HOUSEHOLDS' INDEBTEDNESS: A MICROECONOMIC ANALYSIS BASED ON THE RESULTS OF THE HOUSEHOLDS' FINANCIAL AND CONSUMPTION SURVEY*

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ABSTRACT

The analysis of the Portuguese households' indebtedness based on microeconomic information is particularly useful at the present time, given the high level of debt of this sector and the increase in credit default. Using this type of data it is possible to identify structural relationships between the households' characteristics and their indebtedness and, in particular, to detect the situations of greater vulnerability, which should be taken into account in the analysis and monitoring of the adjustment process that is underway in the Portuguese economy. This paper uses data from a new survey, the Household Finance and Consumption Survey (HFCS), which took place during the second quarter of 2010. According to the results obtained, low income and young households who have taken mortgages are the most vulnerable groups of the population, for which the probability of materialisation of credit risk is higher. However, the fact that low income households have relatively low participation in the debt market mitigates the impact of their eventual entry into default on the financial situation of banks. As for young households, although their market share and the value of their loans are high, their debts are often guaranteed by real estate and the value of the debt service to income ratio for the majority of these households is lower than the usual threshold, used to identify situations of greater vulnerability.

1. Introduction

This paper presents an analysis of the distribution of households' participation in the debt market and their indebtedness level according to some relevant socio-economic and demographic characteristics of households. The analysis is based on microeconomic information obtained from a new survey, the Household Finance and Consumption Survey (HFCS), which took place during the second quarter of 2010.[1] The HFCS is part of a project at the Eurosystem level, to collect comparable information on the financial situation of households in several countries in the euro area. Collecting information on households' financial situation through the implementation of a survey has the advantage of allowing the combination of data on income, expenditure and assets of households with other relevant dimensions. In the analysis of household indebtedness, microeconomic information obtained from surveys is very useful to complement the analysis based on macroeconomic data. With this type of information it is possible in particular to analyse separately the situation of indebted households, to characterise in detail the distribution of debt and to detect the existence of any situations of greater vulnerability.

1 For a detailed presentation of the HFCS see Costa and Farinha (2012).

* The opinions expressed are those of the authors and not necessarily those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

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The analysis of the Portuguese households' debt at the microeconomic level is particularly relevant at present times, given the high level of debt of this sector and the increase in credit default situations. The latest available survey data on households' wealth and debt for Portugal dated back to 2006, the year of implementation of the last edition of the Survey on Household Wealth and Indebtedness (IPEF)[2]. Since 2006 households' aggregate indebtedness maintained the increasing trend, reaching in 2009 a maximum level of about 130 per cent of disposable income, one of the highest levels within the euro area. With the worsening of the international financial and economic crisis and, in particular in the context of the sovereign debt crisis in the euro area, and the consequent difficulties of the Portuguese banks in financing in the wholesale financial markets, the criteria for granting loans to households have become tighter. Additionally, in a very unfavourable macroeconomic environment, with decreasing disposable income and rising unemployment, the demand for credit by households has also been contracting. These developments have contributed to the interruption of the increasing trend in household indebtedness, with the value of debt falling to about 126 per cent of disposable income in 2011. The data from the HFCS, dating from 2010, do not reflect the latest developments on households' finances.[3] However, these data allow us to identify structural relationships between households' characteristics and their debt and, in particular, to detect the existence of situations of greater vulnerability, which should be taken into account in analysing and monitoring the unavoidable adjustment process that is underway in the Portuguese economy.

This paper begins by describing households' participation in the debt market in terms of their socio-economic and demographic characteristics. The factors that determine this participation may differ according to the type of debt. Therefore, the analysis concerning the participation in the debt market is complemented with a characterization of the households that hold only mortgages or only another type of debt.

In the analysis of households' participation in the debt market it is important to separate demand and supply-side considerations. However, usually the available information does not allow making that distinction.[4] This paper takes advantage from the fact that the HFCS include questions that assess whether households have applied for credit in recent years and if any credit application has been refused during the same period. Therefore, it is possible to analyse separately the determinants of the probability of applying for credit and the determinants of the probability of facing restrictions on the access to credit.

In terms of financial stability it is particularly important to have information on the distribution of indebtedness among the indebted households. This analysis is crucial to identify the groups with a higher probability of materialization of credit risk. This paper includes an analysis of the relationship between households' indebtedness level and their characteristics. The level of indebtedness is measured with three alternative indicators commonly used in the literature: the ratio between the debt service and income, the ratio between debt and income and the ratio between debt and wealth.[5] In order to identify the situations that potentially generate more risk, it is more important to assess extreme situations than to analyse the typical values of the distributions. Thus, the analysis of the medians of the indebtedness ratios is complemented with a characterization of the households for which the debt ratios exceed certain values regarded as critical.

2 For an analysis of the results of IPEF 2006 see Farinha (2008). The methodological differences between the IPEF and the HFCS imply that the comparisons between the results obtained in 2006 and 2010 should be made with great caution.

3 The cost of collecting and processing information from this kind of surveys is very high so that it will always have a lower frequency than macroeconomic data.

4 For an exception in the literature see Magri (2007).

5 The debt service is given by the sum of interest payments and the repayment of principal, i.e., corresponds to the loan instalments.

The paper is organized as follows: section 2 presents the methodology and the variables used in the analysis; section 3 includes the results concerning households' participation in the debt market; section 4 analyzes the levels of debt and the indebtedness ratios defined above, and identifies the most vulnerable households; section 5 presents the main conclusions.

2. Methodology and variables

As mentioned above, the purpose of this paper is to characterize the households' participation in the debt market and their level of indebtedness in relation to some relevant economic, social, and demographic features. Section 3 of the paper presents the results of the regressions in which the dependent variables are the participation in the debt market, the decision to apply for a loan or the refusal of a loan application by a credit institution. The results presented in Section 4 refer to the regressions in which the dependent variables are the value of the indebtedness ratios or the probability that these ratios exceed certain threshold levels. When the dependent variable is a binary variable (which takes the values 0 and 1), the models were estimated according to the Logit methodology.[6] In the case of the debt ratios, where the dependent variables are continuous but always take positive values, the models were estimated by linear regression for the logarithmic transformation of the ratios.

The HFCS sample of households is a probability sample, meaning that there is a weight associated to each sampled household. These weights are equal to the inverse of the probability that the household has been selected to the sample. In the computation of totals, ratios, means, medians or other statistics of the survey variables, it is crucial to take into account these weights. In this paper all the results, including the results of the regression analysis, were obtained taking into account the final sample weights.

Another methodological aspect to be taken into account in the analysis follows from the fact that HFCS data have been subject to a process of multiple imputation. In the HFCS, missing values (resulting from the selection of the response options "do not know" or "no answer") in the variables that are the most relevant to evaluate the financial situation of households were estimated by multiple imputation. This method involves statistical techniques that take into account the relationship between the answers to several questions as well as the determinants of non-response. In order to take into account the uncertainty associated with the imputation process, the method originates five versions of the database that differ in the values assigned to the missing answers in the variables that were imputed. The five different versions of the database must be used together in the analysis. To make inference with HFCS data it is advisable to develop the analysis for each of the five databases and subsequently combine the results. For any parameter of interest (mean, median, coefficient of regression, etc.) the point estimate is given by the average of the estimates obtained from the five databases, that is:[7]

$$\bar{Q} = \frac{1}{5}\sum_{i=1}^{5}\hat{Q}_i \tag{1}$$

In turn, the total variance of the parameter is given by equation (2), which corresponds to a combination of the variance within, given by (3), which is the average of the variances obtained from each of the databases, and the variance between, given by (4), which reflects the variability due to the uncertainty concerning the imputation results.

$$T = \bar{W} + \frac{6}{5}B \tag{2}$$

6 For a full discussion of the methodology see for example Greene (2011).

7 See Rubin (2004).

$$\bar{W} = \frac{1}{5}\sum_{i=1}^{5}\hat{W}_i \tag{3}$$

$$B = \frac{1}{4}\sum_{i=1}^{5}(\hat{Q}_i - \bar{Q})^2 \tag{4}$$

The selection of the explanatory variables used in the regression analysis has taken into account that, according to the economic theory, households' decisions concerning debt are largely determined by the objective of smoothing consumption over the life-cycle. Furthermore, households also take investment decisions, in particular the decision on the acquisition of the household's main residence. There is a general consensus about the assumption that households' consumption and investment decisions, and hence their borrowing decisions, largely depend on life-cycle considerations, on their income and wealth, not only current but also prospective, which in turn are conditioned also by the education level and the work status of household members.

Therefore the characterization of indebtedness is based on variables at the household level such as the value of income, the value of real assets, the value of financial assets, the number of household members and the type of household, as well as on variables at the individual level such as the age, education level and work status of the reference person.[8] The income reference period is 2009, while for the remaining variables it is the time of the interview (2nd quarter of 2010).

Household's income is given by the sum of regular income received individually by its members (employee income, income from self-employment, income from pensions and other social benefits) and household income (income from businesses and financial assets, rents on real estate and regular social and private transfers). The value of real assets is given by the sum of the value of real estate, motor vehicles, self--employment businesses and other valuables.[9] Financial assets value is given by the sum of the value of deposits, investment funds, debt securities, shares, non self-employment businesses, voluntary pension plans and other financial assets.

Different classes of income, real assets and financial assets are identified by dummy variables that were defined according to various percentiles.[10] Dummy variables were also created for the number of household's members and the household type. The dummy on the household type intends to control for the presence of dependents, i.e, individuals younger than 25 years that do not to work and are not the household reference person or his spouse/partner, or his parent/grandparent.[11] Dummies variables were also created for the classification of households according to the age class, the education level and the work status of the reference person.[12]

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8 The reference person corresponds to the person appointed by the household as such, if this person is male, or the partner/husband of this person, if this person is female and has a partner/husband in the household.

9 This definition of real assets differs from the concept of the European System of National Accounts because it includes vehicles and participation in business.

