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Wealth Heterogeneity and the Marginal Propensity to Consume out of Wealth*

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Abstract

We provide detailed estimates of how the marginal propensity to consume out of wealth (MPC) varies along the distribution of household wealth and by asset composition, and analyse the sources of MPC heterogeneity across euro area countries. To do this, we i) build a household-level panel dataset combining wealth and consumption surveys for five European countries, and ii) use instrumented household-level panel regressions. First, we find heterogeneity across the wealth distribution with lower MPCs for high-wealth households. Second, we account for asset composition and show the significant role of housing wealth in all countries. We show that our results are indicative of a collateral channel. Third, cross-country differences in MPCs are mostly explained by country-specific institutional and socio-economic characteristics in Germany (compared to Spain) and by differences in consumption behaviours for Belgium, Cyprus and Italy. We show that MPC heterogeneity is related to homeownership rates, mortgage markets, demographics, and wealth inequality. Finally, we investigate to what extent heterogeneous MPC and wealth inequality affect consumption inequality.

Classification: D12, E21, C21

Keywords: consumption, marginal propensity to consume out of wealth, collateral channel, household surveys

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1 Introduction

The heterogeneity across households, in particular according to their financial positions, wealth composition, and indebtedness, has been shown to have important implications for monetary policy transmission mechanisms and aggregate effects (e.g. Auclert (2019), Cloyne et al. (2020), Kaplan et al. (2018), Kaplan and Violante (2022), McKay and Wolf (2023), Mian et al. (2021) or Slacalek et al. (2020)). Consumption reactions to wealth shocks are one channel through which this wealth heterogeneity may have such macroeconomic consequences, due to the decline in marginal propensity to consume along the wealth distribution or to heterogeneous liquidity constraints among households. While there is already a fairly crowded empirical literature aiming at estimating consumption reactions to various types of income shocks,[1] empirical evidence about the heterogeneity of the marginal propensity to consume out of wealth is more limited.[2] The heterogeneous impact of wealth shocks on consumption is, however, a crucial issue given the importance of wealth inequality, the dynamics of housing prices, and the fact that housing assets together with mortgages play a major role in households' wealth.

In this paper, we build an original micro dataset and use the whole wealth distribution to provide a systematic investigation on how heterogeneity in the *total* wealth composition (housing assets, financial wealth, and debt) affects the marginal propensity to consume out of wealth (MPC) along the whole wealth distribution.[3] We address the following question: How does the marginal propensity to consume out of wealth vary across households according to the level and composition of their wealth? We also provide an original analysis of whether housing wealth and mortgages explain

[1] A large part of the micro-data based empirical literature on consumption aims to test theoretical predictions of various models (i.e. anticipated/unanticipated shocks, permanent versus transitory shocks, etc.), see for instance Johnson et al. (2006), Parker et al. (2013), and the survey by Jappelli and Pistaferri (2010). For recent empirical results and their implications for macroeconomic models, see also Boehm et al. (2023), Carroll et al. (2011), Crawley and Kuchler (2023) and Kaplan and Violante (2022).

[2] There is however an extensive literature estimating the average wealth effect on consumption based on aggregate data (see among others, Aron et al. (2012), Case et al. (2005), Davis and Palumbo (2001), Guerrieri and Mendicino (2018), Slacalek (2009) as well as Paiella (2009) or Cooper and Dynan (2016), for detailed literature surveys). The average marginal propensity to consume out of wealth is estimated on average around 5 cents for one dollar of additional wealth. Anglo-Saxon countries tend to exhibit larger average MPC than Continental Europe.

[3] Only a few papers estimate the marginal propensity to consume out of wealth accounting both for housing and financial wealth at the household level (Paiella (2007) and Paiella and Pistaferri (2017) for Italy, Angrisani et al. (2019) for the U.S.). These papers focus on average estimates without providing information regarding the heterogeneity of the MPC across the wealth distribution or accounting for household debt.

part of the heterogeneity in the MPC out of total wealth, since both housing assets and mortgages account for a crucial part of the wealth of many households. In doing so, we investigate the role that the collateral channel may play in explaining the heterogeneity of MPC across countries. Taking advantage of our multiple-country household-level dataset, we also assess the sources of the MPC heterogeneity across euro area countries using an Oaxaca-Blinder decomposition. We estimate how much of the variation in MPC is due to institutional and socio-economic differences (such as homeownership rates, mortgage markets, demographics, and wealth inequality) and how much is explained by differences in consumption behaviours.

Theoretically, consumption may react to unexpected or expected changes in households' wealth. In a baseline life-cycle model, households smooth their consumption over time, accounting for their expected evolution of income and wealth over their lifetime. With perfect credit markets, no uncertainty, and forward-looking agents, only unexpected changes in households' wealth affect their consumption. However, when imperfect markets or credit constraints are introduced, consumption may react to expected changes in wealth, and there may be heterogeneous reactions across households. In particular, an increase in housing prices may alleviate liquidity constraints for people with mortgages, who would then adjust their consumption. The literature also points out how the specific features of housing assets (i.e. illiquid assets that may be hard to adjust) are likely to induce larger MPC out of wealth compared to transitory income shocks. In particular, the large share of housing assets in households' balance sheets may induce large MPC out of wealth (Berger et al. (2018)). From an empirical point of view, one crucial difficulty in assessing the effect of wealth on consumption is the lack of suitable data that provides reliable information on both the distribution of consumption and the distribution of wealth across a representative sample of households (including information about their debt), and that additionally allows to identify wealth shocks (Cooper and Dynan (2016)). Most studies on the heterogeneity of the marginal propensity to consume out of wealth focus on the impact of housing prices on consumption, and do not provide evidence on the role of the heterogeneity in the composition of wealth (such as liquid/illiquid wealth, households' mortgages, etc.). This paper aims at filling this gap.

Our contribution to the literature is threefold. First, we are the first to provide detailed estimates of how marginal propensities to consume vary for various components of wealth and across households over the whole wealth distribution. Our empirical

evidence should prove useful for the calibration and testing of HANK models, as these models move forward with detailed modeling of the heterogeneity of the household balance sheet (Kaplan and Violante (2022)). In particular, our results advocate for considering heterogeneous MPC in HANK models, not only considering the liquidity of assets, but also considering the position in the net wealth distribution (see Slacalek et al. (2020) or Mian et al. (2021) for direct use of our estimates). We provide these MPC estimates for five euro area countries based on a fully harmonised approach in terms of both the data and the empirical approach. Second, based on the heterogeneity across both households and countries, we investigate the role of the collateral channel. Third, we contribute to the understanding of how institutional and socio-economic differences across countries in homeownership rates, mortgage markets, demographics, and wealth inequality may induce cross-country heterogeneity in the transmission of monetary policy through the consumption-wealth channel.[4]

For our empirical analysis, we build a unique panel dataset combining individual data from wealth surveys (Household Finance and Consumption Survey, ECB), and consumption surveys (Household Budget Surveys, National Statistical Institutes). Our main data source is the Eurosystem Household Finance and Consumption Survey, which is a harmonized wealth survey for euro area countries with a panel component for some of them.[5] It also includes questions about consumption. We use the first two waves of this survey which provide household-level changes in wealth between 2010 and 2014. In order to measure total non-durable consumption, we perform statistical matching with the Household Budget Surveys (Skinner (1987), Browning et al. (2003) and Browning et al. (2014)).[6] In the end, this dataset allows us to study the heterogeneity of the MPC within five European countries based on a harmonized approach

[4] See Slacalek et al. (2020) for a quantification of several transmission channels of monetary policy to consumption across euro area countries.

[5] We have to restrict our sample to countries for which we have panel data on wealth at the household level, and for which all necessary information is available over our period of interest, namely Belgium, Cyprus, Germany, Spain, and Italy. While the country selection is driven by data availability, nevertheless we cover a wide cross-country heterogeneity in terms of country size and economic situations in the euro area. Indeed, the GDP of these countries amounted to 60% of the GDP of the euro area in 2014. Note that France (about 20% of Euro area GDP) is not included in this analysis, because there is no panel component for France in the main data source we use (the Wave 1 and Wave 2 of the Household Finance and Consumption Survey).

[6] The construction of our dataset is closely related to Arrondel et al. (2019) who combined the French wealth survey with the Household Budget survey. There are two major differences. First, they rely only on cross-sectional variations to estimate the MPC, while we are able to use panel data and to instrument wealth shocks. Second, they focus on a single country.

in terms of both data and empirical design. [7]

We estimate the marginal propensity to consume out wealth accounting for differences in the level and composition of wealth between households for each country. Such an approach allows us to provide country-specific MPC estimates and analyze their heterogeneity along the wealth distribution as well as depending on asset composition. We address endogeneity issues related to potential omitted variables and active saving/dissaving behaviors by using instrumented household-level panel regressions. First, we exploit the panel nature of our data and estimate our regressions using first differences to capture time-invariant differences across households that may be correlated with their wealth. Second, we also control for a large number of variables (including subjective expectations about future income), which allows to account for temporal trends in the observed individual heterogeneity. Third, we consider a simulated instrumental variable strategy based on Di Maggio et al. (2020). We extend their instrumental variable strategy for stock market return shocks to several assets. Our approach is based on the evolution of aggregate asset prices and on the past composition of wealth held by each household at the beginning of the sample period. In other words, we instrument the variation in each wealth component with the change that would have occurred if the household had retained the same wealth structure. We also consider alternative instrumental variables either based on a lagged-instrument variable approach or using an external source of data (the distributional wealth accounts) to account for potential measurement errors in asset values that may contaminate both the simulated instrumental variable and the actual change in wealth.

Our four main results are as follows.

First, the marginal propensity to consume out of wealth is lower for high-wealth people. We find significant marginal propensity to consume out of wealth which is decreasing from the median wealth group (3.1 cents of additional consumption for one euro increase in total wealth) to the top wealth group (0.4 cent).[8] Such a pattern is observed for all countries. Moreover, we document some heterogeneity across coun-

[7] The existing micro-data-based papers use country-specific data sources on consumption, wealth or asset prices which may differ in various dimensions making cross-country comparisons difficult. These dimensions include time periods, consumption measures or questions about hypothetical gains or losses, panel versus cross-section data, household level versus local variations in wealth or in asset prices, type of the shocks, etc.

[8] Note that, in some cases, due to the sampling design that oversamples wealthy households, the MPC for households at the bottom of the wealth distribution may be imprecisely estimated (or even not statistically significant).

tries. For instance, for households belonging to the P50-P69 net wealth percentiles, the marginal propensity to consume out of wealth is estimated at around 5.5 cents in Belgium and Italy and about 3 cents for the other countries.[9] For households belonging to the top ten percentile of the net wealth distribution, it is around 2.7 cents in Italy, 1 cent in Belgium and less in the other countries. Second, we account for asset composition and show the significant role of housing wealth in all countries, with lower MPCs out of housing wealth for richer people. We also document cross-country heterogeneity in the MPC out of housing wealth. Third, we show that our results are indicative that the collateral channel is a significant determinant of MPC differences: we find that consumption reacts more to wealth shocks in countries with a large share of mortgages. This suggests that increases in housing prices may relax financing constraints when households have contracted mortgages. Fourth, regarding the cross-country heterogeneity in the transmission of housing prices to consumption, we find that countries can be divided into two groups. Based on an Oaxaca-Blinder decomposition, we show that for Belgium, Cyprus and Italy, most of the differences in MPC compared to Spain are explained by differences in coefficients (which may be interpreted as reflecting differences in households' behaviour), while for Germany the main source of difference is due to disparities in endowments (i.e. different institutional structures and socio-economic characteristics). In both cases, we show that the cross-country differences in real estate ownership play a crucial role. A striking result is obtained when comparing Spain (which is characterized by the highest homeownership rate) with Germany (which has the lowest): closing the gap in homeownership rate between these two countries would increase the average MPC in Germany and would fully close the MPC gap compared to Spain. Additionally, we find that factors related to mortgage markets, demographics, and wealth inequality contribute to cross-country differences in MPCs.

In addition to assessing the marginal propensity to consume out of wealth, and its heterogeneity across households and countries, another benefit of our work is related to methodological issues. Our results strongly advocate for using panel data with instrumented wealth shocks - rather than cross-sectional data - otherwise a downward bias is observed in the panel OLS estimates for all countries. Interestingly, once correcting for this bias, our average country-specific estimates turn out to be in line with macro-based estimates (Guerrieri and Mendicino (2018), Slacalek (2009)). The MPC out of total wealth reaches 2.7 cents in Italy, meaning that one additional euro of wealth is

[9]Except for Germany where the coefficient turns out to be not statistically significant.

associated with 2.7 cents of additional annual consumption. The MPC is around 1.3 cents in Belgium, 1 cent in Spain, while it is less than one cent in Germany and Cyprus.

Finally, based on our main results, we investigate how heterogeneous MPC, wealth composition, and wealth inequality can affect consumption inequality. We conduct a simple simulation exercise to assess the effect on consumption of an exogenous shock to the value of different assets.[10] We find that housing price shocks decrease consumption inequality while financial wealth shocks have a limited effect on consumption inequality.

Related literature. Most of the papers estimating the marginal propensity to consume out of wealth based on microdata focus either on housing wealth shocks or on changes in stock market returns. Regarding housing wealth effects, these papers mostly use consumption surveys merged with local housing prices (e.g. Attanasio et al. (2009), Campbell and Cocco (2007), Disney et al. (2010), Aladangady (2017)). By leveraging local transactions data, Mian et al. (2013) are able to study the heterogeneity across areas according to average income and leverage ratio. The stock market consumption wealth effect is analysed by Chodorow-Reich et al. (2021) through a local labor market analysis for the US. Their empirical strategy relies on both heterogeneity in stock market wealth at the county level and aggregate movement in stock prices. They find that an increase in local stock wealth induced by a positive stock return increases total local employment and payroll. Closely related to our paper, Di Maggio et al. (2020) employ household-level data on stock holdings for Sweden to estimate how consumption responds to changes in stock market returns. They show a decreasing marginal propensity to consume out-of-stock market wealth across the wealth distribution and estimate both the effect of capital gain and dividend income on consumption. Their identification strategy is based on instrumental variables that combine the evolution of aggregate asset price with past portfolio weights. We adopt this empirical strategy and extend it to multiple asset classes, as we are interested in total wealth rather than solely on stock market wealth. Another difference with their approach lies in the fact that we rely both on consumption and wealth surveys, whereas they use an imputation of consumption based on wealth and income data (see also Browning et al. (2013)). In order to tackle the challenge of observing both consumption reactions and exogenous wealth shocks, other microdata-based approaches include studies

[10] Let us emphasize that in this simple exercise, we do not account for changes in household behaviours or general equilibrium effects.

on reported changes in spending and reported housing wealth losses and gains (Christelis et al. (2015) or Christelis et al. (2024)), survey questions about intended spending under various scenarios (Fuster et al. (2018), Christelis et al. (2021b)) or household responses to lottery winnings (Golosov et al. (2024)).[11]

Our empirical approach is closely related to recent papers that also use household panel data (Angrisani et al. (2019) and Paiella and Pistaferri (2017)). Angrisani et al. (2019) focus on changes in housing wealth for a sample of American adults over the age of 50 and find the marginal propensity to consume out of housing wealth change to be 6 cents per dollar. Paiella and Pistaferri (2017) used two waves of the Bank of Italy survey about Income and Wealth and find that the MPC is about 3 cents per euro increase in wealth in Italy.[12] While these papers focus on one country (the U.S. and Italy, respectively), we provide micro-based estimates of MPC that are harmonized (both in terms of data and empirical approach) across five countries. Additionally, we investigate the sources of the cross-country heterogeneity in the MPC.

We also contribute to the empirical literature showing the role of debt and housing assets in explaining the heterogeneity in household behaviour and its consequences for aggregate consumption (e.g. Mian et al. (2013), Misra and Surico (2014), Cloyne et al. (2020), Cumming and Hubert (2021)). Our paper is also related to the empirical literature assessing how household heterogeneity affects the transmission of monetary policy (e.g., Amberg et al. (2022), Broer et al. (2022), Fagereng et al. (2022), Lenza and Slacalek (2024), or Hubert and Savignac (forthcoming)). Specifically, our paper contributes to the literature that examines how differences in household wealth and indebtedness affect the consumption reaction (e.g. Andersen et al. (2023), Holm et al. (2021)) and induce heterogeneous monetary policy transmission across European countries (e.g. Adam and Zhu (2016), Ampudia et al. (2024a), Ampudia et al. (2024b), Koeniger et al. (2022), or Slacalek et al. (2020)).

[11] See also Poterba (2000) and Paiella (2009) for a detailed review of the long-lasting literature on wealth and consumption.

[12] We also find a significant wealth effect in Italy (about 2.7 cents at the mean) coming both from housing and financial assets. The financial wealth effect dominates the housing wealth effect in our sample. Note that the empirical approaches in both papers are closely related. However, there are significant differences. Our paper uses the same data source to measure wealth changes at the household level for Italy in different periods (between 2010 and 2014 while they use 2008-2010). Regarding consumption, we improve the measure they use (a summary question asked in the wealth survey) by basing our computation on the distribution of consumption measured in the Household Budget survey. Finally, they control for household expectations about asset returns, which we are not able to do because such information is not available for our set of countries. Nevertheless, this turns out to make no difference since they present identical results for expected and non-expected wealth shocks.

The rest of the paper is organised as follows. Section 2 presents the data. We next present our empirical strategy in Section 3. In Section 4, we estimate heterogeneous marginal propensity to consume out of wealth across the net wealth distribution. The role of housing wealth, the collateral channel, as well as the sources of the cross-country heterogeneity in MPCs are considered in Section 5. In Section 6, we investigate how the heterogeneity in MPC combined with wealth inequality can affect consumption inequality. Section 7 provides additional estimates accounting for potential measurement errors in asset values. Section 8 concludes.

2 Wealth and consumption at the household level

2.1 Construction of a household-level dataset on consumption, wealth, and disposable income

To estimate a MPC a household-level dataset including reliable information on consumption and wealth, and which additionally allows the identification of wealth shocks is required. Indeed, it is a crucial challenge in the literature (Cooper and Dynan (2016)). We combine here two main types of surveys, namely wealth and consumption surveys that we complement with a survey on income and living conditions. Our main data source is the Eurosystem Household Finance and Consumption Survey (HFCS) which is a harmonized wealth survey for euro area countries with a panel component for some of them. To measure total non-durable consumption, we perform statistical matching with the Household Budget Surveys (HBS) (see below). Additionally, we perform the same kind of statistical matching with the Survey on Income and Living Conditions (SILC) to measure disposable income.

Wealth survey

Our main data source, the Household Finance and Consumption Survey (HFCS) is designed to measure the distribution and composition of household wealth in euro area countries (see HFCN (2016)). The HFCS provides detailed household-level information on wealth (assets and debt), household composition, and demographics. It also covers gross income and includes some questions on consumption (food at home, food outside the home). The survey methodology ensures country-representativeness and cross-country comparability. We use the first two waves of the HFCS and take advantage of the fact that a panel component is available for some countries (Belgium, Cyprus, Germany, Italy, and Spain), see Appendix A.1.1 for more details.

Consumption measure

The measure of consumption is a crucial issue. While the HFCS collects information on some item expenditures, it does not provide a measure of total non-durable consumption. The best available household-level information about consumption distribution is provided by the Household Budget Survey (HBS, Eurostat). It collects item expenditures by asking households to fill in a highly detailed diary, thereby providing precise and detailed information on households' consumption behaviors. Unfortunately, the HBS cannot be directly linked with the HFCS as they do not survey the same sample of households. Nevertheless, we take advantage of the information on consumption collected in the HFCS to complement it with a household-level measure of non-durable consumption based on the HBS. This procedure can be seen either as imputation or statistical matching. It uses a regression ("Skinner approach") combined with a rank hot deck imputation to match the consumption distribution observed in HBS. This matching procedure is explained in detail in Appendix subsection A.1. The main steps can be summarized as follows.

First, we follow Skinner (1987) and Browning et al. (2003) to estimate non-durable consumption.[13] We estimate an auxiliary regression on HBS data which links non-durable consumption with explanatory variables such as food at home, food outside the home, and other controls that are available in both the HBS and the HFCS (see Lamarche (2017)). The resulting regression coefficient estimates are then used to predict the non-durable consumption distribution of the HFCS households (based on identical explanatory variables). Appendix Figure A1 compares the original distribution from HBS (dark blue curve) with the imputed distribution from the Skinner method (light blue curve), showing some differences, especially in Germany.

Second, since the HBS is the best source for measuring consumption distribution, we improve the consumption imputation to match the HBS distribution. We achieve this by using the predicted consumption obtained from the Skinner method as an instrumental variable to implement statistical matching between the HFCS and HBS data. Specifically, following D'Orazio et al. (2006), respondents in the HFCS are matched with respondents in the HBS according to the rank of their estimated consumption.

[13] Browning et al. (2003) explain how only a few recall questions on consumption in another purpose survey can be used to impute total consumption using a consumption survey. Moreover, based on Italian data, Battistin et al. (2003) show that food expenditure data are of comparable quality and informational content across the two surveys (SHIW and HBS), once heaping, rounding, and time averaging are properly accounted for. This method is similar to a two-sample-two-stage least squares approach. See also Browning et al. (2014) for a justification of this method.

More precisely, we use a rank hot deck imputation stratified by tenure status and household composition, which means that we first group households by tenure status and household composition and then, within each group, rank them according to their predicted consumption .[14] In doing so, we preserve the consumption ranking across households. We then allocate non-durable consumption observed in the HBS to HFCS households based on their rank in the non-durable predicted consumption distribution (conditional on their tenure status and household composition). As illustrated in Appendix Table A5 and in Appendix Figure A1, this procedure allows the very close reproduction of the marginal distribution of consumption for non-durable goods and services observed in the HBS (as evidenced by the overlapping dark blue and yellow curves in Appendix Figure A1).

Finally, this rank hot deck imputation also allows us to decompose consumption into several categories. Indeed, consumption in the HBS can be broken down into detailed items of consumption (clothing, housing, ...) corresponding to items of the Classification of Individual Consumption by Purpose (COICOP). Since the hot deck procedure allocates consumption observed for an HBS respondent to an HFCS respondent, we can directly allocate the detailed items composing the HBS consumption to each HFCS respondent.

Disposable income

The HFCS provides only gross income, while accounting for taxes and transfers may be a crucial issue for cross-country analysis. To address this issue, we use the Survey on Income and Living Conditions (EU-SILC, Eurostat) which is specifically designed to measure income components at the household level in the European Union. We apply a rank hot deck imputation to impute disposable income from the SILC to HFCS households. Since gross income is available in both sources, we rank households according to their gross income. Assuming that there is no reranking between the gross and the disposable income distributions, we perform a rank hot deck imputation stratified by household composition and tenure status, the same way we do it for consumption. By doing so, we obtain a distribution of disposable income in the HFCS similar to the one observed in the EU-SILC (see Appendix Table A6).[15]

[14] We use the function implemented in the R package StatMatch (D'Orazio (2017)).

