

## HOUSEHOLD FINANCE AND CONSUMPTION NETWORK

August 2019

# Report about the Research Activities of the HFCN since the Release of the Wave 2 Dataset

*The Household Finance and Consumption Network (HFCN) has been tasked by the Governing Council of the ECB with acting as a forum for research that uses Household Finance and Consumption Survey (HFCS). This document provides a concise summary of the main research results of the Network since the release of the wave 2 dataset in December 2016. Following the taxonomy adopted in HFCN (2009), the results are organised along seven key areas identified as “particularly relevant for policy”: i) wealth effects on consumption, ii) housing prices and household indebtedness, iii) micro-simulations as a policy tool, iv) retirement income, consumption and pension reforms, v) access to credit and credit constraints, vi) financial innovation, consumption smoothing and portfolio selection and vii) wealth inequality.*

*The following three sets of results appear especially notable from a policy perspective.*

*First, HFCS data have been used to sharpen the estimates of the marginal propensity to consume out of wealth (MPC), which are problematic when based on aggregate data. Several papers across different countries have estimated the average MPC in ranges roughly between 0.01 and 0.05. More strikingly, various dimensions of heterogeneity in MPCs have been uncovered. The MPC tends to be higher for financial (than housing) wealth and for constrained households (e.g., those with few liquid assets). Some degree of heterogeneity also appears to be discernible across countries: Focussing on countries for which panel data are available, MPCs tends to be relatively higher in Italy and Belgium, somewhat lower in Spain and lower still in Germany and Cyprus.*

*Second, the HFCS has been used to document heterogeneity in the transmission of monetary policy across the income distribution. Besides heterogeneity in MPCs, households also differ with regards to their exposure to interest-rate and inflation risk. For example, households with adjustable-rate mortgages benefit from cuts in interest rates, while those with net savings in the form of bank deposits suffer a loss of financial income. Similarly, surprise deflation will tend to hurt net debtors and benefit savers in nominal financial instruments. A final, important determinant of the transmission of monetary policy, which is especially relevant for households*

*that are not directly exposed to interest rate changes, occurs indirectly through changes in employment and real wages. The HFCS has been used to quantify the impact of all these heterogeneous effects. The overall results suggest that an expansionary monetary policy move tends to reduce income inequality. Households at the bottom of the income distribution benefit disproportionately from higher employment and wages and consequently are able to consume more.*

*Finally, the HFCS has been used as an essential input into micro-simulation models which quantify the effects of stress-testing scenarios on households, financial fragility and ultimately financial stability. One illustrative result on this front is to document an interesting change in borrowers' characteristics over the past 20 years. In countries that experienced a real estate boom-bust, borrowers exhibited significantly higher loan-to-value (LTV) and loan-to-income (LTI) ratios in the run up to the financial crisis, and an increasing tendency towards longer-term loans. These characteristics are suggestive of laxer credit standards. By contrast, in recent years, despite the long period of historically low interest rates and substantial house price increases in some countries, no comparable increase in LTV and LTI ratios is uncovered. The main change in borrower characteristics since 2010 is that new borrowers are older and have higher incomes than before the crisis.*

## 1 Introduction

The Household Finance and Consumption Network (HFCN) has been tasked by the Governing Council of the ECB with implementing the Household Finance and Consumption Survey (HFCS), acting as a forum for research that uses survey data and further developing the HFCS. This document provides a concise overview of the main research results of the Network since the release of its second wave in December 2016. Following the taxonomy adopted in HFCN (2009),<sup>1</sup> we organise the results in seven key areas, which have been identified as “particularly relevant for policy”: i) wealth effects on consumption, ii) housing prices and household indebtedness, iii) micro-simulations as a policy tool, iv) retirement income, consumption and pension reforms, v) access to credit and credit constraints, vi) financial innovation, consumption smoothing and portfolio selection and vii) wealth inequality.

In the text below we highlight the incremental improvement in our knowledge that research based on the HFCS has provided since December 2016, focussing mostly on the work of the members of the HFCN.<sup>2</sup> Not all research is based on the full HFCS dataset. Some of the papers focus on results from a specific country, where more information may be available on the particular topic under investigation.

