)	(-0.0055)	(-0.0045)	(-0.0062)		(-0.0051)	(-0.0058)	(-0.006)	(-0.0048)	(-0.0075)
Income: 5th quintile	-0.0866***	-0.1438***	-0.1092***	-0.1235***	-0.1153***	Household has arrears	0.147***	0.255***	0.1955***	0.2886***	0.2287***
	(-0.0043)	(-0.0062)	(-0.0054)	(-0.0046)	(-0.0059)		(-0.0075)	(-0.0076)	(-0.0073)	(-0.0045)	(-0.0094)
Housing costs/income > 0.5	0.0957***	0.0866***	0.0633***	0.0823***	0.0708***	year: 2006	-0.0077	0.0152*	0.0462***	-0.0037	0.0017
	(-0.0037)	(-0.0088)	(-0.0072)	(-0.0062)	(-0.0056)		(-0.0051)	(-0.0062)	(-0.0057)	(-0.0046)	(-0.0058)

Homeownership status: Homeowner	-0.0053	0.0127*	-0.0241***	-0.1103***	-0.0039	year: 2007	-0.0362***	0.0137*	0.0417***	0.0239***	-0.0206***
	(-0.0033)	(-0.0064)	(-0.0043)	(-0.0041)	(-0.0051)		(-0.0049)	(-0.0063)	(-0.0057)	(-0.0047)	(-0.0059)
Rent free	-0.1101***	-0.0983***	-0.1379***	-0.1965***	-0.0515**	year: 2008	-0.0112*	0.0425***	0.0762***	0.0299***	0.0466***
	(-0.0076)	(-0.0092)	(-0.008)	(-0.0059)	(-0.0176)		(-0.0051)	(-0.0062)	(-0.0058)	(-0.0047)	(-0.0064)
Education: Up to lower secondary	-0.0017	0.0682***	0.0227***	0.0629***	0.0064	year: 2009	-0.0415***	0.0384***	0.0594***	0.0061	0.0052
	(-0.0053)	(-0.0053)	(-0.0043)	(-0.0035)	(-0.0053)		(-0.005)	(-0.0062)	(-0.0058)	(-0.0048)	(-0.0085)
Tertiary	-0.0034	-0.0689***	-0.0171***	-0.038***	-0.0111*	year: 2010	-0.0553***	0.0352***	0.047***	-0.0029	0.0079
	(-0.0031)	(-0.0057)	(-0.0046)	(-0.0044)	(-0.0046)		(-0.0049)	(-0.0062)	(-0.0057)	(-0.0049)	(-0.0064)
Gender: Female	0.011***	0.0477***	0.0274***	0.051***	0.0223***						
	(-0.0031)	(-0.0041)	(-0.0037)	(-0.0031)	(-0.0044)						
Number of obs.	74,454	68,486	58,518	116,525	43,280						
Pseudo R2	0.0788	0.0777	0.0889	0.0850	0.1011						

Source: Authors' calculations on EU-SILC data.

Note: Standard errors in parentheses. Significance levels: *** p<0.001, ** p<0.05, * p<0.1.

Differences in Perceptions of the Housing Cost Burden Among European Countries



Source: Authors' calculations on EU-SILC data.

Figure 6: Probability curves of the housing cost burden by age (%)

4.3 A focus on homeowners with mortgage: Italy and Spain

To understand whether life-cycle effects exist in Italy and Spain, we distinguish between homeowners with mortgage and outright owners.²⁰ We re-run the country models for Italy and Spain, which now include a three-category dummy variable on homeownership status - owners with mortgage, outright owners and renters (base category) - and interaction terms between the dummy for being 'homeowner with mortgage' and age and age squared.²¹ The results, expressed as marginal effects, reveal that the quadratic specification of age is significant in both countries, as well as the interaction terms and the homeownership dummies (Table 6).²² The probability of declaring a heavy burden for homeowners with a mortgage increases by 31.4% for Spain and by 28.1% for Italy. Conversely, results on outright homeowners show a lower probability of the said burden of -16.1% in Italy and -5.0% in Spain.

²⁰ In Spain information on mortgages is available only from 2007.

