

CAHIER D'ÉTUDES WORKING PAPER

N° 58

HOUSEHOLD SECTOR BORROWING IN THE EURO AREA: A MICRO DATA PERSPECTIVE

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FEBRUARY 2011

Conference on Household Finance and Consumption
Luxembourg 25-26 October 2010



BANQUE CENTRALE DU LUXEMBOURG

EUROSYSTEME

Conference on “Household Finance and Consumption”

This paper was presented at the conference on “Household Finance and Consumption”, which was co-organised by the Banque centrale du Luxembourg and the ECB, and was held on 25-26 October 2010 in Luxembourg. The organising committee consisted of Michael Ehrmann (ECB), Michalis Haliassos (CFS and Goethe University), Thomas Mathä (Banque centrale du Luxembourg), Peter Tufano (Harvard Business School), and Caroline Willeke (ECB). The conference programme, including papers, can be found at http://www.ecb.europa.eu/events/conferences/html/joint_ecb_lux.en.html. The views expressed in this paper are those of the authors and do not necessarily reflect those of the Banque centrale du Luxembourg, the ECB or the Eurosystem. Financial support from the Fonds National de la Recherche Luxembourg (FNR) is gratefully acknowledged.

HOUSEHOLD SECTOR BORROWING IN THE EURO AREA: A MICRO DATA PERSPECTIVE^{1,2}

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¹ We are grateful for the very helpful comments we got from ECB colleagues in DG-Statistics and DG-Research, an anonymous referee and the participants in the “Household Finance and Consumption Conference” held in Luxembourg on 25-26 October 2010, in particular to Charles Grant for his helpful discussion, as well as for the exchange of views and support from Olympia Bover and Arthur B. Kennickell on some specific aspects of the paper.

² The views expressed in this paper do not necessarily reflect those of the European Central Bank.

Abstract

This paper uses microdata from the EU-SILC (Statistics on Income and Living Conditions) to generate structural information for the euro area on the incidence of household indebtedness and of the burden to service debt. It distinguishes this incidence according to relevant characteristics such as income, age and employment status, all elements that can be cross-examined in the light of theories such as the life-cycle hypothesis. Overall, income appears as the dominant feature determining the debt status of a household. The paper also examines the evolution of indebtedness and debt service burdens over time and compares it with the US. In general, the results suggest that the macroeconomic implications of indebtedness for monetary transmission and financial stability are not associated with the mean but with the tails of the distribution.

Keywords: household indebtedness, financial vulnerability, micro survey data, monetary transmission.

JEL Classification: C42, D12, D14, G21

1. Introduction

Preserving price stability in the medium term is the primary objective of the ECB's monetary policy. At the same time, the US sub-prime mortgage crisis and the ensuing worldwide financial crisis starting in 2007 have shown that macroeconomic stability and financial stability are intimately related. Monetary policy thus needs to explicitly take into account the relevant macro-financial links, particularly during the emergence of financial turmoil/crisis. Issues related to the sustainability of household debt, the household sector's vulnerability and possible implication on banks' loan losses are a case in point and should be properly understood to enable policymakers to design appropriate measures.

The transmission of monetary policy may be designed at the macro level, but it effectively takes place at the level of individuals. A better understanding of the individual degree of indebtedness and the characteristics of indebted households is thus an important step in exploring the consequences which the aggregate level of indebtedness and the shocks thereupon have for macroeconomic and financial stability. Only microdata can, for instance, reveal with some certainty whether there is a mismatch between debt on the one side, and income/assets on the other side.

A number of European central banks collect and/or use household microdata for policy purposes, with most of these data coming from interview-based surveys.³ However, the comparability of the existing survey data in terms of coverage and definitions is often poor. This paper uses microdata from the EU-SILC (Statistics on Income and Living Conditions), which are available for all euro area countries and offer a relatively high degree of comparability, to examine the incidence of indebtedness of the household sector in the euro area.

The purpose of the paper is to generate and structure information on household indebtedness and show that "distribution matters". This information can then be further used in model-based analysis and simulations, but it is not the purpose of this paper to conduct such further analysis. The paper is structured as follows. Section 2 provides a motivation for looking at microdata in the context of monetary policy, provides the macro background on household sector indebtedness and discusses the scope and limits of macrodata in addressing the relevant questions. Section 3 describes the nature of the EU-SILC database, while Section 4 examines the incidence of indebtedness along different household characteristics. Section 5 summarises and offers some tentative policy conclusions.

2. Motivation from a monetary policy perspective

Monetary policy influences price developments over the medium term along the so-called transmission mechanism. This mechanism comprises a number of different channels, including those that affect the financing conditions of households through the cost of finance or borrowers' balance sheet positions. Household indebtedness is a key indicator in the analysis of these channels.

First, the level of indebtedness determines the changes in the debt servicing burden that typically result from changes in central bank interest rates and may then curtail or enhance the income disposable for

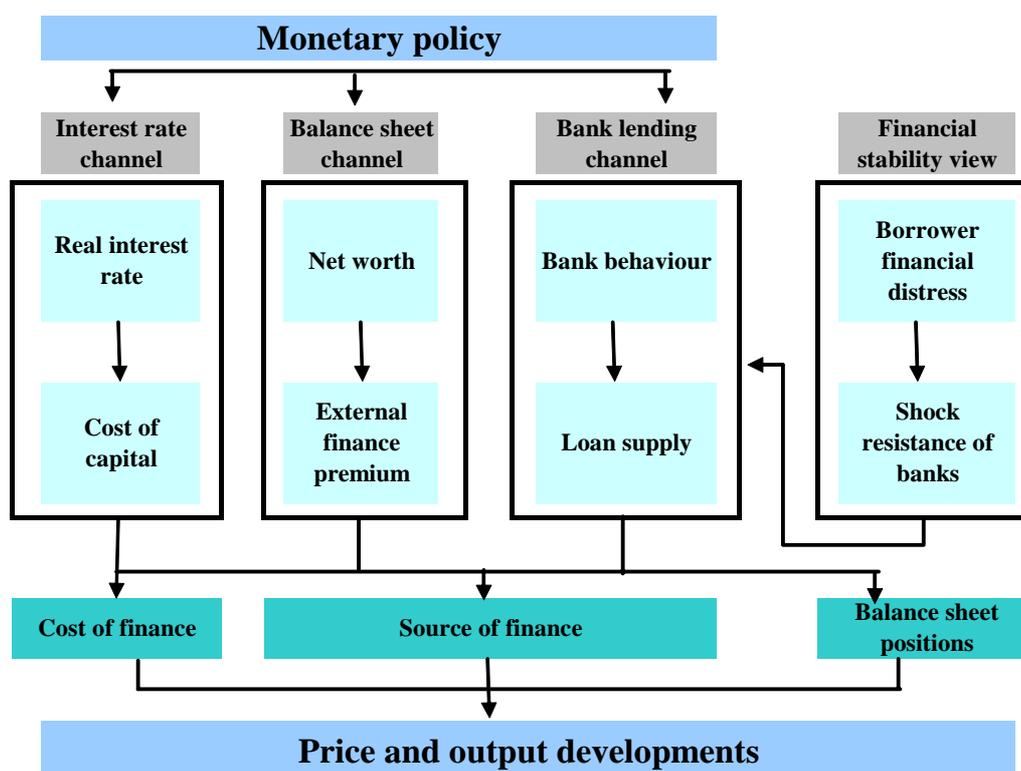
³ For more details see ECB (2009) "Survey data on household finance and consumption".

consumption or residential investment purposes (interest rate channel). Second, it determines borrowers' net worth or net value of collateral and thus the risk premium included in the retail interest rates that banks charge for debt financing (balance sheet channel). Third, indebtedness determines the financial distress and default risk of the borrower. This can have implications for role that bank credit supply plays in the transmission (bank lending channel). For instance, a higher default risk may necessitate more loan loss provisioning and thus affect banks' capital positions. This, in turn, can magnify the impact that monetary policy has on the funding of banks and their ability to provide credit to the bank-dependent parts of the economy. Chart 1 illustrates these various channels in a schematic way.

These examples show that the analysis of household indebtedness also provides an important link between monetary policy and financial stability considerations. Highly indebted households may not only provide for a stronger transmission of monetary policy impulses but their vulnerability may also imply a higher degree of defaults and thus banking sector stress. At the same time, monetary policy analysis and financial stability analysis look at household indebtedness from somewhat different angles. While the former typically focuses on baseline scenarios within a possible distribution of outcomes, the latter focuses on the size and shape of the tail of this distribution of outcomes.

There is increasing consensus that an effective assessment of transmission channels and household sector vulnerabilities should complement the analysis of macrodata with that of microdata. Purely drawing on macrodata, it is often difficult to find clear evidence for the working of specific channels and to uncover tail risks. This may be due to the fact that macrodata reflect the average over different types of households, and then blur the transmission effects that may hold only for specific groups.

Chart 1 Stylised view of the monetary transmission channels



For instance, the interest rate channel may be mainly effective for those households that have variable rate debt, face a high cost of refinancing debt (e.g. early repayment fees), or have not set up debt repayment buffers to smooth interest rate effects. Similarly, the strength of the balance sheet channel may be particularly strong for those households whose assets consist only of their home and whose debt-to-capital (gearing) ratios are thus strongly affected by shocks to house prices. Finally, the bank lending channel may be particularly strong if a funding or capital buffer problem occurs in banks that have specialised on customers that are particularly vulnerable in terms of unsustainable debt levels and overstretched or uncertain incomes, such as was the case for sub-prime mortgage banks.

This paper examines the distribution of indebtedness across households in terms of different categories. Such a categorisation is important, as it generates relatively homogenous subsets of the household sector and then allows examining whether macroeconomic outcomes reflect different behaviours of households that have otherwise similar characteristics, or whether they reflect similar behaviour of households in response to different household characteristics. Such information can be essential in guiding the use of specific theories and models – and the way in which they should deviate from the representative agent assumption – in the analysis of debt accumulation and monetary transmission.

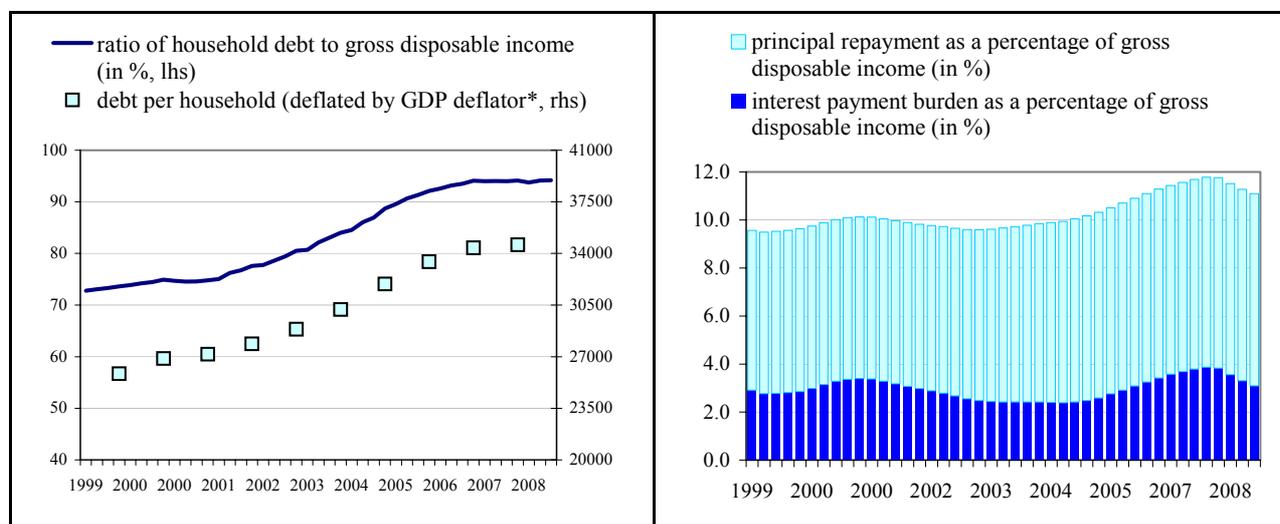
For instance, two households may have the same level of indebtedness and the same preferences or risk profiles, and their consumption/saving response to an increase in interest rates may simply differ because one household has financed its debt with a variable interest rate while the other has financed at fixed rates. But the two households may also show a similar response despite their different debt characteristics, if the household with variable rate debt is forced by the circumstances to adjust consumption/saving while the household with fixed rate debt simply reacts to the macroeconomic news in the interest rate increase even though it is not individually affected.

