# ARTICLES

# THE FINANCIAL VULNERABILITY OF EURO AREA HOUSEHOLDS – EVIDENCE FROM THE EUROSYSTEM'S HOUSEHOLD FINANCE AND CONSUMPTION SURVEY

*This article highlights three examples of new cross-country comparative research based on data from the Eurosystem's Household Finance and Consumption Survey (HFCS) – research that is particularly relevant to the assessment of financial stability. First, the article investigates how the financial vulnerability of households is affected by different adverse macroeconomic shocks, finding that the effects of such shocks are fairly limited at the euro area level. Second, a new methodology is presented which combines household-level data with aggregate data, providing timely estimates of the impact of shocks on individual households. Those estimates suggest that high-income households have recently experienced the largest declines in wealth. Meanwhile, the impact on consumption expenditure by low-income households has probably been magnified owing to their stronger response to wealth shocks. Third, the extended dataset is then used to derive a breakdown of the effect of recent changes in interest rates and unemployment on measures of financial vulnerability (such as the debt service-to-income ratio). The article finds that, although households with variable rate mortgages have benefited from declines in interest rates, the impact of falling rates on the debt service-to-income ratios of low-income households has been dampened by the fact that poorer households have been disproportionately affected by rising unemployment.*

## 1 INTRODUCTION

The financial positions of euro area households differ significantly both within and across countries, reflecting differences in income, consumption, wealth, debt holdings and portfolio allocation. This has implications for central banks. For example, the impact that changes in interest rates will have on the consumption expenditure of an individual household depends crucially on that household's overall financial position – for example, whether it is a net debtor or a net creditor, and whether the interest rates on its assets and liabilities are fixed or variable. Such differences have macroeconomic implications, as the economy's overall response to policy changes will depend on the distribution of assets and debt across households – especially in times of crisis, when economic shocks are large and unevenly distributed. Consequently, a deep understanding of the economy's responses to various shocks or changes in policy instruments requires detailed information on the structure and composition of household finances at the micro level.

Central banks have long been involved in the collection and analysis of data on the financial positions of individual households, reflecting the importance of household finances for monetary policy and the analysis of financial stability. In 1983 the Federal Reserve System launched its Survey of Consumer Finances, which is conducted every three years. Several other central banks have since decided to follow suit and carry out household finance surveys of their own. Here in Europe, the Eurosystem (comprises the ECB and the NCBs of all the countries that have adopted the euro) has recently launched its Household Finance and Consumption Survey. This joint effort involving the central banks of the Eurosystem and a number of national statistical institutes aims to produce data which are comparable across countries.

The HFCS provides detailed data on individual household balance sheets and other aspects of household finances. That dataset currently contains a wealth of information on the finances of over 62,000 households across 15 euro area countries. In April 2013 the ECB published the results of the first wave of the survey,[1] and a number of research projects using those data have

1 For an overview, see the article entitled "The Eurosystem Household Finance and Consumption Survey: Description and main results of the first wave", *Monthly Bulletin*, ECB, April 2013. Extensive information about the survey is available on the ECB's website (www.ecb.europa.eu/home/html/researcher_hfcn.en.html), especially in two ECB reports accompanying the public release of the HFCS dataset: "The Eurosystem Household Finance and Consumption Survey: Results from the first wave" and "The Eurosystem Household Finance and Consumption Survey: Methodological report for the first wave".

since been carried out by Eurosystem researchers. That dataset has also been made available beyond the confines of the Eurosystem, and some 300 external researchers are now working on around 130 different projects using those data. The availability of that information has triggered substantial research activity across the euro area on the subject of household finances.

Research projects using the new data cover a very wide range of topics. Some are studying the links between asset prices and consumption, while others are tracking patterns in debt holdings, wealth and income inequality. Other projects, for example, are gauging the impact that inflation and changes in interest rates have on various households, or estimating the determinants of saving, credit constraints and financial vulnerability.

These topics reflect recent developments in household finance, which is a relatively new research field compared with areas such as corporate finance.[2] The HFCS acts as a catalyst for the further development of this field, particularly in terms of cross-country comparisons. It is also an important input into assessments of macroeconomic and financial stability.

A comprehensive summary of all the results available thus far is beyond the scope of this article. Instead, the article puts the spotlight on three areas that are particularly relevant for the analysis of financial stability.

First, the experiences of a number of countries during the crisis have highlighted the crucial role played by household balance sheets in determining the intensity, duration and macroeconomic impact of the crisis. Accordingly, Section 2 focuses on the financial vulnerability of households – i.e. the risk that adverse shocks will trigger financial distress for particular types of household. Specifically, it uses simulation analysis to "stress test" households' financial positions, in order to see how alternative macroeconomic scenarios affect various measures of households' financial vulnerability and estimate potential losses for the banking system if households default.