²¹ Initially we considered splitting the sample between homeowners with mortgage and homeowners without mortgage. However, the sample for those with mortgages is relatively small for all countries, and furthermore inspection of the data reveals that age is highly concentrated in the class 36-45. This caused the estimated coefficients of age to be non-significant. We therefore resorted to the model specification with the interactions between age and having a mortgage.

²² See footnote 12 on how marginal effects are computed.

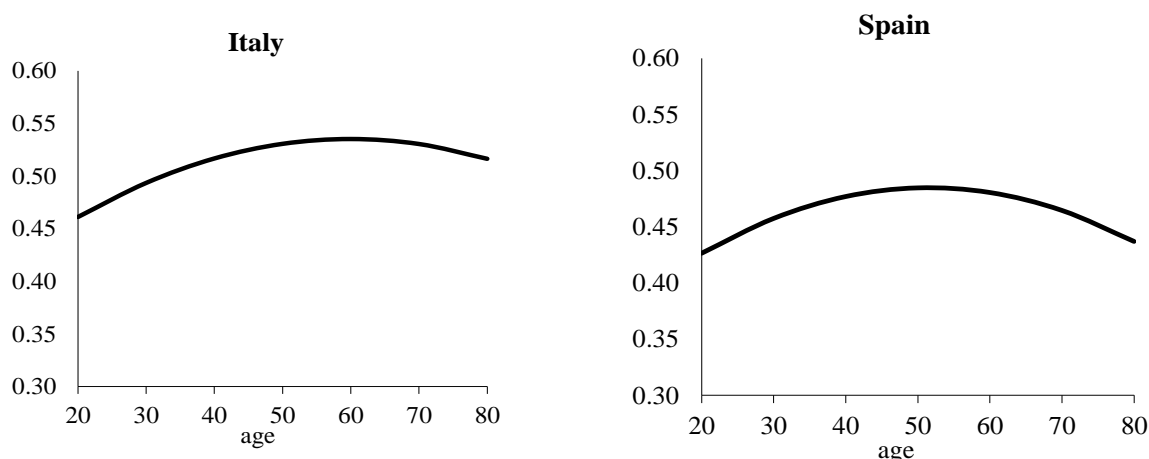
Table 6: Homeowners with mortgage, marginal effects: France, Italy and Spain

	Spain	Italy	France		Spain	Italy	France
Age	0.0061***	0.0056***	0.0076***	Marital status: Single	-0.012	-0.0236***	0.0005
	(-0.0014)	(-0.0008)	(-0.0009)		(-0.0068)	(-0.0042)	(-0.0048)
Age squared	-0.0059***	-0.0047***	-0.0067***	Divorced/separated	0.083***	0.0067	0.0563***
	(-0.0013)	(-0.0007)	(-0.0009)		(-0.009)	(-0.0059)	(-0.0059)
Age * mortgage	-0.0087**	-0.0107***	-0.0106***	Widow	0.0727***	0.0052	0.0458***
	(-0.0029)	(-0.0027)	(-0.0027)		(-0.0088)	(-0.0049)	(-0.0072)
Age squared * mortgage	0.0071*	0.0093***	0.01***	Income earners/components	-0.0133	-0.0517***	-0.046***
	(-0.003)	(-0.0027)	(-0.0029)		(-0.0102)	(-0.0065)	(-0.0074)
Income: 1st quintile	0.0929***	0.0807***	0.0848***	Employment status: Self-employed	-0.0807***	-0.0611***	-0.0191*
	(-0.0077)	(-0.0047)	(-0.0064)		(-0.0084)	(-0.0046)	(-0.0087)
2nd quintile	0.0463***	0.0383***	0.0467***	Unemployed	0.1027***	0.082***	0.0768***
	(-0.0072)	(-0.0044)	(-0.0057)		(-0.0085)	(-0.0084)	(-0.0079)
4th quintile	-0.0621***	-0.0439***	-0.0515***	Retired	0.0002	-0.0135**	0.0025
	(-0.0071)	(-0.0044)	(-0.0054)		(-0.0091)	(-0.0049)	(-0.0066)
5th quintile	-0.1605***	-0.1363***	-0.1088***	Other	0.0119	0.0089	0.0341***
	(-0.0075)	(-0.0046)	(-0.0054)		(-0.0071)	(-0.0046)	(-0.006)
Housing costs/income > 0.5	0.069***	0.0611***	0.0624***	Has arrears	0.2379***	0.2731***	0.1956***
	(-0.0103)	(-0.006)	(-0.0073)		(-0.0092)	(-0.0046)	(-0.0073)
Homeownership status: Homeowner without mortgage	-0.0496***	-0.1608***	-0.0463***	Year:2006		-0.0038	0.0451***
	(-0.0076)	(-0.0045)	(-0.0043)			(-0.0045)	(-0.0057)
Homeownership status: Homeowner with mortgage	0.3137***	0.2811***	0.3059***	Year: 2007		0.0212***	0.0397***
	(-0.046)	(-0.0285)	(-0.0649)			(-0.0046)	(-0.0057)
Free renter	-0.0947***	-0.1834***	-0.1219***	2008	0.0267***	0.0245***	0.0739***
	(-0.0106)	(-0.0061)	(-0.0075)		(-0.0062)	(-0.0047)	(-0.0059)
Education: Up to lower secondary	0.0711***	0.0629***	0.0211***	2009	0.0224***	-0.0021	0.0569***
	(-0.0063)	(-0.0035)	(-0.0043)		(-0.0062)	(-0.0047)	(-0.0058)
Tertiary	-0.0749***	-0.0403***	-0.0182***	2010	0.0189**	-0.0117*	0.0444***
	(-0.0068)	(-0.0044)	(-0.0046)				
Female	0.0469***	0.0513***	0.0274***				
Number of obs.	45,610	116,525	58,518				
Pseudo R2	0.0976	0.1074	0.0917				