In the specific case of the euro area, the use of microdata is also important to assess differences in the transmission of monetary policy across member states. Such differences may stem from compositional effects, if individual countries primarily host households with certain behaviours and/or certain characteristics that influence the strength of transmission. For instance, in Spain and Finland, almost all mortgage debt is taken out at a floating rate or initial rate fixation period of less than one year, while in Germany, France and Belgium this share is rather low. Against this background, it is important that microdata are not by construction biased towards specific types of households, but are encompassing enough to bring out the main characteristics as well as the many different characteristics that households have in each country.

What is missing when looking only at the aggregate data for the household sector of the euro area? Integrated accounts statistics point to a ratio of the sector's debt to the sector's disposable income of 95% in 2008, increasing from around 70% in 1999. Measured per household, real debt has recorded a strong increase from about 25,000 euro to close to 35,000 euro (in 1999 euros). At the same time, the interest payment burden and the overall debt servicing burden (including also repayments) of the household sector (as a ratio of disposable income) has shown a more cyclical pattern despite the continuous increase

in the debt level, reflecting the pronounced changes in interest rates in the period between 1999 and 2008 (see Chart 2).⁴

Chart 2 Household debt and debt servicing burden in the euro area



Sources: Eurostat, Structural Housing Indicators Statistics and ECB calculations.

Note: * GDP deflator set to 100 in year 1999. Interest payments include mortgage as well as non-mortgage related interest costs paid by households.

These aggregate numbers conceal potentially relevant information about the distribution of debt and interest payment burden. For instance aggregate indebtedness of 95% does not tell anything about the number of actually indebted households and about their individual debt levels. In the extreme case the numerator and the denominator of the ratio may refer to different groups of households, i.e. households holding high debt but have very low income on the one side and households earning high income but having very low debt on the other side. The numbers for aggregate debt per household do not help much further in this respect, as it is not clear whether 35,000 euro is too low or too high to be representative for each household.

Assuming that all debt refers to mortgage debt and correcting with the home ownership ratio for the euro area, around 62% in 2007, it implies that average real debt per owner occupying household would be above 55,000 euro – but also this number is difficult to assess in terms of whether it could be representative or not. If the bulk of households in the economy were at the typical “home-buying” age, then an average real debt per owner occupied household of around 55,000 euro would probably be low, given that one needs to bring the present value of the future rents. By contrast, if the bulk of households were either at a late or an early stage of their life cycle where they should either already have paid back large parts of their initial debt or not yet have any debt, then an average real debt per owner occupied

⁴ The estimation of the rise in the repayment burden is based on the assumption that the duration of mortgage loans remains stable. However, in some countries, the lengthening of the loan duration has had the effect of reducing the ratio of annual repayments to total loans, thus partly or fully offsetting the effect of the rise in the debt level on repayment flows.

household of around 55,000 could be assessed high, because it would imply a much higher indebtedness for the households that from their position in the life cycle would naturally be expected to have debt.

But even if we knew that the aggregate indebtedness would only capture households that actually hold debt, we would still need information on the distribution of this indebtedness. Aggregate indebtedness of 95% could result from each individual indebted household having a debt ratio of 95%. But it could also reflect a situation where the distribution is heavily skewed, i.e. part of the indebted households has a uniformly high debt ratio and the other part has a uniformly low ratio. Given the fact that the distribution of the individual debt ratios can be skewed, the median of the sample may provide a more appropriate picture of the “typical” debt ratio (or debt servicing burden) of the households than the sample mean. One of the elements in moving from macroeconomic to microeconomic data is hence the shift from mean to median when discussing general tendencies or “averages” of some sort.

3. Underlying micro data

Micro data on household balance sheets are typically obtained from income and wealth surveys that include, among other things, information on real assets and their associated debts, other debts, financial assets, labour and non-labour income, pension plans and insurances, and consumption and savings.⁵ This type of surveys is available in some euro area countries, for instance with regard to the Spanish Survey of Household Finances and the Italian Survey of Household Income and Wealth, but, there is not, for the time being, a common European source. The European Community Household Panel (ECHP) survey, produced between 1994 and 2001, offered harmonised information at the micro level for a large number of euro area countries, but its focus was very much on issues related to demographics, employment and income positions, or social security and living conditions, and less on issues directly related to households’ financial situation. Moreover, it suffered from various operational problems, such as timeliness, reliability, country coverage and the use of definitions that are not fully in accordance with international practice, in particular for income.

This paper uses the micro information from the EU Statistics on Income and Living Conditions (EU-SILC), which can be seen as the successor of the ECHP. Although the EU-SILC is not a pure household finance survey, it contains relevant information for the analysis of household indebtedness. In addition, compared to the ECHP, the EU-SILC gives priority to: (i) timeliness; (ii) flexibility; (iii) comparability; and (iv) full geographical coverage (i.e. EU25 plus candidate countries for accession). As 2007 is the first official release of the survey (although some countries were providing data since 2004), it is still facing some problems related to a new statistics and some countries are adjusting to some problems detected.⁶ In addition, from the survey design point of view, the EU-SILC uses a rotational panel (the minimum panel

⁵ The surveys typically allow for an over-sampling of wealthy households, to control for the fact that the distribution of wealth is heavily skewed and that some types of assets are owned only by a small fraction of high income households.

⁶ In particular, Germany is facing problems with one of the variables used in our study (interest repayments of mortgage debt) and has to be excluded in some parts of the analysis.

duration is 4 years), which means that it allows the introduction of new population sub-groups each year, therefore enriching the cross-sectional data derived and avoiding problems of attrition.⁷

The EU-SILC contains valuable information to study household indebtedness and its various linkages. For instance, it gives information on housing tenure and allows identifying households holding a mortgage and consumer debt. It allows measuring, at least in part, the debt servicing burden faced by households, as it includes information on interest payments on mortgage debt. It also contains information on financial stress both objective, e.g. arrears on mortgage loan payments and on hire purchase instalments or other loan payments, and subjective, such as the assessment of total housing costs and of the repayment of debts from hire purchase or loans as a financial burden. On the income side, following the international recommendations of the UN “Canberra Manual”, the EU-SILC focuses on household gross disposable income, including among its components interest paid on mortgage loans, imputed rent and non-cash employee income (income in kind).⁸

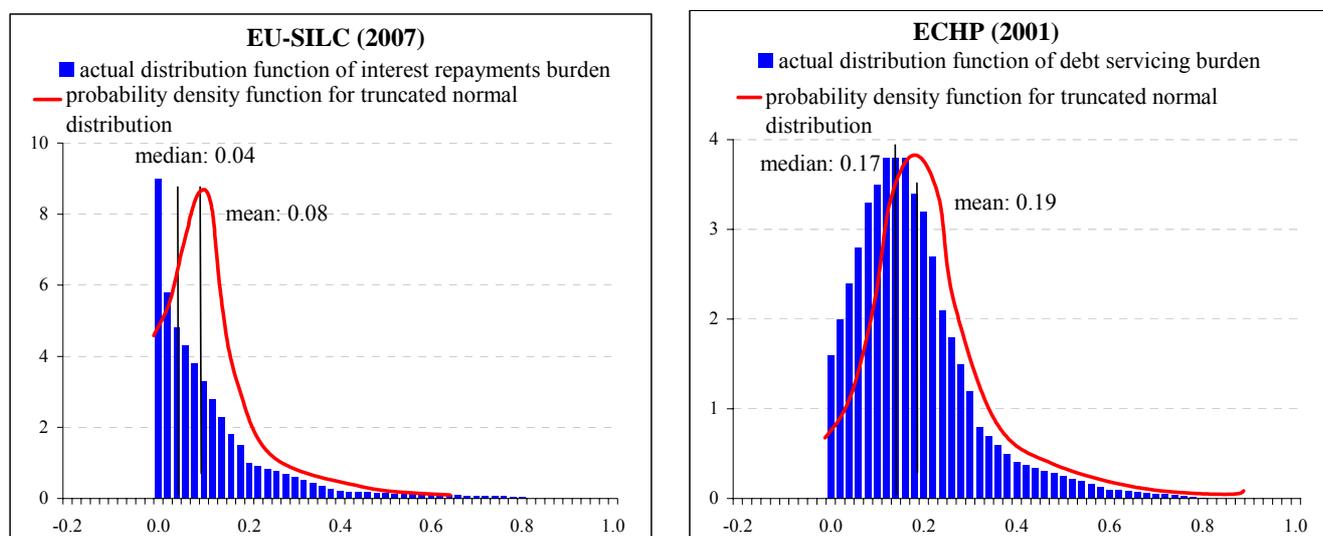
In order to illustrate with an example the value added of using household level information to analyse household indebtedness, Chart 3 illustrates the median of the interest payments to income ratio in 2007, which is estimated to be lower than the mean in the period under review, at levels of slightly above 4%, implying some skewness in the distribution towards lower interest repayment ratios (see left-hand part of Chart 3). Alternatively, the ECHP, predecessor of the EU-SILC, provided information on the overall debt servicing burden (including both interest payments and actual debt repayment). Also in this case, the median and the mean of the distribution of the debt servicing-to-income ratio differed and implied some skewness towards lower debt servicing ratios (see right-hand part of Chart 3).⁹ The probability density function for the truncated normal distribution plotted in the chart is purely for illustrative purposes, to make the point that actual data do not befit the distribution typically assumed when dealing with macroeconomic data.

⁷ The EU-SILC collects information at two levels, at the household level and on a personal basis. It covers, from a household perspective, variables related to income, social exclusion and housing, and, at the personal level, on education, labour situation, health and income. Data are mainly collected via interviews, but information from registers is also used. These data are then presented in two formats, cross-section and longitudinal (i.e. panel). The reference population is all private households and their current members residing in the territory of the individual Member States at the time of data collection. The data are based on a nationally representative probability sample of the population with regard to language, nationality or legal residence status of the population. The aim is to have representative probability samples both for households, which form the basic units of sampling, data collection and data analysis, and for individual persons. The cross-sectional sample sizes were calculated in order to achieve an effective size of around 120.000 households at the European level, ensuring a minimum precision at the country level. This means that the survey can be used for cross-country analyses. For more details regarding weights and imputation, see European Commission (2009).

⁸ The definitions and the details of the socio-economic characteristics used are summarised in Annex 1.

⁹ See ECB Monthly Bulletin, December 2005 Box 4 “The debt servicing burden of euro area households – some macroeconomic and microeconomic evidence”.

Chart 3 Actual distribution and probability density function for the truncated normal distribution of interest repayments burden from EU-SILC and debt servicing burden from ECHP
(as a percentage of gross disposable income)



Sources: Eurostat Eurostat (EU-SILC and ECHP cross-section database) and ECB calculations.
Note: Interest payments include only mortgage related interest costs paid by households.

Looking forward, the Eurosystem is engaged in launching a Household Finance and Consumption Survey (HFCS), based on the experience of some National Central Banks that should allow having a more comprehensive picture of household level balance sheets and its distribution. This will favour a deepening in the analysis of key research and policy questions at the euro area level, including the relationship between consumption and wealth, the implications of household indebtedness and, more generally, the impact across households of shocks to income, interest rates and house prices.¹⁰

¹⁰ For a comprehensive approach on the use of household micro data for research and policy analysis, see Eurosystem Household Finance and Consumption Network (2009).