10 Six income classes were defined corresponding to the households whose income is below the 20th percentile, is between percentiles 20 and 40, 40 and 60, 60 and 80, 80 and 90 and for those that are above the 90th percentile. In the case of wealth the classes correspond to the households whose wealth is below the 25th percentile, is between percentiles 25 and 50, 50 and 75, 75 and 90 and for those that are above the 90th percentile.

11 The dummy variables relating to the number of household members take the value 1 if the household has respectively one, two, three, four or more than four members. The dummies for the household type take the value 1, respectively if the household comprises only one adult, if it comprises various members, all being adults, and if it comprises various members, both adults and dependents. For the sake of simplicity, in the remaining of the paper dependents are labelled as children.

12 The age classes correspond, respectively, to the individuals with less than 35 years old, between 35 and 44, between 45 and 54, 55 and 64, 65 and 74 years and 75 years or more. The education levels considered correspond, respectively, to basic education, secondary education and tertiary education. These levels correspond to the levels effectively completed. The work status distinguishes employees with a permanent position, employees with temporary contracts, self-employed workers, unemployed, retirees and other situations of inactivity (such as the students and the persons dedicated to unpaid home tasks).

3. Participation in the debt market

The objective of this section is to analyse the effect of a set of socio-economic and demographic characteristics of households on their participation in the debt market. The first part of the section includes a descriptive analysis of the percentage of indebted households in each class of households according to the dimensions defined above. These dimensions are in most cases correlated with each other, what makes the interpretation of the results based on a univariate analysis particularly difficult. In order to overcome this limitation, the second part of the section presents the results of multivariate regressions for the probability of participation in the debt market.

Households' decisions concerning their participation in the debt market are expected to be determined by different factors depending on the type of debt. In particular, it is expected that mortgages, which are in most cases associated with investment decisions in real assets with a significant weight in household wealth, are more directly correlated to life-cycle expected income than the other types of debt. In order to assess the hypothesis that mortgages and other debt are determined by different factors, the situations in which households participate only in the mortgage market, only in the market for non-mortgage debt or in both types of credit markets are analysed separately. These situations are identified from the responses to different questions of the HFCS. Mortgage debt relates to loans that have a real estate property as collateral (the household main residence or other properties). Non-mortgage debt relates to non-collateralised loans, as well as to the use of overdraft facilities, credit lines or credit card debt on which interest is charged.

3.1 Univariate analysis

Table 1 presents some indicators concerning households' participation in the debt market in 2010. According to the HFCS, around 38 per cent of households hold some type of debt. Most of the indebted households have mortgages. Nevertheless, around 11 per cent have only other types of debt. In total, about 7 per cent of households have both mortgage and another type of debt.

The percentage of households having debt increases with household income, being about 12 per cent in the lowest income class and greater than 60 per cent in the highest class. This is likely to be explained by the fact that current income is positively correlated with expected income. In the case of wealth there is also a positive relationship with the participation in the debt market. As expected, this relation mainly reflects the fact that households holding real assets with higher value have a higher participation in mortgage markets.

In the case of financial wealth, the relationship between the value of assets and the percentage of indebted households is less clear. However, in the lowest classes of financial wealth there is a higher percentage of households having only non-mortgage debt than in the other wealth classes.

Households' participation in the debt market increases with the level of education of the reference person, this pattern being shaped by mortgage debt. For households who hold only other debts, the participation rates do not differ considerably across the various education classes, possibly reflecting the fact that decisions concerning non-mortgage debt are less dependent on the accumulated value of expected future income.

The percentage of indebted households tends to decrease with the age of the reference person from a certain age. This profile is related to the fact that younger households have a greater need/opportunity to apply for credit as their current income is lower than their expected future income and they have a longer life expectancy. However, debt market participation of the youngest households is lower than the participation of those in the second age class. As a matter of fact, the great uncertainty concerning future income in the case of the very young households may lead to a lower demand and/or supply of mortgages, which at this age is generally associated with the acquisition of the first residence. Finally,

Table 1

PERCENTAGE OF HOUSEHOLDS HOLDING DEBT IN 2010

	As a percentage of the number of households in each class					
	% of households	Any debt	Only mortgages	Only other debt	Both types of debt	No debt
Total	**100.0**	**37.7**	**19.4**	**11.0**	**7.3**	**62.3**
Income percentile						
Less than 20	20.0	12.4	5.6	4.9	2.0	87.6
Between 20 and 40	20.0	24.5	11.4	10.3	2.9	75.5
Between 40 and 60	20.0	44.6	24.0	11.9	8.6	55.4
Between 60 and 80	20.0	49.3	23.1	16.3	9.8	50.7
Between 80 and 90	10.0	52.9	29.0	10.9	13.0	47.1
More than 90	10.0	62.2	36.3	12.2	13.7	37.8
Real wealth percentile						
Less than 25	25.0	19.4	0.1	19.2	0.0	80.6
Between 25 and 50	25.0	26.0	13.6	8.0	4.4	74.0
Between 50 and 75	25.0	51.2	29.4	7.8	14.0	48.8
Between 75 and 90	15.0	55.8	32.9	10.4	12.5	44.2
More than 90	10.0	51.5	36.4	6.7	8.5	48.5
Financial wealth percentile						
Less than 25	25.0	31.6	12.9	12.7	6.0	68.4
Between 25 and 50	25.0	39.9	18.4	13.1	8.4	60.1
Between 50 and 75	25.0	41.0	22.0	9.4	9.6	59.0
Between 75 and 90	15.0	36.4	23.6	7.1	5.7	63.6
More than 90	10.0	40.9	24.6	11.5	4.8	59.1
Household size						
One	17.7	15.2	8.4	4.4	2.4	84.8
Two	30.6	26.5	14.0	8.7	3.8	73.5
Three	25.9	47.7	24.6	14.0	9.2	52.3
Four	18.5	57.5	30.5	12.0	15.0	42.5
Five or more	7.3	53.5	21.7	23.3	8.5	46.5
Household type						
One adult	17.7	15.2	8.4	4.4	2.4	84.8
Several adults	41.9	27.9	14.1	10.1	3.7	72.1
Adult(s) and children(s)	40.4	57.8	29.6	14.8	13.3	42.2
Age						
Under 35	9.8	55.8	26.1	18.6	11.1	44.2
35-44	20.5	66.2	35.9	15.2	15.1	33.8
45-54	18.8	48.6	26.2	11.5	10.8	51.4
55-64	19.8	33.5	17.0	12.1	4.3	66.5
65-74	16.5	13.6	5.3	6.7	1.5	86.4
75 and over	14.7	4.6	1.9	2.6	0.2	95.4
Work status						
Employee	42.0	57.9	31.3	14.4	12.3	42.1
Permanent position	36.7	58.6	32.2	13.6	12.8	41.4
Temporary contract	5.2	53.4	24.3	20.1	9.0	46.6
Self-employed	10.7	46.8	25.5	11.5	9.9	53.2
Unemployed	7.2	40.5	17.0	17.0	6.4	59.5
Retired	36.6	13.2	5.6	5.9	1.7	86.8
Other not working	3.5	16.5	6.6	9.3	0.6	83.5
Education						
Below secondary	78.4	32.5	16.5	10.5	5.4	67.5
Secondary	12.9	55.9	27.6	13.0	15.4	44.1
Tertiary	8.7	57.7	32.9	12.1	12.6	42.3

Source: Household Finance and Consumption Survey.

note that the participation in the mortgage market is larger than in the market for other debts in all age classes, except in the two highest (from 65 years old).

Regarding the work status of the reference person, the lowest percentages of indebted households correspond to the situations where the reference person is not part of the active population. Households whose reference person is an employee have the highest participation in the debt market (58 per cent, compared with 47 per cent in the case of the self-employed). About 40 per cent of the households in which the reference person is unemployed have some type of debt. However, in this case, as well as in households where the reference person is retired, the percentage of households with non-mortgage debt and the percentage of households with mortgages are similar. This is in contrast with the cases where the reference person is an employee with a permanent position or is self-employed, for which the proportion of households with mortgages is clearly higher than the proportion of households with other debts.

The participation in the debt market is also likely to be related with the household composition, particularly because it determines household consumption needs. The results of the HFCS indicate that the households with the highest participation in the debt market are those with children and/or with a larger number of members. Households with the lowest participation are those comprising only a single person.

In summary, the lowest percentages of indebted households are found in the lowest income and wealth classes, in households that do not have children and in those in which the reference person is older, is not part of the active population and has a level of education below secondary. The participation in the debt market is the highest in households whose reference person is an employee with a permanent position and is aged between 35 and 44 years. Given the importance of mortgage debt in total household debt, these regularities apply generally to the participation of households in the mortgage market. In the case of non-mortgage debt, the highest percentages of indebted households correspond to those with low wealth, with a larger number of members, those whose reference person is aged under 35 years, is unemployed or is an employee with a temporary contract. The probability of having only non-mortgage debt does not seem to be much correlated neither with the level of education, nor with income, though it seems to be slightly higher in the intermediate classes.

3.2 Regression analysis

The first part of this section includes the estimation results of regressions in which the dependent variable is the probability of households having debt. As compared to univariate analysis, these results are more adequate to identify the socio-economic and demographic characteristics differentiating indebted and non-indebted households. In order to conclude if the relations found are determined by demand and/or supply factors, the second part of this section includes some additional regressions for the credit demand by households and the supply of credit by financial institutions. These results are based on the HFCS questions regarding the existence of loan applications by each household and refusals of these requests by financial institutions.

3.2.1 Regressions for the probability of having debt

Table 2 presents the results for Logit estimates on the probability of having debt. The first column includes the results for the probability of the households having any kind of debt, the second column for the probability of having only mortgage debt and the third column for the probability of having only non-mortgage debt. In order to enhance the comparability of the results, the probability of having the different types of debt is evaluated against the alternative of not having debt. Thus the dependent variables are binary variables taking the value 1 if the household has debt and the value 0 if households do not have any debt. The variables considered include the economic and socio-demographic characteristics analyzed in the previous section.