[15] We also check the sensitivity of our estimations to the use of gross income (from the HFCS) versus disposable income (resulting from the rank hot deck imputation using SILC). Our results are not impacted in terms of cross-country comparisons (Appendix Table B12).

2.2 Sample selection

We select the countries for which a panel component is available in the first two waves of the HFCS and for which all necessary information is available (Belgium, Cyprus, Germany, Spain, and Italy). Wave 1 refers to the year 2010 and Wave 2 to the year 2014.[16]

We select households where the reference person is aged between 25 and 75 years old in Wave 1 and perform some usual cleaning on extreme values (see the details in Appendix A.1). Our estimation sample includes from 808 households in Cyprus to 3,022 households in Spain. The comparison between the descriptive statistics for the main variables based on the initial sample and the ones obtained after cleaning do not reveal significant differences (Appendix Table A3).

2.3 Heterogeneity in wealth and consumption

Descriptive statistics from our sample are in line with well-known facts about the distributions of consumption, wealth, and income. First, there is substantial cross-country heterogeneity as regards net wealth, income, and consumption distributions. Wealth is far more unequally distributed than income (e.g. Davies and Shorrocks (1999)), while the heterogeneity in non-durable consumption is much more limited within countries (See Appendix Figure C3).[17]

Second, as illustrated in Figure 1, there is a huge heterogeneity within and across countries regarding net wealth composition. In particular, the share of housing assets[18] in total assets varies a great deal across countries: on average housing wealth amounts to 77% of the total assets of Spanish households, compared to just 42% of German households' total assets. Nevertheless, there are some common patterns across countries.[19] In the bottom deciles, households' assets are mostly financial assets (essentially sight accounts and saving accounts) and other assets (durables), and debt amounts to a large share of total assets. The share of housing assets in total assets tends to increase along the wealth distribution. At the very top, wealth composition is much more diversified.[20]

[16] The few exceptions to this rule are detailed in Appendix Table A1.

[17] See for instance Brindusa et al. (2018) for Spain.

[18] Housing assets refers to household's main residence and other real estate properties.

[19] See Appendix Figure C1 for the other countries (Belgium, Cyprus, and Italy).

[20] The financial assets at the top of the distribution may be underestimated in this type of survey because of offshore wealth or of a covering of the very top of the distribution that, despite the oversampling methods, could not be precise enough (see Bricker et al. (2016), Vermeulen (2018) or Garbinti et al. (2020) for a discussion and other references).

Figure 1: Heterogeneity in assets composition and in debt by net wealth decile (% of total assets) – Germany and Spain

Notes: The vertical axis is limited to - 60%. The percentage of debt in total assets for the first net wealth decile (D1) is 447% in Germany and 129% in Spain. Figures based on the Wave 1 of the HFCS. See Appendix Figure C1 for the other countries (Belgium, Cyprus, and Italy).

HMR: household's main residence.

Other real estate:includes all other real estate properties.

Financial wealth: all financial assets owned by the household (sight accounts, saving accounts, mutual funds, bonds, non-self-employment private business, shares, managed accounts, private lending, voluntary pension plans or whole life insurance contracts, and 'other' financial assets).

Other assets: household's vehicles, valuables, and the value of self-employment businesses.

Debt: all types of debts (mortgages and non-collateralized debt).

At the macro level, there was a huge cross-country heterogeneity in asset price developments over our sample period 2010-2014. Three of the countries we consider (Cyprus, Spain, and Italy) faced large drops in asset prices, notably in house prices, domestic shares, and government bonds (for Spain). The two other countries (Belgium and Germany) saw all asset prices increase over the period (Appendix Table A9). Cyprus, Spain, and Italy are also countries where consumption dropped, while it increased moderately in Belgium and Germany. These distinct patterns in aggregate consumption may partly reflect the heterogeneity of the effect of wealth shocks on consumption. This heterogeneity may be due to the country-specific effects of wealth shocks on consumption, notably since these countries differ in wealth inequality and household asset composition. At the micro level, we observe in all countries of our sample both households for whom net wealth increased between Wave 1 and Wave 2 (39% in Italy to 57% in Germany) and other ones for whom net wealth decreased (Appendix Figure C2). Such heterogeneity may partly reflect saving decisions over the period. When focusing only on the value of total assets (gross wealth), we also observe gains and losses across households (Appendix Figure C3).

Overall, these differences in wealth levels and composition, combined with the heterogeneity in wealth shocks, are likely to lead to differences in the marginal propensity to consume out of wealth within (and across) countries.

3 Empirical strategy

Our estimation strategy is based on a household-level instrumented panel regression approach. Concretely, we use i) a first-difference estimator, and ii) an instrument based on passive changes in the household wealth due to changes in asset prices as proposed by Di Maggio et al. (2020). We explain here the different steps of our approach.

3.1 Baseline specification

First, we build on the reduced-form equation estimated on household-level data in the literature. Based on micro-data, wealth effects on consumption are typically estimated

by regressing changes in consumption on changes in wealth (Equation 1):[21]

$$\Delta \frac{C_h}{Y_h} = \beta_1 \Delta \frac{W_h}{Y_h} + \gamma Z_h + \vartheta_h \tag{1}$$

where $\Delta X_h = X_{h,t} - X_{h,t-1}$ (i.e. in our set up, it is the difference between Wave 2 and Wave 1 in the variable X for the household h), C_h, Y_h and W_h stand respectively for consumption, disposable income and gross wealth for a given household h. β_1 denotes the marginal propensity to consume out of wealth (also called "wealth effect"), Z_h is a list of control variables and ϑ_h is an error term. We are thus able to control for individual unobserved time-invariant heterogeneity that might vary systematically across households and contaminate the estimation of the relationship between consumption and wealth (Paiella (2009), Disney et al. (2010), Angrisani et al. (2019)). Following Paiella and Pistaferri (2017), we add a list of variables Z_h to control in particular for age, permanent income, and preferences at the beginning of the period, which allows to account for temporal trends $Z_h.t$ (with t being the year) in the undifferenced equation. More precisely, our list of control variables Z_h includes: age and its square, the employment status of the reference person (unemployed, retired), the household size (number of adults, number of children), and whether the household considers their income over the last twelve months as unusually high or low compared to a "normal" year (cf. Carroll (2000)). It also includes the reference person's subjective expectations about the change in total household income. Indeed, the empirical literature has pointed out that individual income expectations may affect changes in both wealth and consumption (since they indicate changes in future income) which may in turn bias MPC estimates (Dynan and Maki (2001), Disney et al. (2010), Angrisani et al. (2019)). The richness of the HFCS data also allows us to consider dummy variables reflecting the household's expectation about future total household income over the next year (i.e. household total income to vary by more or less than the prices), as additional control variables.

3.2 Instrumental variables: benchmark approach

To deal with the endogeneity issue arising from changes in wealth that are endogeneously made by the household, we adopt an instrumental variable approach which

[21] See for instance Paiella and Pistaferri (2017), Paiella (2007), Arrondel et al. (2019), Poterba (2000), Juster et al. (2006) Case et al. (2005) or Christelis et al. (2015) for other references that also analyze the wealth effects on consumption based on microdata using such specification.

is similar to the one used by Di Maggio et al. (2020). Indeed, the actual changes in wealth ($\Delta W_h = W_{h,t} - W_{h,t-1}$) in Equation 1 may obviously result from the household's saving behavior between $t-1$ and t such as acquiring a house, dissaving on a deposit account or investing in equity. Since such changes in saving behaviours (*active saving*) may affect both wealth and consumption at the same time, it raises the concern of a simultaneity bias. To deal with this endogeneity issue, we follow Di Maggio et al. (2020), and employ *passive changes* in asset prices to instrument for actual changes in total household wealth. This instrument can be written as:

$$W_{h,t-1} \times (p_t - p_{t-1}) \tag{2}$$

where $W_{h,t-1}$ is the household wealth observed at the period $t-1$ [22] and $(p_t - p_{t-1})$ is the price evolution between $t-1$ and t [23] of the composite wealth W held by the household h. By doing so, we capture the effect of changes in actual wealth from what would have been the household's wealth gains/losses, if there had been no changes in its portfolio. In practice, household total wealth is made up of several asset components, A^i, with $W_h = \sum_{i \in I_h} A^i_{h,t}$. In the presence of several assets, the passive change in wealth depicted in Equation 2 results in a set of i instruments, each based on the passive asset change between $t-1$ and t for a specific asset A^i held by household h:

$$A^i_{h,t-1} \times ({p^{Ai}}_t - {p^{Ai}}_{t-1}) \tag{3}$$

where $({p^{Ai}}_t - {p^{Ai}}_{t-1})$ is the price change of the asset A^i between $t-1$ (wave 1) and t (wave 2), and $A^i_{h,t-1}$ is the actual value of the asset A^i held by the household h at time $t-1$. This instrumental approach is a straightforward extension of the instrumental variable approach used by Di Maggio et al. (2020) for stock market returns, applied to total wealth and several assets. In this setup, any variation in the household wealth structure cannot drive our results. Note that similar instrumental variable approaches

[22] i.e. wave 1 of the HFCS survey.
[23] i.e. between wave 1 and wave 2 of the survey.

were also used by Banks et al. (2013) and Bottazzi et al. (2017)).[24, 25, 26]

Finally, coherently with Equation 1, we instrument for the actual ratio $\Delta\frac{W_h}{Y_h}$ with the ratio of passive changes in assets to household income[27]:

$$\frac{A^i_{h,t-1} \times ({p^{Ai}}_t - {p^{Ai}}_{t-1})}{Y_{h,t-1}} \tag{4}$$

Regarding assets A^i, we take into account the largest possible heterogeneity in the composition of the assets by breaking down household total assets into 14 categories of assets. We match these assets with the corresponding asset prices. In a few cases, it requires us to use the same price for different wealth components.[28] For this reason, the initial 14 asset categories are reduced to a smaller set of 7 categories with distinct price indexes which we use for our baseline estimates. However, for all our tables of results, we also present the results obtained with the 14 initial asset categories, as sensitivity tests, in Appendix B.

Measurement errors in asset valuation could be an issue for our IV-approach (see

[24] Note also that a large strand of the literature focusing on housing wealth effects uses the heterogeneity in local house price changes to identify the causal effect of house price fluctuations on consumer spending (e.g., Aladangady (2017), Angrisani et al. (2019)). In these papers, heterogeneity in the local housing supply is used to control for such common factors and identify the causal effect of house prices on consumer spending. We do not implement such an instrumental variable approach here for two reasons. First, we are interested not only in housing prices but also in financial assets, for which there is no obvious similar strategy. Second, due to data limitations, we cannot rely on regional variations within each country using a harmonized approach for all considered countries.

[25] It should also be noted that the literature (e.g., Attanasio et al. (2009), Campbell and Cocco (2007) or Aladangady (2017)) discusses other potential sources of endogeneity related to expectations about economic prospects, demographic trends, or financial liberalization as these factors may simultaneously affect asset prices, household wealth and consumption behaviour. To account for this potential source of bias, one may consider a "lagged instrument", i.e., asset price changes between $t-2$ and $t-1$ and household asset composition in $t-2$. As a robustness test, we have been able to use such a lagged instrument approach in the case of Italy, using the panel sample and the SHIW survey conducted before the first wave of the HFCS. In section 7, we consider these lagged instruments (i.e., $A^i_{h,t-2} \times ({p^{Ai}}_{t-1} - {p^{Ai}}_{t-2})$) and show that findings are not affected by the use of this alternative strategy.

[26] Note that if, as an additional robustness check, we use the changes in assets prices between t-2 and t-1 instead of t-1 and t (i.e. $A^i_{h,t-1} \times ({p^{Ai}}_{t-1} - {p^{Ai}}_{t-2})$), the results are similar.

[27] Note that another choice would have been to rather consider the difference:

$$\frac{(A^i_{h,t}) \times ({p^{Ai}}_t)}{Y_{h,t}} - \frac{(A^i_{h,t-1}) \times ({p^{Ai}}_{t-1})}{Y_{h,t-1}}$$

as an instrument. However, such a choice would have led us to have $Y_{h,\mathrm{t}}$ in the instrument which includes capital income (from wealth measured in Wave 2) and would thus be endogenous to the wealth change observed between t and $t-1$.

[28] See details in Appendix Table A7.

for example Biancotti et al. (2008)). In Section 7, we detail this issue and present two alternative approaches, each based on alternative external datasets, to address this issue. We show that our findings are similar to these two alternative approaches.

4 Heterogenous MPC across the net wealth distribution

In this Section, we estimate the marginal propensity to consume out of wealth accounting for heterogeneity in wealth level. We first provide average estimates of the MPC based on our data and then analyze heterogeneity along the wealth distribution.

4.1 Baseline estimates

Our baseline results are displayed in Table 1. Column 1 shows OLS estimates obtained from Equation 1. IV panel estimates based on our instrumental strategy are in column 2. We also report cross-sectional OLS estimates (i.e., ignoring the panel dimension) for Wave 1 and Wave 2 in the last two columns.[29]

We find statistically significant estimates for the marginal propensity to consume out of wealth. Considering all countries together, the MPC out of wealth reaches 0.5 cents (Equation 1, column 2), meaning that one additional euro of wealth is associated with 0.5 cents of additional annual consumption. Interestingly, we are able to document substantial cross-country heterogeneity. The MPC out of wealth is 2.7 cents in Italy, 1.3 cents in Belgium, one cent in Spain while it is smaller in Cyprus and Germany. Considering detailed country regressions, our baseline IV-estimates (column 2) for the average MPC turn out to be higher than the ones obtained using only cross-sectional variations (columns 3 and 4) and are consistent with the macro-based evidence (Guerrieri and Mendicino (2018), Slacalek (2009)).[30]

[29] They are based on a specification where the cross-sectional ratio of consumption to income is explained by the cross-sectional ratio of wealth to income.

[30] We check the sensitivity of our estimations to the use of gross income (from the HFCS) versus disposable income. Overall, our results are not impacted in terms of cross-country comparisons (Appendix Table B12). Based on gross income, the MPC estimates tend however to be larger at the mean for 3 of the 5 countries, and identical for Spain and Italy. When considering heterogeneous MPC across the net wealth distribution, there is no clear pattern regarding the percentiles which may explain such differences: in some countries, the MPC is higher in given wealth percentiles with gross income than with disposable income, and vice versa in other countries. Clearly, these differences rely on the link between gross and disposable income, which may call for an analysis of the redistributive system in each country. Such an analysis is far beyond the scope of this paper.

Table 1: Baseline results: Marginal propensity to consume out of wealth at the mean – OLS, IV panel and cross-section estimates

	Panel		Cross-section		
	(1)	**(2)**	**(3)**	**(4)**	
	Baseline model				
	OLS	IV	1st wave	2nd wave	Number of obs.
All					
MPC	**0.004*****	**0.005*****	**0.003*****	**0.004*****	8,459
Std. Error	0.001	0.001	0.000	0.001	
Fstat		*28.5*			
Belgium					
MPC	**0.009*****	**0.013*****	**0.003*****	**0.002***	835
Std. Error	0.002	0.003	0.001	0.001	
Fstat		*32.8*			
Cyprus					
MPC	**0.002*****	**0.002*****	**0.000**	**0.001*****	808
Std. Error	0.000	0.001	0.000	0.000	
Fstat		*92.4*			
Germany					
MPC	**0.005*****	**0.004***	**0.000**	**0.005****	1,569
Std. Error	0.001	0.002	0.001	0.002	
Fstat		*14.2*			
Spain					
MPC	**0.004*****	**0.01*****	**0.002*****	**0.003*****	3,022
Std. Error	0.001	0.002	0.000	0.001	
Fstat		*7.6*			
Italy					
MPC	**0.023*****	**0.027*****	**0.009*****	**0.016*****	2,225
Std. Error	0.003	0.005	0.001	0.004	
Fstat		*42.5*			

Notes: Control variables: age and age^2 of the reference person, employment status (whether the reference person is retired (Yes/No), unemployed (Yes/No)), household composition (number of adults and number of children) and questions on income (is income in the reference period normal/above normal/below normal, is income in the next year expected to rise below/above price). The control variables in the panel regressions are measured in Wave 1.
Confidence intervals robust to weak instruments following Andrews (2018) are available in Appendix Table B2. As robustness checks, alternative estimates using instruments based on the distributional wealth accounts are reported in AppendixTable B20, and those based on a lagged instrument approach are presented in Appendix Table B16.

Regarding the quality of the instrument, the F-statistics from the first-stage equa-

tion are above the standard threshold (of 10),[31] indicating that there is no major weak instrument issue.[32] Nevertheless, we compute confidence intervals that are robust to weak instruments. These robust confidence intervals show that the average MPC is statistically significant (at the 10% level in the case of Germany, detailed results available in Appendix Table B2).[33]

This instrumental strategy turns out to be crucial; otherwise, we observe a downward bias in the OLS estimates for all countries (Table 1, column 1). To compare our results with what would have been obtained in the absence of panel data, we also report OLS estimates based on cross-sectional regressions (rather than on our panel data) for Wave 1 and Wave 2 in Table 1 (columns 3 and 4). These cross-sectional estimates are stable across waves. They are however much lower than the ones obtained with our IV panel regressions or than the macro-based ones obtained in the literature. Our results show the interest of using panel data with instrumented wealth shocks rather than cross-sectional data.[34]

4.2 Heterogeneity across the net wealth distribution

From a theoretical point of view, uncertainty about wealth as well as liquidity constraints may lead the marginal propensity to consume out of wealth to decline along the wealth distribution (Carroll and Kimball (1996), Carroll and Kimball (2006)).[35] Our contribution here is to investigate the heterogeneity in consumption reaction to asset prices across the entire net wealth distribution. To explore this heterogeneity across the net wealth distribution, we consider four wealth groups based on the net wealth distribution observed in Wave 1 within each country (below median net wealth, 50th to 69th percentiles, 70th to 89th percentiles, and the top ten percentiles). For each country and wealth group, we estimate separate regressions. As a benchmark, we also

[31] With the sole exception of Spain (col. 3), where it is nevertheless close to 10.

[32] These results are obtained considering the same set of instruments for all countries. We also test for an alternative strategy considering a reduced number of instruments. Our results are virtually unaffected when considering country-specific selections of the instruments (i.e. when keeping the instrument variables in the first stage only when the p-value is below 10%, see Appendix Table B5.a).

[33] These robust confidence intervals are based on Andrews (2018). We compute them using the Stata package *twostepweakiv* (Sun (2018)). Further details are provided in the notes to each table.

[34] In section 7, we show that our conclusions are not affected when considering two alternative sets of instruments to account for potential measurement errors in the survey asset values (Appendix Table B20 and Table B16).

[35] Age is another source of MPC heterogeneity pointed out in structural life-cycle models (see Carroll et al. (2017)). We find some evidence of age dependence: in Belgium and Germany, the marginal propensity to consume out of wealth is higher for younger people. Such a result is in line with the findings of Fagereng et al. (2021) on Norwegian data and with life-cycle models considering the existence of borrowing constraints and realistic earning profiles.

consider the pooled sample of countries for each wealth group (column "All"). The results of the IV regressions are presented in Table 2.[36]

Table 2: Marginal propensity to consume out of wealth across the net wealth distribution – IV panel estimates

		All	Belgium	Cyprus	Germany	Spain	Italy
p0-p49	MPC	**0.003**	**0.061*****	**-0.01**	**0.047****	**0.003**	**0.036*****
	Std. Err.	(0.008)	(0.022)	(0.006)	(0.024)	(0.007)	(0.010)
	Fstat	*9.5*	*3.3*	*10.2*	*4.6*	*9.5*	*8.9*
	Nb obs	3,086	331	322	447	1,029	957
p50-p69	MPC	**0.031*****	**0.055*****	**0.036*****	**0.01**	**0.031*****	**0.055*****
	Std. Err.	(0.007)	(0.016)	(0.008)	(0.009)	(0.006)	(0.007)
	Fstat	*4.3*	*7.5*	*5.7*	*3.1*	*8.5*	*19.7*
	Nb obs	1,593	179	171	290	497	456
p70-p89	MPC	**0.014*****	**0.027*****	**0.001**	**0.03*****	**0.014****	**0.033*****
	Std. Err.	(0.005)	(0.007)	(0.004)	(0.009)	(0.006)	(0.013)
	Fstat	*10.9*	*13.9*	*8.2*	*4.4*	*18.9*	*15.9*
	Nb obs	2,007	211	182	460	642	512
p90-p100	MPC	**0.004*****	**0.01*****	**0.002*****	**0.005*****	**0.008*****	**0.027*****
	Std. Err.	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.010)
	Fstat	*19.2*	*19.9*	*10.0*	*23.2*	*10.3*	*20.4*
	Nb obs	1,773	114	133	372	854	300

Notes: Control variables: age and age^2 of the reference person, employment status (whether the reference person is retired (Yes/No), unemployed (Yes/No)), household composition (number of adults and number of children) and questions on income (is income in the reference period normal/above normal/below normal, is income in the next year expected to rise below/above price). The controls in the panel regression are measured in Wave 1. Confidence intervals robust to weak instruments following Andrews (2018) are available in Appendix Table B3. As robustness checks, alternative estimates using instruments based on the distributional wealth accounts are reported in AppendixTable B21, and those based on a lagged instrument approach are presented in Appendix Table B17.

As it turns out, the marginal propensity to consume out of wealth is lower for high-wealth households. We find a significant marginal propensity to consume out of wealth which is decreasing from the median wealth group to the top wealth group. Such a pattern is observed for all countries. For some low-wealth groups (below median wealth) the MPCs are imprecisely estimated.[37] Overall, the marginal propensity to

[36] See Appendix Table B6 for the OLS estimates. In section 7, Appendix Table B21 and Table B17 show our conclusions are not affected when using alternative IV strategies.

[37] In those cases, the estimates are found not statistically significant. This can be due to the structure of the data. To ensure a better precision at the top of the distribution, the wealth surveys are generally oversampled at the top. A consequence of this oversampling at the top is that the very bottom of the wealth distribution may be imprecisely estimated.

consume out of wealth decreases from 3.1 cents (for the P50-P69 wealth group) to 0.4 cents for the top ten percent wealth group (column 1). Within each wealth group, however, there is large cross-country heterogeneity: for households belonging to the P50-P69 net wealth percentiles, the marginal propensity to consume out of wealth is estimated around 5.5 cents in Belgium and Italy and above 3 cents for Spain and Cyprus (for Germany the coefficient turns out to be not statistically significant). For households belonging to the top ten percentile of the net wealth distribution, we obtain statistically significant estimates for all countries. The MPC is 2.7 for top wealth households in Italy, about one cent in Belgium, and less in the other countries.