## 2 Research on monetary transmission and wealth effects on consumption

The persistently low interest rate environment in the US and Europe has triggered research on the distributional effects of monetary policy. Important recent work by Auclert (2019)<sup>3</sup> shows that spending is affected by real interest rate changes through channels that are likely to be heterogeneous across households, depending on the source of their earnings, on the allocation of their savings across different assets and on their particular MPCs. For example, if households that benefit the most from accommodative monetary policy also have higher MPCs, the aggregate degree of accommodation will be higher (compared to the situation where the main beneficiaries had lower MPCs). Work by Kaplan et al. (2018) suggests that the aggregate effects of monetary policy are importantly shaped by its general equilibrium impact on prices and wages, over and beyond its direct effect on household interest rate income/expenditure. Households that may not react at all to a cut in interest rates, due to lack of savings and debt,

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<sup>1</sup> Eurosystem Household Finance and Consumption Network (2009): “Survey data on household finance and consumption: research summary and policy use”, Occasional Paper 100, European Central Bank, <https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp100.pdf>.

<sup>2</sup> This summary includes references to ongoing and unpublished work.

<sup>3</sup> The references are listed at the end of the main text and in Annex 2.

may still benefit from the monetary policy accommodation because of the rise in employment and wages.

To quantify these heterogeneous effects of monetary policy one needs several inputs: MPCs of individual households, exposures to interest rate risk and exposures to inflation risks. The HFCS is a unique data source that provides the required cross-country comparable information. Several papers aim at quantifying the size of various channels of monetary transmission to consumption.

### **Marginal propensities to consume (MPCs)**

HFCN (2009) highlighted that most of the estimates of the MPC at the time were based on aggregate data and consequently quite subject to the critique of endogeneity and the fact that one could not investigate heterogeneity across households. Our research using the HFCS has focussed on providing estimates of MPCs across more countries, also using panel data techniques, both using reduced-form and structural estimation.

As for the reduced-form regressions, Garbinti et al. (2018) use the panel component of the HFCS from 5 countries (Belgium, Germany, Cyprus, Italy and Spain) to estimate MPCs out of housing and financial wealth. They impute nondurable consumption following Browning et al. (2015) and Lamarche (2017) and find that the wealth effects of consumption range from less than 1 cent (for Cyprus) to 5 cents per euro (for Italy), broadly in line with macro based estimates. MPCs decrease along the net wealth distribution and there is heterogeneity with respect to assets: the MPC out of financial wealth is about ten times higher than the MPCs out of housing wealth.

Jappelli and Pistaferri (2018) use a reduced-form direct survey approach, focussing on subjective MPCs directly reported by households. Specifically, they take panel data on households' reported MPCs from a question in the 2010 and the 2016 Banca d'Italia Survey of Household Income and Wealth (SHIW) that asks respondents to report their MPC in response to a hypothetical income change. They confirm previous findings that the MPC is considerably heterogeneous across households and declines significantly with cash-on-hand. Comparison of cross-sectional and panel data estimation reveals that unobserved heterogeneity exaggerates the sensitivity of MPC to cash-on-hand by roughly 20%.

As for structural estimation, Ampudia et al. (2018a) analyse the MPC heterogeneity of the biggest four euro area countries (France, Germany, Italy and Spain) using a computational model which can handle rich heterogeneity in income, education, wealth accumulation and portfolio allocation. They estimate key parameters of the model using HFCS data and use the results to characterize the distribution of MPCs across households. The model suggests that MPCs tend to be higher for low income and low education households. These features can be used to evaluate the quantitative impact of different channels of transmission of monetary

policy. The results suggest that changes in the return on assets are especially important in shaping the transmission mechanism in Germany, while the impact of monetary policy on income is particularly strong in Spain. France and Italy lay between these two extremes.

### **Heterogeneity in monetary transmission**

The recent structural work on the HANK (heterogeneous agent New Keynesian) models spurred the interest into new concepts relevant to investigate the transmission of monetary policy, which were not taken into account in HFCN (2009). Such new concepts include “unhedged interest rate exposures” (“URE”, the difference between maturing assets and liabilities, reflecting the households’ exposure to interest rate risk) and they complement the older notion of net nominal positions (reflecting the households’ exposure to inflation risk).