Table 2 (to be continued)

REGRESSION RESULTS FOR THE PROBABILITY OF HAVING DEBT[a]			
	Any debt	Only mortgages	Only other debt
Income percentile			
Between 20 and 40	0.545***	0.445	0.573**
	(2.61)	(1.47)	(2.08)
Between 40 and 60	1.01***	1.087***	0.834***
	(4.9)	(3.52)	(3.02)
Between 60 and 80	1.222***	1.038***	1.325***
	(5.67)	(3.23)	(4.8)
Between 80 and 90	1.267***	1.25***	1.027***
	(5.28)	(3.91)	(2.71)
More than 90	1.785***	1.785***	1.631***
	(6.84)	(5.05)	(4.43)
Real wealth percentile			
Between 25 and 50	0.807***	6.284***	-0.504**
	(4.55)	(6.08)	(-2.32)
Between 50 and 75	1.76***	7.449***	-0.169
	(10.94)	(7.24)	(-0.83)
Between 75 and 90	1.84***	7.676***	0.066
	(9.29)	(7.19)	(0.27)
More than 90	1.787***	7.848***	-0.509
	(8.26)	(7.45)	(-1.45)
Financial wealth percentile			
Between 25 and 50	-0.375**	-0.529**	-0.245
	(-2.35)	(-2.13)	(-1.2)
Between 50 and 75	-0.376**	-0.468**	-0.362*
	(-2.32)	(-1.96)	(-1.72)
Between 75 and 90	-0.938***	-0.981***	-0.834***
	(-4.64)	(-3.26)	(-2.92)
More than 90	-0.981***	-1.173***	-0.494
	(-4.42)	(-3.79)	(-1.48)
Household size			
Two	0.246	0.047	0.574**
	(1.51)	(0.2)	(2.1)
Three	0.215	-0.277	0.894***
	(1.05)	(-0.99)	(2.74)
Four	0.113	-0.386	0.732**
	(0.47)	(-1.18)	(1.97)
Five or more	0.208	-0.462	1.332***
	(0.7)	(-1.16)	(3.04)
Household type			
Adult(s) and children(s)	0.343**	0.483**	-0.032
	(2.09)	(2.15)	(-0.14)
Age			
35-44	0.115	0.199	-0.019
	(0.57)	(0.71)	(-0.07)
45-54	-0.685***	-0.755***	-0.718**
	(-3.49)	(-2.79)	(-2.43)
55-64	-1.11***	-1.37***	-0.623**
	(-5.28)	(-4.87)	(-2.11)
65-74	-1.845***	-2.236***	-1.126***
	(-6.27)	(-6.12)	(-2.72)
75 and over	-2.809***	-3.183***	-1.958***
	(-8.9)	(-7.05)	(-4.66)

Table 2 (continued)

REGRESSION RESULTS FOR THE PROBABILITY OF HAVING DEB[a]			
	Any debt	Only mortgages	Only other debt
Work status			
Employee with temporary contract	0.072	0.141	0.158
	(0.36)	(0.47)	(0.59)
Self-employed	-0.418**	-0.664***	-0.323
	(-2.43)	(-3.16)	(-1.2)
Unemployed	-0.02	-0.148	0.013
	(-0.1)	(-0.51)	(0.05)
Retired	-0.36*	-0.628***	-0.264
	(-1.82)	(-2.65)	(-0.96)
Other not working	-0.823**	-1.18**	-0.351
	(-2.34)	(-2.1)	(-0.99)
Education			
Secondary	0.053	0.012	0.033
	(0.35)	(0.06)	(0.15)
Tertiary	0.187	-0.003	0.21
	(1.08)	(-0.01)	(0.77)
Constant	-1.483***	-7.052***	-1.99***
	(-5.47)	(-6.48)	(-4.87)
Number of observations	4394	3593	3278

Source: Household Finance and Consumption Survey.

Notes: (a) The results must be interpreted against the omitted categories in the regression which correspond to households with income below the 20th percentile, with real wealth below the 25th percentile, with financial wealth below the 25th percentile, with only one member, no children, whose reference person has less than 35 years, is an employee with a permanent position and has an educational level corresponding to basic education. The coefficients presented are the regression coefficients whose magnitude cannot be interpreted as the marginal effect of explanatory variable on the variable to be explained. In the logit models marginal effects have the same sign and significance of the estimated coefficients, but vary with the value of the regressors. The symbols *, ** and *** indicate that the coefficients are statistically significant at 10, 5 and 1 percent confidence level, respectively.

The results confirm that the probability of having debt is higher for households with the highest income levels. However, the probability of having mortgages is not significantly different in the two first classes of income. This may reflect the fact that in very low income levels, an increase in income is not enough for the households to have the financial capacity to get a mortgage.

The coefficient associated with the education level is not significant when the regression includes income, although it becomes positive and significant when income is omitted. This seems to confirm a high correlation between current and future income, which may contribute to explain the positive effect of income on the probability of having debt.

As expected, households in the highest real wealth classes are more likely to have a mortgage. Since most mortgage loans are intended for the purchase of property used as the collateral, the fact that the coefficients on real wealth are increasing with the classes of wealth suggests that the probability of getting a mortgage should increase with the value of property purchased. Additionally, under supply side considerations, a higher level of real wealth is expected to ease access to credit, given that real wealth may be used as collateral. By contrast, the value of financial assets is negatively correlated with the probability of having mortgage loans, probably reflecting the fact that households with a higher amount of liquid assets have less need to resort to credit. This effect seems to be also present in the likelihood of having other debts, for which real wealth does not seem to play an important role.

Regarding the family type, the results suggest that households with children are more likely to have debt and, in particular, to have mortgage debt. Controlling for the existence of children in the household, the number of family members do not seems be related to the probability of households having mortgages. Rather the probability of having other debts appears to be greater for households with more members.

Households whose reference person is older are less likely to have debt, although there are no significant differences between the first two age classes. The higher probability of having mortgages in the youngest age groups conforms to the fact that it is in these classes that households generally acquire the first residence. The probability of having only another type of debt is also lower for households in the oldest age classes than in the two youngest classes but in this case the effect of age appears to be less pronounced. The fact that mortgages have higher maturities as compared to other loans is likely to contribute to the greater importance of age for the probability of having mortgage loans.

With regard to work status, the results indicate that households whose reference person is self-employed or inactive have a lower probability of having debt and, in particular, of having mortgages. In the case of the self-employed, this may reflect the fact that these workers have in general more volatile earnings than employees with permanent contracts (the omitted category). The work status appears not to have a significant effect on the probability of households having other debts.

In general, the regression results suggest that the probability of having debt increases with the income level but declines with the level of financial wealth. Additionally, households with children have a higher probability of having mortgages and those with a greater number of members have a higher probability of having other debts. Age has a negative effect on the participation in the debt market, which seems more pronounced in the case of mortgages, probably reflecting the fact that these loans typically have longer maturities. Regarding the work status, there is some evidence that households whose reference person is self-employed or inactive have a lower probability of having mortgages, but not of having other debts.

3.2.2 Regressions for the "demand" and "supply" of credit

This section seeks to assess whether the characteristics identified as relevant to the participation of households in the debt market are mainly due to credit "supply" or credit "demand" factors.

With the HFCS variables it is possible to identify the households that in the three years preceding the survey have applied for credit and those whose applications have been turned down, only partially satisfied or satisfied in the amount desired. Thus, in order to analyze the effects from the demand and the supply side on debt market participation, two variables were built, one relating to applications for loans and another related to credit refusals. The variable on loan applications takes the value 1 for households that have applied for a loan and 0 in other cases. The refusals variable takes the value 1 for households with loan requests turned down or only partially satisfied and 0 for households in which the loan requests were satisfied in the amount desired.

Table 3 presents a characterization of households who requested credit and of those to whom these requests were refused or only partially satisfied. In total about 20 per cent of households requested loans in the three years prior to the completion of HFCS. In relative terms, compared to its weight in the population, the highest incidence of loan applications occurs in households with higher income, a greater number of members or in which the reference person is younger or is an employee. In the case of wealth, the highest percentage of loan applications occurs between the 75th and the 90th percentiles of real wealth and between the 25th and the 50th percentiles of financial wealth. Among the households who have requested credit, about 20 per cent had their applications refused or only partially satisfied. The higher incidence of these situations occurred in households with lower income, lower wealth or in cases where the reference person is unemployed, has a temporary employment contract or belongs to the two youngest or oldest age classes.

In order to identify more precisely which features are relevant to the demand for credit by households and to the provision of credit by financial institutions, the regressions results for these variables are presented in Table 4. Two alternative strategies of estimation were applied. In a first approach, models for credit applications and refusals were estimated using the entire sample. In this case the regressions include an additional explanatory variable to control for the effect of households that were already indebted at the

Table 3

CREDIT APPLICATIONS/REFUSALS IN THE THREE YEARS PRECEDING THE HFCS

	Applications[a]		Refusals[b]	
	Yes	No	Yes	No
Total	**20.1**	**79.9**	**19.6**	**80.4**
Income percentile				
Less than 20	7.2	92.8	29.2	70.8
Between 20 and 40	14.8	85.2	30.8	69.2
Between 40 and 60	24.4	75.6	28.6	71.4
Between 60 and 80	25.5	74.5	21.0	79.0
Between 80 and 90	27.2	72.8	6.5	93.5
More than 90	30.0	70.0	2.6	97.4
Real wealth percentile				
Less than 25	17.5	82.5	36.4	63.6
Between 25 and 50	13.2	86.8	20.3	79.7
Between 50 and 75	22.7	77.3	17.2	82.8
Between 75 and 90	27.6	72.4	14.2	85.8
More than 90	26.4	73.6	5.8	94.2
Financial wealth percentile				
Less than 25	16.9	83.1	27.4	72.6
Between 25 and 50	24.5	75.5	23.2	76.8
Between 50 and 75	21.0	79.0	15.0	85.0
Between 75 and 90	17.2	82.8	15.7	84.3
More than 90	19.1	80.9	12.0	88.0
Household size				
One	8.1	91.9	20.1	79.9
Two	14.1	85.9	14.5	85.5
Three	23.4	76.6	22.4	77.6
Four	30.6	69.4	20.6	79.4
Five or more	36.3	63.7	19.7	80.3
Household type				
One adult	8.1	91.9	20.1	79.9
Several adults	15.8	84.2	14.9	85.1
Adult(s) and children(s)	29.9	70.1	22.4	77.6
Age				
Under 35	41.6	58.4	25.7	74.3
35-44	31.1	68.9	20.4	79.6
45-54	22.7	77.3	16.6	83.4
55-64	18.8	81.2	15.5	84.5
65-74	7.9	92.1	20.2	79.8
75 and over	2.7	97.3	21.1	78.9
Work status				
Employee	29.8	70.2	17.1	82.9
Permanent position	29.2	70.8	14.5	85.5
Temporary contract	33.9	66.1	34.8	65.2
Self-employed	26.9	73.1	17.4	82.6
Unemployed	25.1	74.9	42.1	57.9
Retired	7.1	92.9	20.0	80.0
Other not working	8.6	91.4	0.0	100.0
Education				
Below secondary	17.5	82.5	21.8	78.2
Secondary	29.0	71.0	19.5	80.5
Tertiary	30.8	69.2	9.4	90.6

Source: Household Finance and Consumption Survey.