While the effect of changes in income on detailed consumption categories has been studied for the US by Parker (1999) using the Consumer Expenditure Survey, we provide here an original analysis of the impact of wealth shocks by category of non-durable consumption expenditures thanks to our new dataset. We rely on the classification of individual consumption by purpose (COICOP – 2 digits). For each category of consumption expenditures, here again, our estimates reveal a decreasing pattern of the marginal propensity to consume out of wealth along the net wealth distribution, especially when statistically significant estimates are obtained i.e., for "Food and non-alcoholic beverages" or "Housing, water, electricity, gas, and other fuels" (see Appendix Table B14). These results clearly align with the Engel curve prediction for necessities, showing higher MPCs for less affluent households.

Overall, households differ not only in terms of the level and composition of wealth, but also in their marginal propensity to consume out of wealth along the wealth distribution. Both wealth inequality and heterogeneous MPC are then at play to explain aggregate consumption reaction to asset prices. We investigate further the implications of this heterogeneity in consumption distribution in section 6.

5 Housing wealth and the collateral channel

Where does this wealth effect on consumption come from? The MPC may differ depending on the type of assets held. In particular, housing assets and mortgages, which account for a large share of many households' net wealth, may play a specific role. In this section, we thus further investigate the role of asset composition in explaining the heterogeneity of the MPCs.

5.1 Accounting for asset composition

To investigate the heterogeneity across asset types, we split gross wealth to distinguish between housing and financial assets. The results are presented in Table 3. According to our benchmark IV estimates on the pooled sample of countries, the wealth effect on consumption is mostly explained by the consumption reaction to housing wealth shocks (with an estimated MPC of 1 cent per euro of additional wealth). We find a significant MPC out of housing assets in all countries, ranging from 0.2 cents in Cyprus to 2.8 cents in Italy. For financial wealth, the pooled estimates do not show statistically significant results. However, detailed country-specific regressions reveal that the MPC out of financial wealth is higher than for housing wealth in 2 out of 5 countries (Cyprus and Italy).[38]

Therefore, the main asset channel varies by country. In Cyprus and Italy, the effect of financial wealth dominates that of housing wealth, whereas the reverse is true in Belgium, Germany, and Spain. This cross-country heterogeneity may be due to various factors. First, it is worth noting that there are sharp differences in house prices developments over the period across countries: Belgium and Germany experienced increases in house prices (+ 8% and +9%, respectively), while house prices in Cyprus, Spain, and Italy declined sharply (-22% in Cyprus and Spain and -12% in Italy, cf. Appendix Table A9). Asymmetries in households' reactions to gains versus losses may partly explain this heterogeneity.[39] Second, such housing market developments may interact with institutional differences in the functioning of credit markets and may lead to cross-country differences in MPC out of housing wealth through the collateral chan-

[38] In Table 3, for our IV estimates, we report the standard F-statistics from the first stage regressions, as well as the Sanderson-Windmeijer first stage F-statistics which are more appropriate with multiple endogenous variables (Sanderson and Windmeijer (2016)). Overall, these F-statistics do not raise concerns about the weakness of the instruments. They are above or close to the standard threshold in all regressions (except for housing wealth in the pooled sample of countries and in Spain). As for Table 1, we provide confidence intervals robust to weak instruments to take into account these rare cases, confirming the significance of the coefficient for these two cases (see Appendix Table B4). As robustness checks, we also consider IV regressions with our 14 instruments instead of the 7 used in the baseline (see Appendix Table B5.b). Additionally, alternative IV estimates are presented in section 7 (see Appendix Table B22 and Table B18). Our conclusions are not affected.

[39] We explored this issue by splitting the sample between households facing financial losses and those experiencing financial gains. Our estimates confirm the decreasing marginal propensity to consume out of wealth for both types of shocks, but there is no clear evidence of asymmetries in consumption reaction to financial losses versus gains. Note that we are not able to investigate asymmetries in consumption reaction to housing wealth shocks because the counterfactual gains/losses in housing wealth are computed based on country-specific house prices. In order to perform such an analysis, information regarding the localization of the housing properties as well as geographical variations in housing prices within each country would be required. This is a promising avenue for further research.

Table 3: MPC out of housing and financial wealth – OLS and IV panel estimates

		All	Belgium	Cyprus	Germany	Spain	Italy
Panel A: OLS (Panel)							
Housing wealth							
	MPC	**0.008*** **	**0.01*** **	**0.003*** **	**0.006*** **	**0.009*** **	**0.024*** **
	Std. Err	0.001	0.003	0.001	0.001	0.001	0.003
Financial wealth							
	MPC	**0.004** **	**0.009*** **	**0.004**	**0.016*** **	**0.003**	**0.03*** **
	Std. Err	0.002	0.003	0.004	0.004	0.002	0.010
Other controls		Yes	Yes	Yes	Yes	Yes	Yes
Nb households		8,459	835	808	1,569	3,022	2,225
Panel B: IV (Baseline)							
Housing wealth							
	MPC	**0.01*** **	**0.019*** **	**0.002***	**0.007** **	**0.009*** **	**0.028*** **
	Std. Err	0.003	0.005	0.001	0.003	0.002	0.005
	Fstat	4.5	13.4	45.3	12.6	9.7	41.4
	SW Fstat	5.4	16.4	62.9	11.6	11.7	47.4
Financial wealth							
	MPC	**0.007**	**0.008**	**0.025*** **	**0.002**	**0.004**	**0.058***
	Std. Err	0.005	0.006	0.008	0.010	0.007	0.034
	Fstat	137.0	594.9	43.9	10.3	9.7	16.6
	SW Fstat	161.9	740.7	54.7	11.4	11.6	19.2
Other controls		Yes	Yes	Yes	Yes	Yes	Yes
Nb households		8,459	835	808	1,569	3,022	2,225

Notes: The IV estimates display the standard F statistics (Fstat) and the Sanderson-Windmeijer F-statistics (SW Fstat) from the first-stage regressions. Control variables: see the notes in Table 2. Financial wealth is all financial assets owned by the household. It includes: sight accounts, saving accounts, mutual funds, bonds, non-self-employment private business, shares, managed accounts, private lending, voluntary pension plans or whole life insurance contracts, and 'other' financial assets. Housing wealth is the sum of the household's main residence's value and the other real estate property's value. The regression includes a control variable for "Other wealth".
Confidence intervals robust to weak instruments following Andrews (2018) are available in Appendix Table B4. As robustness checks, alternative estimates using instruments based on the distributional wealth accounts are reported in Appendix Table B22, and those based on a lagged instrument approach are presented in Appendix Table B18.

Table 4: Summary Table: MPC out of housing wealth by net wealth group

	All	Belgium	Cyprus	Germany	Spain	Italy
p0-p49	0.002	0.073**	-0.01*	0.046	0.001	0.036***
p50-p69	0.028***	0.063***	0.034***	0.012**	0.026***	0.056***
p70-p89	0.013**	0.015	-0.003	0.032***	0.017***	0.035***
p90-p100	0.005**	0.014***	0.003**	0.008***	0.007***	0.023**

Notes: Detailed results of each regression are displayed in Table B8 (p0-p49 wealth group) to Table B11 (p90-p100 wealth group) in Appendix B. This table only reports the estimated MPC out of housing wealth (IV estimates). Each regression includes a control variable for financial wealth as well as the full list of control variables presented in the notes of Table 2.

nel. We study these issues in sections 5.2 and 5.3. Finally, differences in asset liquidity may be an additional important source of heterogeneity. We investigate whether the marginal propensity to consume out of wealth of liquid assets is higher than for illiquid financial assets using an alternative specification (in the spirit of Muellbauer et al. (2016) and Chauvin and Muellbauer (2018)). Specifically, we split the financial wealth into net liquid assets (net of non-collateralized debt) and illiquid financial assets, while also controlling for housing wealth net of mortgage debt (Appendix Table B7). After accounting for mortgage debt, we find significant MPC out of net housing wealth in all countries except Cyprus. In most cases, both the marginal propensity to consume out of net liquid assets and out of illiquid assets are imprecisely estimated and turn out to be not statistically significant.

To further understand these cross-country differences, we also examine how the marginal propensity to consume out of housing and financial wealth varies across the net wealth distribution. To do so, we estimate a separate regression for each net wealth group and divide the wealth variable into housing and financial assets.[40] Consistent with the findings when considering total assets (Table 2), we find a decreasing marginal propensity to consume out of housing wealth across the net wealth distribution (see Table 4). Specifically, the MPC out of housing wealth is lower for high-wealth people. For households belonging to the p50-p69 net wealth group, the MPC out of housing wealth ranges from approximately 1.2 cents in Germany to 6.3 cents in Belgium. For the top wealth group, the MPC out of housing assets varies from 0.3 cents in Cyprus to 2.3 cents in Italy. Note that, as was the case for total wealth, the MPC out of housing wealth for the lowest wealth group (p0-p49) is imprecisely estimated and turns out to be not statistically significant in most cases. In the case of Cyprus, we obtain a surprising negative estimate statistically significant at the 10% level. Regarding financial wealth, most of the estimates are not statistically significant, especially for the top wealth group, and are associated with very low F-Statistics for the first stage (See Appendix Table B8 to Table B11 in Appendix B).[41]

Consequently, while we cannot exclude that financial wealth may play a role in driving part of the marginal propensity to consume out of total wealth, our main results here point towards two conclusions: first, household consumption is affected by changes in housing wealth, and second, this effect varies across the wealth distribution and between countries.

[40] Detailed results are available in Appendix Table B8 to Table B11.

[41] Note that we have estimated alternative specifications (focusing on equities and mutual funds only instead of total financial wealth or considering the restricted sample of households holding equities or mutual funds) but have not obtained more significant results.

5.2 The collateral channel

In this section, we provide the first suggestive evidence showing the role played by credit and housing markets in explaining the MPC heterogeneity. Increases in housing prices, everything else being equal, may relax financing constraints for households that have contracted mortgages (e.g., Campbell and Cocco (2007), Browning et al. (2013), or Buiter (2008)). Moreover, depending on the legal and regulatory framework, households may be able to borrow more or less (Bover et al. (2016), Lang et al. (2020)), and thus may be also more or less affected by housing prices.

First, we assess the MPC heterogeneity within each country depending on household indebtedness. To do this, we estimate the MPC among households owning any type of real estate properties (main residence or other real estate properties), and contrast the mortgagors with significant outstanding mortgage debt (defined as higher than 10% of the value of their real estate holdings)[42] with those without outstanding mortgage (i.e., outright owners). The results are displayed in Table 5. In Belgium, Germany, and Italy, we find larger MPC out of housing for mortgagors compared to outright owners. This may reflect the role of a collateral channel in these countries, as increases in housing prices may alleviate financing constraints, especially for highly indebted households. Since focusing on homeowners for the estimation significantly reduces the sample size, we propose an alternative method below to investigate the role of the collateral channel.

Table 5: MPC out of housing wealth for mortgagors and outright owners

	Belgium		**Cyprus**		**Germany**		**Spain**		**Italy**	
Mortgagors	0.035	***	0.004		0.020	**	0.006		0.045	***
Number of households	*234*		*337*		*480*		619		153	
Outright owners	0.016	***	0.001	*	0.010	***	0.013	***	0.033	***
Number of households	*404*		*263*		*633*		1,896		1,556	

Notes: Households owning any type of real estate properties (main residence or other real estate properties). Separate regressions for mortgagors and Outright owners. Mortgagors: those with mortgages that are currently greater than 10% of the value of their real estate holdings. Outright owners: without an outstanding mortgage. Control variables: see the notes in Table 2 .

Thus, in a second step, to investigate further the potential role of such a collateral channel in explaining the cross-country heterogeneity and accounting for the heterogeneity across the wealth distribution, we consider a credit and housing markets indicator based on the individual data from the HFCS as a measure of the mortgage "intensity" within the country. It is defined as the share of mortgages in total household debt by country and by wealth group:

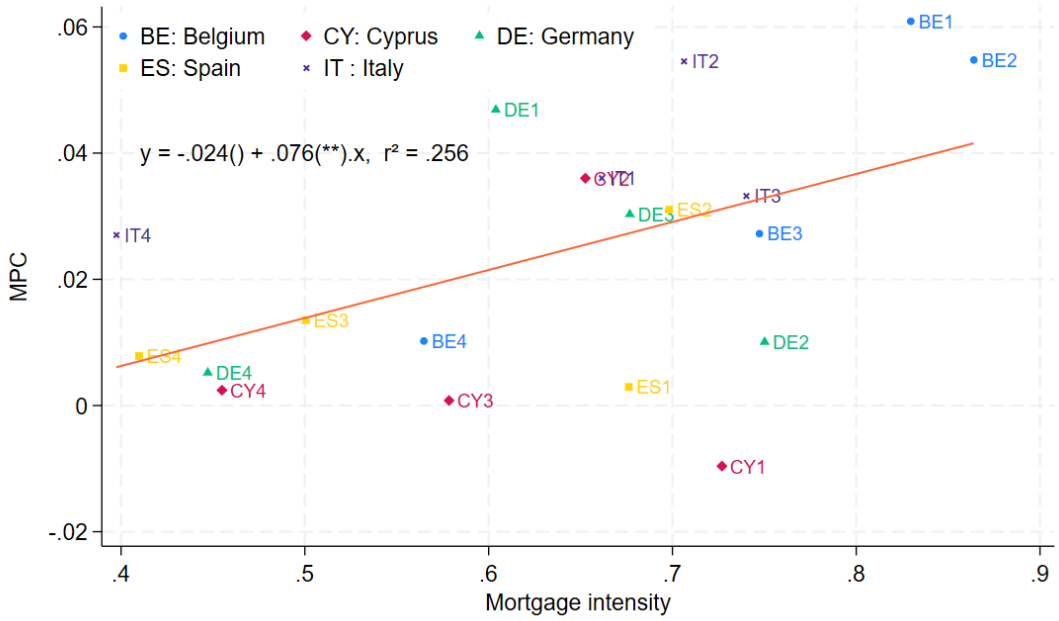
[42]Note that the 5% and 15% thresholds provide similar conclusions.

$$Mortgage\ intensity^{c,q} = \frac{\sum_{i}^{N^q} Mortgages^i}{\sum_{i}^{N^{c,q}} totaldebt^i}$$

Where the superscript q stands for the wealth group, *mortgages* is the household debt with the household main residence as collateral, *totaldebt* is the sum of all types of debts (i.e. including non-collateralized debt), $N^{c,q}$ is the number of individuals i in the group q, and c is the country.

Using our estimates presented in Table 4, we assess the correlation between the marginal propensity to consume out of housing wealth and the indicator of mortgage use by country and wealth group. We find a statistically significant positive correlation (Figure 2), showing that household consumption is more responsive to wealth shocks in countries where the share of mortgages is higher.

Figure 2: Cross-country heterogeneity: Mortgage intensity and MPC



Notes: Correlations between country-specific MPC estimates by wealth groups (Table 4-y axis) and the intensity of mortgages in the country (x axis). Note: BE1 refers to Belgium, first wealth group (i.e. p0-p49), BE2 refers to Belgium, second wealth group (i.e. p50-p69), BE3 refers to Belgium, third wealth group (i.e. p70-p79) and BE4 refers to Belgium, fourth wealth group (i.e. p90-p100)).

5.3 Institutional and socio-Economic differences vs. Consumption behavior differences

How much of the variation in aggregate MPC across countries is due to different institutional structures (different home-ownership rates, different mortgage markets, ...), and how much is due to differences in households' behaviour? Euro area countries differ along a number of dimensions, such as homeownership rates, total household wealth and indebtedness, or demographics (see Appendix Table A3). Such differences may lead to both heterogeneous exposure to house prices and differences in consumption behaviours across countries. We analyse here these sources of the cross-country heterogeneity in the propensity to consume out of wealth using an Oaxaca-Blinder decomposition. Following the seminal work of Oaxaca and Blinder (Blinder (1973); Oaxaca (1973)), such decomposition methods have been widely applied to study wage gaps and other various economic behaviours (see Fortin et al. (2011)), including household wealth and portfolio choices (e.g., Christelis et al. (2021a), or Bover (2010)). To our knowledge, our paper is the first to employ this method to assess the sources of the cross-country heterogeneity in the propensity to consume out of wealth.

To do so, we start by simulating a 10% increase in housing wealth at the household level and compute the resulting changes in consumption in each country (as shown in column 7 of Table 7) leveraging the estimation results by country and by net wealth groups detailed in Table 2. Next, we break down the differences in consumption changes among countries using an Oaxaca-Blinder decomposition (Jann (2008)), with Spain as our reference country. Spain is particularly relevant as a benchmark because, in our group of countries, it has the highest homeownership rate. It is also characterized by a large number of households with adjustable-rate mortgages (along with Cyprus), while in other countries the use of fixed-interest mortgages is more prevalent (See Appendix Table A3, and Tzamourani (2021)). The Spanish households also differ in terms of demographics: the household head is more likely unemployed or non-retired and the families are larger (with more adults in the household). The Oaxaca-Blinder decomposition helps to understand why consumption changes due to the housing price shock, and thus MPC, vary between each country and Spain, considering a set of factors characterising the ownership of real estate assets, household wealth and indebtedness, and demographics.

We present the results from the following *threefold decomposition*:[43]

$$\begin{aligned}\mathbb{E}(MPC^{Spain}) - \mathbb{E}(MPC^{c}) = [\,\mathbb{E}(X^{Spain}) - \mathbb{E}(X^{c})\,]'\beta^{c} + \mathbb{E}(X^{c})'(\,\beta^{Spain} - \beta^{c}\,) \\ + [\,\mathbb{E}(X^{Spain}) - \mathbb{E}(X^{c})\,]'(\,\beta^{Spain} - \beta^{c}\,)\end{aligned} \tag{5}$$

where X^c is a vector of predictors of the MPC for country c (and a constant), and β a vector of the slope parameters (and the intercept). Following the standard terminology, $[\,\mathbb{E}(X^{Spain}) - \mathbb{E}(X^{c})\,]'\beta^{c}$ is called the *endowment effect*, $\mathbb{E}(X^{c})'(\,\beta^{Spain} - \beta^{c}\,)$ the *coefficient effect*, and $[\,\mathbb{E}(X^{Spain}) - \mathbb{E}(X^{c})\,]'(\,\beta^{Spain} - \beta^{c}\,)$ the *interaction term*.

Interestingly, Table 6 shows that countries can be divided into two groups. For Belgium, Cyprus, and Italy, most of the difference in MPC compared to Spain is explained by differences in coefficients, whereas for Germany, the main source of differences is due to disparities in endowments. Specifically, differences in coefficients account for 66% of the gap with Italy and Cyprus, and over 80% with Belgium, while differences in endowments account for 85% of the gap with Germany. Since the average MPC is larger in Italy compared to Spain, while it is slightly lower in Germany, our Oaxaca-Blinder decomposition indicates that if Italian households behaved like Spanish households, their average MPC would be about 1.7 cents lower. Conversely, if German households had the Spanish endowments, their average MPC would be about 0.4 cents higher.[44]

Figure 3 shows the contribution of each factor to the endowment effect (left panels: a, c, e, and g) and the coefficients effect (right panels: b, d, f, and h). For detailed results, see Appendix Table B23 to Table B26.[45]

First, the cross-country differences in real estate ownership turn out to play a crucial role in explaining the MPC differences, either due to differences in behaviours (for instance in the case of Belgium) or to differences in endowments (in the case of Germany). A notable finding emerges from comparing Spain (with the highest home-

[43] See e.g Daymonti and Andrisani (1984).

[44] If German households had the same endowments as Spanish households (i.e., $\mathbb{E}(X^{Spain}) = \mathbb{E}(X^{c})$, the endowment effect and the interaction terms would be zero, accounting for 85% of the absolute difference between these two countries. Similarly, if Italian households behaved like Spanish households (i.e., $\beta^{Spain} = \beta^{c}$), the coefficient effect and interaction terms would be zero, accounting for 67% of the absolute difference between these two countries.

[45] We have tested various alternative measures for the factors related to indebtedness, demographic variables, housing, and total wealth. While Figure 3 is based on the more parsimonious specification, the other specifications yield similar conclusions.

Table 6: Oaxaca-Blinder decomposition of the difference in consumption reaction following a 10% housing shock

	Belgium	**Cyprus**	**Germany**	**Italy**
Average MPC	0.035	0.011	0.011	0.032
Difference in MPC: Spain vs the country	**-0.019**	**0.004**	**0.004**	**-0.017**
Oaxaca-Blinder decomposition				
Endowment	9%	6%	85%	20%
Coefficients	83%	66%	6%	67%
Interaction	8%	28%	9%	13%

Notes: The MPCs at the household level are computed simulating a 10% increase in housing wealth at the household level and then computing the resulting changes in consumption in each country (see column 7 of Table 7), leveraging the estimation results by country and by net wealth groups detailed in Table 2. Spain serves as the reference for each Oaxaca-Blinder decomposition, with an average MPC of 0.016. Thus, the difference in average MPC between Spain and Belgium is 0.016 - 0.035 = -0.019, as shown in the second row. The last 3 rows display the effects of the endowment, coefficients, and interactions, computed in absolute terms so that their sum equals 100%. For instance, absolute endowment effect is the ratio of |endowment| over |endowment| + |coefficients| + |interaction|.

ownership rate) and Germany (with the lowest one): closing the gap in homeownership rates between Germany and Spain would increase the average MPC in Germany by about 0.4 cents, thus fully reducing the MPC gap between the two countries.

Second, differences in wealth distribution drive part of the MPC heterogeneity, especially in the case of Cyprus and Italy (panels d and h), where the differences in MPC due to the coefficients associated with the wealth variables have a large contribution to the MPC gap with Spain.

Third, differences in mortgage markets also appear to play a role in heterogeneous MPC across countries. In particular, the consumption behaviour of households with adjustable rate mortgages in Belgium (i.e. about 10% of households, see Appendix Table A3) contributes to the MPC differential with Spain (Panel b).

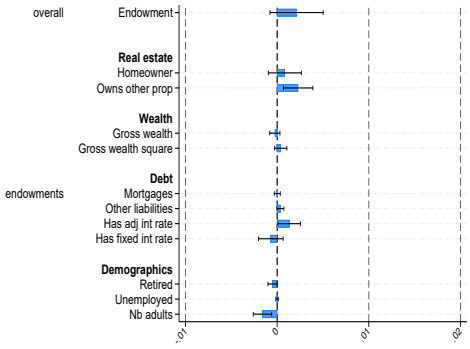
Finally, disparities in demographics also contribute to cross-country differences in MPC. The size of the family (i.e., the number of adults in the household) tends to counteract the effect of the other factors on the MPC gap with Spain (as observed in Belgium (panel b), Cyprus (panel d), Germany (panel e), and Italy (panel h)). In contrast, the consumption behaviour of the retired head of households contributes positively to the MPC gap for Belgium, and Italy (Panels b and h).