Source: Authors' calculations on EU-SILC data

Standard errors in parentheses. Significance levels: *** p<0.001, ** p<0.05, * p<0.1.

Figure 7 depicts the newly estimated probability curves by age. The estimated burden/age relationship changes significantly for both countries, with the probability curve becoming concave, peaking around 60 years of age in Italy and around 55 in Spain, confirming the presence of life-cycle effects for homeowners with mortgages. We compared these results with those of a similar model for France, the only other country for which information on holding a mortgage is available: the probability curve maintains the same shape as in the previous specification. The probability of declaring heavy burden for homeowners with a mortgage increases by 30.6%, while outright homeowners show a lower probability of the said burden at -4.6%.



Source: Authors' calculations on EU-SILC data.

Figure 7: Probability curves of the housing cost burden by age: interaction between age and having mortgage (%)

To explain the variation in the shape of the probability curve in Italy and Spain, Italy and Spain have very high percentages of homeowners without mortgage among younger households, 21.5% and 53.4% in the age class below 35 years, respectively, in comparison to 12.2% in France (Table 7). Overall, the distribution of homeowners without mortgage by age is more equally distributed in Italy and Spain than in France. And, as the percentage of households with mortgages decreases with age, the percentage of households who do not have to pay a mortgage increases almost linearly with age, as expected. This causes the 'flattening' of the age effect observed in Figure 6. Additionally, there is evidence in Italy that almost 70% of individuals who own a property have received help when buying their home, *vis-a-vis* the European average of 50%, and that around 90% of the young (below 35) use 'the bank of mum and dad' in Italy (ING, 2012). If instead we isolate the 'mortgage effect', the probability curves follow a hump-shaped pattern, which is only partially visible in the descriptive statistics, at least for Italy (the percentage of mortgage holders slightly increases in the 36-45 age class).

Table 7: Homeowners with or without mortgage by age
(%, average 2005-2010)

	France		Italy		Spain	
	w/out mortgage	with mortgage	w/out mortgage	with mortgage	w/out mortgage	with mortgage
<=35	6.7	12.2	30.1	21.5	17.8	53.5
36-45	16.6	17.2	42.2	23.0	29.0	52.3
46-55	38.9	25.0	58.1	14.9	52.7	32.7
56-65	59.9	16.7	73.1	8.4	72.4	16.3
66-75	72.7	11.8	77.3	3.0	83.2	6.5
>75	72.4	11.2	79.0	1.1	85.2	2.2

Source: Authors' calculations on EU-SILC data.