4. Micro evidence

The aim of this section is to give a detailed picture of household indebtedness in 2007, the most recent year for which the EU-SILC offers a representative euro area picture. A summary table of the final sample used for this paper is shown in Annex 2. Developments over time are restricted to the period between 2004 and 2007, but, when possible, a longer term comparison is also discussed, based on the results of the ECHP for 1995.

The aggregate figures for the euro area include information of Austria, Belgium, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal for 2007, and of Germany for 2005, as information of 2007 for the latter is not available for all relevant variables. At the same time, the developments between 2004 and 2007 are based on the first group of countries, while those between 1995 and 2007, used for long-term comparisons, include all countries. Country and euro area aggregates are obtained by means of household cross-sectional weights reported at the survey.

In order to provide an overview of the distribution of all households, independently of their debt status, Table 1 reports the main characteristics of the population surveyed by EU-SILC. It shows that around one third of the households had, in 2007, an income below 20,000 euros (in 2007 prices), while only 1.9% of households had an income above 100,000 euros, and that 62.9% were home owners (income ranges are shown at 2007 prices all over the paper). Moreover, regarding the characteristics of the head of household, around 40% are between 35 and 54 years old, 46.3% are employees, 91.3% are non-migrants and 41.8% have a medium level of education.¹¹

Developments between 2004 and 2007 are consistent with some well known economic developments. For instance, an environment of ongoing economic and employment growth over this period has translated into an increase in the proportion of households with high levels of income and in those in which the head of household has a job. The proportion of heads of household that are employees is 0.9 percentage point higher in 2007. At the same time, it appears that home ownership increased somewhat, as well as the proportion of immigrants. Some of these developments are even more marked from a longer-term perspective, i.e. comparing the situation in 1995 and 2007 (see Table A.3.1 in Annex 3). This is especially the case for the influence of economic and employment growth, as the proportion of households in the higher income levels is estimated to have increased significantly – by 10 percentage points for those above 50,000 euros – and of those in the lowest income level has declined by around 7 percentage points. At the same time, the proportion of heads of household with a job has increased (by 1.0 percentage point), as well as the proportion of households owing a house, which is in 2007 3.2 percentage points higher. Finally, these developments are in line with the ageing of the population, as shown by the fact that households in which its head is one of the older age groups are gaining weight.

¹¹ Available information on households collected by Eurostat allows to cross-check, although partially, the picture derived from the EU-SILC with that coming from census sources. For instance, according to census data published by Eurostat referring to 2001, around 4.5% of households are from outside the EU and the activity rate is around 65%, slightly below and above respectively to the figures estimated using the EU-SILC for 2007, 8.5% and 60.5% respectively, although developments in the last few years regarding migration could have reduced the gap.

Table 1 Distribution of households by selected characteristics, euro area
2007 and change 2004-07 (% and percentage points)

	2007	change 2004-07		2007	change 2004-07
<i>By:</i>			<i>By:</i>		
<i>Income level (2007 prices)</i>			<i>Working status</i>		
<10,000	7.9	-1.7	employee	46.3	0.9
10,000-20,000	23.5	-1.4	self-employed	9.5	0.0
20,000-30,000	22.3	0.1	unemployed	4.6	-1.0
30,000-50,000	28.2	1.0	inactive	39.7	0.1
50,000-100,000	16.2	1.8			
>100,000	1.9	0.2			
<i>Age group</i>			<i>Migration status</i>		
below 35	15.7	-0.7	non-migrant	91.3	-0.4
35-44	20.1	-0.5	inside EU	2.9	0.2
45-54	18.8	0.1	outside EU	5.9	0.1
55-64	16.8	0.5			
65-74	15.8	-0.2			
75 and more	12.8	0.8			
<i>Housing status</i>			<i>Education level</i>		
Owner	62.9	0.8	low	31.8	-3.3
Renter or other	37.1	-0.8	medium	41.8	1.1
			high	26.4	2.1

Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

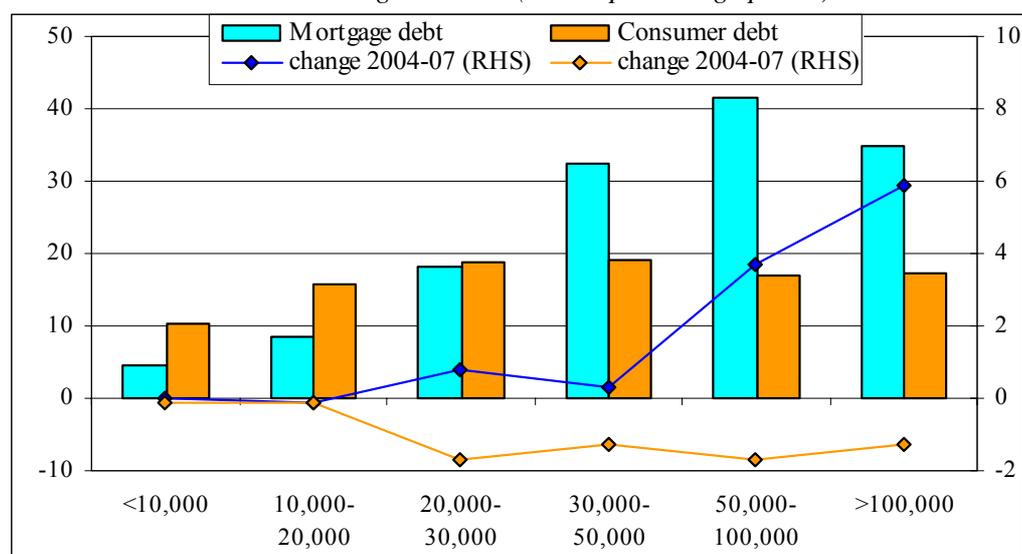
Note: Germany not included in the migration status categories due to lack of information. Age group, working and migration status, and educational level derived from the head of household.

The rest of the section deals with the incidence of debt, the ability to repay mortgage debt obligations, households with high mortgage debt service to income ratio and with late payments, and with changes in housing costs as a burden for individual households over time.

4.1 Incidence of mortgage and non-mortgage debt

The EU-SILC provides information regarding whether households are holding a mortgage on their main residence or whether they are holding consumer credit, and also information about interest repayments associated with the mortgage debt.

Chart 4 % Households holding mortgage and consumer debt
in the euro area by income levels
2007 and change 2004-07 (% and percentage points)



Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). The estimate for 2007 includes 2005 data for Germany. Germany is not included in the estimate of the change between 2004 and 2007. The results by income quantile are broadly similar.

Starting with the incidence of debt, around 22% of households had a mortgage outstanding and 17% had a consumer loan in 2007.¹² These figures are, respectively, 1.7 percentage points above and 0.9 percentage point below the level observed in 2004 (see Table A.4.1 in Annex 4). The level of incidence of mortgage and consumer debt shows a significant variation when looking at various socio-economic characteristics, in particular the level of income. In fact, in 2007 only 4.4% of households with the lowest level of income (below 10,000 euros) had a mortgage outstanding, while the proportion reached 41.5% for households with a high level of income (between 50,000 and 100,000 euros). For consumer debt, the proportion of households holding a loan is 10.2% for the lowest income level and 17.3% for those with the highest level of income. Overall the likelihood of holding a mortgage increases with the level of income (see Chart 4), while the correlation is less marked for consumer debt. This should not be surprising if consumer debt has the function of bridge-financing expenditure if households are constrained by current income.¹³

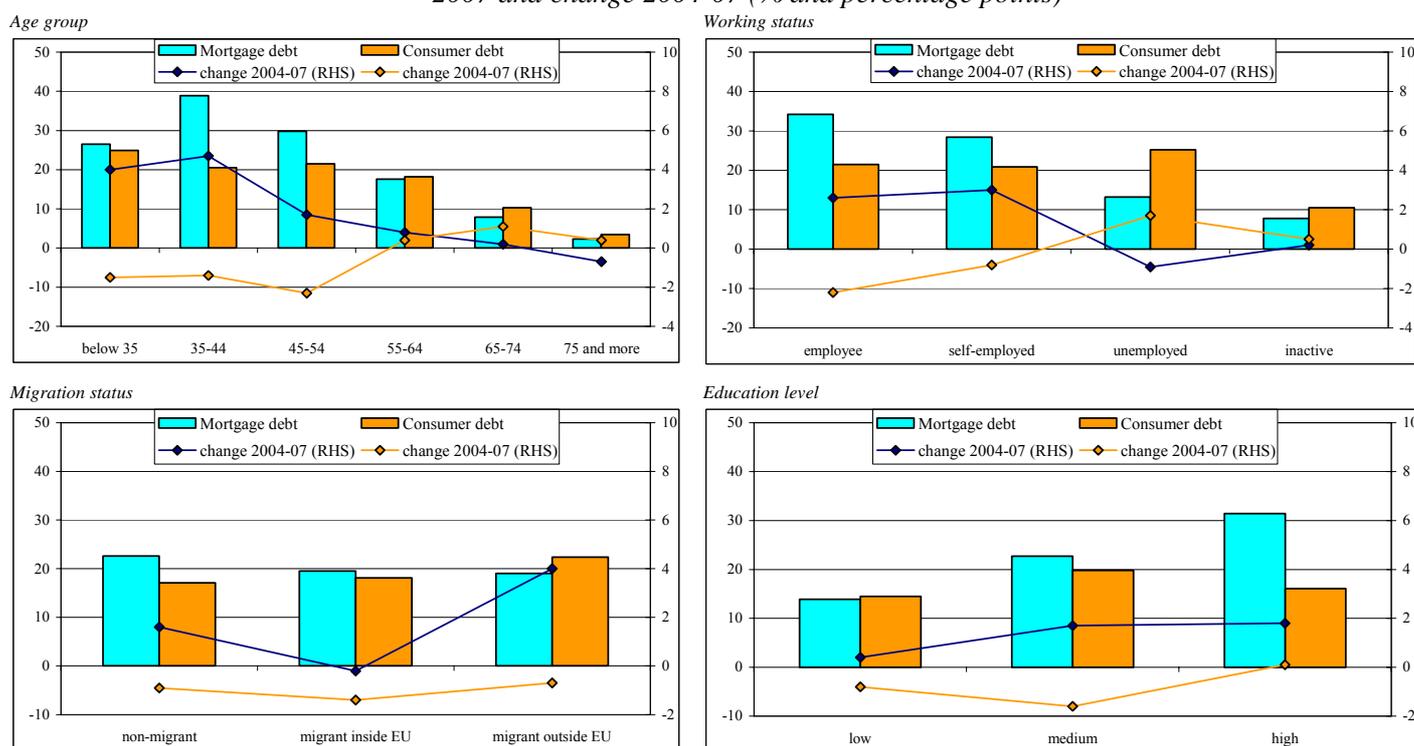
Other aspects that also turn to be relevant are age, working status and education level of the head of household (see Chart 5). Regarding age, holding a mortgage tends to grow with age at the younger groups, to start declining afterwards, while for consumer debt the relationship with age is mostly inverted, i.e. low proportion of households holding consumer debt as age of the head of household increases. It varies in the former between 2.3% and 38.9% for those heads of household aged 75 and older and between 35 and 44 years old, respectively; and between 3.4% for those aged 75 and older and 24.9% for those below 35 years old in the latter. This picture is in line with the life cycle hypothesis, according to

¹² Households are classified as having consumer debt if they have only a consumer loan and are classified as mortgage debtors if they have a mortgage loan, independently if the latter is accompanied by holding consumer debt as well or not.