Notes: (a) Number of households who have applied or have not applied for credit as a percentage of the total number of households in each class. **(b)** Number of households whose loan applications were turned down or satisfied, as a percentage of the number of households that applied for credit in each class.

Table 4 (to be continued)

REGRESSION RESULTS FOR CREDIT "DEMAND" AND CREDIT "SUPPLY"[a]				
	Not excluding households with mortgages prior to 2007		Excluding households with mortgages prior to 2007	
	Credit applications	Credit refusals	Credit applications	Credit refusals
Income percentile				
Between 20 and 40	0.398*	0.243	0.5**	0.411
	(1.82)	(0.54)	(2.16)	(0.8)
Between 40 and 60	0.717***	0.151	0.715***	0.582
	(3.31)	(0.33)	(2.91)	(1.11)
Between 60 and 80	0.738***	-0.211	0.82***	-0.178
	(3.32)	(-0.44)	(3.24)	(-0.32)
Between 80 and 90	0.757***	-1.667***	0.766***	-1.463**
	(3.11)	(-2.65)	(2.59)	(-2.01)
Maior que 90	0.92***	-2.92***	1.151***	-3.216***
	(3.18)	(-2.68)	(3.49)	(-2.63)
Real wealth percentile				
Between 25 and 50	-0.031	-0.98***	-0.011	-0.94**
	(-0.17)	(-2.7)	(-0.06)	(-2.36)
Between 50 and 75	0.446***	-1.166***	0.568***	-1.398***
	(2.59)	(-3.46)	(3.04)	(-3.46)
Between 75 and 90	0.616***	-1.012**	0.727***	-1.117**
	(3.11)	(-2.16)	(3.25)	(-2.08)
More than 90	0.711***	-1.976***	0.716**	-1.323
	(2.85)	(-2.59)	(2.51)	(-1.53)
Financial wealth percentile				
Between 25 and 50	0.062	0.145	-0.004	-0.196
	(0.38)	(0.37)	(-0.02)	(-0.46)
Between 50 and 75	-0.099	0.058	-0.135	0.428
	(-0.59)	(0.14)	(-0.66)	(0.9)
Between 75 and 90	-0.47**	0.338	-0.485*	0.586
	(-2.15)	(0.64)	(-1.79)	(0.91)
More than 90	-0.608**	1.022*	-0.791**	1.249
	(-2.46)	(1.66)	(-2.52)	(1.55)
Household size				
Two	0.352*	-0.076	0.349*	-0.081
	(1.94)	(-0.17)	(1.72)	(-0.17)
Three	0.579**	0.777	0.597**	0.612
	(2.51)	(1.45)	(2.26)	(1.02)
Four	0.802***	1.13**	0.777**	0.933
	(3.09)	(1.98)	(2.56)	(1.44)
Five or more	1.114***	1.312*	1.289***	1.473*
	(3.6)	(1.88)	(3.61)	(1.9)
Household type				
Adult(s) and children(s)	-0.097	-0.184	-0.058	-0.084
	(-0.54)	(-0.47)	(-0.28)	(-0.18)
Age				
35-44	-0.612***	-0.337	-0.65***	0.162
	(-3.16)	(-0.84)	(-2.84)	(0.36)
45-54	-1.002***	-0.647*	-1.223***	-0.522
	(-5.24)	(-1.7)	(-5.47)	(-1.16)
55-64	-1.025***	-0.209	-1.229***	0.058
	(-4.9)	(-0.47)	(-5.16)	(0.12)
65-74	-1.605***	-0.117	-1.701***	0.145
	(-4.99)	(-0.18)	(-4.62)	(0.2)
75 and over	-2.514***	0.242	-2.539***	0.542
	(-7.21)	(0.27)	(-6.52)	(0.58)

Table 4 (continued)

REGRESSION RESULTS FOR CREDIT "DEMAND" AND CREDIT "SUPPLY"[a]				
	Not excluding households with mortgages prior to 2007		Excluding households with mortgages prior to 2007	
	Credit applications	Credit refusals	Credit applications	Credit refusals
Work status				
Employee with temporary contract	0.116	0.745*	0.044	1.199***
	(0.55)	(1.85)	(0.19)	(2.82)
Self-employed	-0.115	0.3	-0.411*	0.038
	(-0.64)	(0.71)	(-1.84)	(0.07)
Unemployed	0.014	1.046***	-0.033	1.482***
	(0.07)	(2.63)	(-0.14)	(3.29)
Retired	-0.43*	0.258	-0.639**	0.365
	(-1.89)	(0.5)	(-2.37)	(0.65)
Other not working	-0.867*	(b)	-0.985**	(b)
	(-1.92)		(-2.03)	
Education				
Secondary	0.1	0.072	-0.087	0.354
	(0.64)	(0.21)	(-0.46)	(0.89)
Tertiary	0.334*	0.159	0.347	0.404
	(1.83)	(0.3)	(1.57)	(0.66)
Holding debt before 2007	-0.482***	0.528	-	-
	(-3.49)	(1.57)	-	-
Constant	-1.466***	-1.164**	-1.35***	-1.721***
	(-5.49)	(-2.1)	(-4.61)	(-2.73)
Number of observations	4325	719	3463	508

Source: Household Finance and Consumption Survey.

Notes: (a) The results must be interpreted against the omitted categories in the regression which correspond to households with income below the 20th percentile, with real wealth below the 25th percentile, with financial wealth below the 25th percentile, with only one member, no children, who have no mortgage loans contracted before 2007, whose reference person has less than 35 years, is an employee with a permanent position and has an educational level corresponding to basic education. The coefficients presented are the regression coefficients whose magnitude cannot be interpreted as the marginal effect of explanatory variable on the variable to be explained. In the logit models marginal effects have the same sign and significance of the estimated coefficients, but vary with the value of the regressors. The symbols *, ** and *** indicate that the coefficients are statistically significant at 10, 5 and 1 per cent confidence level, respectively. **(b)** The dependent variable never takes the value 1 for the households of this class, so that, for the purpose of estimating the model these households are combined with those of the previous class.

time of the loan application. The variable considered is a dummy that takes the value 1 for households having mortgage debt contracted before 2007 and 0 in the opposite case[13]. In a second approach, regressions were conducted for a subsample that includes only households who had no mortgage debt in 2006. This approach is more consistent with the analysis in the previous section that identified the characteristics that distinguish households who are indebted from those who do not have any debt. The findings obtained with the two approaches are similar.

The positive relation between the probability of having debt and household income appears to result, as expected, both from the supply and the demand for credit. On one hand, households in the two highest income classes are less likely to have their loan applications refused than households with lower income and on the other hand, households in the lowest income percentile are less likely to apply for credit.

As expected, households with the highest levels of real wealth have a higher probability of having applied for credit and that these requests have been satisfied. In the case of financial wealth, the fact that households with the highest allocations are less likely to have debt seems to reflect primarily an effect on the demand side, confirming the argument that households with higher amounts of liquid assets are less likely to resort to credit.

13 The HFCS does not include information that allows identifying accurately households who had no debt in 2006. However, in the case of mortgages it is possible to identify households with loans granted before 2007 if they were alive at the time of interview. For non-mortgage debt there is no information on the year the loans were taken.

Larger households are more likely to apply for credit but have also a higher probability that their applications are turned down. These opposing effects might explain why in the regression on the probability of having debt, the number of household members do not have a significant effect.

In the case of age, the negative relation found for the probability of having debt seems to be determined by the demand for credit. In fact, households with younger members have greater need to borrow, particularly to finance their investment decisions. In the regressions where the variable to be explained is the existence of restrictions on the access to credit, age classes are generally not significant. This suggests that, when controlling for other characteristics, age does not matter for the decision of financial institutions to grant credit.

With regard to work status, the results suggest that the lower probability of having debt found for households whose reference person is self-employed or inactive is determined by a lower demand for credit. Indeed, these situations seem not to significantly affect the decision of the lender. Among the households who requested loans, applications are more likely to be refused when the reference person is an employee with a temporary contract or is unemployed.

In summary, the larger participation in credit market of households with higher income and higher real wealth is likely to reflect both demand and supply side factors. By contrast, the lower participation of households with a high level of financial wealth, of those whose reference person is older, self-employed or inactive seems to reflect mainly the decision of these households not to participate in the debt market. Those households whose reference person is unemployed or is employed with a temporary contract are more likely to have their loan applications turned down by financial institutions.

4. Households indebtedness

In the previous section we analyzed the decision of households to participate in the debt market. When households decide to borrow they have also to take a decision regarding the extent of indebtedness. In this section we analyze this decision and its consequences in terms of vulnerability of the financial situation of households. The first part of the section presents a brief description of the median levels of household debt. The decisions on the amount of debt are expected to take into account the ability to pay debts. Thus, the second part of the section examines the degree of household indebtedness and vulnerability based on three measures of the debt burden: the debt service to income ratio, the debt to income ratio and the debt to wealth ratio.