This analysis allows us to provide an empirical framework to support and complement the conclusions drawn by Slacalek et al. (2020), who argue that the differences in homeownership rates and mortgage market institutions imply that the strength of the transmission channels of monetary policy varies considerably across euro area coun-

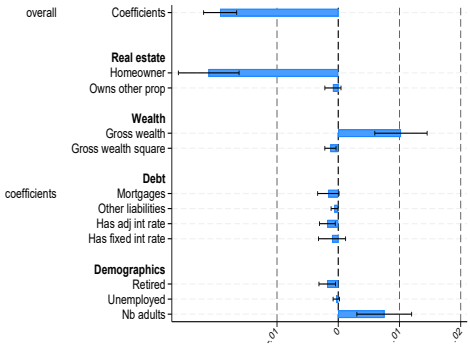
tries. They use a structural VAR that considers several transmission channels, but does not account for the heterogeneity in MPC across countries. Our methodology allows us to directly estimate and account for this heterogeneity.

Figure 3: Contributions to the endowment / coefficient parts of the gap in MPC

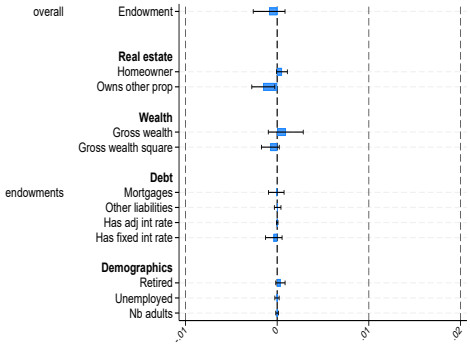
(a) Belgium - Endowment



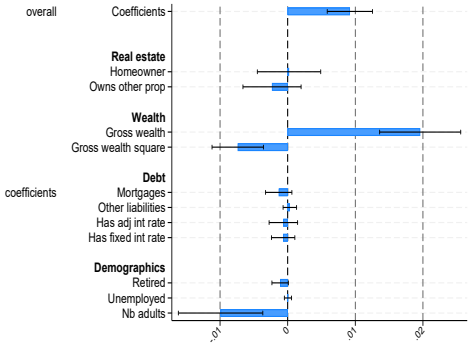
(b) Belgium - Coefficients



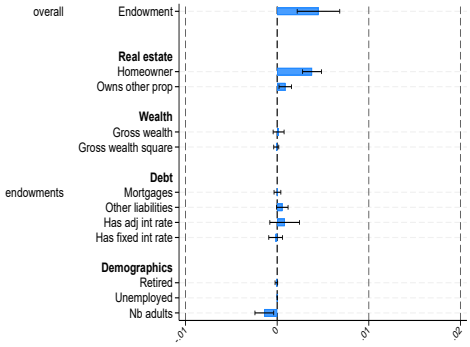
(c) Cyprus- Endowment



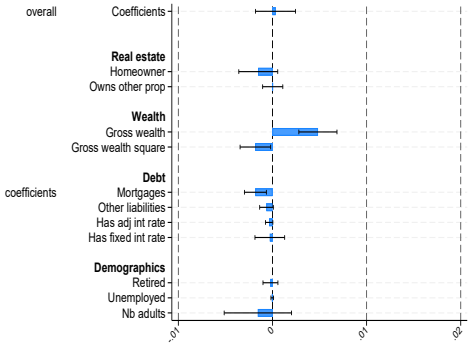
(d) Cyprus- Coefficients



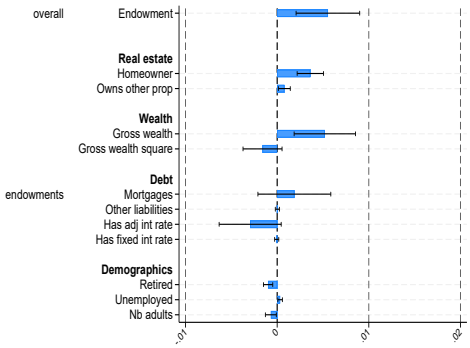
(e) Germany- Endowment



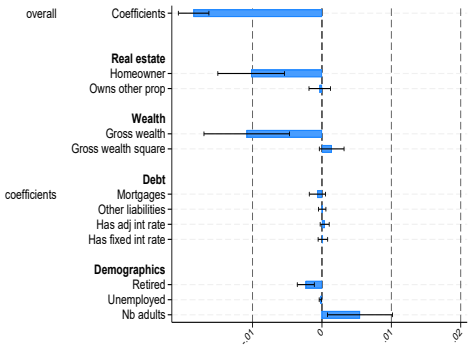
(f) Germany- Coefficients



(g) Italy- Endowment



(h) Italy- Coefficients



Notes: Details of the contribution to the endowment part and to the coefficients part of the gap by factor, Oaxaca-Blinder decomposition. Reference country: Spain. Confidence intervals at 95%. See Appendix Table B23 to Table B26 for the detailed results.

6 Wealth and consumption inequalities

Here, we investigate how heterogeneous MPC, wealth composition, and wealth inequality can affect consumption inequality. We conduct a simple simulation exercise to assess the impact on consumption of an exogenous shock to the value of different assets.[46] We consider, in turn, a 10% increase in deposits, shares, or housing assets at the household level. Table 7 reports how these changes affect wealth and consumption distributions for each country, applying for the latter our MPC estimates by country and wealth groups (reported in Table 2). Overall, we find that a positive shock to hous-

Table 7: Simulation exercise: price shocks and consumption inequalities

		Before shock (euros)		After shock With a 10% increase in					
				Deposits		Shares		Housing wealth	
		Consumption	Net wealth	Consumption	Net wealth	Consumption	Net wealth	Consumption	Net wealth
Belgium	Mean	27,997	396,195	0.50%	1.22%	0.04%	0.17%	3.47%	6.96%
	Median	25,064	265,820	0.40%	1.53%	0.00%	0.00%	4.47%	9.47%
	Share Top10/Share B50	0.71	2.63	-1.60%	0.37%	-0.05%	0.32%	-2.68%	-5.61%
	Gini	0.28	0.54	-0.36%	0.09%	-0.04%	0.09%	-2.29%	-1.42%
Cyprus	Mean	27,677	718,413	0.04%	0.42%	0.01%	0.12%	1.13%	7.88%
	Median	24,179	316,641	0.03%	0.39%	0.00%	0.00%	1.86%	12.61%
	Share Top10/Share B50	0.80	5.51	-0.07%	-0.47%	0.11%	0.04%	-1.42%	-3.39%
	Gini	0.31	0.65	0.00%	-0.08%	0.01%	0.01%	-0.38%	-1.05%
Germany	Mean	24,628	241,400	0.22%	1.01%	0.02%	0.19%	1.14%	7.20%
	Median	21,188	81,200	0.32%	3.69%	0.09%	0.37%	1.44%	11.95%
	Share Top10/Share B50	0.75	12.49	-0.20%	-2.61%	0.04%	0.02%	-0.44%	-2.72%
	Gini	0.29	0.73	-0.17%	-0.34%	0.00%	0.01%	-0.53%	-0.55%
Spain	Mean	21,374	310,180	0.11%	0.63%	0.01%	0.08%	1.58%	8.68%
	Median	18,648	200,339	0.22%	0.70%	0.00%	0.00%	1.55%	10.70%
	Share Top10/Share B50	0.84	2.62	-0.12%	-0.03%	0.05%	0.11%	-1.47%	-5.13%
	Gini	0.32	0.54	-0.06%	-0.03%	0.00%	0.03%	-0.95%	-1.61%
Italy	Mean	23,050	262,377	0.20%	0.48%	0.01%	0.04%	3.25%	8.02%
	Median	19,347	187,093	0.63%	0.50%	0.00%	0.00%	5.94%	8.37%
	Share Top10/Share B50	0.84	3.04	0.56%	-0.94%	-0.01%	0.01%	-2.42%	-0.95%
	Gini	0.32	0.56	-0.12%	-0.16%	0.00%	0.01%	-2.12%	-0.24%

Notes: The estimated mean for non-durable consumption in Belgium in Wave 1 is 27,997 euros. When increasing the value of deposits at the household level by 10%, mean net wealth increases by 1.22% and the predicted mean value of consumption by 0.50%. To compute this effect, we take the estimated value of consumption and add the increase in consumption as estimated by our empirical model (Table 2).

ing prices decreases consumption inequality, while positive shocks to financial wealth have a limited effect. However, the impact of financial shocks varies depending on the considered financial asset. A 10% value shock to deposits tends to decrease wealth inequality due to the larger share of deposits in the total net wealth for households in bottom deciles. This reduced wealth inequality, combined with the decreasing MPC across the net wealth distribution, also lowers consumption inequality. Conversely, a 10% rise in share values, which are more concentrated among the wealthy, slightly

[46] Let us emphasize that this simple exercise does not account for changes in household behaviors, or for general equilibrium effects. However, we believe that it provides useful insights into how wealth inequality transmits to consumption inequality through the wealth effect.

increases wealth inequality. However, because the wealthy have a lower MPC, the impact on consumption inequality is very limited.

A 10% rise in housing prices has a larger impact on both wealth and consumption inequalities. All inequality indicators for net wealth and consumption decrease within the five countries. This effect is explained by the fact that housing assets constitute a large share of household total assets for many households, particularly middle-class households (Figure 1), who also exhibit a higher MPC out of wealth than high-wealth people. Interestingly, there is however large cross-country heterogeneity. In particular, the effect of housing prices on consumption inequality is much more limited in Germany and Cyprus. The main channel explaining this pattern differs by country. Since Germany exhibits the lower homeownership rate (44%), a limited share of the population is directly exposed to housing price shocks. In contrast, Cyprus has a higher homeownership rate (77%)[47] but the MPC out of housing wealth is lower there than in Germany (cf. Table 3). As previously stated, this simulation exercise is simple and does not account for changes in households' behavior. In particular, the overall effect of housing prices on inequality may be ambiguous because higher housing prices also reduce the probability for poor people to become homeowners.[48]

7 Accounting for potential measurement errors in asset values

In this section, we address the question of potential measurement errors in asset valuation. The survey responses about asset values may be affected by measurement errors due to various causes (see, for example, Biancotti et al. (2008)). Answering detailed questions about asset composition requires some cognitive processes to recall the various assets the respondent owns. Moreover, respondents may not know the exact answer regarding the value of some assets. For instance, they may not be well aware of the housing market in their neighbourhood if they have been outright owners of their house for many years. If such a measurement error affects the valuation $A^i_{h,t-1}$ of an asset i in the first period $t-1$, it may contaminate both the instrumental variable (based on the first-period valuation of assets), and the actual change in wealth between the first and second periods (ΔW_h, i.e. $W_{h,t} - W_{h,t-1}$), in Equation 1, and thus may attenuate the instrumented estimates. To account for this potential bias, we perform two robustness

[47] See Appendix Table A3.

[48] See for instance Bonnet et al. (2018).

tests using alternative instrumental variables based on alternative sources of data.

7.1 Lagged instrument

First, we lag our instrument by using data collected before the first wave of the HFCS survey, i.e., before our first period of interest. We compute this new instrument based on the different assets observed in this earlier wave, which corresponds to the period $t-2$ in our framework. Since the valuation of assets used for this new instrument and our endogenous variable now correspond to different periods, this approach eliminates the concern of a simultaneous measurement error affecting both this new instrument (evaluated before $t-1$), and the endogenous variable (that corresponds to a change between $t-1$ and t). One limitation of this approach is that measurement errors could be linked over time. We will come back to this limitation in our second approach. Another limitation is that the first wave we use in our benchmark approach is the first wave of the HFCS survey making it unfortunately impossible to have HFCS data for a prior year. Nevertheless, this first alternative approach is possible for Italy, for which the Bank of Italy has collected data prior to the first wave of the HFCS survey (thanks to the Survey on Income and Wealth, SHIW), and has kindly provided us with confidential data and codes to i) compute wealth components for the year 2008 i.e., 2 years before our first wave of interest, and ii) link the respondents to the households in our benchmark panel.[49] As expected, the F-Stats from the first-stage equations are lower compared to our benchmark approach, but reassuringly, Appendix Table B16 to Table B19 show that this approach leads to similar conclusions regarding the decreasing MPC across the net wealth distribution and the role of housing assets.

7.2 Rescaling based on the distributional wealth accounts

Second, we use the Distributional Wealth Accounts (DWA) produced by the European Central Bank. The DWA offers, for euro area countries, an assessment of the distribution of household wealth and its components, that is consistent with the aggregates compiled in each country's national accounts. Country-specific estimates are provided

[49] We have been able to recompute all the different assets used in the instrument (main residence, other real estate properties, the value of households' vehicles, valuables, the value of self-employment businesses, deposits, mutual funds, bonds, the value of a non-self-employment private business, shares, managed accounts, money owed to the household, and other assets) with the sole exception of voluntary pension wealth.

for several asset classes and for each decile of the net wealth distribution. [50] We leverage these aggregates to rescale our instruments by rescaling each of their component assets so that the sum of the rescaled assets (by decile of household wealth) equals the corresponding country-specific aggregate provided in the DWA. Note that we only alter the counterfactual wealth and do not apply this adjustment to the observed wealth of the households, which thus remains unchanged. Specifically, we rescale the amount of each asset i held by household h in country c at time $t-1$, $A^i_{h,c,t-1}$, so that the sum of the individual rescaled assets matches the aggregate value of this asset within the corresponding net wealth decile d depicted in the country-specific distributional wealth accounts $A^i_{DWA,c,d,t-1}$. Consequently this adjustment comes down to replacing $A^i_{h,c,t-1}$ with $A^i_{h,c,t-1} \times \frac{A^i_{DWA,c,d,t-1}}{\sum_{h \in d} A^i_{h,c,t-1}}$ in the corresponding instrument. By doing so, we use an external source of data to alter potential measurement errors within each country and asset class. This allows us to assess how sensitive our results are to changes in the magnitude of a potential measurement error. This method presents two advantages. First, unlike the previous alternative approach which uses a dataset collected before our first wave of interest, this second alternative approach does not require the assumption that measurement errors are uncorrelated between waves. Second, it offers the crucial advantage of providing a comprehensive assessment for all countries.

The DWA database allows us to rescale 8 asset classes: debts, deposits, financial business assets, non-financial business assets, housing, investment fund shares, listed shares, and life insurance and annuity (see Appendix Table B15 for the detailed matching between the HFCS asset classes and the DWA aggregates). Reassuringly, here again, Table B20, Table B21, and Table B22 show that the results obtained with this alternative IV approach are similar to our benchmark findings.[51]

[50] More precisely, the distribution is consistent with the Quarterly Sector Accounts of each country. In the public dataset, the first 5 deciles are grouped together, but our results are not affected when using the confidential dataset containing the full decomposition by deciles. The data can be directly downloaded from the ECB website: *https://data.ecb.europa.eu/data/data-categories/macroeconomic-and-sectoral-statistics/sector-accounts/distributional-wealth-accounts*. As precised in the methodological note of the ECB: *"The data for the euro area as a whole and most countries (Belgium, Estonia, Ireland, Greece, Spain, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Portugal, Slovenia, Slovakia and Finland) are currently compiled centrally by the ECB, using the agreed methodology and in close cooperation with national experts. Other countries (Austria, Germany, France, Italy and the Netherlands) compile the data themselves, using the same concept"*.

[51] The instruments are computed using the publicly available DWA, defined according to 6 wealth groups (the bottom 50%, and each decile from the 6th to the 10th). As a robustness check, we have also used confidential data with detailed information for the first five deciles. Again, the results obtained with this data are similar to those from our benchmark approach.

8 Conclusion

Using a unique household-level panel dataset that combines wealth and consumption surveys, we investigate various dimensions of heterogeneity in the marginal propensity to consume out of wealth across households and across five euro area countries. Endogeneity issues related to omitted variables and to active saving/dissaving are tackled by using an instrumented panel regression approach based on the evolution of aggregate asset prices and on the past composition of assets held by each household. The robustness of our findings is confirmed by the use of two alternative IV approaches.

Our results reveal various new elements of heterogeneity in the wealth-consumption transmission channel. We observe that the average MPC varies significantly, ranging from 2.7 cents in Italy to less than one cent in Cyprus and Germany. For all countries, we find lower MPCs for high-wealth households. When decomposing total wealth into housing and financial assets, we find a statistically significant marginal propensity to consume out of housing wealth for all countries decreasing along the net wealth distribution. We document evidence of a collateral channel: in countries where mortgages constitute a larger share of total household debt, consumption reacts more strongly to wealth shocks. Based on an Oaxaca-Blinder decomposition, we show that the cross-country differences in MPC are related to differences in homeownership rates, mortgage markets, demographics, and wealth inequality.

Finally, we conduct a simple simulation exercise to assess how heterogeneous MPCs and wealth inequality shape consumption inequality. We find evidence that positive housing price shocks reduce consumption inequality while positive financial wealth shocks have a more limited impact. The heterogeneity of the results highlights in particular the role of the homeownership rates: the effect of housing prices on consumption inequality is far more limited in Germany than in the other countries due to its much lower homeownership rate.

Methodologically, our results strongly advocate for using panel datasets with instrumented wealth shocks rather than cross-sectional data, which tends to present a downward bias in the estimates. Developing the collection of household-level information on wealth and consumption in a panel setup would be therefore highly beneficial for future research. In particular, with a longer time period and a broader sample of countries in the sample, it would be possible to further investigate other sources of cross-country heterogeneity (such as differences in tax regimes or social security systems).

References

ADAM, K. AND J. ZHU (2016): "Price-level changes and the redistribution of nominal wealth across the euro area," *Journal of the European Economic Association*, 14, 871–906.

ALADANGADY, A. (2017): "Housing Wealth and Consumption: Evidence from Geographically-Linked Microdata," *American Economic Review*, 107, 3415–46.

AMBERG, N., T. JANSSON, M. KLEIN, AND A. R. PICCO (2022): "Five Facts about the Distributional Income Effects of Monetary Policy Shocks," *American Economic Review: Insights*, 4, 289–304.

AMPUDIA, M., R. COOPER, J. LE BLANC, AND G. ZHU (2024a): "MPC Heterogeneity and the Dynamic Response of Consumption to Monetary Policy," *American Economic Journal: Macroeconomics*, 16:3, 343–388.

AMPUDIA, M., M. EHRMANN, AND G. STRASSER (2024b): "Shopping behavior and the effect of monetary policy on inflation heterogeneity along the income distribution," *Journal of Monetary Economics*, 103618.

ANDERSEN, A. L., N. JOHANNESEN, M. JØRGENSEN, AND J.-L. PEYDRÓ (2023): "Monetary Policy and Inequality," *The Journal of Finance*, 78, 2945–2989.

ANDREWS, I. (2018): "Valid Two-Step Identification-Robust Confidence Sets for GMM," *The Review of Economics and Statistics, MIT Press*, 100, 337–348,.

ANGRISANI, M., M. HURD, AND S. ROHWEDDER (2019): "The effect of housing wealth losses on spending in the Great Recession," *Economic Inquiry*, 57, 972–996.

ARON, J., J. DUCA, J. MUELLBAUER, K. MURATA, AND A. MURPHY (2012): "Credit, housing collateral and consumption: Evidence from the UK, Japan and the US," *Review of Income and Wealth*, 58, 397–423.

ARRONDEL, L., P. LAMARCHE, AND F. SAVIGNAC (2019): "Does inequality matter for the consumption-wealth channel? Empirical evidence," *European Economic Review*, 111, 139–165.

ATTANASIO, O., L. BLOW, R. HAMILTON, AND A. LEICESTER (2009): "Booms and busts: consumption, house prices and expectations," *Economica*, 76, 20–50.

AUCLERT, A. (2019): "Monetary Policy and the Redistribution Channel," *American Economic Review*, 109, 2333–2367.

BANKS, J., R. CRAWFORD, T. CROSSLEY, AND C. EMMERSON (2013): "Financial Crisis Wealth Losses and Responses among Older Households in England," *Fiscal Studies, Institute for Fiscal Studies*, 34, 231–254.

BATTISTIN, E., R. MINIACI, AND G. WEBER (2003): "What Do We Learn from Recall Consumption Data?" *Journal of Human Resources*, 38.

BERGER, D., V. GUERRIERI, G. LORENZONI, AND J. VAVRA (2018): "House Prices and Consumer Spending," *The Review of Economic Studies*, 85, 1502–1542.

BIANCOTTI, C., G. D'ALESSIO, AND A. NERI (2008): "Measurement Error In The Bank Of Italy'S Survey Of Household Income And Wealth," *Review of Income and Wealth*, 54, 466–493.

BLINDER, A. S. (1973): "Wage Discrimination: Reduced Form and Structural Estimates," *Journal of Human Resource*, 8, 436–455.

BOEHM, J., E. FIZE, AND X. JARAVEL (2023): *Five Facts about MPCs: Evidence from a Randomized Experiment*, CEPR Discussion Paper No. 18676.

BONNET, C., B. GARBINTI, AND S. GROBON (2018): "Rising inequalities in access to home ownership among young households in France, 1973-2013," *Economics and Statistics*, 117–138.

BOTTAZZI, R., S. TRUCCHI, AND M. WAKEFIELD (2017): *Wealth Effects and the Consumption of Italian Households in the Great Recession*, Universita: Working Papers, Dipartimento Scienze Economiche.

BOVER, O. (2010): "Wealth inequality and household structure: U.S. vs. Spain," *Review of Income and Wealth*, 56, 259–290.

BOVER, O., J. CASADO, S. COSTA, P. CAJU, Y. MCCARTHY, E. SIERMINSKA, P. TZAMOURANI, E. VILLANUEVA, AND T. ZAVADIL (2016): "The Distribution of Debt across Euro-Area Countries: The Role of Individual Characteristics, Institutions, and Credit Conditions," *International Journal of Central Banking*, 12, 71–128.

BRICKER, J., A. HENRIQUES, J. KRIMMEL, AND J. SABELHAUS (2016): "Measuring Income and Wealth at the Top Using Administrative and Survey Data," *Brookings Papers on Economic Activity*, 47, 261–331.

BRINDUSA, A., H. BASSO, O. BOVER, J. CASADO, L. HOSPIDO, M. IZQUIERDO, I. KATARYNIUK, A. LACUESTA, J. MONTERO, AND E. VOZMEDIANO (2018): "Income, consumption and wealth inequality in Spain," *SERIEs: Journal of the Spanish Economic Association, Springer;Spanish Economic Association*, 9, 351–387,.

BROER, T., J. KRAMER, AND K. MITMAN (2022): "The Curious Incidence of Monetary Policy Across the Income Distribution," *CEPR Discussion Paper*, 17589.

BROWNING, M., T. CROSSLEY, AND G. WEBER (2003): "Asking consumption questions in general purpose surveys," *Economic Journal*, 113, 540– 567.

BROWNING, M., T. CROSSLEY, AND J. WINTER (2014): "The Measurement of Household Consumption Expenditures," *Annual Review of Economics, Annual Reviews*, 6, 475–501.

BROWNING, M., M. GORTZ, AND S. LETH-PETERSEN (2013): "Housing wealth and consumption: a micro panel study," *Economic Journal*, 123, 401–428.

BUITER, W. (2008): "Housing wealth isn't wealth," *NBER Working Paper*, 1204.

CAMPBELL, J. AND J. COCCO (2007): "How do house prices affect consumption? Evidence from micro data," *Journal of Monetary Economics*, 54, 591–621.