¹³ The statistics presented in Chart 4 are broadly the same when plotted by income quartile.

which individuals tend to smooth consumption through life subject to an intertemporal budget constraint, therefore borrowing when young. It is also in line with precautionary savings theories, which see this motive weaken as borrowing constraints become more relaxed - especially for young households, given that older ones tend to use accumulated wealth to protect themselves from income uncertainty.¹⁴ Among working status, being inactive makes it less likely to hold a mortgage (7.8%), while employees have the highest incidence (34.2%). For consumer debt, the difference across working status is smaller, and the highest proportion is observed in the unemployed (25.2%). Lastly, a higher level of education makes more likely holding a mortgage – from 13.9% for household in which its head has a low level of education to 31.4% with a high level, while for consumer debt the maximum is reached in those with a medium level of education (19.8%). Assuming this pattern is not purely capturing income effects, it would be in line with the economic theories that suggest that literacy has a positive impact on access to credit markets. By contrast, the migration status does not induce much variation in the incidence of debt, although it is slightly lower in the case of holding mortgage debt for migrants and slightly higher for non-EU migrants in the case of consumer debt.

Chart 5 % Households holding mortgage and consumer debt in the euro area by socio-economic characteristics 2007 and change 2004-07 (% and percentage points)



Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). The estimate for 2007 includes 2005 data for Germany. Germany is not included in the migration status categories due to lack of information and, overall, in the estimate of the change between 2004 and 2007.

¹⁴ See, for instance, Gourinchas and Parker (2002).

To assess the impact that the incidence of debt may have on the transmission mechanism or for financial stability issues, this information needs to be complemented with other type of financial indicators, such as the effort in terms of income that holding these debts implies. For instance, the fact that the likelihood of holding mortgage debt increases with income is not indicative for a lower strength of the transmission of monetary policy, as in the end the ratio to income and the financial effort made to service this debt are the decisive factors, and these may still be high at any end of the income distribution. Similarly, heads of households that are relatively aged or in unemployment have a lower probability of holding mortgage debt, but this does not mean that the transmission is lower as the households concerned may still have a high debt servicing burden and may thus be affected by interest rate changes. The next section will provide information on the financial effort by household characteristics.

Focusing on the developments over time, the observed increase in mortgage debt incidence between 2004 and 2007 is mainly concentrated among households at the higher income levels (above 50,000 euros of income); and in which the head of household is at the younger age groups (especially between 35 and 44 years old), has a stable labour market situation (either employees or self-employed), mainly non-migrant (but also for those migrants from outside the EU) and with a medium and high level of education. By contrast, the decline in consumer debt incidence is led by high income level households, and by those with a head of household that is young, employed, non-migrant and with a medium level of education.

A longer-term perspective points to an increase in mortgage and consumer debt incidence since 1995, by around 2 and 3 percentage points, respectively. However, while high income households and those in which the head of household is young and employed have been leading the increase in mortgage outstanding rates, the incidence of consumer debt has shown a more broadly based increase across socio-economic characteristics (see Table A.3.2 in Annex 3). This more pervasive element in consumer debt development may have to do with changing conditions in the financing of consumer durables (such as car makers offering particularly low interest rates) or with the more wide-spread use of credit cards across all types of households.

Box 1 gives details on the country variation at the euro area of home ownership, mortgage debt incidence and mortgage debt service.

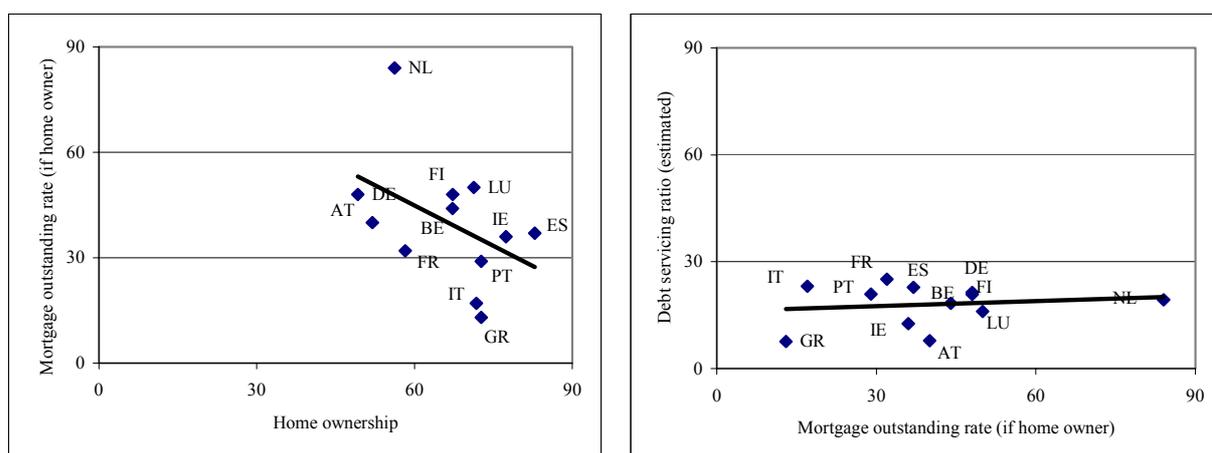
Box 1 The incidence of debt of households and home ownership by country

Table A.4.1 in Annex 4 reports significant differences in levels of the mortgage debt holders across the euro area countries. This box explores to what extent these differences in (conditional) mortgage outstanding rates are driven from differences in observed home ownership rates. The Chart below indicates that there is a slightly negative relationship between these two variables, i.e. high mortgage outstanding rates tend to be associated with low ownership rates. In fact, while some of the Southern European countries (Greece, Italy, Spain and Portugal) exhibit very high home ownership rates with only a minority of households holding an outstanding mortgage, at the other extreme, country such as the Netherlands shows a much lower home ownership rate with the vast majority among those households

owning a home also holding an outstanding mortgage (see left-hand part of Chart).¹⁵ One possible explanation could be that the households in the Southern European countries use more frequently the alternative sources of financing the purchase of a home (for example loans or money transfers from relatives) or received houses more frequently through bequest. The role of such informal credit channels can be particularly important in countries with less expanded credit markets. By contrast, mortgages are very widespread among homeowners in the Netherlands where the mortgage and credit markets are rather expanded and households may benefit from the greater availability of credit allowing them easier access to liquidity and more options to refinance. For example, households in the Netherlands face a greater variety of financial products (specialised loans) and a higher supply of loans via the securitisation of mortgages, and are able to take out a larger mortgage relative to the value of a property purchased.¹⁶

The right-hand part of Chart presents developments in the debt servicing ratio among households with a mortgage outstanding. It shows very stable average ratio of around 17% in the euro area, with some heterogeneity among countries, for example with levels above 20% in Spain, France and Portugal and the lowest levels in Austria, Greece and Ireland. In sum, significant national differences in both home-ownership and mortgage outstanding rates suggested large differences in housing and mortgage markets across countries of the euro area. Southern countries may have tended to finance their home ownership through different channels than mortgage debt – symptomatic of relatively less-developed credit markets. These national differences in perceptions about borrowing may be partly shaped by a country's history, traditions and norms, and may be partly the outcome of interactions with the prevailing institutional environment.

Chart: Home ownership, percentage of households holding a mortgage and mortgage debt service to income ratio (estimated) across euro area countries, 2007



Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Note: German data refer to 2005. Mortgage debt service ratio, i.e. the percentage of income devoted to serve mortgage debt, is obtained at the household level by adding to the interest payments derived from EU-SILC and estimate of capital repayments derived from the ECHP.

¹⁵ See Georgarakos, Lojschova and Ward-Warmedinger (2010) for a similar analysis based on data from ECHP.

¹⁶ See Structural Issues Report 2003, ECB.

4.2 Ability to repay mortgage debt obligations

In order to have a more precise view on the burden that debt represents for households, various measures have been proposed in the literature, such as the ratio of outstanding loans to income, of total debt to total financial assets and of repayment burden to income. Each of them has pros and cons. For instance the total or outstanding debt held by a household over income does not reflect the actual burden that has to be serviced on a periodical basis. Moreover, a higher debt ratio may be less problematic if there are financial assets that can be used to pay the debt off if needed. But then these assets may have different degrees of liquidity and therefore they are not fully indicative of the capacity to compensate existing debt at each point in time. Lastly, the repayment burden does not take into account household's assets and the alternative incomes earned on them, so in some cases it may be rational for a household to hold debt and incur a higher debt servicing ratio and at the same time hold financial assets and realise high or better rates of return on them.

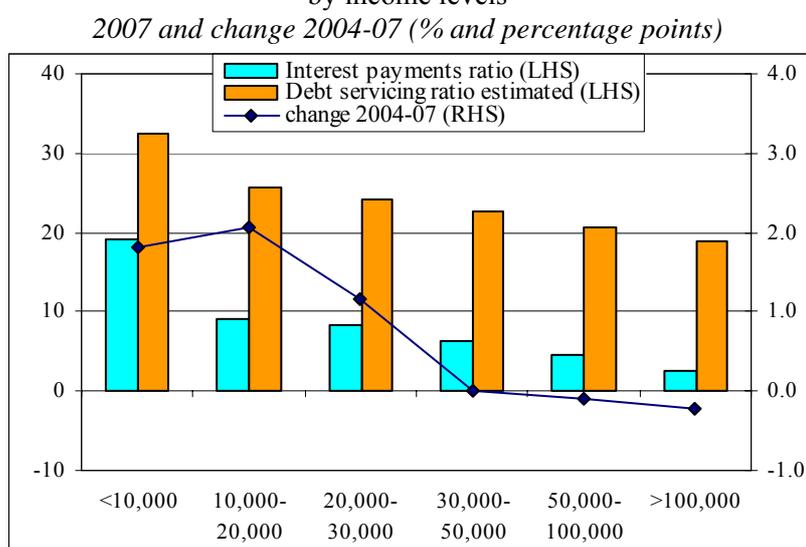
In the existing literature, the percentage of income devoted to serve mortgage and non-mortgage debt obligations, has received a lot of focus as it helps to measure the cuts in disposable income that households experience in repaying their debt. The EU-SILC does not provide a direct estimate of the overall debt service, but only about interest repayments on mortgage debt (excluding capital repayments). Therefore we focus in this subsection in the percentage of income used to serve interest repayments on mortgage loans. At the same time, a proxy of the overall mortgage debt service, i.e. interest payments and capital repayments, at the household level is also provided. It is obtained by deriving a measure of capital repayments – the part missing in EU-SILC – via comparing total debt service to income ratio from the ECHP and the interest repayments to income ratio from the EU-SILC at the country level for three income and three age groups. This measure is then added to the ratio of interest repayments over income, derived from the EU-SILC, for each household.

It is worth signalling some caveats regarding the proxy of the debt service ratio presented. First of all, the year of comparison is not the same, for the ECHP the last available year is used (2001), while the EU-SILC data are based on the most recent results (2007). However, the fact the level of interest rates was broadly comparable in both years, makes the estimate of capital repayments more reliable. Secondly, the denominator is not fully comparable, as the ECHP uses net income, while the EU-SILC measures gross disposable income. Given the steps followed to derive both concepts, its impact in the estimation is expected to be small, though. Finally, the more important drawback is that the estimation of debt service at the household level finally obtained is the combination of purely household level information (interest repayments) and more aggregate information, i.e. the estimated capital repayments for various income and age groups by country, which goes a bit against the nature of the whole exercise. However, the estimate of debt service ratio obtained is only used to compute patterns at the socio-economic characteristics level, and as the indicator used to measure these patterns is the median, the impact of the lower degree of variability at the household level is expected to be very small.

The interest repayments ratio and the estimated debt service ratio are assessed to stand at 6.2% and 22.4% respectively in 2007 (see Table A.4.1 in Annex 4). In line with the results for the incidence of mortgage

debt, both the interest repayments and the estimated debt servicing ratio also show a high variation across the socio-economic characteristics considered. In particular, the variation across income levels turns out to be again the highest, showing an inverted relationship with both ratios, i.e. the lower is the level of income the higher are the interest repayments and the estimated debt servicing ratio (by contrast, the relationship between income and incidence of mortgage debt was positive). Indeed, households with the lowest income level devoted 19.2% and 32.5% of their income to service interest and overall mortgage debt respectively, while this effort is around 3% and below 20% for households at the top of the income distribution (see Chart 6). As reported in other studies, low income level households have to make a higher effort than high level income households in order to service their debt.