4.1 Indebtedness levels

The set of charts 1 shows the median debt by households' characteristics and type of debt together with the percentage of households holding debt.[14,15]

Higher values of debt are found in households with higher real wealth, higher income and with a younger reference person. This behaviour stems from mortgages, given the higher amounts of this type of credit.[16]

There are some differences in the distribution of mortgage debt and non-mortgage debt according to the characteristics of the households. The median value of mortgage debt clearly decreases with the age of the reference person, which is due to the fact that these debts are contracted at relatively low age,

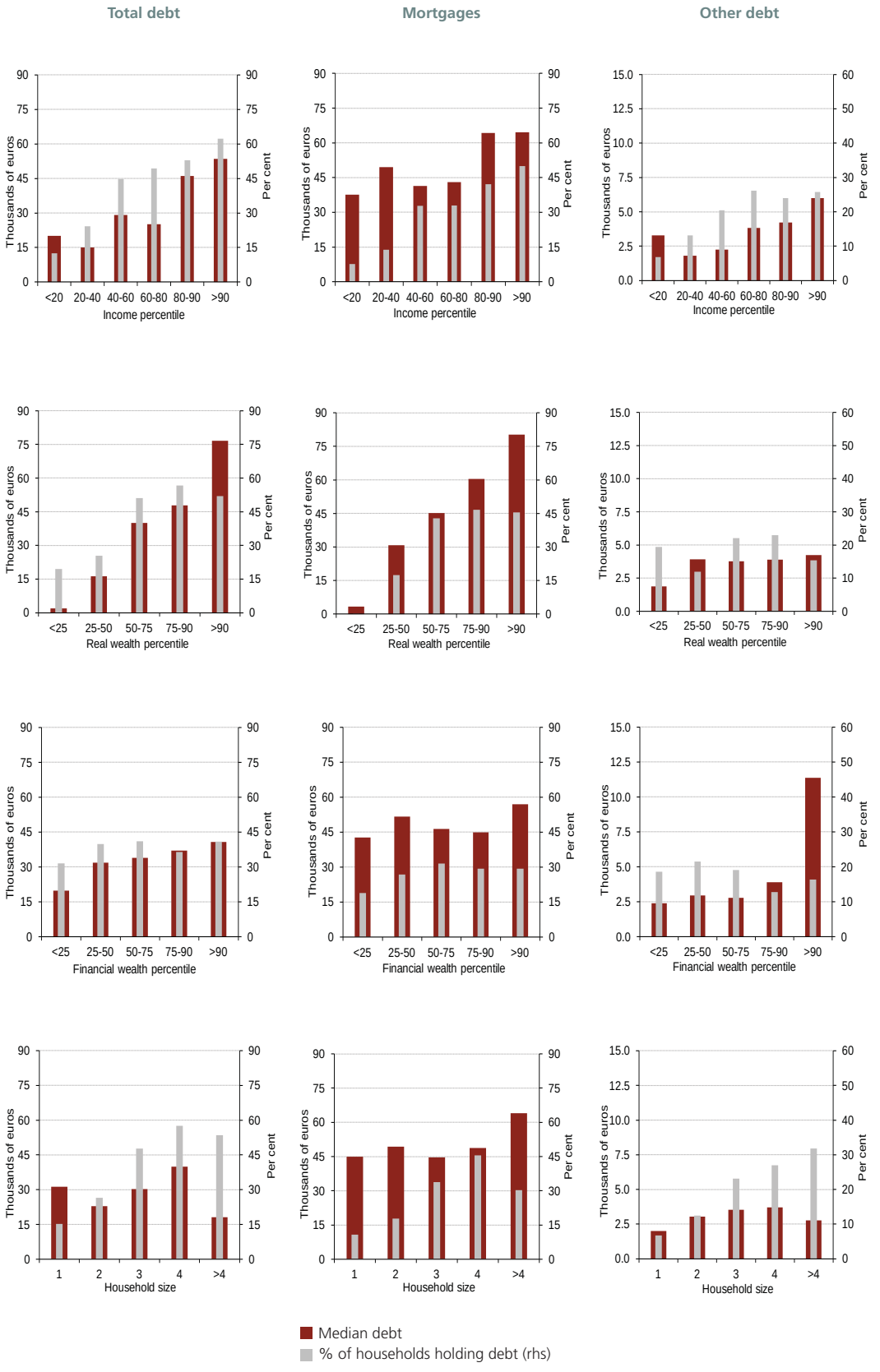
14 The percentage of households with mortgages (other debt) includes all families that have this type of debt, not only those who have only mortgages (other debt), as was the case in Table 1.

15 Median values are a better indicator than means for the typical borrower since they are less dependent on the extreme values of the distribution.

16 The households in the highest age class or in the lowest real wealth percentile are the only ones for which the median value of mortgage debt is not much higher than the median value of non-mortgage debt.

Chart 1 (to be continued)

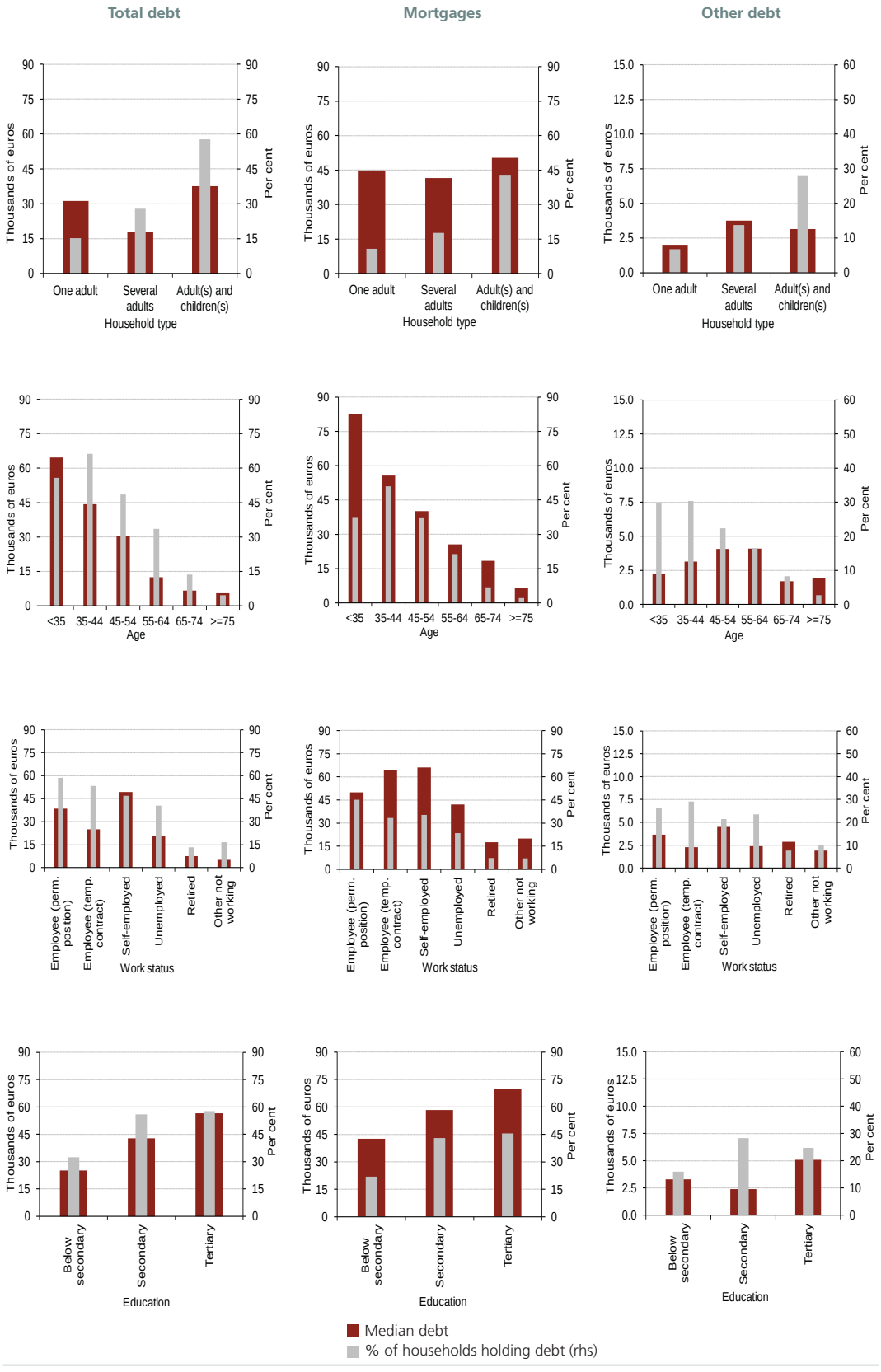
MEDIAN DEBT VALUES AND DEBT MARKET PARTICIPATION



Source: Household Finance and Consumption Survey.

Chart 1 (continued)

MEDIAN DEBT VALUES AND DEBT MARKET PARTICIPATION



Souce: Household Finance and Consumption Survey.

being repaid over the life. In the case of non-mortgage debt the median value increases until the age of 45-55 years old, being similar in the next age group and clearly lower in the two older age classes. The value of mortgage debt is, as expected, strongly correlated with the amount of real wealth of households. In turn, the distribution of non-mortgage debt by classes of real wealth is relatively uniform. The distribution of mortgage debt by class of financial wealth do not presents a clear pattern. In the case of non-mortgage debt, households in the highest financial wealth percentile have a median value of debt much higher than the remaining households. In both types of debt the median values show an increasing trend with income percentiles.