CARROLL, C. (2000): *Why do the rich save so much? in Does the Atlas shrug? The economic consequences of taxing the rich*, Joel B. Slemrod, Harvard University Press.

CARROLL, C. AND M. KIMBALL (1996): "On the concavity of the consumption function," *Econometrica*, 64, 981–992.

——— (2006): *Precautionary Saving and Precautionary Wealth, Economics Working Paper Archive 530*, The Johns Hopkins University, Department of Economics.

CARROLL, C., M. OTSUKA, AND J. SLACALEK (2011): "How large are housing and financial wealth effects? A new approach," *Journal of Money, Credit and Banking*, 43, 55–79.

CARROLL, C., J. SLACALEK, K. TOKUOKA, AND M. WHITE (2017): "The distribution of wealth and the marginal propensity to consume," *Quantitative Economics, Econometric Society*, 8, 977–1020.

CASE, K., J. QUIGLEY, AND R. SHILLER (2005): "Comparing Wealth Effects: The Stock Market Versus the Housing Market," *Advances in Macroeconomics*, 5, 1–32.

CHAUVIN, V. AND J. MUELLBAUER (2018): "Consumption, household portfolios and the housing market in France," *Economie et Statistique / Economics and Statistics*, 157–178.

CHODOROW-REICH, G., P. T. NENOV, AND A. SIMSEK (2021): "Stock Market Wealth and the Real Economy: A Local Labor Market Approach," *American Economic Review*, 111, 1613–57.

CHRISTELIS, D., M. EHRMANN, AND D. GEORGARAKOS (2021a): "Exploring Differences in Household Debt across the United States and Euro Area Countries," *Journal of Money, Credit and Banking*, 53, 477–501.

CHRISTELIS, D., D. GEORGARAKOS, AND T. JAPPELLI (2015): "Wealth shocks, unemployment shocks and consumption in the wake of the Great Recession," *Journal of Monetary Economics, Elsevier*, 72, 21–41.

CHRISTELIS, D., D. GEORGARAKOS, T. JAPPELLI, AND G. KENNY (2024): "Wealth shocks and portfolio choice," *Journal of Monetary Economics*, 103632.

CHRISTELIS, D., D. GEORGARAKOS, T. JAPPELLI, L. PISTAFERRI, AND M. ROOIJ (2021b): "Heterogeneous wealth effects," *European Economic Review*, 137, 103805.

CLOYNE, J., C. FERREIRA, AND P. SURICO (2020): "Monetary Policy when Households have Debt," *New Evidence on the Transmission Mechanism, The Review of Economic Studies*, 87, 102–129.

COOPER, D. AND K. DYNAN (2016): "Wealth effects and Macroeconomic Dynamics," *Journal of Economic Surveys*, 30, 34–55.

CRAWLEY, E. AND A. KUCHLER (2023): "Consumption Heterogeneity: Micro Drivers and Macro Implications," *American Economic Journal: Macroeconomics*, 15, 314–41.

CUMMING, F. AND P. HUBERT (2021): "The Distribution of Households' Indebtedness and the Transmission of Monetary Policy," *The Review of Economics and Statistics*.

DAVIES, J. AND A. SHORROCKS (1999): "The Distribution of Wealth, Handbook of Income Distribution," *V. and ch*, 1, 605–667.

DAVIS, M. AND M. PALUMBO (2001): "A primer on the economics and time series econometrics of wealth effects," in *No 2001-09, Finance and Economics Discussion Series*, Board of Governors of the Federal Reserve System (US).

DAYMONTI, T. N. AND P. J. ANDRISANI (1984): "Job Preferences, College Major, and the Gender Gap in Earnings," *Journal of Human Resources*, 19, 408–428.

DI MAGGIO, M., A. KERMANI, AND K. MAJLESI (2020): "Stock Market Returns and Consumption," *The Journal of Finance*, 75, 3175–3219.

DISNEY, R., J. GATHERGOOD, AND A. HENLEY (2010): "House price shocks, negative equity, and household consumption in the United Kingdom," *Journal of the European Economic. Association*, 8, 1179–1207.

DYNAN, K. E. AND D. M. MAKI (2001): "Does stock market wealth matter for consumption?" *Available at SSRN 270190*.

D'ORAZIO, M. (2017): "Package 'StatMatch," Available at:.

D'ORAZIO, M., M. ZIO, AND M. SCANU (2006): *Statistical Matching, Theory and Practice*, New York: Wiley.

FAGERENG, A., M. GULBRANDSEN, M. HOLM, AND G. NATVIK (2022): "How Does Monetary Policy Affect Household Indebtedness?" *Mimeo*.

FAGERENG, A., M. B. HOLM, AND G. J. NATVIK (2021): "MPC heterogeneity and household balance sheets," *American Economic Journal: Macroeconomics*, 13, 1–54.

FORTIN, N., T. LEMIEUX, AND S. FIRPO (2011): "Chapter 1 - Decomposition Methods in Economics," in *Handbook of Labor Economics, Volume 4, Part A*, ed. by D. C. Orley Ashenfelter, Elsevier.

FUSTER, A., G. KAPLAN, AND B. ZAFAR (2018): "What Would You Do With $500? Spending Responses to Gains, Losses, News and Loans," *NBER Working Papers*, 24386.

GARBINTI, B., J. GOUPILLE-LEBRET, AND T. PIKETTY (2020): "Accounting for Wealth Inequality Dynamics: Methods, Estimates and Simulations for France," *Journal of the European Economic Association*, 19, 620–663.

GOLOSOV, M., M. GRABER, M. MOGSTAD, AND D. NOVGORODSKY (2024): "How Americans Respond to Idiosyncratic and Exogenous Changes in Household Wealth and Unearned Income," *The Quarterly Journal of Economics*, 139, 1321–1395.

GUERRIERI, C. AND C. MENDICINO (2018): "Wealth effects in the Euro Area," *ECB WP°*, 2157.

HFCN (2016): "The Eurosystem Household Finance and Consumption Survey: methodological report for the second wave," *ECB Statistics Paper Series*.

HOLM, M. B., P. PAUL, AND A. TISCHBIREK (2021): "The Transmission of Monetary Policy under the Microscope," *Journal of Political Economy*, 129, 2861–2904.

HUBERT, P. AND F. SAVIGNAC (forthcoming): "The Heterogeneous Effects of Monetary Policy on Labor Income: Disentangling the Extensive and Intensive Margins," *Journal of Political Economy Macroeconomics*.

JANN, B. (2008): "The Blinder–Oaxaca decomposition for linear regression models," *Stata Journal*, 8, 453–479.

JAPPELLI, T. AND L. PISTAFERRI (2010): "The consumption response to income changes," *Annual Review of Economics*, 2, 479–506.

JOHNSON, D. S., J. A. PARKER, AND N. S. SOULELES (2006): "Household Expenditure and the Income Tax Rebates of 2001," *American Economic Review*, 96, 1589–1610.

JUSTER, F., J. LUPTON, J. SMITH, AND F. STAFFORD (2006): "The Decline in Household Saving and the Wealth Effect," *The Review of Economics and Statistics*, 88, 20–27.

KAPLAN, G., B. MOLL, AND G. VIOLANTE (2018): "Monetary Policy According to HANK," *American Economic Review*, 108, 697–743.

KAPLAN, G. AND G. VIOLANTE (2022): "The Marginal Propensity to Consume in Heterogeneous Agent Models," *Annual Review of Economics*, 14, 747–775.

KOENIGER, W., B. LENNARTZ, AND M.-A. RAMELET (2022): "On the transmission of monetary policy to the housing market," *European Economic Review*, 145, 104107.

LAMARCHE, P. (2017): "Estimating consumption in the HFCS," Tech. rep., European Central Bank Statistical Paper Series n°22.

LANG, J.H.AND PIROVANO, M., M. RUSNÁK, AND C. SCHWARZ (2020): "Trends in residential real estate lending standards and implications for financial stability," *Financial Stability Review*.

LENZA, M. AND J. SLACALEK (2024): "How Does Monetary Policy Affect Income and Wealth Inequality? Evidence from Quantitative Easing in the Euro Area," *Journal of Applied Econometrics*, forthcoming.

MCKAY, A. AND C. K. WOLF (2023): "Monetary Policy and Inequality," *Journal of Economic Perspectives*, 37, 121–44.

MIAN, A., K. RAO, AND A. SUFI (2013): "Household balance sheets, consumption and the economic slump," *Quarterly Journal of Economics*, 128(4), 1687–1726.

MIAN, A., L. STRAUB, AND A. SUFI (2021): "Indebted Demand," *The Quarterly Journal of Economics*, 2243–2307.

MISRA, K. AND P. SURICO (2014): "Consumption, income changes, and heterogeneity: Evidence from two fiscal stimulus programs," *American Economic Journal: Macroeconomics*, 6, 84–106.

MUELLBAUER, J., F. GEIGER, AND M. RUPPRECHT (2016): "The housing market, household portfolios and the German consumer," *Working Paper Series*.

OAXACA, R. (1973): "Male-Female Wage Differentials in Urban Labor Markets," *International Economic Review*, 14, 693–709.

PAIELLA, M. (2007): "Does Wealth Affect Consumption. Evidence for Italy," *Journal of Macroeconomics*, 29, 189–205.

——— (2009): "The stock market, housing and consumer spending: a survey of the evidence on wealth effects," *Journal of Economic Surveys*, 23, 947–973.

PAIELLA, M. AND L. PISTAFERRI (2017): "Decomposing the wealth effect on consumption," *Review of Economics and Statistics*, 99, 710–721.

PARKER, J. A. (1999): "The Reaction of Household Consumption to Predictable Changes in Social Security Taxes," *American Economic Review*, 89, 959–973.

PARKER, J. A., N. S. SOULELES, D. S. JOHNSON, AND R. MCCLELLAND (2013): "Consumer Spending and the Economic Stimulus Payments of 2008," *American Economic Review*, 103, 2530–53.

POTERBA, J. (2000): "Stock Market Wealth and Consumption," *Journal of Economic Perspectives, American Economic Association*, 14, 99–118.

SANDERSON, E. AND F. WINDMEIJER (2016): "A weak instrument F-test in linear IV models with multiple endogenous variables," *Journal of Econometrics*, 190, 212–221.

SKINNER, J. (1987): "A superior measure of consumption from the Panel Study of Income Dynamics," *Economics Letters*, 23, 213–216.

SLACALEK, J. (2009): "What drives personal consumption? The role of housing and financial wealth," *B.E. Journal of Macroeconomics*, 9, 1–37.

SLACALEK, J., O. TRISTANI, AND G. VIOLANTE (2020): "Household balance sheet channels of monetary policy: A back of the envelope calculation for the euro area," *Journal of Economic Dynamics and Control*, 115, 103879.

SUN, L. (2018): "Implementing valid two-step identification-robust confidence sets for linear instrumental-variables models," *Stata Journal, StataCorp LP*, 18, 803–825,.

TZAMOURANI, P. (2021): "The interest rate exposure of euro area households," *European Economic Review*, 132.

VERMEULEN, P. (2018): "How Fat is the Top Tail of the Wealth Distribution?" *Review of Income and Wealth*, 64, 357–387.

List of Tables

Appendices

A Data Appendix

A.1 Construction of the household level dataset

This appendix describes the sample selection and the statistical matching procedure we perform to complement the HFCS with individual-level information on non-durable consumption (from HBS) and disposable income (from SILC).

A.1.1 Sample selection

We select countries for which a panel component is available in the two first waves of the HFCS (Belgium, Cyprus, Germany, Spain, and Italy). We exclude Malta and the Netherlands, despite their panel components, due to the unavailability of other crucial information. After performing the statistical matching procedure as explained below in subsubsection A.1.2, we conduct necessary cleaning on the data. We select households where the reference person is aged between 25 and 75 years old at wave 1. We exclude the households where the reference person is identified as a student or has zero or negative disposable income in Wave 1. Additionally, we exclude households with extreme values in debt (debt/total assets above 100), gross wealth (top 0.1%), disposable income (bottom 0.1%), and consumption-to-disposable income ratio (top 1% and bottom 1%). After these cleaning steps, we rebalance the panel sample. Descriptive statistics for the initial and the estimation samples are provided in Table A3.

Table A1: Reference periods for the first and second waves of the HFCS, and sample size

	HFCS reference period		**Number of panel households**	
	wave 1	**wave 2**	**Initial sample**	**After cleaning**
Belgium	2010	2014	891	835
Cyprus	2010	2014	844	808
Germany	2011	2014	1,901	1,569
Spain	2009	2012	3,210	3,022
Italy	2010	2014	2,484	2,225

Table A2 provides a summary of the specific vintages of the SILC and HBS datasets used for imputation procedure.

Table A2: Household Budget Surveys (HBS) and Survey on Income and Living Conditions (SILC) used for imputation

	Non-durable consumption		Disposable income	
Country	Source Wave 1	Source Wave 2	Source Wave 1	Source Wave 2
Belgium	HBS 2010	HBS 2015	SILC 2009	SILC 2013
Cyprus	HBS 2010	HBS 2015	SILC 2009	SILC 2014
Germany	HBS 2008	HBS 2013	SILC 2009	SILC 2013
Spain	HBS 2010	HBS 2015	SILC 2007	SILC 2010
Italy	HBS 2010	HBS 2015	SILC 2010	SILC 2014

Table A3: Descriptive statistics - main variables: Initial sample versus estimation sample

		Net wealth (euros)	**Gross Wealth** (euros)	**Disposable income** (euros)	**Homeowners** (percent.)	**Other real estate** (percent.)	**Total debt** (euros)	**Mortgages** (euros)	**Other debt** (euros)	**With adjustable interest rate** (percent.)	**With fixed interest rate** (percent.)	**Retired** (percent.)	**Unemployed** (percent.)	**Number of adults**
Belgium	Wave 1	339,141	369,708	32,220	0.70	0.16	259,128	26,676	3,891	0.10	0.21	0.32	0.09	1.9
	Panel sample	396,195	432,802	37,231	0.81	0.20	305,615	31,692	4,915	0.14	0.27	0.27	0.09	2.1
Cyprus	Wave 1	68,3402	754,632	34,802	0.77	0.52	692,031	59,220	12,010	0.29	0.16	0.24	0.05	2.3
	Panel sample	71,8414	796,993	37,335	0.82	0.57	725,470	66,122	12,458	0.32	0.18	0.19	0.05	2.3
Germany	Wave 1	197,363	224,186	30,364	0.44	0.18	176,945	23,072	3,752	0.05	0.18	0.30	0.05	1.7
	Panel sample	243,624	279,149	34,803	0.53	0.23	218,847	31,209	4,316	0.05	0.26	0.24	0.05	1.8
Spain	Wave 1	290,844	323,544	28,353	0.83	0.36	290,599	27,846	4,854	0.27	0.06	0.21	0.09	2.3
	Panel sample	310,236	348,185	31,635	0.88	0.41	311,558	32,060	5,889	0.32	0.08	0.17	0.08	2.4

Notes: Variables measured in Wave 1. Mean values per household for: net wealth, gross wealth, total debt, mortgages, other debt, number of adults. Percentage of households with adjustable interest rate, fixed interest rate, retired or unemployed household reference person.

A.1.2 Statistical matching with HBS

Our matching strategy to complement the HFCS with non-durable consumption from HBS involves two main steps: an auxilliary regression (Step 1, following Skinner (1987) and Browning et al. (2003)) and on a rank hot deck imputation (Step 2) to address the measurement errors that we observe in the predictions from the auxilliary regression (compared to the HBS distribution).

Step 1: Skinner approach. We estimate a regression for non-durable consumption based on HBS data (Setp 1.1), and then use the estimated coefficients to predict non-durable consumption of the HFCS households (step 1.2).

- Step 1.1. Estimation of non-durable consumption on HBS data
  We estimate an auxiliary regression on HBS data that links non-durable consumption to explanatory variables such as food at home, food outside home and other controls that are available in both the HBS and HFCS. The estimates of these coefficients for wave 1 are available in Lamarche (2017), and we provide the estimates for wave 2 in Table A4 below.[52]

- Step 1.2. Prediction of non-durable consumption for HFCS households
  The resulting regression coefficient estimates are then used to predict the non-durable consumption distribution of the HFCS households (based on identical explanatory variables). Figure A1 compares the original distribution from HBS (dark blue curve) with the imputed distribution from the Skinner method (light blue curve), showing some differences, especially in Germany.

Step 2: Rank hot deck imputation. We use the predicted consumption estimated from the Skinner method (step 1.2 above) as an instrumental variable to implement statistical matching between the HFCS and HBS data. Specifically, following D'Orazio et al. (2006), respondents in the HFCS are matched with respondents in the HBS according to the rank of their estimated consumption. More precisely, we use a rank hot deck imputation stratified by tenure status and household composition, which means that we first group households by tenure status and household composition and then, within each group, rank them according to their predicted consumption. It is performed using the function implemented in the R package StatMatch (D'Orazio (2017)).[53] By

[52] Note that for Italy, since disposable income is not available in the HBS data, we cannot directly compute income quintiles. Consequently, we use quintiles of imputed rents as a proxy. This variable could be regarded as a proxy for wealth rather than income, but it still appears to have a significant predictive effect in the Skinner equation.

[53] For each country and each wave, we perform matching using the HBS vintage year that corresponds to the year of the wave of the HFCS (see Table A2).

Table A4: Coefficients from the Skinner equation estimated on wave 2 HFCS data

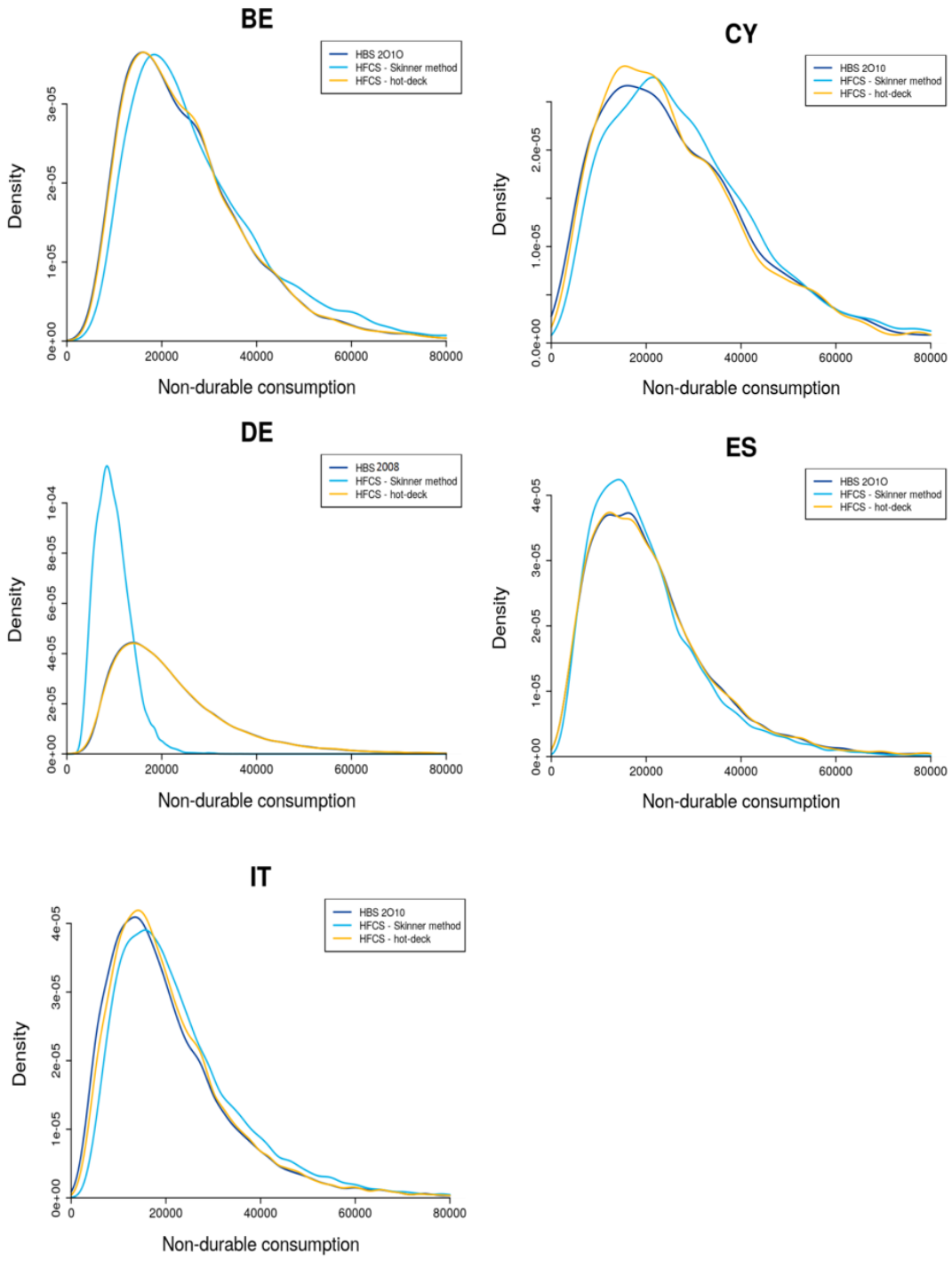
	Dependent variable:				
			l_cndur		
	BE	CY	DE	ES	IT
	(1)	(2)	(3)	(4)	(5)
log food consumption at home	−1.531**	0.277*	3.438***	0.089	−0.055
	(0.708)	(0.157)	(1.163)	(0.062)	(0.089)
log food at home^2	0.180*	−0.049	−0.569***	−0.021	−0.008
	(0.101)	(0.039)	(0.159)	(0.015)	(0.020)
log food at home^3	−0.005	0.005**	0.032***	0.004***	0.003**
	(0.005)	(0.003)	(0.007)	(0.001)	(0.001)
log food consumption away	0.067***	0.043			0.065***
	(0.016)	(0.026)			(0.015)
log food away^2	−0.022***	−0.018**			−0.021***
	(0.004)	(0.007)			(0.004)
log food away^3	0.002***	0.002***			0.003***
	(0.0003)	(0.0005)			(0.0003)
log rent	−0.453**	−0.185	−0.002	0.138***	−0.041
	(0.199)	(0.159)	(0.026)	(0.012)	(0.094)
log rent^2	0.086*	0.025	−0.014**	−0.043***	−0.008
	(0.046)	(0.039)	(0.006)	(0.004)	(0.023)
log rent^3	−0.003	−0.0001	0.002***	0.004***	0.002
	(0.003)	(0.002)	(0.0004)	(0.0003)	(0.001)
age of RP - 30-	−0.028*	−0.044	0.031***	0.068***	−0.155***
	(0.016)	(0.035)	(0.005)	(0.019)	(0.024)
age of RP - 30-40	−0.028**	−0.041**	−0.004	0.011	−0.027**
	(0.011)	(0.019)	(0.004)	(0.009)	(0.012)
age of RP - 50-60	0.032***	0.005	0.006	0.014*	0.016
	(0.012)	(0.019)	(0.004)	(0.008)	(0.010)
age of RP - 60-70	0.044**	−0.037	0.037***	−0.008	0.019
	(0.017)	(0.023)	(0.005)	(0.011)	(0.012)
age of RP - 70+	0.037*	−0.072**	0.045***	−0.078***	0.006
	(0.021)	(0.029)	(0.007)	(0.012)	(0.014)
head male	−0.023***	0.020*	−0.021***	−0.011*	−0.032***
	(0.008)	(0.012)	(0.003)	(0.006)	(0.007)
Owner or free use	0.006	−0.087***	−0.001	0.073***	
	(0.060)	(0.028)	(0.005)	(0.017)	
household size - 1 person	−0.051***	−0.086***	−0.038***	−0.130***	−0.148***
	(0.012)	(0.017)	(0.004)	(0.008)	(0.008)
household size - 3+ persons	−0.014	0.053***	0.005	0.092***	0.052***
	(0.013)	(0.017)	(0.005)	(0.008)	(0.009)
number of children - 1	0.049***	0.057***	−0.002	0.007	−0.016
	(0.014)	(0.019)	(0.005)	(0.009)	(0.011)
number of children - 2	0.080***	0.048**	0.0002	−0.004	−0.038***
	(0.016)	(0.022)	(0.007)	(0.010)	(0.013)
number of children - 3+	0.099***	0.067**	0.010	−0.014	−0.046**
	(0.019)	(0.030)	(0.009)	(0.017)	(0.022)
level of education - 0+1	−0.060***	−0.073***	−0.128***	−0.182***	−0.158***
	(0.014)	(0.015)	(0.022)	(0.009)	(0.009)
level of education - 2	−0.036***	−0.037*	−0.076***	−0.097***	−0.074***
	(0.011)	(0.022)	(0.007)	(0.007)	(0.007)
level of education - 5+6	0.022**	0.022	0.005	−0.008	−0.029
	(0.009)	(0.014)	(0.003)	(0.008)	(0.024)
labour of status - unemployed	−0.056***	−0.015	−0.089***	−0.102***	−0.084***
	(0.013)	(0.017)	(0.006)	(0.008)	(0.010)
labour of status - retiree	−0.011	0.001	−0.012**	−0.060***	−0.019*
	(0.016)	(0.021)	(0.005)	(0.009)	(0.010)
income quintile - 2	6.603	1.971	7.209**	1.453***	−0.838***
	(6.428)	(3.088)	(2.856)	(0.103)	(0.116)
income quintile - 3	3.246	1.921***	5.165	1.207***	−0.432***
	(9.023)	(0.211)	(3.957)	(0.122)	(0.134)
income quintile - 4	14.446	2.087***	9.393***	1.933***	0.238**
	(9.619)	(0.249)	(3.081)	(0.113)	(0.120)
income quintile - 5	23.027**	3.273	33.058***	2.086***	−0.181
	(10.220)	(6.237)	(5.007)	(0.106)	(0.162)
income quintile - 2 * log food at home	−2.150	−0.238	−3.157***	0.092	−0.319***
	(2.424)	(1.275)	(1.175)	(0.095)	(0.110)
income quintile - 2 * log food at home^2	0.234	0.0001	0.482***	−0.066***	0.091***
	(0.305)	(0.177)	(0.161)	(0.022)	(0.025)
income quintile - 2 * log food at home^3	−0.008	0.0002	−0.025***	0.004***	−0.005***
	(0.013)	(0.008)	(0.007)	(0.001)	(0.002)
income quintile - 3 * log food at home	−0.992	0.305	−2.718*	0.565***	0.043
	(3.293)	(0.243)	(1.583)	(0.103)	(0.115)
income quintile - 3 * log food at home^2	0.105	−0.112*	0.476**	−0.151***	−0.004
	(0.401)	(0.058)	(0.211)	(0.024)	(0.026)
income quintile - 3 * log food at home^3	−0.004	0.006*	−0.026***	0.008***	0.001
	(0.016)	(0.004)	(0.009)	(0.001)	(0.002)
income quintile - 4 * log food at home	−5.031	−0.143	−4.246***	0.044	−0.088
	(3.472)	(0.230)	(1.262)	(0.100)	(0.117)
income quintile - 4 * log food at home^2	0.597	−0.005	0.663***	−0.047**	0.011
	(0.418)	(0.053)	(0.172)	(0.023)	(0.026)
income quintile - 4 * log food at home^3	−0.024	−0.0003	−0.034***	0.002*	−0.0002
	(0.017)	(0.003)	(0.008)	(0.001)	(0.002)
income quintile - 5 * log food at home	−8.024**	−0.276	−12.596***	0.196**	0.129
	(3.597)	(2.356)	(1.906)	(0.095)	(0.129)
income quintile - 5 * log food at home^2	0.942**	−0.011	1.647***	−0.069***	−0.018
	(0.422)	(0.296)	(0.243)	(0.022)	(0.028)
income quintile - 5 * log food at home^3	−0.037**	0.0005	−0.072***	0.003**	0.001
	(0.017)	(0.012)	(0.010)	(0.001)	(0.002)
Constant	12.874***	7.390***	1.882	7.731***	8.790***
	(1.652)	(0.140)	(2.830)	(0.065)	(0.098)
Observations	6,074	2,845	51,837	21,909	14,793
R^2	0.697	0.824	0.667	0.667	0.719
F Statistic	330.142*** (df = 42; 6031)	311.470*** (df = 42; 2802)	2,662.647*** (df = 39; 51797)	1,122.743*** (df = 39; 21869)	920.372*** (df = 41; 14751)