Section 3 of the article shows how the usefulness of the HFCS dataset for monetary policy – and for financial stability in particular – can be increased by introducing aggregate data. One major limitation of data derived from household finance surveys is the amount of time taken to collect and process that information. Consequently, data are published with a substantial lag. For example, the HFCS data that were released in 2013 related mainly to the year 2010. For many policy purposes, this delay is simply too long (particularly when there are major changes in asset prices and/or economic conditions). Fortunately, this problem can be alleviated by combining the cross-sectional survey data with more timely aggregate data (e.g. data on asset prices). This makes it possible to derive timely estimates of several relevant indicators of households' financial positions and, ultimately, to ascertain the implications for the dynamics of consumption. The results of such an approach are presented in Section 3.

Section 4 demonstrates one possible use of such extended HFCS data. Using the technique described above, it looks at how the distribution of financial pressures on households (as measured, for example, by the debt service-to-income ratio) evolves over time and how its dynamics are affected by changes in interest rates and the unemployment rate. Such timely measures of financial pressure are useful not only in terms of analysing the risks to financial stability, but also for more general macroeconomic analysis.

2 For an overview of household finance and key references, see: Campbell, J.Y., "Household Finance", presidential address to the American Finance Association, *The Journal of Finance*, Vol. 61(4), 2006, pp. 1553-1604; and Guiso, L. and Sodini, P., "Household Finance: an Emerging Field", in Constandinides, G.M., Harris, M. and Stulz, R.M. (eds.), *Handbook of the Economics of Finance*, Elsevier, 2013.

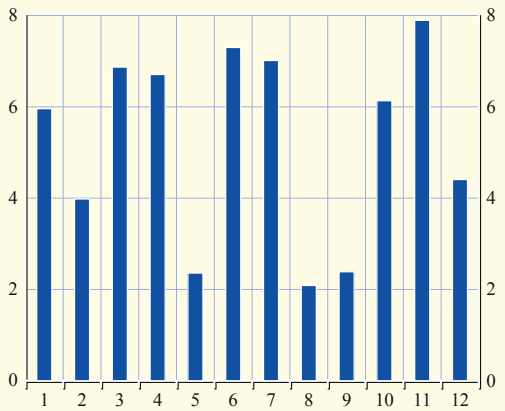
## 2 "STRESS TESTING" HOUSEHOLDS' FINANCES

Given that the HFCS provides detailed information on the balance sheets of individual households, it is especially well suited to the analysis of households' financial vulnerabilities – particularly using stress-testing techniques. As these tests can provide valuable information supporting the assessment of risks to financial stability, their use has become increasingly widespread in recent years. However, most of the studies undertaken thus far have faced serious limitations in terms of data, such as the unavailability of income and wealth data for individual households or a lack of comparability across countries.[3] Using data from the HFCS, Ampudia, van Vlokhoven and Żochowski[4] propose a framework for assessing the vulnerability of households and carry out a stress-testing exercise. In addition, since full information on households' balance sheets is now available, they also estimate the potential losses incurred by the banking system if households default.

First, the authors propose a measure of financial distress which takes account of both the solvency and liquidity positions of individual households. A household is considered to be in distress if two conditions are met: (i) its financial margin (defined as household income minus taxes, debt payments and basic living costs) must be negative; and (ii) the total negative flow (vis-à-vis that financial margin) over a given period of time must exceed the household's liquid assets. In order to calibrate households' basic living costs and the number of months needed to satisfy the solvency requirement, the study uses country-level data on non-performing loans. Chart 1 uses that measure to estimate the percentage of distressed indebted households in various countries.

Chart 1 Estimated percentage of indebted households in distress

(percentages)




Sources: HFCS and ECB calculations.
Notes: Data for Spain relate to 2008; data for Greece and the Netherlands relate to 2009; and data for all other countries relate to 2010. Total refers to the 11 countries included in the graph.

Using such a measure of household distress, the authors then perform a stress-testing exercise on the household sector, analysing the impact that various adverse shocks have on households' financial distress. This section reports on the impact that shocks to employment, interest rates and house prices have on various indicators of credit risk at the country level: (i) the percentage of vulnerable households, which can be used as an indicator of households' probability of default;

3 For studies using income data, see: Beck, T., Kibuuka, K. and Tiongson, E., "Mortgage Finance in Central and Eastern Europe – Opportunity Or Burden?", *World Bank Policy Research Working Papers*, No 5202, 2010; Herrala, R. and Kauko, K., "Household loan loss risk in Finland – estimations and simulations with micro data", *Bank of Finland Research Discussion Papers*, No 5/2007, 2007; Sugawara, N. and Zalduendo, J., "Stress-Testing Croatian Households with Debt-Implications for Financial Stability", *World Bank Policy Research Working Papers*, No 5906, 2011; and Zajączkowski, S. and Żochowski, D., "The distribution and dispersion of debt burden ratios among households in Poland and its implications for financial stability", *IFC Bulletin*, No 26, BIS, pp. 62-74. Two other studies use the HFCS for similar purposes, looking at particular countries: Albacete, N. and Lindner, P., "Household Vulnerability in Austria – A Microeconomic Analysis Based on the Household Finance and Consumption Survey", *Financial Stability Report*, No 25, Oesterreichische Nationalbank, June 2013, pp. 57-73; and IMF, "Spain: Vulnerabilities of Private Sector Balance Sheets and Risks to the Financial Sector – Technical Notes", IMF Country Report No 12/140, June 2012.