Note: Statistics are weighted with sample weights.

5. Conclusions

This article performs a comparative analysis of subjective financial distress in five European countries - France, Germany, Italy, Spain and the UK - by using the self-reported perception of the housing cost burden. Our work lies within the literature employing subjective indicators, which goes along that on objective ones in identifying the areas of potential economic and financial distress among households. We employ EU-SILC data for the period 2005-2010. The survey asks to what extent housing costs are perceived as a burden. Wide differences emerge between Germany, France and the UK on the one hand, and Italy and Spain on the other. Differences in perceptions may be due to several reasons which are difficult to disentangle, but perceptions of economic distress depend both on objective and on subjective motives. The former are related to socio-economic conditions of the household (levels of income, wealth, household composition, etc.) and to the economic situation of each country (GDP growth, unemployment rate, inequality and more broadly the overall institutional settings). Subjective motives are more challenging to identify, but depend on confidence, life style expectations, or more generally cultural aspects.

To investigate the relationship between perceptions of this burden and households' socio-economic characteristics and country-specific factors, we estimated a set of logit models in which the dependent variable is the self-reported indicator of the housing costs burden. First, we estimated a pooled model on the six-year, five-country sample, taking account of country effects by means of either country dummies or aggregate (country specific) variables, such as unemployment and GDP growth rates and Gini index. We included also the monthly economic sentiment indicator which expresses residents' confidence in their country's economic situation. Since pooled models do not allow for the differentiation of the impact of the household-level variables by country, we built five single country models to examine how within-country factors affect the perception of the burden.

The results from the pooled model show that country effects are captured very well by macro-economic variables. The probability of perceiving a large burden is higher with greater inequality and unemployment, while increase in GDP is associated with a lower likelihood of perceiving a heavy burden. The family's economic sentiment towards the country has a negative relationship with this probability: positive feelings about the country's political and economic situation make families more optimistic and decrease the probability of perceiving a high housing costs burden. As for the household-specific variables, the results reveal the existence of life-cycle effects, with younger households more like to perceive housing costs as a major burden, while the opposite is true for households with household heads aged over 56 years. Income has a strong impact on the probability of indicating a higher burden with all income quintiles highly significant, positive for the two lower quintiles and negative for the two upper quintiles. Having relatively high housing costs increases the probability of distress, which shows consistency between subjective and actual burden of housing costs, although Italian and Spanish households, who declared the highest burden, are among those with the smallest shares. The same holds for being in arrears with some payments, which has the greatest impact on the probability of expressing a heavy housing costs burden.

At the country level, the results are similar to those of the pooled models for sign and significance of the household-level variables, but we observe differences by country in the size of the impact of explanatory variables on the probability of perceiving a high burden. Housing costs, as expected, positively affect the burden perception, with France showing the lowest impact, and Germany the highest. Italy is the country where being a homeowner most lowers the probability of a high burden. Gender effects are likewise strongest in Italy, as well as in Spain, but are present in all countries. Having an unemployed household head most raises the probability of a high burden in Spain and in France. On the contrary, self-employment and retirement both lower such probability. Finally, the dummy of having arrears positively affects the burden, especially in Italy and Spain.

We then investigated the existence of life-cycle effects at the country-level by drawing probability curves: the relationship is concave for Germany, France and the UK, while decreasing in Italy and Spain. Life-cycle patterns were examined by interacting age with being a homeowner with mortgage. The estimated burden/age relationship changes significantly for both countries, with the probability curve becoming concave, and therefore confirming the presence of life-cycle effects for homeowners with mortgages. The change in the probability curves might be explained by the fact that at least in Italy, a high percentage of homeowners among young households do not have mortgages on their property and that the majority of homeowners receive help from family when buying their home.

We are aware that differences in perceptions may depend on other elements, such as the prevailing tax and benefits systems, which are difficult to both quantify and account for. It is reasonable to think that higher perceived burdens are in line with actual housing costs, but also other cost burdens (e.g. health-related expenditure,

child-care, etc.). If increasing housing costs are considered as reduced wealth, households may curtail consumption or shift their preferences. The links between these aspects and the housing costs burden deserves further analysis in future research.

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