Notes: The coefficients presented in this table are estimated using the Skinner equation applied to the wave 2 HFCS data. To make the table easier to read, for Italy, the coefficients corresponding to the variables "imputed rent quintile" (for all quintiles) and "imputed rent quintile * log food at home" (for all quintiles and all degrees of the variable "log food at home") have been placed in the rows corresponding to "income quintile" and "income quintile * log food at home" as explained in subsubsection A.1.2. *p<0.1; **p<0.05; ***p<0.01.

doing so, we preserve the consumption ranking across households. We then allocate non-durable consumption observed in the HBS to HFCS households based on their rank in the non-durable predicted consumption distribution (conditional on their tenure status and household composition). As illustrated in Appendix Figure A1 and Table A5, this procedure allows to reproduce very closely the marginal distribution of consumption for non-durable goods and services observed in the HBS (as evidenced by the overlapping dark blue and yellow curves in Appendix Figure A1).

Finally, this rank hot deck imputation also allows to decompose consumption into several categories. Indeed, consumption in the HBS can be broken down into detailed items of consumption (clothing, housing, ...) corresponding to items of the Classification of Individual Consumption by Purpose (COICOP). Since the hot deck procedure allocates consumption observed for an HBS respondent to an HFCS respondent, we directly allocate the detailed items composing the HBS consumption to each HFCS respondent.

Figure A1: Density of non-durable consumption measured in HBS and imputed in the HFCS with the Skinner method and with the rank hot-deck method (Wave 1)



Notes: BE: Belgium, CY: Cyprus, DE: Germany, ES: Spain, IT: Italy

Table A5: Distribution of non-durable consumption in Consumption surveys (HBS), and in the HFCS after imputation with the Skinner method and with the rank hot-deck method.

	Belgium		Cyprus		Germany		Spain		Italy	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
HBS distribution										
p10	11,131	10,922	8,341	7,570	9,484	9,643	7,344	6,007	7,051	6,488
p25	15,356	14,990	14,327	12,179	13,080	13,134	11,596	9,699	11,174	10,528
p50	22,504	21,806	23,757	19,524	18,916	19,023	18,331	15,441	17,428	16,545
p75	31,993	31,329	36,168	29,769	27,332	27,072	27,064	23,415	26,545	24,980
p90	43,477	43,854	50,318	43,937	38,252	36,961	38,037	33,392	38,032	35,476
HFCS distribution - Skinner method										
p10	12,624	12,973	10,309	9,601	5,486	9,842	7,588	7,198	9,234	8,025
p25	17,163	17,463	16,594	13,696	7,114	13,504	11,434	10,927	13,347	11,346
p50	24,346	24,442	25,906	20,365	9,337	19,286	17,447	17,395	19,871	16,780
p75	35,250	34,244	37,905	29,377	11,991	27,760	25,318	26,853	29,315	24,553
p90	49,378	45,505	51,892	40,880	14,622	37,576	35,433	39,143	41,480	34,413
HFCS distribution - Benchmark (rank hot-deck method)										
p10	11,261	11,685	8,956	8,893	9,532	10,230	7,317	7,176	7,879	7,859
p25	15,516	16,045	14,529	13,836	13,132	14,075	11,527	11,210	11,940	11,952
p50	22,650	23,160	23,290	21,159	18,932	20,425	18,345	17,513	18,077	18,251
p75	32,109	33,090	35,314	30,911	27,360	29,239	27,156	26,113	26,970	26,799
p90	43,678	46,897	49,717	43,714	38,444	40,018	38,518	37,128	38,334	37,810

A.1.3 Statistical matching with EU-SILC

The HFCS provides only gross income, while accounting for taxes and transfers may be a crucial issue for cross-country analysis. To address this issue, we use the Survey on Income and Living Conditions (EU-SILC, Eurostat) which is specifically designed to measure income components at the household level in the European Union. We apply a rank hot deck imputation to impute disposable income from the SILC to HFCS households. Since gross income is available in both sources, we rank households according to their gross income. Assuming that there is no reranking between the gross and the disposable income distributions, we perform a rank hot deck imputation stratified by household composition and tenure status, the same way we do it for consumption. By doing so, we obtain a distribution of disposable income in the HFCS as observed in the EU-SILC. [54]

[54] We also check the sensitivity of our estimations to the use of gross income (from the HFCS) versus disposable income (resulting from the rank hot deck imputation using SILC). Our results are not impacted in terms of cross-country comparisons (Appendix Table B12).

Table A6: Distribution of disposable income in EU-SILC, and in the HFCS after imputation with the rank hot-deck method.

		Belgium		**Cyprus**		**Germany**		**Spain**		**Italy**	
		SILC	Imputed HFCS	SILC	Imputed HFCS	SILC	Imputed HFCS	SILC	Imputed HFCS	SILC	Imputed HFCS
Wave 1	P10	12,120	12,126	10,173	11,322	9,716	10,028	8,406	8,554	8,926	8,914
	P25	16,926	16,640	16,024	17,743	15,681	15,430	14,057	14,486	15,200	15,222
	P50	27,300	26,629	28,812	29,718	25,576	25,237	23,918	23,857	24,318	24,205
	P75	43,736	42,513	43,845	43,434	40,006	38,430	37,001	36,714	38,549	37,583
	P90	60,225	58,112	62,369	62,395	56,494	54,475	53,548	53,289	54,830	53,617
Wave 2	P10	13,403	13,587	9,747	10,723	9,600	9,646	8,317	8,481	8,969	8,871
	P25	18,709	18,338	14,159	15,391	16,016	15,878	13,853	13,481	15,171	14,870
	P50	30,577	29,408	23,711	24,250	26,893	26,087	23,212	23,035	23,952	23,598
	P75	49,831	48,198	37,160	38,037	42,530	41,491	36,403	35,864	37,671	36,612
	P90	67,203	65,137	54,688	54,877	60,121	58,444	53,230	52,395	53,994	52,412

Notes: Distribution of disposable income at the household level as measured in EU-SILC and applying the rank-deck imputation to the HFCS sample, for Wave 1 and Wave 2.

A.2 Main definitions

- *Consumption of non-durable goods (C_i) – Source: HBS*

Consumption is restricted to services and non-durable goods; it implies that expenditures for durable goods are excluded from the measure. Durable goods are mostly vehicle and furniture purchases. Note that consumption does not include imputed rents. The detailed list of COICOP items that are excluded may be found in the code.

- *Disposable income (Y_i) – Source : SILC*

Disposable income is defined consistently with the EU-SILC framework. Hence it includes gross employee income, income from self-employment, pensions, unemployment benefits, old-age benefits, sickness benefits, disability benefits, education-related allowances, property income, family-related allowances, regular inter-household transfers received, interests, dividends, profits from capital investments, income received by people aged less than 16, from which are subtracted wealth taxes, regular inter-household transfers paid, tax on income and social contributions.

- *Wealth (W_i) - Source: HFCS*

Wealth is measured at the household level. All wealth variables are defined in gross values (i.e. not accounting for debt). Household indebtedness is taken into account to rank households in the net wealth distribution so as to define the wealth groups used to estimate heterogeneous MPC along the wealth distribution.

Total wealth: All assets owned at the household level — it includes all kinds of assets: real assets (household main residence, other real estate properties, vehicles, valuables) and financial assets [variable name in the HFCS: DA3001].

Financial wealth: all financial assets owned by the household [DA1000]. It includes: sight accounts, saving accounts, mutual funds, bonds, non-self-employment private business, shares, managed accounts, private lending, voluntary pension plans or whole life insurance contracts, and 'other' financial assets.

Housing wealth: sum of the household's main residence's value [DA1100], and the other real estate property's value [DA1120]. Net Housing wealth: housing wealth [DA1100+ DA1120] minus mortgage debt [DL1110 + DL1120].

Other gross assets: Non-housing real assets owned by the household. It includes the value of household's vehicles [DA1130], valuables [DA1131], and the value of self-employment businesses [DA1140].

Net liquid financial assets: Liquid assets owned by the household minus non-collateralized debt. Liquid assets include deposits [DA2101], mutual funds [DA2102], bonds [DA2103], shares [DA2105], and managed accounts [DA2106]. Non collateralized debt is total debt [DL1000] minus mortgage debt [DL1110 + DL1120].

Illiquid financial assets: non-self-employment private business [DA2104], private lending [DA2107], voluntary pension plans or whole life insurance contracts [DA2109], and other assets [DA2018].

Wealth groups: We consider four wealth groups on the basis of the net wealth percentiles defined within the country in Wave 1: below median net wealth, 50th to 69th percentiles, 70th to 89th percentiles, and the top ten percentiles. Net wealth [DN3001] is household's total wealth minus total outstanding household's liabilities.

- *Other control variables (X_i)- Source: HFCS*

Demographic variables: age, education of the reference person (defined in 4 categories: primary or lower / lower secondary / upper secondary / tertiary), labor status of the reference person (defined in 5 categories: employed / self-employed / retired / unemployed / others), number of household members (number of adults and number of children), questions on income (is income in the reference period normal/above normal/below normal, is income in the next year expected to rise below/above price).

Table A7: Wealth components and asset prices

			HFCS variables	Asset types	Prices index
DA1000	Total real assets =	+	DA1110	Value of household's main residence	Housing
		+	DA1120	Value of other real estate property	Housing
		+	DA1130	Value of household's vehides	-
		+	DA1131	Valuables	-
		+	DA1140	Value of self-employment businesses	Bonds (non-financial corporations)
DA2100	Total financial assets =	+	DA2101	Deposits	Interest rate on deposits
		+	DA2102	Mutual funds, total	
				+ HD1320A Equity	Shares (domestic)
				+ HD1320B Bonds	Bonds (gov)
				+ HD1320C Money market	Bonds (gov)
				+ HD1320D Real estate	Housing
				+ HD1320E Hedge funds	Shares (domestic)
				+ HD1320F Others	Shares (domestic)
		+	DA2103	Bonds	
				+ HD1410A Governements	Bonds (gov)
				+ HD140B Banks	Bonds (financial corporations)
				+ HD1410C Corporates	Bonds (non-financial corporations)
				+ HD1410D Others	Bonds (non-financial corporations)
		+	DA2104	Value of non self-employment private business	Bonds (non-financial corporations)
		+	DA2105	Shares, publicly traded	
				* HD1520 Includes Foreign companies (Yes/No)	Shares (world)
		+	DA2106	Managed accounts	Shares (domestic)
		+	DA2107	Money owed to households	-
		+	DA2108	Other assets	Shares (world)
		+	DA2109	Voluntary pension/whole life insurance	Shares (domestic)

Notes: For Germany, as the detailed composition of mutual funds is not available for wave 1, we assume that all mutual funds are invested in equities.

Table A8: Prices indexes by country for shares, government bonds, interest on deposits and housing assets, and corporate bonds

A8.a: Prices indexes by country for shares, government bonds, interest on deposits and housing assets

Country	Domestic shares	Foreign shares	Government Bonds	Interest rates on deposits	Housing prices
Belgium	BEL20-PROEINDEX	FTSEALLWORLDE-PRICEINDEX	FISEGLOBAL GOVT. BG ALLMATS(E) - CLEAN PRIOINDEX	Bank interest rates - deposits from households - BE	House price index - BE
Cyprus	FTSECYPRUSSE20-PRIOEINDEX	FTSEALLWORLDE-PRICEINDEX	FTSEGLOBALGOVT. EUROZONEALLMATS(E)-CLEAN PRICEINDEX	Bank interest rates - deposits House from households - CY	House price index - CY
Germany	DAX30 PERFORMANCE-PRICEINDEX	FTSEALLWORLDE-PRICEINDEX	FTSEGLOBALGOVT.BD ALLMATS(E)-CLEAN PRICEINDEX	Bank interest rates - deposits House from households- DE	House price index - DE
Spain	IBEX35-PRICEINDEX	FTSEALLWORLDE-PRICEINDEX	FTSEGLOBALGOVT.ES ALLMATS(E)-CLEAN PRIOINDEX	Bank interest rates - deposits from households - ES	House price index - ES
Italy	FTSEMIBINDEX-PRIOEINDEX	FTSEALLWORLDE-PRICEINDEX	FTSEGLOBALGOVT.IT ALLMATS(E)-CLEAN PRIOINDEX	Bank interest rates - deposits from households - IT	House price index - IT
Source	Datastream	Datastream	Datastream	ECB (sdw)	Eurostat

A8.b: Prices index for corporate bonds

Companies	**Corporate bonds**
All	FTSE EURO CORP. ALL MATURITIES - CLEAN
Non-financial corporation	FTSE EURO CORP. NON FINANCIALS- CLEAN PRICE INDEX
Financial corporations	FTSE EURO CORP. FINANCIALS - CLEAN PRICE INDEX
Source	Datastream

Table A9: Asset prices and consumption developments (%) between Wave 1 and Wave 2 at the country level

	Belgium	Cyprus	Germany	Spain	Italy
Period covered by the survey	2010-2014	2010-2014	2011-2014	2009-2012	2010-2014
Aggregate asset prices					
House prices	8.1	-21.9	9.4	-21.7	-12.0
Domestic shares	21.8	-87.4	44.7	-23.7	-3.2
Government bonds	10.6	6.2	5.7	-8.3	9.1
Interest rates on deposits	11.7	15.6	5.6	8.0	10.5
Financial corporation bonds	7.9	7.9	10.2	5.9	7.9
Non-financial corporation bonds	4.2	4.2	6.9	5.8	4.2
Foreign companies	38.8	38.8	35.5	40.2	38.8
Aggregate households' consumption	4.12	-4.80	3.04	-4.63	-5.48

Sources:
House prices: country specific house price index (Eurostat). Domestic shares: BEL-20 (Belgium), FTSE Cyprus SE20, DAX 30 (Germany), IBEX 35 (Spain), FTSE MIB Index (Italy). Government bonds: country specific FTSE Global government bonds (all maturities), not available for Cyprus (we then consider the Eurozone index). Interest rates on deposits: Bank interest rates on deposits from households (country specific, source: ECB). Financial corporation bonds: FTSE Euro corporate bonds index (non-financials), financial corporation bonds: FTSE euro corporate bonds (financials). Foreign companies: FTSE all word equities index.
Households' consumption: Final consumption expenditure of households (Eurostat, National accounts indicator, ESA 2010), in volume.

B Additional results

Table B1: First-stage regression – Baseline model

	All			Belgium			Cyprus			Germany			Spain			Italy		
	Coeff.		Std. dev.	Coeff.		Std. dev.	Coeff.		Std. dev.	Coeff.		Std. dev.	Coeff.		Std. dev.	Coeff.		Std. dev.
Instrument housing prices	5.14	***	1.41	-11.04	***	2.36	68.65	***	6.73	-20.01	***	3.47	7.51	***	1.31	63.94	***	4.19
Instrument interest rates on deposits	-30.05	**	12.55	-33.50	***	7.36	-17.23		32.96	-6.23		17.85	-4.51		18.44	-51.01	***	16.71
Instrument corporate bonds prices	-15.05	***	1.54	-4.40		4.46	-17.81	***	0.99	6.39		19.20	-5.41		4.60	-8.56	***	2.97
Instruments government bonds prices	15.89		24.23	-17.12		15.09	-97.24	*	51.82	731.98		618.98	86.45	*	48.92	25.57		34.86
Instrument financial bonds prices	-33.45	***	4.42	-31.40	***	2.42	41.80		65.70	-149.49		161.82	-39.88		68.74	-6.50		16.99
instrument domestic shares prices	-5.06	*	2.78	0.15		3.15	-15.91		15.55	-10.45	**	4.70	-2.19		3.06	5.06		7.74
Instrument foreign share prices	-0.43		4.49	1.23		5.10	36.24		54.54	21.81		57.11	0.00	***	0.00	-4.21		3.20
Age	0.15	**	0.07	0.10		0.09	0.00		0.33	0.15	**	0.07	-0.01		0.12	0.17	***	0.04
Age square	0.000		0.001	0.000		0.001	0.006		0.008	0.000		0.001	0.003	*	0.002	-0.001	***	0.001
Reference person is retired (1/0)	-2.17	*	1.25	1.64		1.80	-15.30		15.60	-3.66	***	1.42	-1.43		1.96	0.95	*	0.52
Reference person is unemployed (1/0)	-0.46		1.42	1.54		2.03	-4.51		2.98	-3.70	***	0.90	1.95		2.76	0.37		1.65
Number of adults in the household	-0.15		0.30	0.25		0.36	-0.32		1.41	-0.73		0.56	-0.42		0.56	-0.35	*	0.20
Number if children in the household	-0.15		0.33	-0.12		0.55	0.06		0.86	-0.69	**	0.32	-0.17		0.80	-0.31		0.23
Income is expected to grow more than prices (1/0)	1.26		0.89	5.31	**	2.42	0.68		3.48	2.28		1.49	1.18		1.56	-0.35		0.54
Income is expected to grow less than prices (1/0)	1.41	**	0.71	0.19		1.17	1.73		3.37	-0.68		0.75	4.95	**	2.13	-0.30		0.38
Income was above normal during the year of the survey (1/0)	2.58	*	1.32	1.91		2.20	0.89		3.15	0.02		0.86	3.57		3.33	-0.71		0.62
Income was below normal during the year of the survey (1/0)	-0.54		0.75	-2.77	***	1.05	3.11		3.31	-1.02		0.86	-0.43		1.35	0.06		0.50
Number of observations	8459			835			808			1569			3022			2225		
Fstat (instrumental variables)	28.519			32.832			92.370			14.181			7.559			42.507		

Table B2: Baseline results: Marginal propensity to consume out of wealth at the mean – OLS, IV panel and cross-section estimates, full table

	Panel				Cross-section				
	(1)		(2)		(3)		(4)		
	Baseline model								
	OLS		IV		1st wave		2nd wave		
All									
MPC	0.004	***	0.005	***	0.003	***	0.004	***	8459
Std. Error	0.001		0.001		0.000		0.001		
CI robust to weak instruments			[.002998, .006676]						
Fstat			28.5						
Belgium									
MPC	0.009	***	0.013	***	0.003	***	0.002	*	835
Std. Error	0.002		0.003		0.001		0.001		
CI robust to weak instruments			[.008804, .021023]						
Fstat			32.8						
Cyprus									
MPC	0.002	***	0.002	***	0.000		0.001	***	808
Std. Error	0.000		0.001		0.000		0.000		
CI robust to weak instruments			[.001505, .003053]						
Fstat			92.4						
Germany									
MPC	0.005	***	0.004	*	0.000		0.005	**	1569
Std. Error	0.001		0.002		0.001		0.002		
CI robust to weak instruments			[.000101, .01023]						
Fstat			14.2						
Spain									
MPC	0.004	***	0.010	***	0.002	***	0.003	***	3022
Std. Error	0.001		0.002		0.000		0.001		
CI robust to weak instruments			[.006046, .015024]						
Fstat			7.6						
Italy									
MPC	0.023	***	0.027	***	0.009	***	0.016	***	2225
Std. Error	0.003		0.005		0.001		0.004		
CI robust to weak instruments			[.019351, .034435]						
Fstat			42.5						

Notes: Control variables : see Notes for Table 1. Statistically significant at ***1%, **5% and *10%. Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals.