Overall, the median amounts of debt are higher in classes where there is a higher percentage of indebted households. This suggests that the reasons associated with the decision to participate in the debt market and decisions about the amount of debt are not very different. There are however some cases where a different pattern emerges. In the mortgage debt, households in the two lowest income classes have a limited participation in the debt market but median levels of debt that are close to the ones of the intermediate classes of income. When total debt is considered, households with the lowest income have, however, median debt levels lower than higher income households. As regards the number of family members, the smallest households have a low participation in the debt market but median debt levels, in particular in mortgages, relatively close to the ones of the larger households. In the case of age, households whose reference persons are under 35 years old have a median value of mortgage debt much higher than that of households in the following age class, but have a more reduced participation in the mortgage market. This behaviour is attenuated when considering the total debt. In fact, households whose reference persons are younger have a high participation in non-mortgage credit market but relatively limited amounts of debt. Finally, it should be noted that households in the highest level of financial wealth have a high median amount of other debts but a similar participation in this market as compared to other households.

4.2 Indebtedness ratios

It is expected that decisions on the debt amount are taken according to the households' ability to repay their debts. A common measure of debt burden corresponds to the ratio between the amount of debt and households income. Considering, as usual, the annual income, this measure gives the number of years it would take to pay off the debt if the household used all of its income for this purpose. A second indicator of indebtedness, frequently used in the analysis, is the ratio of debt on the gross wealth. This indicator, by analogy with the debt to capital ratio used for corporations, measures the solvency of households within a relatively long period. Indeed, the ratio debt to wealth takes into account the fact that households can dispose of their accumulated assets to pay their debts. In the short term, households may dispose only from the most liquid assets and in the medium/long term they may also dispose from their less liquid assets. A more intuitive measure of the ability of households to repay their debts is given by the ratio between the value of debt service due in a given period and households income in the same period. This indicator measures the ability of households to repay their debts, mainly in the short term. If the debt service represents a very high proportion of the household income it is more likely that households default on their commitments (with the payment of debts or with other accounts) or be forced to retract their level of consumption. The debt service ratio has the advantage of not only take into account variables related to the amount owed and household income, but also reflecting the level of interest rates.

In assessing the degree of indebtedness it is important to give special attention to the most vulnerable, i.e., to households that have more difficulty in meeting their debt responsibilities both in the short-term as well as in the medium/long term. For analysis purposes, it is common to consider that households are more vulnerable when debt ratios exceed certain threshold levels. In this paper, the threshold levels used were 40 per cent for the ratio of debt service to income, three times for the ratio of debt to income and

75 per cent for the ratio between debt and wealth.[17] The first part of this section includes an univariate analysis of the median values of the three debt ratios and of the percentage of households that exceed the critical values of these ratios, distributed according to various characteristics of households. The second part of the section includes the results of some regressions intended to identify the most relevant households characteristics associated with different degrees of indebtedness and with the different probabilities of households being in vulnerable situation.

4.2.1 Univariate analysis

The set of charts 2 includes, for the various characteristics of households, the median values of the three debt ratios. The median values correspond to typical values of the distribution, which are not the most suitable indicators to assess the importance of risky situations. Thus these charts include also the percentage of households in which the ratios exceed the critical levels. In this analysis only households with debt were considered.

For all of indebted households, the median value of the debt service to income ratio is 16 per cent, of the debt to income ratio is 1.3 and of the debt to wealth ratio is 26 per cent. These median values are below the threshold levels. It is also important to quantify the incidence of situations in which those limits are exceeded. About 13 per cent of the indebted households have ratios of debt service to income above 40 per cent, 28 per cent have debt ratios to income higher than 3 and 15 per cent have an outstanding debt greater than 75 per cent of the value of their assets. In total the critical values for the three ratios are simultaneously exceeded for 2.5 per cent of households.

The proportion of households with debt service to income ratio and debt to wealth ratio at worrying levels are thus significantly lower than the proportion of households with very high debt to income ratios. This is largely due to the very high proportion of mortgage loans in the total debt of Portuguese households. Indeed, mortgage debt service level is lowered by the fact that in Portugal mortgage loans typically have very long maturities. According to data from HFCS, the median of the initial maturity of the loans contracted in 2010 stood at 30 years.[18] Another factor that contributes favourably to the level of debt service to income ratio is that most mortgage loans have variable interest rates indexed to money market interest rates, which have remained at relatively low levels. Additionally, mortgage loans in Portugal typically have fixed interest rate spreads over the life of the contracts, which stayed at very low levels for debt taken in the years prior to the start of sovereign debt crisis in the euro area. Finally, the fact that it did not occurred a bubble in the Portuguese housing market, or the subsequent sharp fall in property prices which would have caused a reduction in the value of real wealth, contributes to the relatively low level of the debt to wealth ratio.

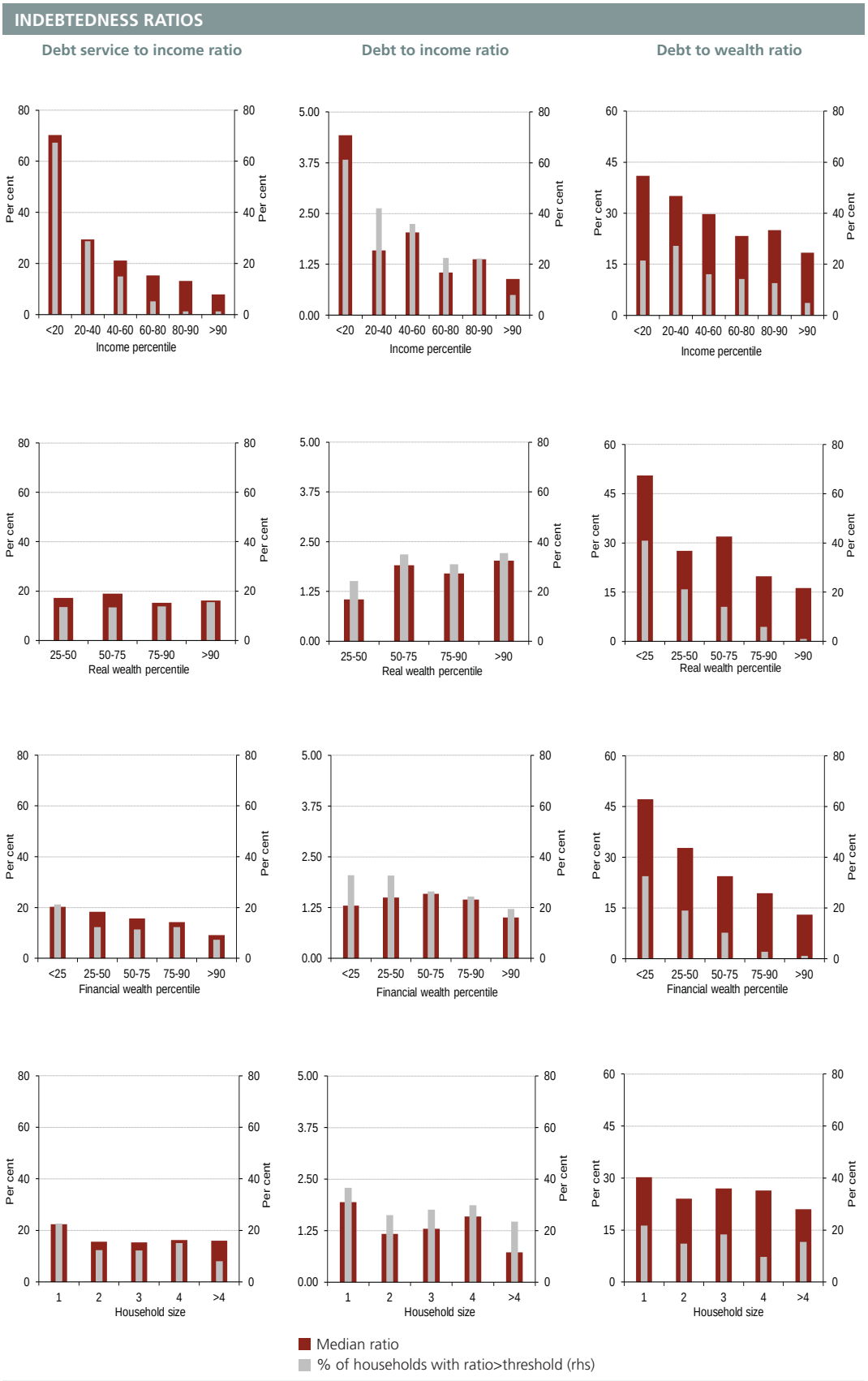
The debt service ratio declines with households' income level, being particularly high in the case of the households at the lowest income percentile, where the critical value is clearly surpassed. In fact, more than 60 per cent of indebted households in the lowest income class have debt service to income ratios above 40 per cent. In what concerns other household characteristics, the most vulnerable situations, according to this ratio, are more evenly distributed and the median ratios lie in maximum at about 20 per cent that is around half the threshold level.

The median value of the debt to income ratio clearly exceeds the critical level for the households in the lowest income percentile and is close to this value for the households in the youngest age class. This means that at least half of these households have debt to income ratios around or above 3. In fact, about

17 These threshold levels, which are commonly used in analyses for other countries (see, for example, Bank of Spain (2011) and Bricker et al (2011)), are related to the criteria used by banks in lending decisions.

18 The analysis of loan maturities by periods when loans were granted shows some increase in maturities in the period 2003-06 and some stability thereafter.