4 See Ampudia, M., van Vlokhoven, H. and Żochowski, D., "Financial fragility of euro area households", *Working Paper Series*, ECB, forthcoming.

(ii) exposure at default, which represents the percentage of total debt that is held by distressed households; and (iii) loss given default, which represents the losses (net of collateral) that are incurred by the financial sector when distressed households default. These losses are calculated on the basis of various scenarios, depending on the amount of assets that banks are able to seize in the event of a default.

**Table Estimated effects of shocks on the percentage of households in distress**

(percentages)

| Country | Belgium | Germany | Greece | Spain | France | Italy | Cyprus | Portugal | Slovakia | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Baseline | 6.0 | 4.0 | 6.9 | 6.7 | 2.4 | 7.3 | 7.0 | 6.1 | 7.9 | 4.7 |
| Interest rate shock | 6.3 | 4.0 | 7.8 | 8.8 | 2.4 | 7.5 | 7.6 | 7.5 | 8.0 | 5.1 |
| Employment shock | 6.0 | 4.1 | 7.5 | 7.1 | 2.5 | 7.4 | 7.3 | 6.4 | 8.4 | 4.9 |
| Combined shock | 6.3 | 4.1 | 8.5 | 9.1 | 2.5 | 7.7 | 8.0 | 7.7 | 8.5 | 5.3 |

Sources: HFCS and ECB calculations.
Notes: The interest rate shock involves a 300 basis point increase in the interest rates on all loans to households. The employment shock is defined as a 5 percentage point increase in the unemployment rate. People who lose their jobs are assumed to receive unemployment benefits. Data for Spain relate to 2008; data for Greece relate to 2009; and data for all other countries relate to 2010. In addition, total refers to the nine countries included in the table.

The above table presents baseline figures showing the percentage of distressed households at the time of the survey (2008 for Spain, 2009 for Greece and 2010 for all other countries).[5] It also shows the situation under three alternative scenarios, reporting the effect of (i) a 300 basis point increase in interest rates, (ii) a 5 percentage point increase in the unemployment rate, and (iii) both shocks combined. When looking at all the countries in our sample together, the effects of such shocks are fairly limited, with the combined shock causing the percentage of distressed households to rise from 4.7% to 5.3%. At the country level, however, the results vary quite considerably. For example, the impact of that combined shock is negligible in France and Germany (the percentage of distressed households rises from 2.4% to 2.5% and from 4.0% to 4.1% respectively), but fairly large in Spain (here, the corresponding figure increases from 6.7% to 9.1%). A key driver of the results is the relative prevalence of fixed and variable rate mortgages in each country; a factor which determines the transmission of the interest rate shock. Households seem to be more vulnerable in countries with a large percentage of variable rate mortgages. These figures also reflect the restrictiveness of previous bank lending policies as well as household aversion to risk, which ultimately shapes the size of the buffer (comprising income and liquid assets) that indebted households maintain.

The authors also estimate the impact that such shocks would have on loss given default. Loss given default is a key measure of the credit losses that banks could incur if households were to default, and it provides some useful insight into the risks that house price shocks pose to banks. Chart 2 presents the changes in loss given default that would result from a combined interest rate, employment and house price shock. It shows outcomes for three different scenarios, depending on the amount of household assets that a bank is able to recover after a default, namely: (i) all assets; (ii) all liquid assets, plus the value of any real estate in the event that the household has a mortgage; and (iii) all liquid assets, plus the value of any real estate, but with a 20% reduction in the said value (reflecting the fact that the bank may be obliged to accept a lower price if a quick asset sale is necessary).

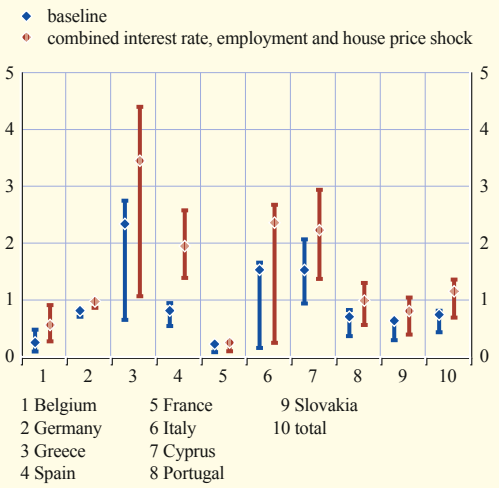
5 The Netherlands and Austria are excluded from this analysis owing to small sample sizes of distressed households.

In France and Germany there are only small differences between the three loss given default scenarios. In particular, reducing the value of collateral has hardly any effect. This suggests that the debts of French and German households are relatively well covered by assets. In contrast, reducing the value of collateral may significantly increase the losses incurred by banks in Greece, Spain and Cyprus. Overall, risks to the financial sector are limited: potential losses do not exceed 5% of total household debt in any euro area country, even in the worst scenario.