Table B3: Marginal propensity to consume out of wealth across the net wealth distribution – IV (Baseline), full table

	All	Belgium	Cyprus	Germany	Spain	Italy
MPC	**0.003**	**0.061** ***	**-0.010**	**0.047** **	**0.003**	**0.036** ***
Std. Err.	(0.008)	(0.022)	(0.006)	(0.024)	(0.007)	(0.010)
CI robust to weakiv	[-.013871, .02978]	[.034841, .219486]	[-.012579, .000531]	[-.138862, ...]	[-.01135, .017288]	[.021769, .065664]
Fstat	*9.5*	*3.3*	*10.2*	*4.6*	*9.5*	*8.9*
Nb households	3086	331	322	447	1029	957
MPC	**0.031** ***	**0.055** ***	**0.036** ***	**0.010**	**0.031** ***	**0.055** ***
Std. Err.	(0.007)	(0.016)	(0.008)	(0.009)	(0.006)	(0.007)
CI robust to weakiv	[.020243, .055096]	[.039823, .072511]	[.026545, .046957]	[... ,-.044094] U [-.001015, .009429] U [053813, ...]	[.024492, .046047]	[.04403, .065122]
Fstat	*4.3*	*7.5*	*5.7*	*3.1*	*8.5*	*19.7*
Nb households	1593	179	171	290	497	456
MPC	**0.014** ***	**0.027** ***	**0.001**	**0.030** ***	**0.014** **	**0.033** ***
Std. Err.	(0.005)	(0.007)	(0.004)	(0.009)	(0.006)	(0.013)
CI robust to weakiv	[.005743. .024181]	[.015232, .04312]	[-.00898, .008548]	[.015135, .107843]	[.003352, .024892]	[.009508, .05445]
Fstat	*10.9*	*13.9*	*8.2*	*4.4*	*18.9*	*15.9*
Nb households	2007	211	182	460	642	512
MPC	**0.004** ***	**0.010** ***	**0.002** ***	**0.005** ***	**0.008** ***	**0.027** ***
Std. Err.	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.010)
CI robust to weakiv	[.002623, .006508]	[.007132, .017379]	[.001325, .005149]	[.002931, .009346]	[.00552, .012122]	[.010066, .044047]
Fstat	*19.2*	*19.9*	*10.0*	*23.2*	*10.3*	*20.4*
Nb households	1773	114	133	372	854	300

Notes: Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%. Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals. In rare cases where the LC-confidence interval is not informative, we use the K-confidence interval if it is more informative. Here, the adjustment is made for Cyprus for the groups p70-p89 and p90-p100.

Table B4: MPC out of housing and financial wealth – OLS and IV (Baseline) estimates, full table

	All		Belgium		Cyprus		Germany		Spain		Italy	
Panel A:OLS (Panel)												
Housing wealth												
MPC	**0.008**	***	**0.010**	***	**0.003**	***	**0.006**	***	**0.009**	***	**0.024**	***
Std. Err	0.001		0.003		0.001		0.001		0.001		0.003	
Financial wealth												
MPC	**0.004**	**	**0.009**	***	**0.004**		**0.016**	***	**0.003**		**0.030**	***
Std. Err	0.002		0.003		0.004		0.004		0.002		0.010	
Other controls	Yes		Yes		Yes		Yes		Yes		Yes	
Number of households	8,459		835		808		1,569		3,022		2,225	
Panel B: IV (Baseline)												
Housing wealth												
MPC	**0.010**	***	**0.019**	***	**0.002**	*	**0.007**	**	**0.009**	***	**0.028**	***
Std. Err	0.003		0.005		0.001		0.003		0.002		0.005	
CI robust to weak instruments	[.008081, .016804]		[.014365, .031292]		[.000142, .003598]		[.002237, .013667]		[.005594, .015074]		[.019461, .036852]	
Fstat	4.5		13.4		45.3		12.6		9.7		41.4	
SW Fstat	5.4		16.4		62.9		11.6		11.7		47.4	
Financial wealth												
MPC	**0.007**		**0.008**		**0.025**	***	**0.002**		**0.004**		**0.058**	*
Std. Err	0.005		0.006		0.008		0.010		0.007		0.034	
CI robust to weak instruments	[-.001669, .019067]		[-.001951, .016954]		[.019648, .042099]		[-.013273, .017637]		[-.012693, .047015]		[.003859, .112083]	
Fstat	137.0		594.9		43.9		10.3		9.7		16.6	
SW Fstat	161.9		740.7		54.7		11.4		11.6		19.2	
Other controls	Yes		Yes		Yes		Yes		Yes		Yes	
Number of households	8,459		835		808		1,569		3,022		2,225	

Notes: The IV estimates display the standard F statistics (F-stat) and the Sanderson-Windmeijer F-statistics (SW F-stat) from the first-stage regressions. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%. Financial wealth is all financial assets owned by the household. It includes: sight accounts, saving accounts, mutual funds, bonds, non-self-employment private business, shares, managed accounts, private lending, voluntary pension plans or whole life insurance contracts, and 'other' financial assets. Housing wealth is sum of the household's main residence's value, and the other real estate property's value.
Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals.

Table B5: Robustness: Marginal propensity to consume out of wealth – IV with alternative sets of instruments

B5.a: Robustness: Marginal propensity to consume out of wealth – IV with country-specific instruments selection (columns 1 and 2) and full set of 14 instruments (column 3)

	Country-specific selection of instruments		**Full set of instruments**
	(1)	**(2)**	**(3)**
	Baseline model		
	IV - 7 instr.	IV - 14 instr.	IV - 14 instr.
All			
MPC	**0.004** ***	**0.004** ***	**0.004** ***
Std. Error	0.001	0.001	0.001
CI robust to weak instruments	[.002482, .00599]	[.002028, .005767]	[.004006, .004163]
Fstat	*43.8*	*53.4*	24.6
Belgium			
MPC	**0.013** ***	**0.009** ***	**0.009** ***
Std. Error	0.003	0.002	0.002
CI robust to weak instruments	[.00882, .02005]	[.000793, .003689]	[.001041, .003378]
Fstat	*64.1*	*67.2*	42.7
Cyprus			
MPC	**0.002** ***	**0.002** ***	**0.002** ***
Std. Error	0.001	0.001	0.001
CI robust to weak instruments	[.000908, .003668]	[.000793, .003689]	[.001041, .003378]
Fstat	*158.3*	*121.7*	48.8
Germany			
MPC	**0.005** **	**0.004** **	**0.003**
Std. Error	0.002	0.002	0.002
CI robust to weak instruments	[.001031, .009156]	[.000481, .0086]	[-.000908, .006635]
Fstat	*33.2*	*11.0*	8.9
Spain			
MPC	**0.010** ***	**0.009** ***	**0.007** ***
Std. Error	0.002	0.002	0.002
CI robust to weak instruments	[.006096, .015236]	[.005657, .013883]	[.005093, .013785]
Fstat	*14.1*	*17.9*	8.7
Italy			
MPC	**0.027** ***	**0.028** ***	**0.027** ***
Std. Error	0.005	0.005	0.005
CI robust to weak instruments	[.020555, .033728]	[.020793, .03541]	[.018556, .036667]
Fstat	*92.8*	*74.7*	29.5

Notes: In columns 1) and 2) the endogenous independent variable is estimated on a restricted set of instruments in the first-stage regression. For each country, we select the most relevant instruments (pvalue < 0.10) to estimate the first stage.
Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%. Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals. In rare cases where the LC-confidence interval is not informative, we use the K-confidence interval if it is more informative. Here, the adjustment is made for the 14 IV case for Belgium and for the country-specif 14 IV for "All".

B5.b: Robustness: Marginal propensity to consume out of housing and financial wealth – IV panel estimates with 14 instruments

	All	**Belgium**	**Cyprus**	**Germany**	**Spain**	**Italy**
Housing wealth						
MPC	**0.010** ***	**0.011** ***	**0.002** *	**0.005** *	**0.008** ***	**0.028** ***
Std. Err	0.002	0.004	0.001	0.003	0.002	0.006
CI robust to weak instruments	[.007559, .01548]	[.012729, .022365]	[.000375, .003792]	[.000633, .009233]	[.004732, .013553]	[.019232, .036947]
Fstat	5.8	13.9	45.7	7.7	12.3	26.4
SW Fstat	8.4	15.7	178.8	7.1	13.5	27.4
Financial wealth						
MPC	**0.005**	**0.006**	**0.013** **	**0.005**	**0.005**	**0.069** **
Std. Err	0.005	0.005	0.007	0.008	0.006	0.034
CI robust to weak instruments	[-.005343,-.001848]	[-.007971, -.00088]	[.008522, .027264]	[-.007477, .018067]	[... ,-.031957] U [.000015, ...]	[.016422, .148578]
Fstat	40.3	118.5	79.7	23.6	5.0	16.6
SW Fstat	69.2	113.0	86.4	25.9	5.3	17.3
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of households	8,459	835	808	1,569	3,022	2,225

Notes: List of control variables: see Notes for Table B5.a. Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals.

Table B6: Marginal propensity to consume out of wealth across the net wealth distribution – OLS estimates

		All		Belgium		Cyprus		Germany		Spain		Italy	
p0-p49	MPC	**0.015**	***	**0.012**	**	**-0.004**		**0.013**	**	**0.014**	***	**0.026**	***
	Std. Err.	(0.002)		(0.005)		(0.004)		(0.006)		(0.003)		(0.005)	
	Nb households	3086		331		322		447		1029		957	
p50-p69	MPC	**0.019**	***	**0.017**	**	**0.010**	**	**0.012**	*	**0.022**	***	**0.039**	***
	Std. Err.	(0.003)		(0.007)		(0.004)		(0.007)		(0.004)		(0.008)	
	Nb households	1593		179		171		290		497		456	
p70-p89	MPC	**0.010**	***	**0.017**	***	**0.002**		**0.012**	***	**0.011**	***	**0.022**	***
	Std. Err.	(0.002)		(0.004)		(0.002)		(0.004)		(0.003)		(0.006)	
	Nb households	2007		211		182		460		642		512	
p90-p100	MPC	**0.003**	***	**0.007**	***	**0.002**	***	**0.003**	**	**0.003**	***	**0.016**	**
	Std. Err.	(0.001)		(0.002)		(0.000)		(0.001)		(0.001)		(0.006)	
	Nb households	1773		114		133		372		854		300	

Notes: Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B7: Marginal propensity to consume out of net housing wealth, illiquid financial assets, and net liquid financial assets

	All	Belgium	Cyprus	Germany	Spain	Italy
Net housing wealth						
MPC	**0.013** ***	**0.019** ***	**0.002**	**0.005** **	**0.010** ***	**0.030** ***
Std. Err	0.005	0.005	0.001	0.002	0.004	0.005
CI robust to weak instruments	entire grid	[-.017437, .056179]	entire grid	entire grid	entire grid	entire grid
Fstat	*2.5*	*12.9*	*34.2*	*4.9*	*3.7*	*25.5*
SW Fstat	*3.6*	*23.5*	*64.7*	*3.4*	*2.9*	*13.7*
Net liquid assets						
MPC	**0.002**	**0.006**	**0.023**	**0.004**	**0.016**	**0.058**
Std. Err	0.008	0.006	0.024	0.014	0.010	0.038
CI robust to weak instruments	[-.049796,.05394]	[-.013173, .025597]	[-.093716, .081833]	entire grid	entire grid	entire grid
Fstat	*110.9*	*609.0*	*47.4*	*10.4*	*11.1*	*11.7*
SW Fstat	*62.1*	*587.2*	*95.0*	*11.4*	*2.8*	*17.0*
Illiquid financial assets						
MPC	**-0.053**	**-0.052**	**0.056** *	**-0.009**	**-0.009**	**0.075**
Std. Err	0.049	0.066	0.029	0.100	0.015	0.138
CI robust to weak instruments	entire grid	entire grid	entire grid	entire grid	entire grid	entire grid
Fstat	*1.8*	*3.4*	*3.1*	*1.0*	*1.7*	*2.6*
SW Fstat	*21.1*	*4.2*	*24.7*	*3.4*	*2.0*	*4.0*
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of households	8,459	835	808	1,569	3,022	2,225

Notes: MPC (IV estimates – Baseline) estimated country by country. See the definitions in Appendix A. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.
Net Housing wealth: housing wealth [DA1100+ DA1120] minus mortgage debt [DL1110 + DL1120].
Other gross assets: Non-housing real assets owned by the household. It includes the value of household's vehicles [DA1130], valuables [DA1131], and the value of self-employment businesses [DA1140].
Net liquid financial assets: Liquid assets owned by the household minus non-collateralized debt. Liquid assets include deposits [DA2101], mutual funds [DA2102], bonds [DA2103], shares [DA2105], and managed accounts [DA2106]. Non collateralized debt is total debt [DL1000] minus mortgage debt [DL1110 + DL1120].
Illiquid financial assets:. non-self-employment private business [DA2104], private lending [DA2107], voluntary pension plans or whole life insurance contracts [DA2109], and other assets [DA2018].

Table B8: MPC Financial and Housing Assets, First Quartile of Net Wealth

	All	Belgium	Cyprus	Germany	Spain	Italy
Panel A: OLS						
Housing wealth						
MPC	**0.015** ***	**0.008**	**-0.004**	**0.010**	**0.014** ***	**0.026** ***
Std. Err	0.003	0.009	0.004	0.007	0.004	0.005
Financial wealth						
MPC	**0.024** ***	**0.018** ***	**0.024**	**0.060** **	**0.022**	**0.086** **
Std. Err	0.006	0.004	0.019	0.030	0.018	0.040
Number of households	3 086	331	322	447	1 029	957
Panel B: IV (Baseline)						
Housing wealth						
MPC	**0.002**	**0.073** **	**-0.010** *	**0.046**	**0.001**	**0.036** ***
Std. Err	0.008	0.035	0.006	0.032	0.008	0.010
CI robust to weak instruments	[-.011432, .022532]	[-.011863, ...]	[-.015575, -.000203]	entire grid	[-.012233, .019902]	[.019468, .061312]
Fstat	6.5	4.1	139.1	2.3	9.9	7.3
SW Fstat	8.3	5.9	150.0	4.7	14.2	7.6
Financial wealth						
MPC	**0.051**	**0.050**	**0.105** *	**0.221** **	**0.068**	**0.218**
Std. Err	0.032	0.032	0.055	0.097	0.042	0.166
CI robust to weak instruments	[-.026346, .154678]	[-.099342, .150284]	[.018375, .190899]	[-.250708, .378647]	[-.029134, ...]	[-.053136, .488817]
Fstat	13.0	21.4	18.7	21.6	4.1	9.8
SW Fstat	16.0	14.0	27.1	23.1	5.8	11.1
Number of households	3 086	331	322	447	1 029	957

Notes: MPC (IV estimates – Baseline) estimated country by country. See the definitions in Appendix A. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B9: MPC Financial and Housing Assets, Second Quartile of Net Wealth

	All	Belgium	Cyprus	Germany	Spain	Italy
Panel A: OLS						
Housing wealth						
MPC	**0.021** ***	**0.037** ***	**0.010** **	**0.011** ***	**0.023** ***	**0.041** ***
Std. Err	0.004	0.008	0.005	0.003	0.004	0.007
Financial wealth						
MPC	**0.015** *	**-0.002**	**0.034** **	**0.086** ***	**0.004**	**0.027**
Std. Err	0.008	0.007	0.015	0.017	0.016	0.034
Number of households	1 593	179	171	290	497	456
Panel B: IV (Baseline)						
Housing wealth						
MPC	**0.028** ***	**0.063** ***	**0.034** ***	**0.012** **	**0.026** ***	**0.056** ***
Std. Err	0.007	0.018	0.008	0.006	0.007	0.007
CI robust to weak instruments	[.017331, .044717]	[.049761, .152708]	[.027079, .046825]	[... ,-.019433] U [.00272, ...]	[.00962, .036656]	[.043819, .067781]
Fstat	5.9	12.4	11.3	1.8	12.1	15.3
SW Fstat	6.7	13.0	11.3	5.3	14.9	14.3
Financial wealth						
MPC	**0.072** ***	**0.051**	**0.053** **	**0.098** ***	**0.110** ***	**0.097**
Std. Err	0.024	0.034	0.023	0.032	0.033	0.063
CI robust to weak instruments	[.015457, .16527]	[-.000353, .232632]	[.018055, .052649]	[-.070716, .170295]	[.074541, .496728]	[-.005609, .200367]
Fstat	5.7	3.9	77.6	8.8	5.0	9.6
SW Fstat	6.6	4.5	53.2	9.9	5.9	10.9
Number of households	1 593	179	171	290	497	456

Notes: MPC (IV estimates – Baseline) estimated country by country. See the definitions in Appendix A. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B10: MPC Financial and Housing Assets, Third Quartile of Net Wealth

	All		Belgium		Cyprus	Germany		Spain		Italy	
Panel A: OLS											
Housing wealth											
MPC	**0.011**	***	**0.017**	***	**0.001**	**0.013**	***	**0.012**	***	**0.024**	***
Std. Err	0.002		0.006		0.003	0.004		0.003		0.006	
Financial wealth											
MPC	**0.004**		**0.017**	***	**0.000**	**0.004**		**0.006**		**0.012**	
Std. Err	0.004		0.006		0.003	0.010		0.009		0.023	
Number of households	2 007		211		182	460		642		512	
Panel B: IV (Baseline)											
Housing wealth											
MPC	**0.013**	**	**0.015**		**-0.003**	**0.032**	***	**0.017**	***	**0.035**	***
Std. Err	0.006		0.010		0.004	0.010		0.007		0.013	
CI robust to weak instruments	[.003328, .027705]		[-.009059, .031776]		[-.017534,-.005581]	[-.001017, .105812]		[.006951, .032814]		[.012951, .056202]	
Fstat	7.3		11.7		75.8	4.0		11.8		16.5	
SW Fstat	7.1		9.8		52.2	5.5		10.2		19.4	
Financial wealth											
MPC	**0.002**		**0.037**	***	**-0.005**	**-0.002**		**-0.006**		**0.028**	
Std. Err	0.018		0.012		0.028	0.045		0.028		0.067	
CI robust to weak instruments	[... ,-.132122] U [.002064, .063057]		[.016729, .057006]		[-.110136,-.057367]	entire grid		[-.040435, .046082]		[-.11751, .125522]	
Fstat	5.5		15.9		39.6	3.7		86.8		8.5	
SW Fstat	6.8		18.7		45.1	4.7		67.5		9.7	
Number of households	2 007		211		182	460		642		512	

Notes: MPC (IV estimates – Baseline) estimated country by country. See the definitions in Appendix A. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B11: MPC Financial and Housing Assets, Fourth Quartile of Net Wealth

	All		Belgium		Cyprus		Germany		Spain		Italy	
Panel A: OLS												
Housing wealth												
MPC	0.006	***	0.007	***	0.003	**	0.005	***	0.007	***	0.017	**
Std. Err	0.001		0.003		0.001		0.002		0.001		0.007	
Financial wealth												
MPC	0.004	**	0.008		0.007		0.014	***	0.003		0.026	**
Std. Err	0.002		0.005		0.007		0.004		0.002		0.011	
Number of households	1 773		114		133		372		854		300	
Panel B: IV (Baseline)												
Housing wealth												
MPC	0.005	**	0.014	***	0.003	**	0.008	***	0.007	***	0.023	**
Std. Err	0.002		0.004		0.001		0.002		0.002		0.010	
CI robust to weak instruments	[... ,-.008079] U [.001333, .012627] U [.025803, ...]		[.010114, .027875]		null set		[.003603, .011446]		[-.003934, .022371]		[.007029, .039969]	
Fstat	3.0		10.4		242.4		18.6		7.7		23.5	
SW Fstat	4.4		11.9		347.6		12.8		7.9		26.3	
Financial wealth												
MPC	0.006		0.006		0.022	**	0.008		0.008		0.106	***
Std. Err	0.005		0.006		0.010		0.008		0.005		0.035	
CI robust to weak instruments	[-.001332, .021538]		[-.007518, .0151]		null set		[-.004703, .021526]		[.008387, .045248]		[.051016, .189074]	
Fstat	181.3		130.3		11.7		14.6		12.6		17.4	
SW Fstat	188.6		134.4		13.9		12.7		14.4		20.4	
Number of households	1 773		114		133		372		854		300	

Notes: MPC (IV estimates – Baseline) estimated country by country. See the definitions in Appendix A. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B12: Robustness: gross income (HFCS variable) instead of disposable income (Imputed from SILC)

	Belgium	Cyprus	Germany	Spain	Italy
Panel A. Full sample					
MPC	**0.040** ***	**0.010** ***	**0.010** ***	**0.010** ***	**0.027** *
Std. Err	0.012	0.001	0.004	0.002	0.015
CI robust to weak instruments	[.015157, .046389]	[.007728, .011538]	[.001758, .019131]	[.007373, .013827]	[-.014544, .036569]
Fstat	*20.6*	*436.2*	*9.3*	*14.5*	*13.4*
	832	800	1,778	3,019	2,216
Panel B. By wealth groups					
p0-p49					
MPC	**0.087** ***	**0.045** ***	**0.165** *	**0.018** **	**0.096** **
Std. Err	0.026	0.004	0.096	0.008	0.042
CI robust to weak instruments	[.055809,.08886]	[.034132, .048338]	[.017156, .297381]	[-.002675, .058646]	[... , .232068]
Fstat	*41.8*	*282.5*	*8.1*	*8.2*	*2.5*
Number of households	329	316	606	1,026	948
p50-p69					
MPC	**0.059** ***	**0.062** **	**0.066** ***	**0.027** ***	**0.053** ***
Std. Err	0.011	0.028	0.023	0.006	0.017
CI robust to weak instruments	[.049804, .057953]	[.060412, .084458]	[.080547, .219485]	[.021881, .0394]	[.011238, .064431]
Fstat	*37.6*	*349.6*	*9.1*	*11.3*	*8.3*
Number of households	178	169	320	497	456
p70-p89					
MPC	**0.048** ***	**0.010** ***	**0.038** ***	**0.013** ***	**0.018** **
Std. Err	0.009	0.001	0.008	0.005	0.008
CI robust to weak instruments	[.039274, .056895]	[.008548, .010977]	[.032408, .083031]	[.005903, .020326]	[.00278, .033911]
Fstat	*26.6*	*9668.3*	*5.4*	*26.1*	*13.1*
Number of households	211	182	475	642	512
p90-p100					
MPC	**0.011** ***	**0.004** ***	**0.009** ***	**0.008** ***	**0.031**
Std. Err	0.003	0.001	0.002	0.001	0.031
CI robust to weak instruments	[.003195, .015545]	[.005146, .008107]	[.005326, .014777]	[.005623, .010718]	[-.024078, .139469]
Fstat	*13.1*	*7.6*	*19.1*	*14.1*	*8.2*
Number of households	114	133	377	854	300

Notes: Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%. Confidence intervals robust to weak instruments following Andrews (2018) are computed thanks to the Stata package twostepweakiv (Sun (2018)). We use the LC-confidence intervals. In rare cases where the LC-confidence interval is not informative, we use the K-confidence interval if it is more informative. Here, the adjustment is made for Belgium for the groups for the groups from p0 to p89.