Tzamourani (2019) quantifies the unhedged interest rate exposure of euro area households, thereby illustrating the distribution of the gains and losses in interest income flows from a change in real interest rates across countries and household groups. Assuming constant inflation, mortgagors would incur the greatest losses following an increase in the policy rate, whereas households in the upper part of the net wealth distribution, outright owners and of older age would benefit the most. The heterogeneity in interest rate exposures across countries is largely attributed to the prevalence of mortgagors with an adjustable rate mortgage (ARM).

In this context, Dossche et al. (2019) find that since 2007 lower interest rates have indeed decreased the income of net savers, but they have also directly contributed to lower income inequality. Moreover, lower interest rates led to a redistribution of interest income from households with a low marginal propensity to consume to households with a high propensity to consume, supporting total household spending.

Dossche et al. (2019a) estimate the joint distribution of exposures of individual households and sectors in euro area countries to inflation and interest rate risks. They show the substantial heterogeneity across these dimensions, both across countries and even more so across households. Their methodology could be used for both an ex post and an ex ante assessment of the joint effect of changes in inflation and nominal interest rates on the income and net wealth distribution.

Lenza and Slacalek (2018) instead focus on the effects of the unconventional monetary policy on income and wealth. They estimate a multi-country VAR model with some of the key variables affecting income and wealth and then perform a micro simulation to distribute the aggregate effects on individual households, taking into account their income and portfolio composition as well as the earnings heterogeneity channel. They find that the recent quantitative easing affects differently individual households. In particular, QE reduces income inequality through the earnings heterogeneity channel, i.e., more households with lower incomes become employed. The effects on wealth inequality in contrast are negligible.

Ampudia et al. (2018b) estimate how monetary policy produces heterogeneous effects on euro area households, depending on the composition of their income and on the components of their wealth. Through a simple methodology, the authors attempt to summarise quantitatively how various channels of transmission—net interest rate exposure, intertemporal substitution and indirect income channels—affect individual euro area households. They find that the indirect income channel has an overwhelming importance, especially for households holding few or no liquid assets. The indirect income channel is therefore also a substantial driver of changes in consumption at the aggregate level.

All in all, the results of this research suggest that an expansionary monetary policy move tends to reduce income inequality. Households at the bottom of the income distribution benefit disproportionately from higher employment and wages and consequently are able to consume more. The effects of monetary policy on the wealth distribution are found to be much smaller.

### **3 Research on housing prices and household indebtedness**

Another strand of research has focussed on the interactions between housing, indebtedness, mortgage market institutions and monetary policy.

Part of this research is related to the one discussed in the previous section because it sheds light on the transmission of monetary policy. More specifically, it has been shown that mortgage markets institutions, in particular the characteristics of mortgages, play an important role on the transmission of monetary policy to household consumption. De Falco (2017) estimates that the transmission is faster in countries in which the share of adjustable rate mortgages is higher: For example, between 2010 and 2014 holders of adjustable-rate mortgages experienced a decline in monthly mortgage payments of EUR 100 on average, compared to the holders of fixed-rate mortgages, with some evidence of an increase in durable consumption (among ARM holders).

Du Caju et al. (2018) focus on the role of indebtedness and find that during the financial crisis overindebted Belgian households (i.e., households with Debt-Service-to-Income ratios above 30%) tend to reduce their food consumption to be able to repay their debt. The effect is particularly strong for the poor, unemployed households with a low level of education.

A second branch of this literature focuses instead on implications for financial stability. Using the cross-country dimension of the HFCS, Kelly et al. (2019) find a strong evidence of laxer credit standards in countries that experienced a real estate boom-bust, and a significant tightening after the bust. Borrowers in these countries exhibited significantly higher loan-to-value (LTV) and loan-to-income (LTI) ratios in the run up to the financial crisis, and an increasing tendency towards longer-term loans compared to borrowers in other countries. In recent years, despite the long period of historically low interest rates and substantial house price increases in some countries, they do not find similar credit easing as before the crisis. Instead, there is evidence of

a considerable change in borrower characteristics since 2010: new borrowers are older and have higher incomes than before the crisis. In the majority of countries, the top two income quintiles account for roughly 70 per cent of mortgages in the more recent period, and the percentage of borrowers aged over 40 has increased.