All in all, the framework devised by Ampudia, van Vlokhoven and Żochowski provides a platform for assessing both risks to financial stability stemming from the household sector and possible heterogeneity in the monetary transmission mechanism. These two aspects are highly relevant from the ECB's perspective, not only in view of the establishment of the Single Supervisory Mechanism and the ECB's assumption of a number of macro-prudential policy responsibilities, but also in terms of understanding how the monetary transmission mechanism functions in all parts of the euro area when households are under stress.

**Chart 2 Estimations of loss given default**

(percentages)




Sources: HFCS and ECB calculations.
Notes: The interest rate shock involves a 300 basis point increase in the interest rates on all loans to households. The employment shock is defined as a 5 percentage point increase in the unemployment rate. People who lose their jobs are assumed to receive unemployment benefits. The house price shock is a decline of 20% in the value of real estate. Three different estimates are provided, based on different assumptions regarding the assets that a bank can recover in the event of a default. The bottom of the line represents a scenario in which the bank is able to recover all of the household's assets. The diamond indicates a scenario where the bank is able to recover all liquid assets, plus the value of collateral if the household has a mortgage. The top of the line is based on the same assumptions as the diamond, but the value of real estate is reduced by 20% because the purchase price of an asset tends to be below its market value in the case of a forced sale. In addition, total refers to the nine countries included in the chart.

## 3 COMBINING AGGREGATE AND HOUSEHOLD-LEVEL DATA

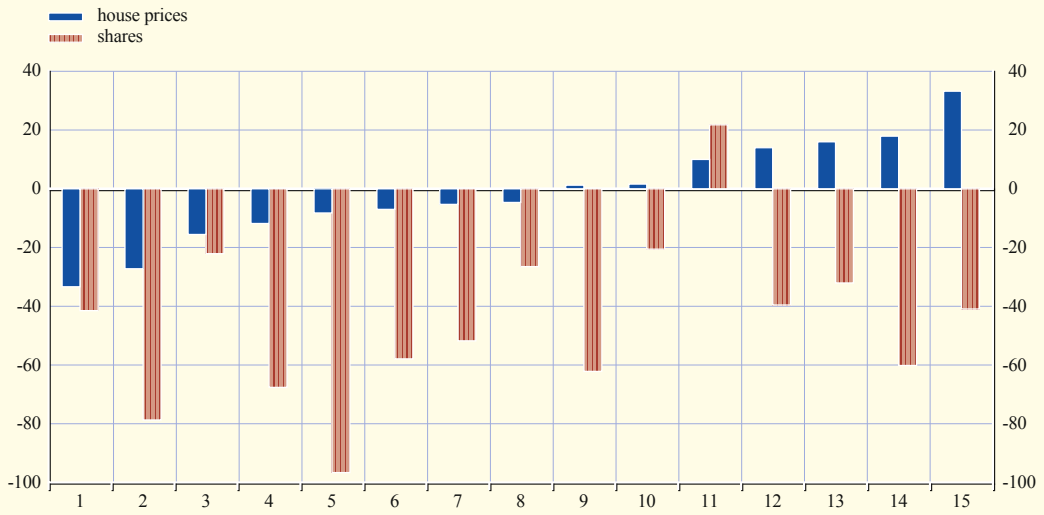
This section shows how the HFCS can be rendered more useful for monetary policy and the assessment of financial stability by combining the data that it generates with aggregate data (which are released with a shorter lag). It then shows how the extended dataset can be used to assess the impact of shocks to household wealth and to ascertain the implications of wealth dynamics for households' consumption.

Thus far, the HFCS dataset consists of just a single wave (note that a second wave is currently under way). The dataset contains a considerable amount of detailed data on the composition of the balance sheets of individual households in the period around 2010 (the reference year for most countries), and thereby complements existing aggregate data.

In contrast with normal periods, when changes in the distribution of wealth and the structure of assets and liabilities tend to be small and gradual, households have experienced very substantial

**Chart 3 Growth in asset prices**

(percentages; Q1 2008 to Q2 2013)




1 Spain
2 Greece
3 Netherlands
4 Slovenia
5 Cyprus
6 Slovakia
7 Italy
8 Malta
9 Portugal
10 France
11 Germany
12 Finland
13 Belgium
14 Luxembourg
15 Austria

Sources: ECB, Thomson Reuters and national sources.

changes in asset prices during the last few years (see Chart 3).[6] Consequently, the HFCS dataset represents a snapshot of past developments and does not accurately reflect the current state of households' balance sheets.