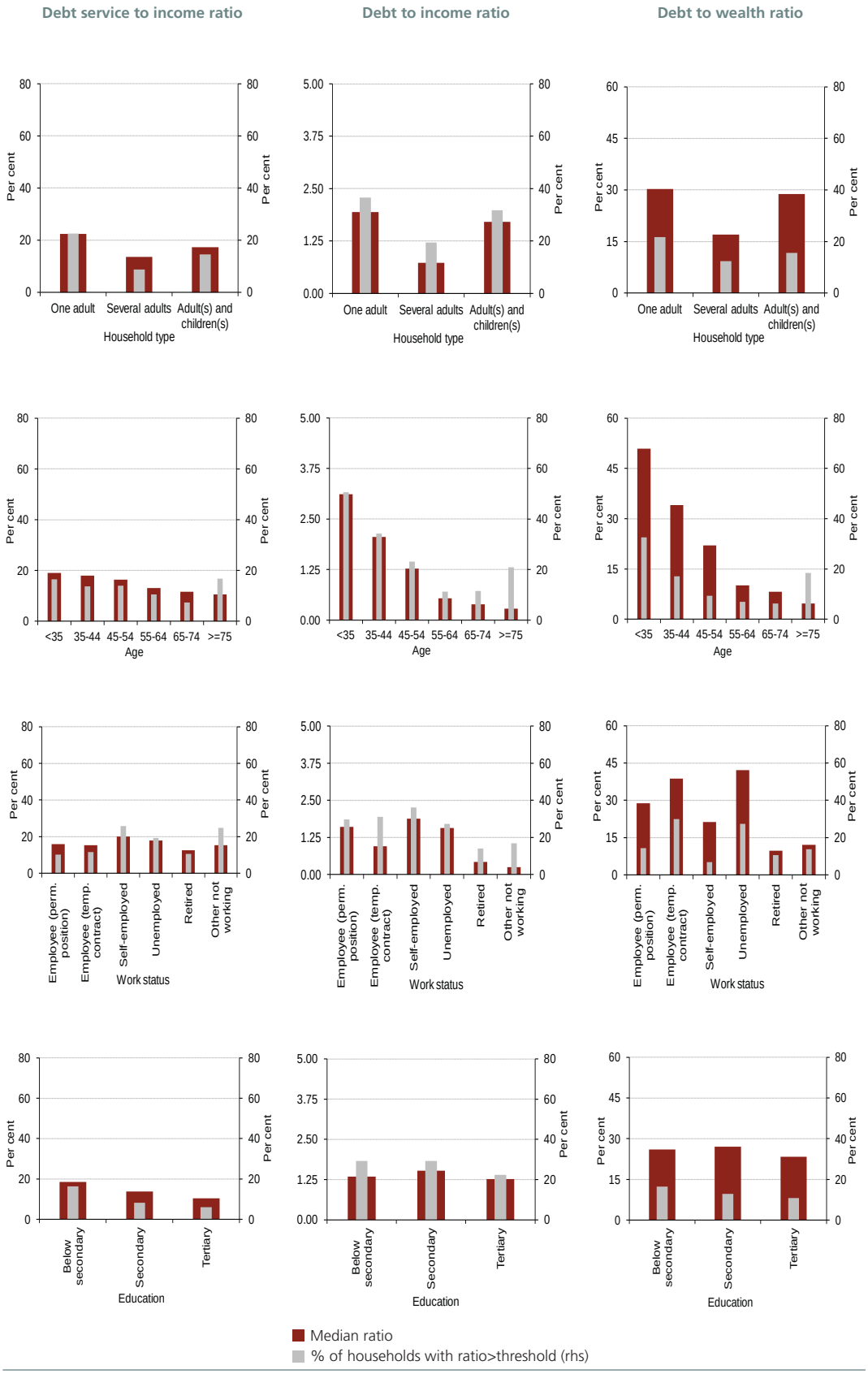
Chart 2 (to be continued)



Source: Household Finance and Consumption Survey.

Chart 2 (continued)

INDEBTEDNESS RATIOS



Source: Household Finance and Consumption Survey.

60 per cent of indebted households in the lowest income percentile and 50 per cent of those whose reference person has less than 35 years have debt to income ratios above 3. The negative relationship between the age of the reference person and the level of the debt to income ratio is consistent with the fact that debt, especially mortgage, is contracted at relatively young ages, and paid back over the life until around retirement age. The distributions of debt to income ratio for the other characteristics of households are more homogeneous than for income or age.

Finally, the highest median values of the debt to wealth ratio correspond, as expected, to households with the lowest levels of real or financial wealth, or to households where the reference person has less than 35 years old. The median ratios in these classes are nevertheless still below the critical value. For the groups of households with the lowest levels of financial wealth or income and in which the reference person has less than 35 years old, is unemployed or is an employee with a temporary contract there is a higher incidence of debt to wealth ratios greater than 75 per cent, than for the remaining households groups.

In summary, the most vulnerable situations occur in the lowest income class. In this class the critical values of the ratios debt service to income and debt to income are exceeded by more than 60 per cent of indebted households. Nevertheless, in the case of debt to wealth ratio the proportion of these households that exceed the critical value is only about 20 per cent. In the youngest age group, whose debts have been taken recently, about 50 per cent of the indebted households exceed the critical value of the ratio of debt to income. However, this situation is mitigated by the fact that the levels of the ratios of debt service to income and debt to wealth are relatively moderate.

4.2.2 Regression analysis

Table 5 presents the results of linear regressions for the ratios of debt service to income, debt to income and debt to wealth as well as Logit regressions for the probability that these ratios exceed the threshold levels. The last column of the table consists of the results of the Logit regression for the probability that the three ratios exceed simultaneously the threshold levels. In all cases, the analysis is made only for the indebted households. The explanatory variables consist in the characteristics of households used in the previous analysis. The values of debt and of debt service may differ significantly depending on the type of debt. This aspect is controlled in the regressions by including a dummy variable indicating if households have simultaneously non-mortgage debt and mortgage debt and a dummy variable indicating if households only have non-mortgage debt.

The results for the individual debt burden ratios confirm that income and age characteristics are decisive for the degree of indebtedness and vulnerability of households. Households in the lowest income class have higher debt to income ratios and debt service to income ratios and are more likely to find themselves in situations of great vulnerability. Income is not significant however for the debt to wealth ratio. With regard to age, households whose reference person is under 35 years old have higher indebtedness ratios than households with older reference persons. This effect is less pronounced in the case of the ratio of the debt service than in the other two ratios. In fact the probability that the ratio of debt service exceed 40 per cent is not related to age. For this situation contributes, on one hand, the fact that in households with younger reference persons loans have been contracted recently[19], and thus still have very high outstanding amounts, and, on the other hand, the fact that in Portugal most mortgages have constant instalments.

Households with higher real wealth levels generally have higher ratios of debt service to income and of debt to income. This situation is likely to result from the fact that most households use credit to acquire properties and that loans for higher amounts are generally secured by real estate. In the case of the debt to wealth ratio there is, as expected, a negative effect associated with the real and financial wealth.

19 The age effect became not significant in the regression for the probability that the debt ratio to wealth is higher than 75 per cent, when it is only used data for households that did not have mortgages until 2006.

Table 5 (to be continued)

REGRESSION RESULTS FOR THE INDEBTEDNESS RATIOS[a]

	Debt service to income		Debt to income		Debt to wealth		Prob (all ratios> thresholds)
	Ratio	Prob (Ratio>40)	Ratio	Prob (Ratio >3)	Ratio	Prob (Ratio >75)	
Type of debt							
Mortages and other debt	0.384***	1.057***	0.371***	0.759***	0.402***	0.934***	2.138***
	(8.32)	(3.86)	(5.38)	(3.56)	(5.85)	(3.64)	(3.56)
Only other debt	-0.315***	-1.98***	-2.069***	-3.264***	-1.947***	-2.527***	-2.919***
	(-4.54)	(-3.29)	(-14.81)	(-5.86)	(-13.84)	(-4.28)	(-2.97)
Income percentile							
Between 20 and 40	-0.883***	-2.255***	-0.814***	1.55***	-0.24	0.403	-0.536
	(-5.73)	(-5.15)	(-4.12)	(-3.19)	(-1.05)	(0.88)	(-0.79)
Between 40 and 60	-1.24***	-3.661***	-1.206***	2.929***	-0.251	0.08	-1.91***
	(-9.68)	(-9.3)	(-6.93)	(-6.48)	(-1.17)	(0.2)	(-2.64)
Between 60 and 80	-1.482***	-4.945***	-1.463***	3.608***	-0.229	0.342	-3.007***
	(-12.12)	(-11.69)	(-8.46)	(-7.73)	(-1.08)	(0.83)	(-3.25)
Between 80 and 90	-1.73***	-7.141***	-1.678***	-4.371***	0.044	0.763	-5.539***
	(-13.36)	(-7.94)	(-9.02)	(-8.22)	(0.2)	(1.45)	(-3.67)
More than 90	-2.203***	-7.377***	-2.304***	-5.955***	-0.044	0.563	(b)
	(-15)	(-7.44)	(-11.18)	(-9.48)	(-0.18)	(0.89)	
Real wealth percentile							
Between 25 and 50	0.187	-0.841	0.552***	0.727	-2.249***	-2.858***	-2.288*
	(1.53)	(-1.03)	(2.72)	(0.8)	(-10.41)	(-4.55)	(-1.87)
Between 50 and 75	0.243**	-0.493	0.872***	1.516*	-2.444***	-3.802***	-2.476**
	(2.05)	(-0.62)	(4.24)	(1.68)	(-11.47)	(-5.89)	(-2.13)
Between 75 and 90	0.377***	0.327	0.994***	2.117**	-2.773***	-4.789***	-2.585**
	(2.81)	(0.37)	(4.28)	(2.26)	(-11.84)	(-6.46)	(-1.97)
More than 90	0.574***	1.42	1.265***	3.274***	-3.125***	(b)	(b)
	(3.9)	(1.45)	(4.93)	(3.33)	(-12.29)		
Financial wealth percentile							
Between 25 and 50	-0.002	-0.524	-0.001	0.183	-0.347***	-0.703***	-0.377
	(-0.02)	(-1.14)	(-0.01)	(-0.57)	(-2.87)	(-2.65)	(-0.65)
Between 50 and 75	-0.03	-0.372	-0.021	0.612*	-0.542***	-1.325***	-0.925
	(-0.36)	(-0.82)	(-0.18)	(-1.85)	(-4.42)	(-3.92)	(-0.93)
Between 75 and 90	-0.002	0.204	-0.052	0.526	-0.756***	-3.357***	-0.721
	(-0.02)	(0.42)	(-0.37)	(-1.56)	(-4.52)	(-3.99)	(-0.49)
More than 90	-0.154	-0.314	0.065	0.219	-0.828***	(b)	(b)
	(-1.24)	(-0.36)	(0.36)	(-0.42)	(-3.93)		
Household size							
Two	0.021	-0.068	0.007	0.106	-0.192	-0.216	-0.29
	(0.22)	(-0.14)	(0.05)	(0.31)	(-1.25)	(-0.54)	(-0.34)
Three	-0.009	-0.204	0.033	0.196	-0.177	0.061	-0.458
	(-0.08)	(-0.33)	(0.19)	(0.43)	(-0.98)	(0.13)	(-0.41)
Four	-0.019	-0.066	-0.114	0.094	-0.269	-0.622	-0.976
	(-0.14)	(-0.1)	(-0.62)	(-0.2)	(-1.45)	(-1.08)	(-0.93)
Five or more	-0.034	-0.203	-0.111	0.134	-0.241	-0.161	(b)
	(-0.24)	(-0.28)	(-0.5)	(0.23)	(-1.15)	(-0.25)	
Household type							
Adult(s) and children(s)	-0.028	0.322	-0.039	0.06	-0.082	-0.338	1.245
	(-0.35)	(0.75)	(-0.3)	(-0.16)	(-0.63)	(-0.95)	(1.39)