#### **4 Micro-simulations as a tool for policy**

Micro-simulation models have also experience renewed attention due to the availability of HFCS data. Traditionally, these models were used in areas other than monetary policy and financial stability, to analyse effects of fiscal policy and the design of systems of taxes and social benefits.

More recently, several papers based on the HFCS dataset construct micro-simulation models to analyse quantitatively the effects of stress scenarios on financial fragility of households and to conduct stress tests of household debt in several countries; see for example Mihai et al. (2017) and Giordana and Ziegelmeier (2019).

The results of this literature tend to be mostly methodological, but a few economic features can be highlighted here. Giordana and Ziegelmeier (2019) estimates using a model estimated for Luxembourg that among negative shocks, a drop in real estate prices has the biggest impact on Loss Given Default. Fasianos et al. (2017), Lydon and McIndoe-Calder and McIndoe-Calder (2017) investigate the evolution of household indebtedness over the life cycle and the document the process of deleveraging and changes in mortgage debt burdens in Ireland.

#### **5 Research on retirement income/wealth**

Research on retirement income and wealth is relevant for the transmission of monetary policy because aging of population in industrial countries raises questions about the long-run sustainability of their pension systems and the need to analyse economic behaviour of older households in alternative pension schemes.

D'Addio et al. (2018) find on average each euro of pension wealth is associated with a 62-72 cents decline in private net wealth at the mean (7 euro area countries) with considerable heterogeneity across countries, and both crowding in and crowding out of private wealth are observed.

Garbinti and Georges-Kot (2019) provides new insights on the effect of inheritance receipt on retirement. The paper builds on lifelong information on inheritances received and labor market transitions available for respondents of the French Wealth Survey, which allows the authors to compare current retirement rates among current and future inheritors. Chances of current retirement are 40% higher among current inheritors than among individuals who will inherit in

the next two years, but there is substantial heterogeneity in this effect across socio-demographic groups. The effect is also stronger for individuals with a higher risk aversion, which we interpret with a simple theoretical model.

## **6 Research on access to credit and borrowing constraints**

HFCN (2009) reported that research based mostly on US data estimated that consumption of credit-constrained households is more sensitive to economic shocks. As mentioned in section 2.1, this research has been broadened to European countries, also extending the notion of credit-constrained households to a larger group, which includes the wealthy hand-to-mouth households (i.e., those with illiquid assets but little liquid assets).

In related work, Ampudia and Palligkinis (2017) report that trust is an important factor in the household-bank relationship. Households with low trust in the banking sector are less likely to hold an account. And those with low trust in their bank are more likely to switch to a new one. Banks' financial health as evidenced by its balance sheet components is related to trust in a significant way.

Focussing on household borrowing, Lindner et al. (2018) estimate that own labour contributions in their property can help getting access to credit and home ownership to credit constrained households.

Albacete et al. (2018) evaluate loan-to-value (LTV), debt-to-income (DTI) and debt service-to-income (DSTI) limits with regard to their impact on the following two potential errors: denying nonvulnerable households access to credit (type I) and not preventing vulnerable households from obtaining credit (type II). They find that policymakers' awareness of their own goals and preferences in terms of weights of type I and II errors are crucial to effectively use the macroprudential tools at hand. Their analysis delivers qualitative results to better understand the mechanics of macroprudential policy measures as well as a tool for their evaluation in terms of costs and benefits.

Marek (2018) argues that the effect of macroprudential measures should be analysed in combination with the interest rate charged. These instruments are less effective if banks account for risk of high LTV via an interest mark-up.

## **7 Research on consumption and housing**

Several papers (in addition to Ampudia et al. (2018a) referenced above) have used HFCS data to calibrate and estimate reduced-form and structural models of consumption and housing decisions.



Ampudia et al. (2018c) use the panel component of the Italian and the Spanish household surveys to analyse the impact of monetary policy on housing wealth inequality. Their results suggest an increase in housing wealth inequality after expansionary shocks. A policy expansion stimulates house prices and generates a relative increase in the value of houses owned by older Spanish or more educated Italian households.