Chart 6 Mortgage interest payments and overall debt service to income ratio in the euro area by income levels



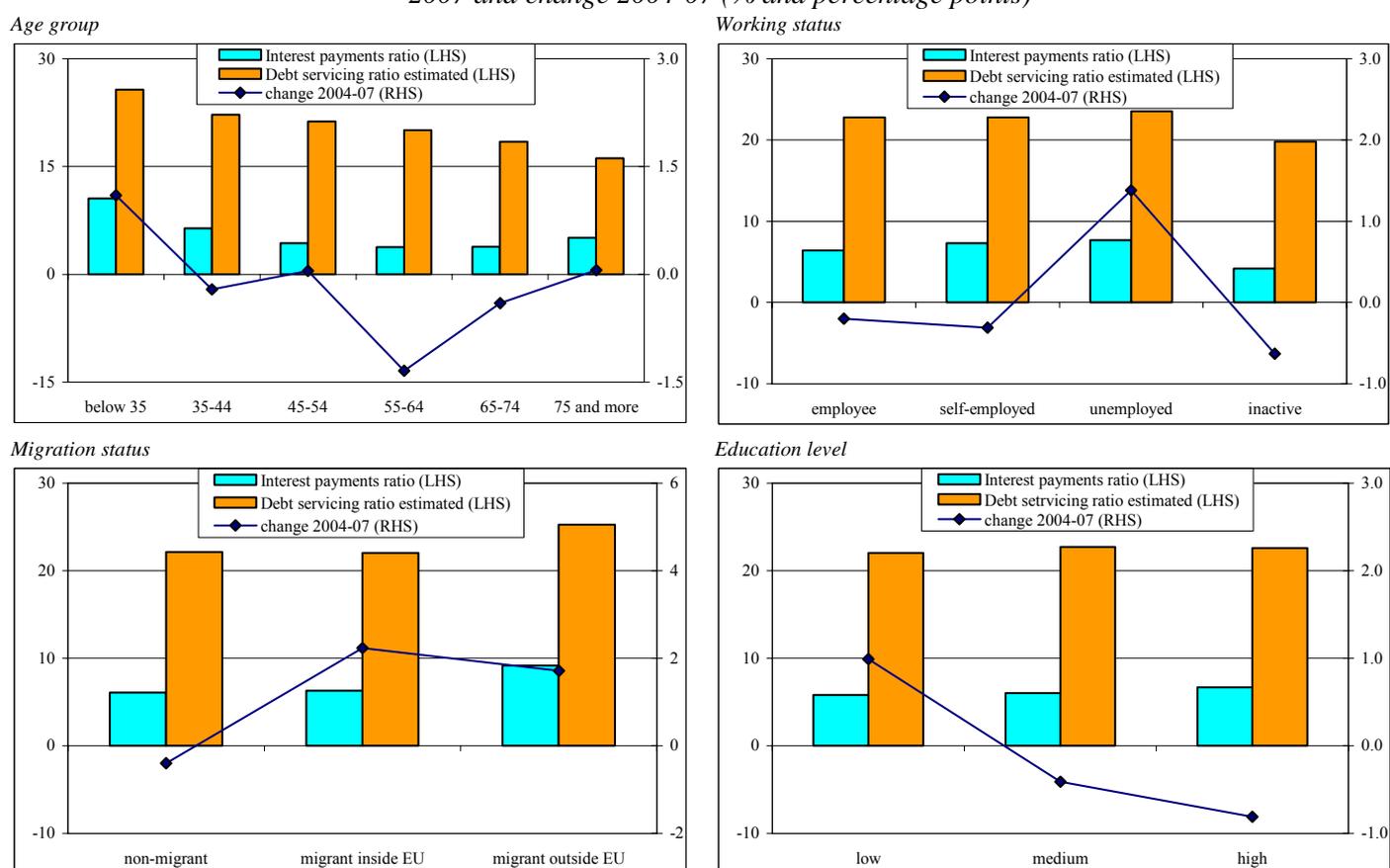
Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). Germany is excluded. Mortgage debt service ratio estimated at the household level by estimating capital repayments using data from the ECHP (see Annex1).

Among the characteristics of the head of household, the differences are not that remarkable as in the case of income, with the exception of age. The interest payments ratio has a slight U-shape relationship against age, as the youngest group shows the highest level, then declines but it increases slightly again for the oldest group (see Chart 7), while the estimated debt servicing ratio declines with age steadily. At the same time, for both indicators there is a broadly positive relationship with the level of attachment to the labour market; and a marginal upward relationship with the level of education (specially for interest payments), and it increases somewhat for immigrants. The most significant differences, with respect to the average, can be seen in the youngest heads of household and in immigrants from outside the EU, showing high interest repayments ratios (and estimated debt servicing ratios) of 10.5% (25.7%) and 9.2% (25.3%) respectively. A multivariate approach relating the fact of holding a mortgage and a consumer loan, and the interest repayments to income ratio with socio-economic characteristics is presented in Box 2.

The information about interest payments and estimates on debt servicing ratios complements that derived from the incidence of debt. In particular, it appears that low income households and to a lesser extent those that have a head of household aged below 35, immigrant from outside the EU or unemployed are making the biggest effort in terms of current income to service their mortgage debt. Although some of these characteristics represent only a small part of overall households and/or have relatively low mortgage outstanding rates, such as low income households or those in which the head of household is unemployed, they have allowed identifying groups in which a strong impact of monetary policy or financial distress may be an issue. The next section will explore further the debt servicing problems.

Chart 7 Mortgage interest payments and overall debt service to income ratio in the euro area by socio-economic characteristics 2007 and change 2004-07 (% and percentage points)



Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). Germany is excluded. Mortgage debt service ratio estimated at the household level by estimating capital repayments using data from the ECHP (see Annex 1).

Finally, regarding recent developments, a marginal decline in the interest payments to income ratio is estimated between 2004 and 2007.¹⁷ This decline has been led by households with relatively high income levels (above 50,000 euros) – by contrast to the increase observed for income groups below 30,000 euros

¹⁷ The developments described refer only to the interest rate payments, as the estimate of the debt servicing ratio is only done for the year 2007. At the same time, as interest payments are not available for all countries in 2004, developments between 2004 and 2007 have been proxied by the change in total housing costs that include interest payments as one of its components.

–, heads of household are in the youngest and oldest age groups (between 35 and 44 years old, and between 55 and 74 years old), in those employed, non-migrants and with medium and high levels of education.

Box 2 Mortgage and consumer debt outstanding, and interest repayments to income ratio – a multivariate approach¹⁸

As mentioned at the beginning of Section 4, some of the socio-economic characteristics chosen are susceptible to show a high degree of correlation among them. The purpose of this box is to explore to what extent a multivariate approach would confirm the main findings described for mortgage and consumer outstanding rates, and interest repayments regarding their linkages to income and other socio-economic variables.

In order to enrich the analysis, the number of variables has been extended in various directions. First, other socio-economic characteristics have been considered both for the household (including the number of durable goods owned and the number of members) and for the head of household (including gender, marital status and being employee with a temporary versus a permanent contract). Second, in order to account for the cyclical position of the economy and the level of welfare, the employment rate of the region has been included.¹⁹

The results confirm that after controlling for all other factors it is still more likely to hold a mortgage if the income is higher, and the interest repayments to income ratio would also typically be lower. On the other hand, the relationship between income and holding a consumer loan is less clear. Indeed, the proportion of households with consumer debt is significantly higher than the benchmark (lowest income group) only for the mid income levels. At the same time, the probability of holding a mortgage increases for those 35 to 44 years old and declines for the older age groups, while age is negatively correlated with holding consumer debt. The multivariate approach also confirms that the probability of holding a mortgage increases with the level of education, as well as the interest repayments to income ratio, while that of consumer debt declines, instead of showing a slight increase. Also in contrast with the bivariate analysis, being an immigrant is positively correlated with holding a mortgage, but it is negatively correlated with holding consumer debt and reduces the debt-servicing ratio, especially for those coming from inside the EU. Finally, the results by working status are broadly confirmed for the probability of holding a mortgage and consumer debt, but, regarding the interest repayments to income ratio, only the increase for those self-employed and the decline for those inactive are confirmed, while the increase for the unemployed seen in the bivariate analysis is not significant.

¹⁸ The analysis is also done for the estimated debt service to income ratio, although due to the similarities of the results with those of the interest repayments ratio, only the latter is described in the text.

¹⁹ See Annex 1 for more details.

Table: The impact of socio-economic characteristics on holding a mortgage and on the interest repayments and the overall service to income ratios across euro area countries, 2007

	Mortgage outstanding (1)	Consumer debt outstanding (1)	Interest service ratio (2)
	<i>coef.</i>		<i>coef.</i>
Constant	-1.954 ***	-2.930 ***	-2.324 ***
<i>Income level</i>			
decile 3-4	0.267 ***	0.135 ***	-0.372 ***
decile 5-6	0.499 ***	0.120 ***	-0.634 ***
decile 7-8	0.657 ***	0.061 ***	-0.869 ***
decile 9	0.736 ***	0.024	-1.040 ***
decile 10	0.755 ***	-0.015	-1.276 ***
<i>Age group</i>			
35-44	0.144 ***	-0.198 ***	-0.363 ***
45-54	-0.184 ***	-0.121 ***	-0.830 ***
55-64	-0.477 ***	-0.181 ***	-1.073 ***
65-74	-0.778 ***	-0.495 ***	-1.329 ***
75 +	-1.184 ***	-1.000 ***	-1.318 ***
<i>Education level</i>			
medium	0.103 ***	-0.045 ***	-0.001
high	0.207 ***	-0.217 ***	0.176 ***
<i>Working status</i>			
employee (temporary)	-0.305 ***	0.098 ***	-0.058
self-employed	-0.141 ***	0.075 ***	0.046 **
unemployed	-0.393 ***	0.122 ***	0.006
inactive	-0.275 ***	-0.040 **	-0.160 ***
<i># Durable goods owned</i>			
1	-0.208 **	-0.231 ***	0.150
2	-0.172 ***	-0.072 ***	0.100
4	0.140 ***	0.087 ***	0.029
<i>Regional economic activity</i>			
employment rate	0.009 ***	-0.008 ***	0.015 ***
<i>Household size</i>			
# members	0.022 ***	0.034 ***	-0.033 ***
<i>Marital status</i>			
married	0.311 ***	-0.080 ***	-0.046 *
separated	0.381 ***	0.115 ***	0.229 ***
widowed	0.332 ***	-0.044 *	-0.041
divorced	0.293 ***	0.118 ***	0.203 ***
<i>Gender</i>			
female	-0.149 ***	-0.045 ***	-0.098 ***
<i>Migration status</i>			
inside EU	0.212 ***	-0.141 ***	-0.397 ***
outside EU	0.014	-0.071 **	-0.209 ***
Country dummies	yes	yes	yes
# Observations	102,988	102,988	21,752
LR chi2(q)	27,464.7	7,485.4	-
R-squared	-	-	0.311

Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: (1) Probit estimate; German data refer to 2005. (2) OLS estimate (logit transformation); excluding Germany.

Statistically significant at *** 1%, ** 5% and * 10%. In both (1) and (2), the benchmark case is characterised by: households in the income decile 1-2 and holding three durable good (including telephone, washing machine, colour-TV and PC) and with a head of household below 35 years old, low educated, employee, single, male and non-migrant.