To alleviate this shortcoming, HFCS data can be extended using country-specific aggregate data, which are more up to date than household-level data. A group of ECB authors[7] has recently updated the data for each of the various asset types and income components (as well as the debt service rate), using their aggregate country-level counterparts.[8]

This approximation procedure is not intended as an alternative to the collection of actual household-level data, since it neglects much of the household-specific variation in the data and overlooks

6 Available evidence from the US Survey of Consumer Finances and the Spanish Survey of Household Finances indicates that changes in prices are the main drivers of asset holdings, with participation rates for various asset types changing only very gradually over time. See: Bricker, J., Dettling, L.J., Henriques, A., Hsu, J.W., Moore, K.B., Sabelhaus, J., Thompson, J. and Windle, R.A., "Changes in U.S. Family Finances from 2010 to 2013: Evidence from the Survey of Consumer Finances", *Federal Reserve Bulletin*, Vol. 100(4), 2014, pp. 1-40; and Banco de España, "Survey of Household Finances (EFF) 2011: Methods, Results and Changes Since 2008", *Economic Bulletin*, January 2014, pp. 13-44.

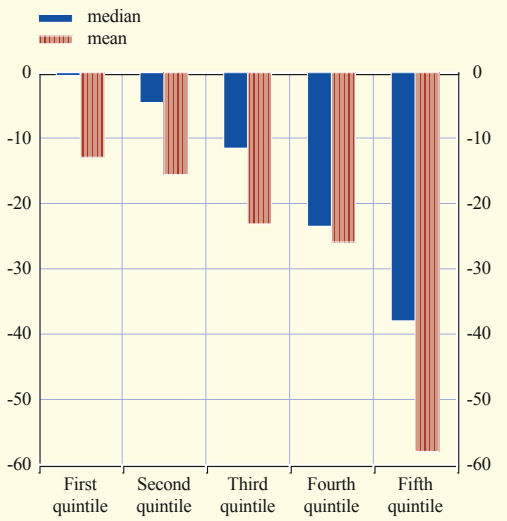
7 See Ampudia, M., Pavlickova, A., Slacalek, J. and Vogel, E., "Household heterogeneity in the euro area since the onset of the Great Recession", *Working Paper Series*, No 1705, ECB, 2014.

8 For real estate (the most important category, since it represents the largest asset held by most euro area households), they use developments in house prices. For the other asset types, they use indices of quoted and unquoted stocks and bonds. On the liability side, debt is assumed to be constant in real terms, which is in line with the developments observed in aggregate household liabilities in the euro area since 2008. Net wealth is defined as the sum of real and financial assets, net of total liabilities. Debt service is adjusted depending on whether mortgages have variable or fixed rates, using actual changes in the relevant interest rates for variable rate mortgages and consumer loans. This procedure is similar to that conducted by another group of authors for the United States (see Krimmel, J., Moore, K.B., Sabelhaus, J. and Smith, P., "The Current State of U.S. Household Balance Sheets", *Federal Reserve Bank of St. Louis Review*, Vol. 95(5), 2013, pp. 337-359).

the behavioural responses of individual households. However, significant heterogeneity is still observed in the approximated data, both across countries and across all households. Consequently, the extended dataset can be used to quantify economic shocks affecting various types of household.

**Chart 4 Estimated changes in median and average net wealth per household, broken down by income quintile**

(EUR thousands; Q1 2008 to Q2 2013)




Sources: HFCS and ECB calculations.

The extended dataset allows for an insight into the current distribution of wealth, as well as changes that have taken place during the recent financial turbulence. For example, looking at the period from the first quarter of 2008 to the second quarter of 2013 (which covers the financial crisis), we can estimate whether the wealth of households with low income was affected differently than that of households with high income. Chart 4 shows estimates of changes in the median and mean net wealth of households in all five income quintiles. Net wealth decreased for all quintiles, with declines ranging from €400 to €38,000 for the median and from €13,000 to €58,000 for the mean. The declines were larger for households with higher incomes, reflecting the fact that these are more likely to hold various types of risky assets (such as real estate and shares) – the value of such assets fell in most countries during the period under observation (see Chart 3). At the same time, even in the lowest income quintile, almost a half of households are home-owners. Given that house prices fell quite significantly in many cases, decreases in household wealth are broadly based across income quintiles.

Many authors have estimated the effect that changes in wealth have had on households' consumption.[9] The first wave of the HFCS does not cover household consumption in much detail, so it does not permit an evaluation of the wealth effect (note that the box in this article describes a method for estimating consumption expenditure). However, it is possible to ascertain the effects of changes in households' wealth (as indicated by Chart 4) for some assumed values of the marginal propensity to consume out of wealth (MPCW) – i.e. the change in consumption (in euro) that is caused by a €1 change in wealth.