Using a structural model approach, Le Blanc et al. (2018) study how a life-cycle model can explain the striking differences in housing wealth and homeownership rates across countries. They solve a rich model with a discrete house owning-renting choice in which housing is illiquid and subject to idiosyncratic house price shocks, calibrated to key statistics from the HFCS. Their model generates substantial wealth differences across countries and households which are driven by country-specific demographics.

Using a computational model, Grevenbrock (2018) investigates whether co-residence patterns within households can explain the difference in homeownership rates across countries. He solves and simulates a model calibrated to German data and shows that his model matches the co-residence patterns of individuals in the HFCS as well as the homeownership rate. In a counterfactual exercise, he finds that imposing the Italian rental market in Germany would increase co-residence by 9% whereas household homeownership rate would increase by 80%.

Using detailed balance sheet data of all Danish households, Crawley and Kuchler (2018) estimate the sensitivity of consumption to transitory and permanent income shocks. They use covariance restrictions on income and consumption to identify and estimate their income processes and the associated consumption response. They then measure the size of the unhedged interest rate exposure channel, and find that a 1 percentage point increase in the interest rate reduces consumption by 26 basis points, a response which is substantially larger than the intertemporal substitution channel predicted by New Keynesian models.

As for the reduced-form estimation, given its overall importance for households' portfolios and its transmission of monetary policy, several papers have focused on housing choices and the role of mortgages. Combining data from the HFCS and a six-year panel from an Irish bank, O'Malley et al. (2018) study the effects of a mortgage interest rate change on consumption. They find that following an income shock from an unexpected interest rate decline, households reduce their debt and significantly spend more. Furthermore, households who experience a negative income shock through an interest rate increase raise their credit card debt but reduce spending.

## **8 Research on wealth inequality and measurement of consumption, income and wealth**

The HFCS has also been used to analyse various aspects of wealth inequality (including the coverage of the top tail of the wealth distribution) and measurement and estimation of the joint distribution of consumption, income and wealth.

Two papers analyse the increase in wealth inequality in France and in the US. Garbinti et al. (2017) find that wealth inequality in France (as measured by the top share) declined after the World War II but started to rise moderately in the early 1980s, driven by income inequality, higher saving rates of the rich and differences in rates of returns. Moore et al. (2017) report that the wealth share in the US has been rising the last couple of decades, also partly affected by income heterogeneity and tax rates.

Several papers including Chakraborty and Waihl (2018) and Chakraborty et al. (2019) investigate the coverage of the top tail of the wealth distribution in the HFCS data. They find that wealth is more under-estimated in Germany, while evidence from other countries suggests that the effect of top wealth adjustment is smaller in France (due to large sample) and in Spain (due to effective oversampling of the rich). Wealth concentration is slightly higher when imputation is based on national rich lists instead of the Forbes list (France, and Spain). Overall, methods, which use rich lists or administrative data, improve the measurement of the top wealth tail in the survey data.

Abidgren et al. (2018) find that in Denmark there is a close match regarding the median and mean levels of consumption reported for the same households in the register-imputed and survey based consumption data. However, the distribution of the differences between the two measures of consumption at the household level is rather wide. Several papers find that consumption measures imputed using Eurostat Household Budget Survey data can improve reliability of consumption indicators collected in HFCS.

Zhu (2017) shows that using the HFCS information it is possible to estimate effective tax functions that map gross income to average tax rates, which can be used to calculate the after-tax income distribution in survey data without using detailed tax rules to estimate it individually using detailed tax rules.

Bruine de Bruin et al. (2018) compare responses to financial questions in face-to-face and web surveys and find no statistically significant differences of exact matching by survey mode in the financial module. The results in the general knowledge and in the numeracy/literacy questions were mixed. By asking gross or net income figures more precise information can be obtained (as checked by converting the gross and net figures bilaterally, using detailed tax rules), since knowledge of the gross/net income figures are income level dependent.

## 9 Outlook

The research topics will continue focusing on: heterogeneous household responses to monetary policy, households' indebtedness and deleveraging, the link between standard and non-standard monetary policy and income, wealth and consumption inequality, exposure of household portfolios to interest rate and asset price shocks and financial fragility of households. Joint work with national account compilers will continue to help understanding the coverage of components of household assets and liabilities.

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