Turning to the additional variables considered, a positive economic situation in the region of residence (i.e. a high employment rate) is positively correlated with holding a mortgage and with the interest repayments to income ratio, but negatively with holding only consumer debt. This may reflect that in

relatively prosperous regions the likelihood that households take a mortgage increases (possibly because of lower income risk but also because housing in such regions has a higher probability of resale) and that they are able or willing to sustain a higher effort to service the debt. Similarly, in prosperous regions households may have to draw less on consumer debt as a means of financing expenditure in the absence of current income. The household size is positively correlated with holding a mortgage and consumer debt, but negatively correlated with the interest repayments to income ratio, meaning that in big households more members tend to be income earners and this tends to lower the burden or that the effort has to be somewhat reduced in order to face other expenditures. The same applies to the number of durable goods owned, as an indirect measure of wealth, which is positively correlated with holding a mortgage and consumer debt, although in the latter case it could be a sign of reverse causality as it is precisely durable goods that are often financed by consumer credit. The distinction between those heads of households that have a temporary or permanent employment contract indicates that temporary workers have a lower probability of holding mortgage debt, but higher of holding consumer debt - relative to permanent workers. There is, however, no significant difference in terms of interest repayments of mortgage debt. At the same time, the fact the head of household is married, separated, widowed or divorced, increases the probability of holding a mortgage, relative to being single, and, in the case of those separated or divorced, it is also positively correlated with the interest repayments to income ratio. By contrast, being married or widowed reduces the probability of holding consumer debt, relative to being single, while for those divorced it increases. Finally, being head of household and female reduces the probability of holding both a mortgage and consumer debt, and in case of holding a mortgage, it has also a negative effect on the interest repayments to income ratio.

In sum, the multivariate analysis tends to corroborate the descriptive results derived from the bivariate analysis. Overall, combining these results with the population weights shown in Table 1 would indicate that the typical household holding a mortgage would be at top deciles of the income distribution and its head of household would be between 35 and 44 years old, with a medium to high education level and employed. At the same time, the typical household with consumer debt only would be at the mid to lower deciles of the income distribution and its head of household would be below 54 years old, with a medium and low level of education level and employed. Finally, a high interest service ratio on mortgage debt is associated with households at the lower income deciles, and with a head of household either at the youngest or oldest age group, low to medium education level, self-employed or unemployed and non-migrant.

4.3 Households with high total housing costs to income ratio and late payments

The exposure to debt payment problems can be assessed by means of looking at households that have a high debt servicing ratio. This is typically defined as the proportion of families for which debt servicing, including both interest payments and capital repayments, represents more than 30 or 40% of their income and thus goes beyond what renting would normally absorb. As the EU-SILC does not provide a direct measure of debt service at the household level, and the estimate shown in the previous section is

considered to be an informative proxy for median values by income levels and other socio-economic characteristics, but not a valid estimate at the household level, we will focus, alternatively, on the percentage of households holding a mortgage for which the ratio of total housing costs – which includes interest repayments on mortgages among other expenditures – to income is over 40%, which could still be a good indicator of financial stress at the household level.²⁰

Table 2 % Households with high total housing costs to income ratio and with late payments, euro area 2007 and change 2004-07 (% and percentage points)

	% HHs with total housing costs ratio above 40% (mortgage debt)			Debtors with arrears, % (mortgage debt)			Debtors with arrears, % (consumer debt)		
	2007	change 2004-07		2007	change 2004-07		2007	change 2004-07	
Overall	6.8	-0.9		3.9	-0.5		11.1	-0.6	
Country range [max,min]	15.8	0.9		18.3	0.8		43.0	1.3	
By:									
Income level (2007 prices)									
<10,000	60.7	0.4		16.7	5.5		25.3	0.2	
10,000-20,000	26.8	5.5		7.0	-1.6		16.4	-0.6	
20,000-30,000	9.4	0.5		5.9	0.0		12.4	1.3	
30,000-50,000	3.4	-1.4		3.1	-0.3		7.7	-1.0	
50,000-100,000	1.9	-0.9		1.9	-0.4		3.8	-1.5	
>100,000	0.8	-0.1		1.4	0.3		1.5	-1.3	
Age group									
below 35	9.3	-0.4		4.0	0.2		12.6	-0.2	
35-44	6.6	-0.8		4.4	-0.4		12.4	-0.8	
45-54	5.2	-0.9		3.9	-1.3		11.9	-0.4	
55-64	6.8	-0.5		3.1	-0.9		8.9	-0.3	
65-74	5.7	-2.4		2.7	0.2		6.9	-0.5	
75 and more	8.2	-5.4		1.5	0.0		8.5	-2.0	
Working status									
employee	5.4	-0.6		3.3	-0.2		9.8	-0.3	
self-employed	13.4	-1.0		6.7	-0.5		12.7	0.6	
unemployed	10.7	-4.5		9.8	-6.6		27.0	-3.9	
inactive	7.6	-1.1		3.3	-0.5		9.2	-0.8	
Migration status									
non-migrant	6.6	-1.0		3.7	-0.5		10.6	-0.4	
inside EU	5.2	-0.5		4.0	-2.7		7.5	-0.9	
outside EU	11.8	0.9		7.9	-0.9		17.7	-3.0	
Education level									
low	9.4	1.1		6.4	0.0		16.0	1.1	
medium	6.0	-0.9		4.1	-0.2		10.9	-1.2	
high	5.8	-2.3		1.7	-0.9		6.0	-0.7	

Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). Total housing costs defined in Annex 1. Germany is excluded in the first and second columns. The estimates in column three include 2005 data for Germany; Germany is not included in the migration status categories due to lack of information and, overall, in the estimate of the change between 2004 and 2007.

In 2007, 6.8% of households in the euro area had such a high total housing cost to income ratio, only slightly below the figure of 2004 (see Table 2).²¹ This ratio shows a negative relationship with the level of income and with the level of education of the head of household, while it tends to increase for immigrants

²⁰ See Annex 1 for more details.

²¹ Estimates of the proportion of households with total housing costs above 40% do not include Germany, given the measurement problem detected in this country regarding interest repayments on mortgages.

(outside the EU) and for non-employees. The relationship with age has a slight U-shape pattern, i.e. being higher for the youngest and oldest age groups. In particular, the highest proportion across household characteristics is observed for those with the lowest income level (60.7%). In addition, characteristics of the head of household that are associated with high total housing costs include being below 35 years old or 75 years old and above and among the self-employed and unemployed, the non-EU immigrants and the low-skilled.

It is worth signalling that the overall slight decline observed between 2004 and 2007 masks a more marked increase for certain socio-economic characteristics. In particular, the percentage of households with a high total cost ratio in the income bracket between 10,000 and 20,000 euros has increased by 5.5 percentage points and it is now every fourth rather than fifth household in that bracket that has a high housing cost ratio. At the same time, the proportion of households with a high total housing costs ratio has mainly increased in those cases where the head of households is non-EU immigrant and has a low level of education.

An alternative way to address debt payment problems would be to look at late payments, i.e. whether the household has been in arrears (unable to pay scheduled mortgage or consumer loan payments) at any time in the last 12 months.²² In line with the developments in the percentage of households with a high total housing costs ratio, the proportion of households with late payments fell in 2007, to stand at 3.9% and 11.1% for mortgage and consumer debt respectively. However, a slight increase was observed for some household characteristics. Overall, the results show that there is a negative relationship between households facing debt payment problems and the level of income and the level of education, both for mortgage and consumer debt, while the risk increases for immigrants (mainly outside the EU) and those in unemployment. Regarding age, the proportion is broadly stable across groups for those with mortgage debt, but tends to decrease with age for those with consumer debt.

Across household characteristics, the most significant increases between 2004 and 2007 depend on the type of debt. For mortgage debt, significant increases were recorded for those with relatively low income levels (below 10,000 euros) and, to a lesser extent, for those below 35 years old and aged between 65 and 74. For consumer debt, where developments appear to be more balanced, it is worth pointing to the increase in those with a medium level of income (between 20,000 and 30,000 euro), as well as for the low skilled.

From a policy perspective, information on late payments and relatively high housing costs confirms, and in some cases accentuates, the results on the debt service ratio previously discussed. Indeed, although these ratios remained contained in broad terms, they indicate that for certain socio-economic characteristics households' balance sheets may be fragile, such as low income households and households where the head is young, unemployed, low skilled and non-EU immigrant. This fragility may derive in risks in some tails of the distribution if they are not identified early enough. In that sense, an ongoing evaluation of the evolution of the distribution of debt servicing difficulties, among other variables, by

²² For an analysis in depth on late payments, country heterogeneity and the role of institutions, see Duygan-Bump and Grant (2009).

household characteristics is essential for an early assessment of the impact of monetary policy measures and risks of financial vulnerability.

Box 3 presents a detailed comparison between the euro area and the US in terms of the incidence of mortgage debt, mortgage debt service and late payments.

Box 3 Debt payments to income ratio: euro area vs. the US

The estimation of household sector borrowing at the euro area using micro data allows making a comparison with the US picture for specific socio-economic characteristics, which may lead to some general conclusions on the relative situation of households' balance sheet in the euro area. This box puts together euro area estimates based on the EU-SILC and the US estimates derived from the Survey of Consumer Finances (SCF), both for 2007, and focuses in two socio-characteristics that account for most of the variability across households, i.e. income and age.

The concepts examined are the holding of a mortgage on the main residence (percentage of households), the debt service to income ratio (in %) – estimated in the case of the euro area – and a measure of late payments (percentage of households). There are some conceptual differences in the definition of income and household that is worth mentioning. Regarding income, the US definition refers to family's cash-income before taxes and the euro area to total disposable income at the household level. The fact that euro area figures are after taxes should reduce somewhat the variability across income groups relative to the US. Another issue relates to the definition of household: while the euro area uses the standard definition (everyone living in the household), the US focuses on the primary economic unit, i.e. the economically dominant single person or couple together with anyone else who is economically interdependent with that person or couple. This is, however, expected to have a very small impact in the comparison.²³

Bearing in mind these caveats, the proportion of households holding a mortgage on the main residence in the US is 48.7%, compared with an estimate of 22.1% in the euro area. This gap is observable across all income levels and age groups. However, the most significant differences are in the highest income levels, between 30 and 45 percentage points for those above the 60th percentile, and in older age groups, around 35 percentage points for those between 45 and 74 years old. The different picture presented is certainly related to the role mortgages play in Europe and in the US and to the types of contract available. While in the euro area the mortgage debt is used primarily for housing investment, in the US mortgages may also serve as a form to obtain liquidity out of residential assets that can be used, for instance, for consumption or financial investment purposes. This may be particularly important for the old age groups where reverse

²³ From a statistical point of view, German data included in the euro area estimates of mortgage outstanding rates and arrears refer to 2005, and the debt service to income ratio excludes Germany and is estimated using both household level and non-household level information (see Annex 1 for a detailed description). The exclusion of Germany in the calculation of the debt service ratio is not expected to have a big impact in the overall figure, although it can distort somewhat the breakdown by level of income given that available sources estimate a more compressed distribution than in other euro area countries (see Eurosystem Household Finance and Consumption Network (2009)). By contrast, the use of 2005 data for Germany to estimate 2007 euro area aggregates is expected to have a negligible effect, as mortgage outstanding and debt service ratios have shown in the past a high degree of stability over time in this country.

mortgaging is still relatively rare in Europe. Relatively comparable home ownership rates – 63% in the euro area and 69% in the US – seem to confirm this assessment.