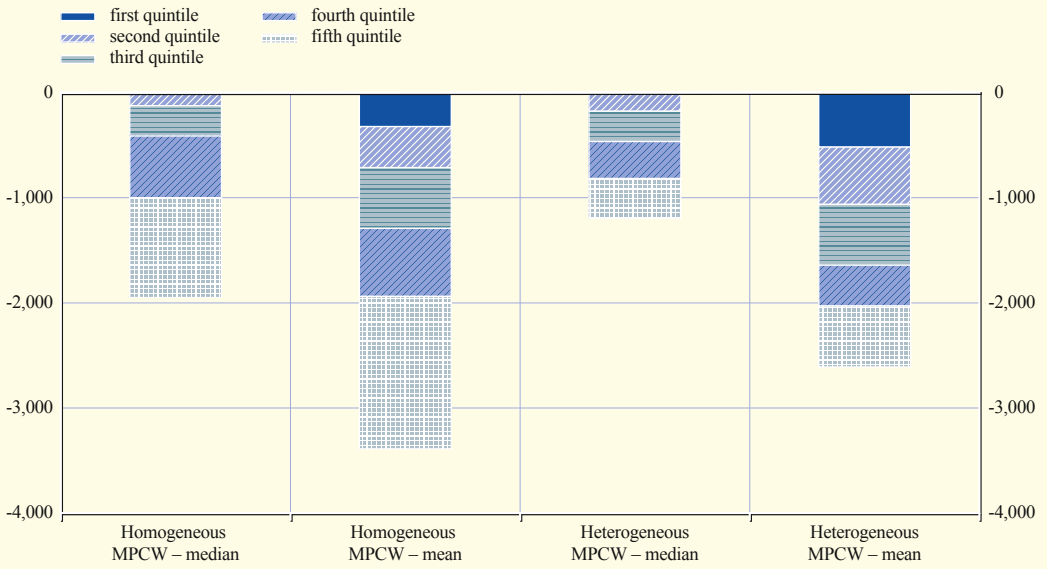
Two scenarios are considered for the MPCW: (i) a homogeneous scenario, in which the MPCW of all households equals 0.025; and (ii) a heterogeneous scenario, in which households in the five income quintiles have MPCWs of 0.040, 0.035, 0.025, 0.015 and 0.010 respectively. The latter is consistent with the large volume of empirical literature reporting that poorer households react more strongly to wealth shocks (see, for example, the recent paper by Mian, Rao and Sufi[10]).

9 See, among others, Slacalek, J., "What Drives Personal Consumption? The Role of Housing and Financial Wealth", *The B.E. Journal of Macroeconomics*, Vol. 9(1), 2009, Article 37.

10 Please refer to Mian, A., Rao, K. and Sufi, A., "Household Balance Sheets, Consumption, and the Economic Slump", *The Quarterly Journal of Economics*, Vol. 128(4), 2013, pp. 1687-1726.

**Chart 5 Estimated changes in consumption per household, broken down by scenario and income quintile**

(EUR; Q1 2008 to Q2 2013)




Sources: HFCS and ECB calculations.
Note: MPCW refers to marginal propensity to consume out of wealth.

As Chart 5 illustrates, changes in median and mean wealth have prompted a decline in consumption expenditure of between €1,200 and €3,400 per household. The decreases in consumption are larger for the specifications using mean wealth (because mean wealth fell more strongly than median wealth) and a homogeneous MPCW (because households with higher incomes experienced larger losses). The chart also indicates the share of the decline in aggregate consumption that can be attributed to each income quintile. With a heterogeneous MPCW, the shaded areas appear to be of a fairly similar size, meaning that even poor households accounted for a significant decrease in aggregate consumption – despite their vastly lower incomes and wealth.

**Box**

### COMBINING THE HFCS WITH EUROSTAT'S HOUSEHOLD BUDGET SURVEY TO DERIVE INFORMATION ON HOUSEHOLDS' CONSUMPTION

HFCS data provide an accurate description of households' wealth, indebtedness and income. Given that the HFCS questionnaire is already fairly demanding, adding any further specific questions about consumption could prove difficult. However, it is possible to estimate households' total consumption by linking the limited information in the HFCS (which relates only to expenditure on food) with detailed data on consumption from Eurostat's diary-based Household Budget Survey (HBS). Those data can be useful, for example, for analysing cross-country heterogeneity in expenditure and estimating the size of wealth effects on consumption.

## Information on households' consumption derived from the HBS

The 2010 HBS reported that the average annual consumption of euro area households amounted to €29,300. While the average expenditure of German, French and Italian households was close to this figure, there were large differences across other countries. For example, the consumption of households in Luxembourg was, on average, five times higher than in Slovakia. In addition, it was found that consumption in the euro area was strongly linked to income: average consumption for the bottom income quintile was less than half the average consumption for the top quintile. Average consumption also varied depending on the age of household members and household composition.

On average, food and non-alcoholic beverages accounted for 14.6% of total expenditure, but this figure varied significantly from country to country – ranging from just 8.8% in Luxembourg to 22.0% in Slovakia. Thus, cross-country variations in food consumption were smaller than the differences in total consumption. Furthermore, food consumption was affected by the composition and characteristics of the household: in almost all countries, the proportion of total consumption devoted to food increased with age and declined with a rising income.