Table 5 (continued)

REGRESSION RESULTS FOR THE INDEBTEDNESS RATIOS[a]	Debt service to income		Debt to income		Debt to wealth		Prob (all ratios> thresholds)
	Ratio	Prob (Ratio>40)	Ratio	Prob (Ratio >3)	Ratio	Prob (Ratio >75)	
Age							
35-44	-0.147*	-0.31	-0.223*	1.208***	-0.124	-0.705**	-0.81
	(-1.73)	(-0.64)	(-1.77)	(-3.97)	(-0.98)	(-2.2)	(-1.55)
45-54	-0.138*	-0.259	-0.576***	2.014***	-0.444***	-1.51***	-0.563
	(-1.65)	(-0.54)	(-4.28)	(-5.75)	(-3.19)	(-4.32)	(-0.88)
55-64	-0.317***	-0.284	-1.054***	2.988***	-0.961***	-2.249***	-1.604
	(-3.47)	(-0.48)	(-5.85)	(-6.5)	(-5.21)	(-4.47)	(-1.26)
65-74	-0.457***	-1.097	-1.11***	2.923***	-1.061***	-2.748***	-1.23
	(-3.28)	(-1.29)	(-4.32)	(-3.81)	(-4.04)	(-3.93)	(-0.82)
75 and over	-0.317	0.122	-1.15***	2.189*	-1.056***	-0.916	-0.222
	(-1.62)	(0.11)	(-3.05)	(-1.91)	(-2.77)	(-1.22)	(-0.14)
Work status							
Employee with temporary contract	-0.024	-0.372	-0.146	-0.05	0.053	0.414	0.513
	(-0.3)	(-0.8)	(-1.13)	(-0.15)	(0.42)	(1.19)	(0.92)
Self-employed	0.197***	0.804*	0.154	0.039	0.02	-0.184	-1.295
	(2.67)	(1.84)	(1.13)	(0.12)	(0.15)	(-0.37)	(-0.98)
Unemployed	-0.021	-0.048	0.033	0.052	0.214	0.292	1.104*
	(-0.21)	(-0.12)	(0.21)	(-0.12)	(1.32)	(0.76)	(1.94)
Retired	-0.015	-0.121	-0.089	0.138	-0.115	0.518	0.073
	(-0.15)	(-0.21)	(-0.5)	(-0.24)	(-0.63)	(1.02)	(0.07)
Other not working	0.109	1.000	-0.373	1.016	-0.389	0.731	(b)
	(0.38)	(0.68)	(-1.52)	(-1.17)	(-1.02)	(1.1)	
Education							
Secondary	-0.139**	-0.304	-0.195*	0.002	-0.251**	-0.113	-0.408
	(-2.54)	(-0.91)	(-1.82)	(0.01)	(-2.33)	(-0.33)	(-0.52)
Tertiary	-0.149**	-0.338	0.055	0.086	-0.087	0.197	0.802
	(-2)	(-0.66)	(0.44)	(0.24)	(-0.69)	(0.35)	(0.77)
Constant	-0.404*	2.306**	1.626***	2.767***	2.379***	3.631***	0.332
	(-1.79)	(2.47)	(5.48)	(2.72)	(7.71)	(4.07)	(0.24)
Number of observations	1576	1576	1576	1576	1576	1576	1576

Source: Household Finance and Consumption Survey.

Notes: (a) The results must be interpreted against the omitted categories in the regression which correspond to households with only mortgage debt, with income below the 20th percentile, with real wealth below the 25th percentile, with financial wealth below the 25th percentile, with only with one member, no children, whose reference person has less than 35 years, is an employee with a permanent position and has an educational level corresponding to basic education. In the logit models the coefficients presented correspond to the regression coefficients whose magnitude cannot be interpreted as the marginal effect of explanatory variable on the variable to be explained. In the logit models marginal effects have the same sign and significance of the estimated coefficients, but vary with the value of the regressors. The symbols *, ** and *** indicate that the coefficients are statistically significant at 10, 5 and 1 per cent confidence level, respectively. **(b)** The dependent variable never takes the value 1 for the households of this class, so that, for the purpose of estimating the model these households are combined with those of the previous class.

In what concerns the work status, the results suggest that households whose reference person is self--employed have the highest ratios of debt service to income and the greatest probability that these ratios exceed 40 per cent. This might be explained by the fact that self-employment income, which typically is more volatile, has suffered a greater reduction than other sources of income after the borrowing decisions were taken. This result seems consistent with the fact that 2009 (the reference year for income) has been a year of recession.

Finally, the variables on the type of debt are significant in all regressions. Households with mortgage debt together with other debts are more vulnerable than the ones who only have mortgages and households with only other debts are less vulnerable.

The regression on the probability that households are in a situation of extreme vulnerability, i.e., a situation where the thresholds for the three ratios are simultaneously surpassed, suggests that this occurs mainly in cases of the two lowest income percentiles, of the lowest real wealth percentile and when the reference person is unemployed.[20] Among these very vulnerable households, the ones with low income and in an unemployment situation mostly have mortgage debt, while the ones with lower values of real wealth mostly have only non-mortgage debt.

5. Conclusions

The indebtedness level of Portuguese households is one of the highest in the euro area, although the upward trend persistently observed during more than two decades, has been interrupted, in the context of the adjustment process that is underway in the Portuguese economy. This paper analyses households' participation in the debt market and characterizes the indebted households in particular the most vulnerable. The analysis is based on data collected through the Household Finance and Consumption Survey Financial held in the second quarter of 2010. Although these data may not reflect the latest developments regarding households' financial situation, they are particularly relevant to characterize the distribution of debt and to identify the most vulnerable groups of households i.e. those groups for which the materialisation of credit risk is more likely.

The analysis of households' participation in the debt market suggests that the probability of having debt increases with the level of households' income and real wealth, and it decreases with the level of households' financial wealth. Additionally, households with children have a higher probability of having mortgages and those with a greater number of members have a higher probability of having other debts. Age has a negative effect on the participation in the debt market. Concerning the effect of the work status there is some evidence that households whose reference person is self-employed or inactive have a lower probability of having mortgages, but not of having other debts.

The larger participation in credit market of households with higher income and higher real wealth is likely to reflect both demand and supply factors. The lower participation of households with a high level of financial wealth and of those whose reference person is older, is self-employed or inactive seems to reflect mainly the decision of these households not to participate in the debt market. On the contrary, those households whose reference person is unemployed or is employed with a temporary contract are more likely to have their loan applications turned down by financial institutions.

Regarding the distribution of the debt value among the households holding debt, the HFCS results indicate that the median values of debt are, in general, higher in the groups of households in which the participation in the debt market is also higher.

The percentage of vulnerable households is higher when indebtedness is measured by the debt to income ratio than when it is measured by the ratios between the debt service and income and between debt and wealth. The relatively low incidence of situations where the ratio of debt service exceeds the usual threshold is likely to be due to the fact that in Portugal mortgages typically have very long maturities, their interest rates are indexed to money market rates, which have remained low, and their spreads are fixed.[21] In turn, the relatively moderate levels of the debt to wealth ratio partly reflect the fact that there was not a bubble in the Portuguese real estate market neither the subsequent sharp fall in property prices, which would have caused a reduction in the value of real wealth.

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20 Although age is not significant in this regression, about 65 per cent of households for whom the three threshold levels are exceeded belong to two youngest age classes. The effect of aging may be in large part captured by income. In fact, these very vulnerable households with young reference persons have low income levels.

21 The available data indicate that the debt service to income ratio is relatively low in Portugal, when compared with other euro area countries, even in the case of the households in the lowest income classes. See ECB (2009).

The analysis of the distribution of the indebtedness ratios according to the households' characteristics suggests that the most vulnerable cases occur in the lowest income and age classes, and when these households hold mortgages, especially if they also hold other debts. In the lowest income class and in the case of the youngest borrowers, whose debts have been taken recently, the percentage of households with very high debt to income ratios is very large. Households in the lowest income class are also likely to have high debt service to income ratios, while in the case of the youngest households this ratio is usually relatively moderate.

According to the HFCS results, the percentage of households in a situation of extreme vulnerability, i.e. those households with difficulties in fulfilling their debt commitments both in the short and in the medium/long term, was relatively low in 2010. However, under the current very unfavourable macroeconomic environment, characterized by a reduction in disposable income and a sharp increase in unemployment, households in very vulnerable situations are likely to increase. In particular, the case of households having taken high levels of debt in the past, and facing meanwhile a significant deterioration of their financial situation deserve special attention.

Low income and young households who have taken mortgages are the most vulnerable groups of the population. These are the groups for which the probability of materialisation of credit risk is larger. However, in the perspective of financial stability it should be taken into account that the participation of low income households in the debt market is relatively low, mitigating the impact of their eventual entry into default on banks financial situation. In the case of young families, although their participation in the debt market is high, their debts are generally guaranteed by real estate. Additionally, for the majority of these households the debt service ratios are lower than the usual threshold. These results are in line with those obtained in the last edition of IPEF held in 2006.

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