Table: Percentage of households holding a mortgage, mortgage debt service to income ratio, share of mortgage debtor households with ratio greater than 40% and share of mortgage debtors in arrears in the euro area and the US, 2007

	Mortgage outstanding rates			Debt service ratio			% Debtors with arrears (mortgage debtors)		
	EA	US	gap US-EA	EA (1)	US	gap US-EA	EA	US	gap US-EA
Overall	22.1	48.7	26.6	22.4	17.2	-5.2	8.1	26.9	18.8
<i>By income level (percentile)</i>									
Less than 20	5.9	14.9	9.0	27.2	42.2	15.0	15.1	50.6	35.5
20-39.9	15.7	29.5	13.8	24.2	25.2	1.0	11.9	40.9	29.0
40-59.9	28.2	50.5	22.3	23.0	20.2	-2.8	8.9	28.5	19.6
60-79.9	38.8	69.7	30.9	21.1	17.3	-3.8	5.3	18.2	12.9
80-89.9	38.3	80.8	42.5	21.3	14.6	-6.7	6.5	13.2	6.7
90-100	41.1	76.4	35.3	20.6	9.7	-10.9	4.1	5.6	1.5
<i>By age group</i>									
below 35	26.5	37.3	10.8	25.7	20.3	-5.4	8.0	32.9	24.9
35-44	38.9	59.5	20.6	22.2	17.4	-4.8	9.4	28.5	19.1
45-54	29.8	65.5	35.7	21.3	16.1	-5.2	7.1	23.3	16.3
55-64	17.6	55.3	37.7	20.0	15.5	-4.5	5.9	21.3	15.4
65-74	7.9	42.9	35.0	18.5	16.5	-2.0	9.9	22.1	12.3
75 and more	2.3	13.9	11.6	16.2	23.1	7.0	9.2	38.5	29.3

Sources: Eurostat (EU-SILC cross-section database), SCF and ECB calculations.

Notes: Euro area aggregates are obtained using 2005 data for Germany. (1) Mortgage debt service ratio, excluding Germany, estimated at the household level by estimating capital repayments using data from the ECHP (see Annex 1).

The table also shows that, overall, indebted households in the US have a slightly lower debt service to income ratio than in the euro area, 17.2% versus 22.4%, a gap that is somewhat downwards biased as income in the euro area is measured after taxes. However, the distribution across income levels points to a higher ratio – and, therefore, financial effort – at the lower levels in the US than in the euro area, as the ratio is higher in the US at the lower levels of income (below the 40th percentile). In particular, for those families below the 20th percentile of income – which includes the sub-prime – the debt service to income ratio in the euro area is estimated at around 27.2%, while that of the US is 15 percentage points higher. Turning to the distribution across age groups, it appears that the gap US vis-à-vis the euro area is more stable than for the income breakdown, the only exception being the oldest age group that shows a higher ratio in the US, possibly due to practices like reverse mortgaging.

By contrast, the proportion of debtors with arrears on mortgage payments is much higher in the US, a fact that is not taking into account the proportion of foreclosures and personal bankruptcies in the US, which is estimated in 2007 at around 1% of debtor households – while it is expected to be negligible at the euro area. In particular, the percentage of debtors in arrears is more than 30 percentage points higher in the US for the lowest income group and above 20 percentage points higher for the youngest group. Interestingly, the situation is broadly comparable for the highest income levels.

Overall, the higher participation in the mortgage market for all age and income categories in the US than in the euro area, albeit the gap being more significant for the higher income level groups, the higher debt service to income ratio for the lowest income level families holding a mortgage and a higher percentage of families with late payments on mortgages, especially in lower income groups, tends to indicate that the US appears to be more exposed to the risks associated to household balance sheet problems than the euro area and the transmission of monetary policy may be stronger.

4.4 Changes in Payments Burdens for Individual Households

By concentrating on a balanced panel of households over time, it is possible to know how persistent the payment burden of debt is for households. This exercise is done using the longitudinal database of the EU-SILC that, for 2007, including all the euro area countries considered except Germany. At the same time, as the debt service ratio cannot be computed in the longitudinal database, the variable used is the perception of households as to how much of burden housing costs are – which is divided in three categories: not a burden, somewhat a burden and a heavy burden.

Table 3 displays the results of this exercise, indicating changes in the perception between 2004 and 2007.²⁴ For instance, the figure in the second row and third (fourth) column indicates that 25.1 % (4.4%) of the families that perceived housing costs as not being a burden at all in 2004 were in 2007 of the opinion that housing costs are somewhat of a burden (a heavy burden). But developments can obviously also go the other way: of the households reporting housing costs a heavy burden in 2004, in 2007 30.4% (8.0%) said that this was only somewhat of a burden (no burden at all).

Table 3 Changes in the perception of households with mortgage outstanding about housing costs as a burden between 2004 and 2007 (percent distribution)

2004 perception	2007 perception				
	No mortgage debt	Not burden at all	Somewhat a burden	A heavy burden	All households
No mortgage debt	93.2	2.0	3.1	1.7	100
Not burden at all	19.0	51.5	25.1	4.4	100
Somewhat a burden	17.6	20.9	47.8	13.6	100
A heavy burden	19.2	8.0	30.4	42.4	100
All households	70.0	9.8	13.7	6.6	100
Pro memoria:					
<i>All households 2004</i>	<i>69.0</i>	<i>9.3</i>	<i>14.7</i>	<i>7.1</i>	<i>100</i>

Sources: Eurostat (EU-SILC longitudinal database) and ECB calculations.

Note: Germany is not included.

²⁴ The balance panel is formed by 23,000 households. No weighting scheme is used to compute the euro area aggregate results.

There are two main conclusions that can be extracted. Firstly, there seems to be a high persistence in the perception of burdensome housing costs between 2004 and 2007, as reflected in the fact that the biggest proportions are observed in the main diagonal of the table, i.e. 51.5% still perceive housing costs not being a burden at all, 47.8% being somewhat of a burden and 42.4% being a heavy burden. Moreover, the persistence at a low level of perceived burden is higher than at a high level. Secondly, the overall perception has moved slightly to a more positive territory. For instance, those considering housing costs somewhat of a burden in 2004 have mainly moved to not a burden at all (20.9%) rather than to a heavy burden (13.6%).

5. Summary and policy conclusions

The information provided in the EU-SILC microeconomic dataset suggests that the distribution of both household debt and the burden/perceived problems of servicing this debt is skewed in the euro area. In particular, households in the lower income groups and households where the head is unemployed or an immigrant have a lower probability of holding mortgage debt. However, if they hold it, their probability of experiencing the debt servicing as burdensome – and even leads to late payments – is higher. For consumer debt the situation is less clear cut, as the distribution of holding consumer debt, in particular across income levels and working status, is more balanced. At the same time, late payment problems seem more acute than for mortgage debt, and are mostly concentrated in low income families and in those with the head of household unemployed, immigrant and with a low level of education.

Benchmarking the exposure to debt and the vulnerability implied by debt servicing is obviously difficult. One possibility is to compare the situation with that in the US. In this respect, it appears that the level of exposure to household balance sheet problems is relatively contained in the euro area, at least when measured in terms of the percentage of households having a mortgage and the percentage of households being affected by late payments. On the other hand, there is a high heterogeneity within the euro area – with a range in mortgage incidence and mortgage debt service between 10%-48% and 8%-25% respectively – that indicates that the exposure to household balance sheet problems is not equally distributed and in some euro area countries may be similar to that in the US.

Some benchmarking can also be achieved by looking at developments over time. Data for the period 2004 to 2007 suggest that the increase in the proportion of mortgage holders was not associated with increases in the burden that these mortgages imply with regard to interest payments, total housing costs, or late payment. However, risks associated to household balance sheets have increased in some specific groups. In particular, the debt service to income ratio has increased mainly for relatively low income households and in which the head of household is very young, unemployed, migrant and with a low level of education. Another example is mortgage debt arrears, where the data point to vulnerability of debtor households at the lowest income level and where the head of household is 65 years old and above.

These findings have implications for the assessment of the effectiveness of the transmission of monetary policy as they imply that there are pockets of vulnerability in the household sector with regard to indebtedness. This, in turn, means that the incidence of higher household indebtedness at the aggregate level may not be associated with a deterioration of the household sector's balance sheet and a different responsiveness of spending to changes in monetary policy, but that such a change in responsiveness can occur as a result of a changed distribution in the incidence of debt.

Obviously, whether a higher vulnerability through indebtedness ultimately leads to a changed responsiveness of spending to monetary policy impulses depends on the particular economic conditions and options for households to smooth out shocks in other ways. For instance, if vulnerable households had the possibility to decrease their savings ratios, to liquidate financial assets, to withdraw equity from their home, or to draw on unsecured borrowing, then a *prima facie* higher exposure to changes in interest rates could be cushioned and there would be no direct impact on spending. Of course, through changes in net wealth, such impacts could then come as a second round effect. The particular nature of the financial tensions and crisis starting in 2007 curtailed many of the possibilities for households to smooth out interest rate shocks, as house prices slumped at the same time as income uncertainty increased, and as banks tightened their standards for unsecured and secured debt.

These considerations show that microeconomic data on indebtedness are a first step to gauge possible changes in the monetary transmission, but that in order to get a complete picture, these micro data would need to be complemented with micro data for households' asset holdings and savings. Moreover, the impact that debt and asset positions at the micro level have on aggregate spending in the context of monetary transmission should ideally be tested in micro-macro simulations. These are promising areas for future research, and the forthcoming Eurosystem Household Finance and Consumption Survey (HFCS) with its harmonised structural information on both assets and liabilities will significantly increase the scope of such research.

Annex 1: DEFINITIONS**Table A.1.1** Financial and non-financial variables – EU-SILC

Financial variables at the household level	
Mortgage debt holding	Derived from a positive answer to the question on interest repayments on mortgage.
Consumer debt holding	Derived from the financial burden of the repayment of non-housing related debts (a heavy burden, somewhat of a burden and not a burden at all); current.
Mortgage interest repayments	Total gross amount of mortgage interest on the main residence of the household; it excludes payments on mortgages for repairs/renovation or for non-housing purposes, and repayments of the principal; annual amount over the previous 12-month period.
Mortgage debt service to income ratio (estimated)	<p>Obtained by adding to the mortgage interest repayments an estimation of the repayments of the principal derived from the ECHP – annual amount as percentage of income –, which contains information on total mortgage service following:</p> $dsr_est_i = isr_i + csr_g$ $csr_g = dsr_g - isr_g$ <p>where dsr_est_i \equiv mortgage debt service to income ratio estimated at household level; isr_i \equiv mortgage interest repayments to income ratio at household level (EU-SILC); csr_g \equiv mortgage capital (or principal) repayments to income ratio estimated at income/age groups level (three income groups and three age groups are defined: first/second, third and fourth income quartiles, and below 35, between 35 and 45 and 45 and above, respectively); dsr_g \equiv mortgage debt service to income ratio at income/age groups level (ECHP); and isr_g \equiv mortgage interest repayments to income ratio at income/age groups level (EU-SILC).</p>
Total housing cost	It includes mortgage interest payments, structural insurance, mandatory services and charges, regular maintenance and repairs, taxes and the cost of utilities; monthly current cost.
Income	Total disposable household income: based on total gross household income (i.e. the sum for all members of gross personal income) minus taxes on income/wealth, transfers paid and social insurance contributions; annual income over the previous 12-month period. Includes PPP adjustment across countries. The income level breakdown also includes an HICP adjustment within countries (2007 prices).
Late payments	Arrears on mortgage and on consumer loan payments; incidence over the last 12 months.
Mortgage debt burden	Financial burden of the total housing cost (a heavy burden, somewhat of a burden and not a burden at all); current.

Non-financial variables at the household level	
Durable goods own	Durable goods include telephone, colour TV, computer, washing machine and car ownership; current incidence.
Tenure status	Owner of the house (one member of the family) versus tenant/subtenant and accommodation rented at a reduced price or provided for free; current.
Household size	Number of members in the household; current.
Personal characteristics of the head of household	
Head of household	The head of household is identified in a very standard way, via the person answering the questions in the interview: i) if the interviewed person is male, he is considered the head of household; ii) if the interviewed person is female and her spouse/partner is part of the household, the latter is considered the head of household; iii) if the interviewed person is female and has no spouse/partner being part of the household, she is would be the head of household.
Age and gender	Age at the date of the interview. Male/female.
Marital status	Includes never married, married, separated, widowed and divorced; current.
Nationality	Based on the country of birth: non-migrant (born in the same country as country of residence), EU-migrant (born in any EU-25 country except the country of residence) and non-EU migrant (born in any other country).
Education level	Highest ISCED level of educational attained: low (pre-primary, primary and lower-secondary education), medium (upper secondary and post-secondary non tertiary education) and high (first and second stage of tertiary education); current.
Working status	Derived from the basic activity status and the status in employment: at work employee, at work self-employed, unemployed and in retirement/early retirement/other inactive person; current.
Other variables	
Country	Countries from the so-called Euro Area-12 have been included, i.e. Belgium, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland.
Regional economic activity	Proxied by the employment rate of the region in which the household is located, which is available for all countries except for the Netherlands, Portugal, Ireland and Luxembourg. In the latter cases the employment rate for the country as a whole has been used. Source: Eurostat (EU-Labour Force Survey).