## Estimating households' consumption using HBS data

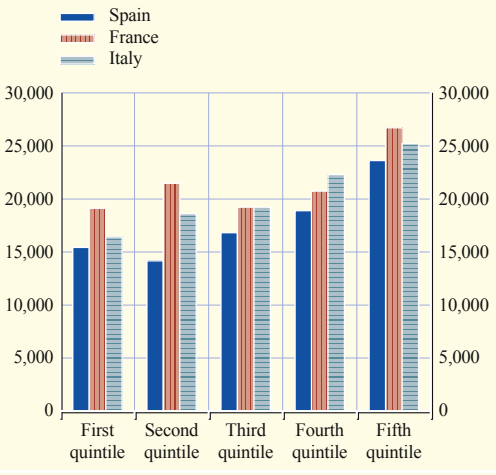
This box presents initial estimates of household consumption using both HFCS and HBS data; ones based on fitted values of equations that are estimated using HBS data. These equations allow for consumption to be linked to observable variables which are common to both the HFCS and the HBS. Note that it is essential to take account of different household characteristics when estimating heterogeneity in the consumption of individual households. Initial tentative estimates of total consumption at the household level are now available for Spain, France and Italy; countries for which HBS micro data are available for the year 2010. The results show a clear relationship between net wealth and consumption (see the chart below) – a relationship that could not have been established using HBS data alone, as the HBS survey does not provide information on wealth.

The unexpected decline in consumption observed for France (i.e. from the second to the third quintile) is due to indebtedness. Households in the third quintile of net wealth are more likely to be indebted and have higher debt service-to-income ratios, which tends to reduce their consumption.

These initial results are promising and should eventually be extended to other euro area countries. Once consumption data are available, it will be possible to calculate saving rates by using disposable income data derived from the information on gross incomes available via the HFCS. Although it relies on estimation, this data enrichment process allows users of HFCS data to study the determinants of consumption at the household level for a large number of countries.

**Chart Estimated median consumption of non-durables, broken down by net wealth quintile**

(EUR; average annual data for 2010)




Sources: HFCS, HBS and ECB calculations.

## 4 CHANGES IN THE DISTRIBUTION OF FINANCIAL PRESSURES ON HOUSEHOLDS

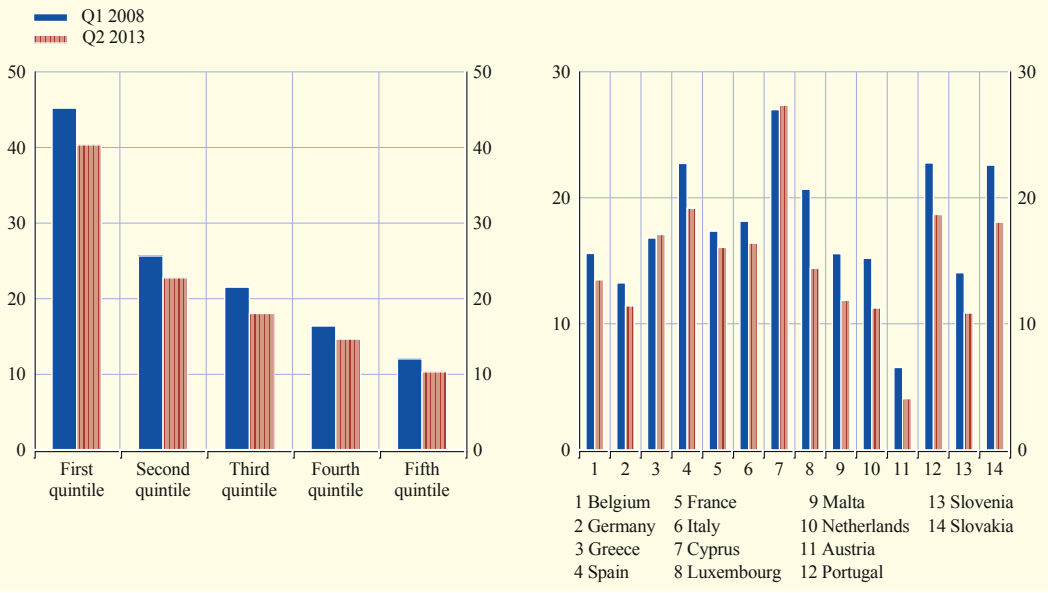
The extended HFCS dataset can also be used to approximate the distribution of the financial pressures on euro area households (as measured, for example, by the debt service-to-income ratio) and its evolution since the financial crisis. The aforementioned ratio can be used to gauge households' capacity to take on new loans or service existing debt, making it an indicator of their ability to cope with financial shocks (and an alternative to the measure discussed in Section 2). The debt service-to-income ratio has recently been affected by two countervailing factors, the magnitude of which varies across both countries and households: (i) a decline in interest rates; and (ii) an increase in unemployment rates (which has caused a decrease in income for some households).