Annex 2: SUMMARY OF DATA AVAILABILITY

Table A.2.1 Summary of data availability, EU-SILC 2004 and 2007

	2004				2007				Pro memoria: 2007 including DE 2005			
	Mortgage oustanding	%	TOTAL	%	Mortgage oustanding	%	TOTAL	%	Mortgage oustanding	%	TOTAL	%
<i>Country</i>												
Austria	236	1.0	1,077	1.1	1,792	6.9	6,806	7.0	1,792	6.1	6,806	6.2
Belgium	1,573	6.6	5,245	5.5	1,959	7.6	6,287	6.5	1,959	6.7	6,287	5.7
Germany	-	-	-	-	-	-	-	-	3,362	11.5	13,040	11.9
Spain	3,532	14.8	13,718	14.4	3,258	12.6	12,159	12.6	3,258	11.1	12,159	11.1
Finland	3,881	16.3	11,184	11.7	3,996	15.4	10,604	10.9	3,996	13.7	10,604	9.6
France	1,910	8.0	10,142	10.7	2,260	8.7	10,493	10.8	2,260	7.7	10,493	9.5
Greece	823	3.5	6,240	6.6	545	2.1	5,632	5.8	545	1.9	5,632	5.1
Ireland	1,350	5.7	5,474	5.7	1,229	4.8	5,608	5.8	1,229	4.2	5,608	5.1
Italy	2,619	11.0	24,256	25.5	2,438	9.4	20,899	21.6	2,438	8.3	20,899	19.0
Luxembourg	1,325	5.6	3,564	3.7	1,229	4.8	3,875	4.0	1,229	4.2	3,875	3.5
Netherlands (1)	5,426	22.8	9,351	9.8	6,394	24.7	10,193	10.5	6,394	21.9	10,193	9.3
Portugal	1,159	4.9	4,977	5.2	772	3.0	4,306	4.4	772	2.6	4,306	3.9
<i>Income level (2007 prices)</i>												
<10,000	555	2.3	8,943	9.4	378	1.5	7,135	7.4	402	1.4	7,828	7.1
10,000-20,000	2,193	9.2	21,985	23.1	1,817	7.0	20,408	21.1	2,020	6.9	23,116	21.0
20,000-30,000	4,285	18.0	20,204	21.2	4,045	15.6	20,162	20.8	4,500	15.4	22,964	20.9
30,000-50,000	9,771	41.0	26,803	28.1	10,235	39.6	28,308	29.2	11,641	39.8	32,436	29.5
50,000-100,000	6,312	26.5	15,308	16.1	8,368	32.3	18,333	18.9	9,531	32.6	20,774	18.9
>100,000	718	3.0	1,985	2.1	1,029	4.0	2,516	2.6	1,140	3.9	2,784	2.5
<i>Age group</i>												
below 35	4,440	18.6	13,896	14.6	4,429	17.1	12,998	13.4	4,631	15.8	14,156	12.9
35-44	8,143	34.2	19,072	20.0	8,791	34.0	18,688	19.3	9,958	34.1	21,734	19.8
45-54	6,339	26.6	19,557	20.5	7,139	27.6	20,042	20.7	8,246	28.2	23,009	20.9
55-64	3,367	14.1	17,155	18.0	3,989	15.4	18,421	19.0	4,562	15.6	20,824	18.9
65-74	1,145	4.8	14,225	14.9	1,179	4.6	14,404	14.9	1,448	5.0	16,815	15.3
75 and more	400	1.7	11,323	11.9	345	1.3	12,309	12.7	389	1.3	13,364	12.2
<i>Working status</i>												
employee	16,327	68.5	41,958	44.1	17,988	69.5	43,318	44.7	20,375	69.7	49,807	45.3
self-employed	3,470	14.6	12,096	12.7	3,770	14.6	12,033	12.4	4,084	14.0	12,921	11.8
unemployed	708	3.0	4,105	4.3	537	2.1	3,521	3.6	661	2.3	4,340	3.9
inactive	3,329	14.0	37,069	38.9	3,577	13.8	37,990	39.2	4,114	14.1	42,834	39.0
<i>Migration status (2)</i>												
non-migrant	22,208	93.2	88,171	92.6	23,832	92.1	88,464	91.3	26,987	92.3	100,252	91.2
inside EU	884	3.7	3,041	3.2	1,091	4.2	4,057	4.2	1,091	3.7	4,057	3.7
outside EU	742	3.1	4,016	4.2	949	3.7	4,341	4.5	1,156	4.0	5,593	5.1
<i>Education level</i>												
low	7,081	29.7	43,743	45.9	6,188	23.9	39,100	40.4	6,319	21.6	40,275	36.6
medium	9,353	39.2	33,129	34.8	10,881	42.1	37,182	38.4	12,398	42.4	43,535	39.6
high	7,400	31.0	18,356	19.3	8,803	34.0	20,580	21.2	10,517	36.0	26,092	23.7
# Observations	23,834		95,228		25,872		96,862		29,234		109,902	

Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). (1) 2004 data refer to 2005; (2) Germany not included in the migration status categories due to lack of information.

Annex 3: LONG-TERM PERSPECTIVE**Table A.3.1** Distribution of households by selected characteristics
1995-2007

Distribution of households by selected characteristics			
	1995	2007	change
<i>By:</i>			
<i>Income level (2007 prices)</i>			
<10,000	15.1	7.9	-7.2
10,000-20,000	29.4	23.5	-5.9
20,000-30,000	23.4	22.3	-1.1
30,000-50,000	23.1	28.2	5.1
50,000-100,000	7.5	16.2	8.7
>100,000	0.6	1.9	1.3
<i>Age group</i>			
below 35	20.2	15.7	-4.5
35-44	19.0	20.1	1.1
45-54	17.6	18.8	1.2
55-64	16.6	16.8	0.2
65-74	13.7	15.8	2.1
75 and more	12.9	12.8	-0.1
<i>Working status</i>			
employed	54.8	55.8	1.0
unemployed	5.4	4.6	-0.8
inactive	39.8	39.7	-0.1
<i>Housing status</i>			
Owner	58.1	61.3	3.2
Renter or other	41.9	38.7	-3.2
<i>Pro memoria:</i>			
# observations	58,318	109,902	

Sources: Eurostat (ECHP and EU-SILC cross-section database) and ECB calculations.

Note: The aggregate for 1995 includes data of 1996 for Finland and Luxembourg and the aggregate for 2007 includes data of 2005 for Germany.

Table A.3.2 Percentage of households holding a mortgage and consumer debt in the euro area 1995-2007

	Mortgage outstanding rates			Consumer debt outstanding rates		
	1995	2007	change	1995	2007	change
Overall	20.4	22.1	1.7	14.0	17.2	3.2
By:						
<i>Income level (2007 prices)</i>						
<10,000	5.2	4.4	-0.8	9.7	10.2	0.5
10,000-20,000	9.9	8.4	-1.5	13.8	15.7	1.9
20,000-30,000	22.9	18.2	-4.7	16.9	18.9	2.0
30,000-50,000	35.2	32.5	-2.7	14.5	19.2	4.7
50,000-100,000	40.1	41.5	1.4	12.3	17.1	4.8
>100,000	30.6	35.0	4.4	10.2	17.3	7.1
<i>Age group</i>						
below 35	20.7	26.5	5.8	22.5	24.9	2.4
35-44	36.9	38.9	2.0	17.6	20.5	2.9
45-54	30.7	29.8	-0.9	16.4	21.5	5.1
55-64	17.1	17.6	0.5	11.7	18.2	6.5
65-74	6.9	7.9	1.0	6.5	10.3	3.8
75 and more	2.6	2.3	-0.3	1.8	3.4	1.6
<i>Working status</i>						
employed	31.0	33.2	2.3	17.9	21.4	3.4
unemployed	12.1	13.2	1.1	18.3	25.2	6.9
inactive	7.8	7.8	0.0	7.7	10.5	2.8
Pro memoria:						
# observations	58,318	109,902		58,318	109,902	

Sources: Eurostat (ECHP and EU-SILC cross-section database) and ECB calculations.

Note: The aggregate for 1995 includes data of 1996 for Finland and Luxembourg and of 1997 for Germany; and the aggregate for 2007 includes data of 2005 for Germany.

Annex 4: MORTGAGE OUTSTANDING AND DEBT SERVICING RATIO**Table A.4.1** Percentage of households holding a mortgage and consumer debt, mortgage interest payments and overall debt service to income ratio in the euro area 2007 and change 2004-07 (% and percentage points)

	Mortgage outstanding rates		Consumer debt outstanding rates		Debt servicing ratio (mortgage debt)			
	2007	change 2004-07	2007	change 2004-07	Interest repayments		Interest + capital repayments - estimation	
					2007	change 2004-07	2007	
Overall	22.1	1.7	17.2	-0.9	6.2	-0.3	22.4	
Country range [max,min]	48.2	9.7	27.4	8.4	14.6	2.3	25.1	7.6
Standard deviation					9.2		9.7	
By:								
Income level (2007 prices)								
<10,000	4.4	0.0	10.2	-0.1	19.2	1.8	32.5	
10,000-20,000	8.4	-0.1	15.7	-0.1	9.2	2.1	25.6	
20,000-30,000	18.2	0.8	18.9	-1.7	8.3	1.2	24.2	
30,000-50,000	32.5	0.3	19.2	-1.3	6.4	0.0	22.6	
50,000-100,000	41.5	3.7	17.1	-1.7	4.6	-0.1	20.6	
>100,000	35.0	5.9	17.3	-1.3	2.6	-0.2	18.9	
Age group								
below 35	26.5	4.0	24.9	-1.5	10.5	1.1	25.7	
35-44	38.9	4.7	20.5	-1.4	6.4	-0.2	22.2	
45-54	29.8	1.7	21.5	-2.3	4.4	0.0	21.3	
55-64	17.6	0.8	18.2	0.4	3.8	-1.3	20.0	
65-74	7.9	0.2	10.3	1.1	3.8	-0.4	18.5	
75 and more	2.3	-0.7	3.4	0.4	5.1	0.1	16.2	
Working status								
employee	34.2	2.6	21.5	-2.2	6.4	-0.2	22.8	
self-employed	28.4	3.0	20.9	-0.8	7.3	-0.3	22.8	
unemployed	13.2	-0.9	25.2	1.7	7.7	1.4	23.5	
inactive	7.8	0.2	10.5	0.5	4.2	-0.6	19.8	
Migration status								
non-migrant	22.6	1.6	17.1	-0.9	6.1	-0.4	22.2	
inside EU	19.5	-0.2	18.1	-1.4	6.3	2.2	22.0	
outside EU	19.0	4.0	22.4	-0.7	9.2	1.7	25.3	
Education level								
low	13.9	0.4	14.5	-0.8	5.8	1.0	22.0	
medium	22.7	1.7	19.8	-1.6	6.0	-0.4	22.7	
high	31.4	1.8	16.1	0.1	6.7	-0.8	22.6	

Sources: Eurostat (EU-SILC cross-section database) and ECB calculations.

Notes: Income levels in euros (2007 prices). The estimates on mortgage outstanding rates for 2007 include 2005 data for Germany; Germany is not included in the migration status categories due to lack of information and, overall, in the estimate of the change between 2004 and 2007. The estimates on mortgage debt service ratios exclude Germany; mortgage debt service ratios estimated at the household level by approximating capital repayments using data from the ECHP (see Annex 1).

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