Chart 6 shows how estimated changes in mortgage interest rates and income affected the median mortgage debt service-to-income ratios of households holding mortgages across income quintiles over the period under review. The substantial declines in mortgage interest rates – between 150 and 250 basis points in most countries – resulted in decreases in mortgage debt service ratios in all income quintiles. Households in the bottom quintile benefited most, with their median mortgage debt service ratios falling by almost 5 percentage points (compared with a decline of less than 2 percentage points for the top quintile). The right-hand panel shows that the evolution of mortgage debt service ratios was also heterogeneous across countries. While declines were particularly strong in countries where variable rate mortgages are more prevalent (such as Spain, Luxembourg, the Netherlands and Portugal), those ratios actually increased slightly in Greece and Cyprus on account of a considerable increase in the unemployment rate.

The simulations conducted by Ampudia, Pavlickova, Slacalek and Vogel (see footnote 7) allow for a breakdown of the projected changes in the debt service-to-income ratio into (i) the part that is due to the

**Chart 6 Estimated distribution of households' median mortgage debt service-to-income ratios across income quintiles and countries**

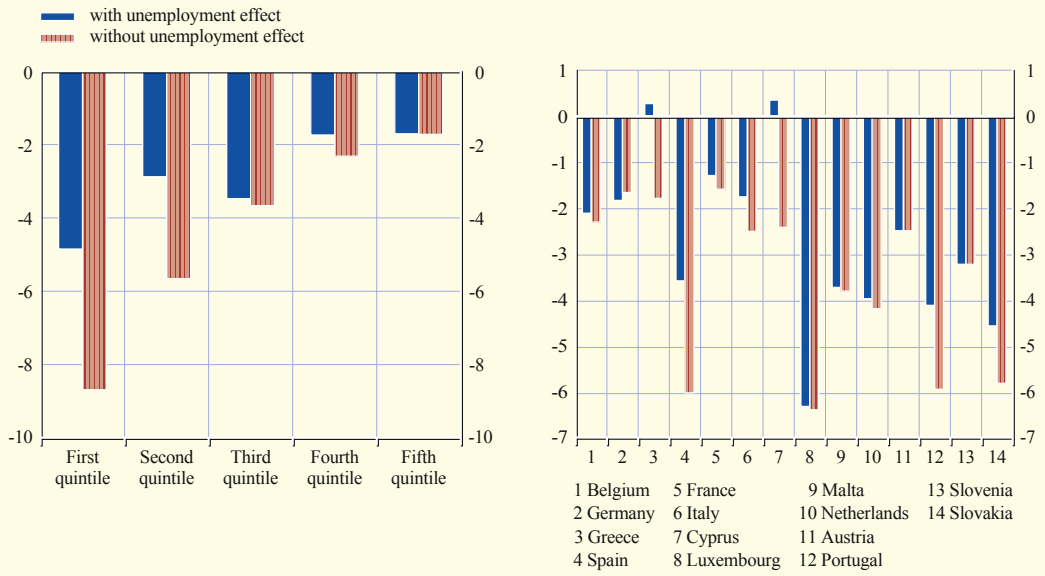
(percentages)




Sources: HFCS and ECB calculations.

**Chart 7 Estimated changes in median mortgage debt service-to-income ratios across income quintiles and countries, both with and without the unemployment effect**

(percentage points; Q1 2008 to Q2 2013)




Sources: HFCS and ECB calculations.

decline in interest rates (accounting for the fact that the rates on some mortgages are fixed, while others are variable), and (ii) the part that is due to the change in the unemployment rate. Chart 7 looks at how changes in unemployment rates contributed to changes in mortgage debt service ratios by comparing the baseline estimates (shown in Chart 6) with the counterfactual scenario in which unemployment is assumed to be constant. The left-hand panel suggests that the increase in unemployment had a disproportionate effect on households in the bottom two income quintiles, significantly offsetting the decreases in their mortgage rates. Without the unemployment channel, their median mortgage debt service ratio would have declined by a further 2.7 percentage points. Once again, the right-hand panel indicates that unemployment rates had a particularly strong impact on mortgage debt service ratios in Greece, Spain, Cyprus and Portugal. Thus, the observed increases in unemployment rates – which varied from country to country and were fairly severe in a number of cases – offset some of the declines in mortgage debt service ratios that were caused by falling interest rates.[11]

The analysis presented in sections 3 and 4 illustrates the value added by the extended HFCS dataset. This dataset is available whenever timely distributional information is required vis-à-vis households' balance sheets and financial pressures.

## 5 CONCLUSION

This article shows that household-level data can provide significant additional insight into other macroeconomic data and support the assessment of financial stability. In contrast to the fairly limited variation in macroeconomic data that has been witnessed over time, heterogeneity

11 These estimates are qualitatively similar to those of Ehrmann and Ziegelmeyer, who report on the impact of a 300 basis point decline in interest rates on the mortgage debt service ratios of individual households (see Ehrmann, M. and Ziegelmeyer, M., "Household risk management and actual mortgage choice in the euro area", *Working Paper Series*, No 1631, ECB, 2014).

across households is substantial and highly pervasive, and has a strong impact on their economic behaviour. Household-level data make it possible to document such heterogeneity by focusing on specific types of household. In addition, the different responses of individual households are interesting in themselves and can have major implications at an aggregate level.