Table B13: Heterogeneity across ages - IV estimates

	Belgium	Cyprus	Germany	Spain	Italy
D(W/Y) * 25-39					
MPC	**0.013** ***	**0.002**	**0.015** *	**-0.010**	**0.012**
Std. Err	0.005	0.002	0.008	0.036	0.016
CI robust to weak instruments	[.008858, .012052]	[.001583, .003788]	[.00753, .026666]	entire grid	[-.059226, .069532]
Fstat	*1175.3*	*65.5*	*16.4*	*5.7*	*6.8*
Number of households	*115*	*231*	*251*	*332*	*212*
D(W/Y) * 40-59					
MPC	**0.010** *	**0.002** ***	**0.004** **	**0.014** ***	**0.033** ***
Std. Err	0.006	0.001	0.002	0.004	0.007
CI robust to weak instruments	[.002588, ...]	[.001464, .002884]	[.001101, .008907]	[... ,-.006459] U [.006296, ...]	[.01974, .045438]
Fstat	*56.2*	*93.1*	*17.9*	*2.0*	*34.4*
Number of households	*419*	*430*	*688*	*1347*	*1062*
D(W/Y) * 60-75					
MPC	**0.009** ***	**0.002** *	**0.006** **	**0.008** ***	**0.019** **
Std. Err	0.002	0.001	0.003	0.002	0.008
CI robust to weak instruments	[.008402, .015632]	[-.00542, ...]	[-.001272, .010022]	[.005741, .015157]	[.004703, .031628]
Fstat	*25.6*	*8.4*	*13.2*	*7.6*	*15.5*
Number of households	*301*	*147*	*630*	*1343*	*951*

Notes: Estimated MPC and robust standard errors. Fstat: standard F statistics from the first-stage regressions. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B14: Estimated MPC by category of consumption expenditure and by net wealth groups (IV estimates)

		Food and non-alcoholic beverages		Alcoholic beverages tobacco narcotics		Clothing and footwear		Housing water elec.. gas other fuels		Furnishings equipment routine hous. main.		Health		Transp.		Comm.		Culture		Educ.		Rest. hotels		Misc.		F-stats
Belgium	p0-p49	0.0114	***	0.0032		0.0084	**	0.0155	**	0.0031		-0.0032		0.0189		0.0029	*	0.0076		-0.0008		0.0084		0.0059		3.3
	p50-p69	0.0126	***	0.0036	**	-0.0007		0.0284	***	0.0043		0.0034		0.0467		0.0016		0.0006		0.0015	*	-0.0047		0.0124	**	7.5
	p70-p89	0.0042	***	0.0006		0.0018		0.0085	***	0.0022		0.0025	**	0.0048		0.0012	*	0.0062	*	0.0000		0.0021	*	0.0085	***	13.9
	p90-p100	0.0009	*	0.0000		0.0005		0.0035	***	-0.0001		0.0009	***	0.0035	**	0.0001		0.0006		0.0000		0.0005		0.0023	**	19.9
Germany	p0-p49	0.0047		-0.0016		0.0033		0.0745	***	-0.0037		-0.0017		0.0053		0.0037	**	-0.0012		0.0016		0.0096	*	-0.0044		4.6
	p50-p69	0.0004		0.0001		0.0003		0.0127		0.0015		-0.0020		-0.0012		0.0004		0.0042		0.0011	***	-0.0007		0.0005		3.1
begintable[]	p70-p89	0.0039	***	-0.0005		0.0022		0.0196	***	0.0004		0.0013		0.0055		0.0008	*	0.0064	**	0.0002		0.0019		0.0042	*	4.4
	p90-p100	0.0008	***	0.0000		0.0005	**	0.0016	**	-0.0003		0.0006		0.0017		0.0001		0.0015	***	0.0001		0.0007		0.0009	**	23.2
Spain	p0-p49	0.0022		0.0016	**	-0.0007		0.0152	***	0.0004		0.0014		0.0006		0.0005		0.0018		0.0000		-0.0014		0.0016		9.5
	p50-p69	0.0113	***	0.0002		0.0012		0.0256	***	0.0051	***	0.0027	**	0.0054		0.0009	*	0.0016		0.0002		0.0014		0.0032	**	8.5
	p70-p89	0.0037	**	0.0000		-0.0005		0.0137	***	0.0025		0.0015		0.0049		0.0012	***	0.0010		-0.0003		0.0023		0.0025	**	18.9
	p90-p100	0.0020	***	0.0002		0.0005		0.0037	***	0.0007	**	0.0007	**	0.0015	**	0.0003	***	0.0005	*	0.0000		0.0014	***	0.0007	**	10.3
Italy	p0-p49	0.0227	***	-0.0004		0.0017		0.0386	***	0.0072	***	-0.0022		-0.0036		0.0027	***	-0.0010		0.0001		-0.0009		0.0040	***	8.9
	p50-p69	0.0158	***	0.0024	***	0.0013		0.0243	***	0.0034		0.0004		0.0061	**	0.0028	***	0.0118	***	0.0016		0.0011		0.0042	***	19.7
	p70-p89	0.0080	***	0.0010	**	0.0061		0.0048		-0.0013		0.0023		0.0119	*	0.0007	**	0.0050	**	-0.0002		0.0021		0.0041		15.9
	p90-p100	0.0096	**	0.0010	***	0.0018	**	0.0079	**	0.0009		0.0011	*	0.0014		0.0010		0.0035	**	0.0000		0.0013		0.0011		20.4

Notes: MPC (IV estimates – Baseline) estimated country by country and by category of consumption expenditures. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B15: Matching between DWA categories and HFCS variables

DWA Category	**Deposits**
Corresponding HFCS variables	DA2101 Deposits HD1110 Value of sight accounts HD1210 Value of saving accounts
DWA Category	**Housing**
Corresponding HFCS variables	DA1110 Value of household's main residence DA1120 Value of other real estate property
DWA Category	**Business**
Corresponding HFCS variables	DA2104 Value of non self-employment private business DA1140 Value of self-employment businesses
DWA Category	**Mutual funds**
Corresponding HFCS variables	HD1320A Mutual funds (predominantly in equity) HD1320B Mutual funds (predominantly in bonds) HD1320C Mutual funds (predominantly in money market instruments) HD1320D Mutual funds (predominantly in real estate) HD1320E Mutual funds (Hedge funds) HD1320F Mutual funds (Other fund types) DA2102 (Mutual funds, total)
DWA Category	**Listed Shares**
Corresponding HFCS variables	DA2105 Shares, publicly traded
DWA Category	**Life Insurance**
Corresponding HFCS variables	DA2109 Voluntary pension/whole life insurance
DWA Category	**Debt Securities**
Corresponding HFCS variables	DA2103 Bonds DA2106 Managed accounts
DWA Category	**Not rescaled**
Corresponding HFCS variables	DA1130 Value of household's vehicles DA1131 Valuables DA2107 Money owed to households DA2108 Other assets

Notes: This table depicts the link between our HFCS variables and the corresponding categories in the Distribution Wealth Accounts from ECB, see details in the main text, section 7.

Table B16: Robustness: Italy with lagged instruments - Table 1

	Panel		Cross-section		
	(1)	**(2)**	**(3)**	**(4)**	
	Baseline model				
	OLS	IV	1st wave	2nd wave	Number of obs.
Italy					
MPC	**0.025*****	**0.041*****	**0.009*****	**0.016*****	1,789
Std. Error	0.003	0.009	0.001	0.004	
Fstat		*12.9*			

Notes: MPC - IV estimates for Italy with lagged instruments ($t-2$) based on SHIW 2008. OLS estimates on the same sample, i.e. considering the panel households of our sample that are also observed in the SHIW 2008. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B17: Robustness: Italy with lagged instruments - Table 2

		Italy	
p0-p49	MPC	**0.080**	**
	Std. Err.	(0.036)	
	CI robust to weakiv	[.04046, .36768]	
	Fstat	*1.3*	
	Nb households	754	
p50-p69	MPC	**0.041**	***
	Std. Err.	(0.012)	
	CI robust to weakiv	[... . .057826] U [.121448, ...]	
	Fstat	*1.6*	
	Nb households	367	
p70-p89	MPC	**0.029**	**
	Std. Err.	(0.013)	
	CI robust to weakiv	[-.000208, .050407]	
	Fstat	*3.4*	
	Nb households	430	
p90-p100	MPC	**0.034**	***
	Std. Err.	(0.011)	
	CI robust to weakiv	[.013078, .055704]	
	Fstat	*21.9*	
	Nb households	238	

Notes: MPC - IV estimates for Italy with lagged instruments ($t-2$) based on SHIW 2008. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B18: Robustness: Italy with lagged instruments - Table 3

		Italy
Panel A: OLS		
Housing wealth		
	MPC	**0.026*****
	Std. Err	0.004
Financial wealth		
	MPC	**0.031*****
	Std. Err	0.011
	Nb households	1,789
Panel B: IV (lagged instrument)		
Housing wealth		
	MPC	**0.044*****
	Std. Err	0.010
	Fstat	11.8
	SW Fstat	4.2
Financial wealth		
	MPC	**0.034**
	Std. Err	0.122
	Fstat	2.2
	SW Fstat	1.9
	Nb households	1,789

Notes: MPC - IV estimates for Italy with lagged instruments ($t-2$) based on SHIW 2008. OLS estimates on the same sample, i.e. considering the panel households of our sample that are also observed in the SHIW 2008. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B19: Robustness: MPC out of housing wealth - Italy with lagged instruments - Table 4

	Italy
p0-p49	0.086**
p50-p69	0.039***
p70-p89	0.024
p90-p100	0.035***

Notes: MPC - IV estimates for Italy with lagged instruments ($t-2$) based on SHIW 2008. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B20: Robustness: Table 1 with instruments based on distributional wealth accounts

	(1) **IV rescaled** 14 assets decomposition		(2) **IV rescaled** Baseline	
All				
MPC	**0.008**	***	**0.007**	***
Std. Error	0.002		0.002	
CI robust to weak instruments	[.006421, .01408]		[.00602, .017254]	
Fstat	*17.9*		*6.1*	
Belgium				
MPC	**0.009**	***	**0.011**	***
Std. Error	0.002		0.003	
CI robust to weak instruments	[.006258, .015339]		[.007504, .01702]	
Fstat	*43.2*		*38.0*	
Cyprus				
MPC	**0.002**	***	**0.002**	***
Std. Error	0.001		0.001	
CI robust to weak instruments	[.00159,.003098]		null set	
Fstat	*39.9*		*72.5*	
Germany				
MPC	**0.004**	*	**0.004**	*
Std. Error	0.002		0.002	
CI robust to weak instruments	[.00038,. 007523]		[.001122, .010807]	
Fstat	*8.5*		*14.4*	
Spain				
MPC	**0.006**	***	**0.010**	***
Std. Error	0.002		0.003	
CI robust to weak instruments	[.004882,.01349]		[.006209, .0199]	
Fstat	*8.0*		*3.3*	
Italy				
MPC	**0.027**	***	**0.027**	***
Std. Error	0.005		0.005	
CI robust to weak instruments	[.018621. .036835]		[.018647. .035876]	
Fstat	*29.0*		*45.0*	

Notes: MPC - IV estimates with instruments rescaled using the distributional wealth accounts – Baseline (column 2) and based on the 14 assets decomposition(column 1), estimated country by country. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%. We use the LC-confidence intervals. In rare cases where the LC-confidence interval is not informative, we use the K-confidence interval if it is more informative. Here, the adjustment is made in the case of 14 IV for Belgium and for "All".

79

Table B21: Robustness: Table 2 with instruments based on distributional wealth accounts

		All	Belgium	Cyprus	Germany	Spain	Italy
p0-p49	MPC	**0.008**	**0.062*** **	**-0.01**	**0.049** **	**0.002**	**0.036*** **
	Std. Err.	(0.009)	(0.023)	(0.006)	(0.024)	(0.007)	(0.010)
	Fstat	*7.0*	*3.3*	*8.9*	*4.5*	*8.1*	*8.9*
	Nb obs	3086	331	322	447	1029	957
p50-p69	MPC	**0.032*** **	**0.054*** **	**0.036*** **	**0.009**	**0.03*** **	**0.055*** **
	Std. Err.	(0.007)	(0.016)	(0.008)	(0.008)	(0.006)	(0.007)
	Fstat	*3.4*	*8.2*	*4.7*	*3.6*	*9.0*	*20.7*
	Nb obs	1593	179	171	290	497	456
p70-p89	MPC	**0.014** **	**0.025*** **	**0.002**	**0.027*** **	**0.013** **	**0.033** **
	Std. Err.	(0.006)	(0.007)	(0.004)	(0.008)	(0.006)	(0.013)
	Fstat	*23.022*	*12.927*	*7.353*	*4.262*	*25.490*	*17.025*
	Nb obs	2007	211	182	460	642	512
p90-p100	MPC	**0.004*** **	**0.009*** **	**0.002*** **	**0.005*** **	**0.009*** **	**0.027*** **
	Std. Err.	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.010)
	Fstat	*6.9*	*26.7*	*9.6*	*24.4*	*6.4*	*32.8*
	Nb obs	1773	114	133	372	854	300

Notes: MPC - IV estimates with instruments rescaled using the distributional wealth accounts. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B22: Robustness: Table 3 with instruments based on distributional wealth accounts

	All	Belgium	Cyprus	Germany	Spain	Italy
Housing wealth						
MPC	**0.013*** **	**0.013*** **	**0.002**	**0.007** **	**0.01*** **	**0.029*** **
Std. Err	0.004	0.004	0.001	0.003	0.003	0.005
Fstat	2.9	13.7	76.7	12.5	3.3	49.3
SW Fstat	3.9	16.1	62.4	13.1	4.2	55.1
Financial wealth						
MPC	**0.013** **	**0.008**	**0.036*** **	**0.006**	**0.005**	**0.043**
Std. Err	0.006	0.006	0.013	0.008	0.006	0.030
Fstat	4.2	590.1	11.9	25.2	9.0	19.6
SW Fstat	4.7	757.1	13.9	29.7	10.2	22.6
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Nb households	8,459	835	808	1,569	3,022	2,225

Notes: MPC - IV estimates with instruments rescaled using the distributional wealth accounts. Control variables: see Notes for Table 2. Statistically significant at ***1%, **5% and *10%.

Table B23: Oaxaca-Blinder decomposition: contribution of each factor to the endowment part and to the coefficient part - Belgium versus Spain

	Endowment		Coefficients	
	Coeff.	**P. value**	**Coeff.**	**P.value**
Homeowner	0.001	0.364	-0.021	0.000
Owns other prop.	0.002	0.005	-0.001	0.197
Gross wealth	0.000	0.373	0.010	0.000
Grosse wealth²	0.000	0.256	-0.001	0.006
Mortgages	0.000	0.958	-0.002	0.071
Other liabilities	0.000	0.068	-0.001	0.039
Has adj. int. rate	0.001	0.037	-0.002	0.007
Has fixed rate	-0.001	0.311	-0.001	0.371
Retired	-0.001	0.041	-0.002	0.010
Unemployed	0.000	0.895	0.000	0.232
Number of adults	-0.002	0.002	0.008	0.001
Constant			-0.007	0.020

Notes: Detailed results of the threefold Oaxaca-Blinder decomposition - Endowment and Coefficients parts

Table B24: Oaxaca-Blinder decomposition: contribution of each factor to the endowment part and to the coefficient part - Germany versus Spain

	Endowment		Coefficients	
	Coeff.	**P. value**	**Coeff.**	**P.value**
Homeowner	0.004	0.000	-0.002	0.153
Owns other prop.	0.001	0.011	0.000	0.960
Gross wealth	0.000	0.607	0.005	0.000
Grosse wealth²	0.000	0.476	-0.002	0.028
Mortgages	0.000	0.879	-0.002	0.002
Other liabilities	0.001	0.082	-0.001	0.087
Has adj. int. rate	0.001	0.321	0.000	0.078
Has fixed rate	0.000	0.670	0.000	0.726
Retired	0.000	0.219	0.000	0.596
Unemployed	0.000	0.531	0.000	0.735
Number of adults	-0.001	0.007	-0.002	0.395
Constant			0.004	0.073

Notes: Detailed results of the threefold Oaxaca-Blinder decomposition - Endowment and Coefficients parts

Table B25: Oaxaca-Blinder decomposition: contribution of each factor to the endowment part and to the coefficient part - Cyprus versus Spain

	Endowment		Coefficients	
	Coeff.	**P. value**	**Coeff.**	**P.value**
Homeowner	0.001	0.085	0.000	0.933
Owns other prop.	-0.002	0.018	-0.002	0.291
Gross wealth	0.001	0.336	0.020	0.000
Grosse wealth²	-0.001	0.134	-0.007	0.000
Mortgages	0.000	0.824	-0.001	0.182
Other liabilities	0.000	0.776	0.000	0.531
Has adj. int. rate	0.000	0.811	-0.001	0.552
Has fixed rate	0.000	0.424	-0.001	0.449
Retired	0.000	0.173	-0.001	0.071
Unemployed	0.000	0.875	0.000	0.894
Number of adults	0.000	0.899	-0.010	0.002
Constant			0.012	0.000

Notes: Detailed results of the threefold Oaxaca-Blinder decomposition - Endowment and Coefficients parts

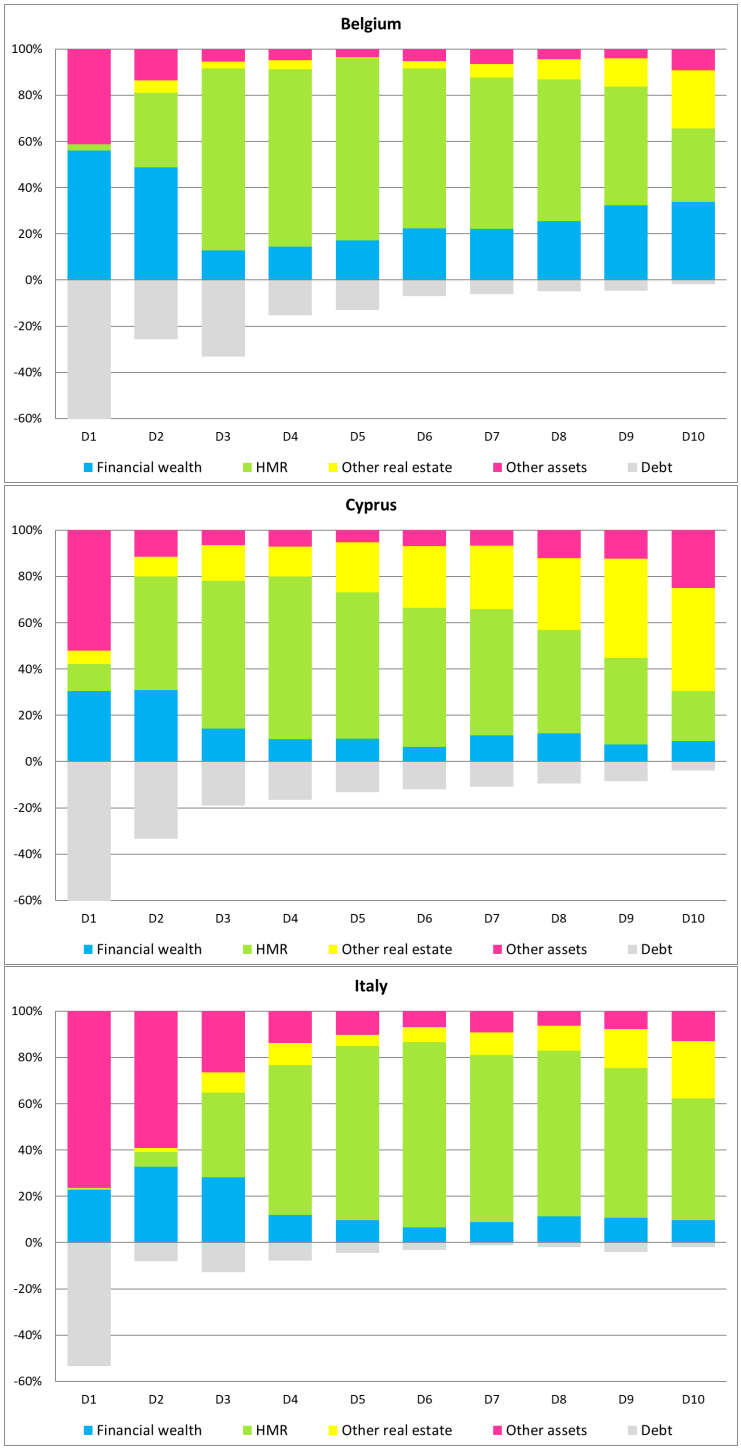
Table B26: Oaxaca-Blinder decomposition: contribution of each factor to the endowment part and to the coefficient part - Italy versus Spain

	Endowment		Coefficients	
	Coeff.	**P. value**	**Coeff.**	**P.value**
Homeowner	0.004	0.000	-0.010	0.000
Owns other prop.	0.001	0.018	0.000	0.686
Gross wealth	0.005	0.002	-0.011	0.001
Grosse wealth²	-0.002	0.141	0.001	0.123
Mortgages	0.002	0.355	-0.001	0.268
Other liabilities	0.000	0.878	0.000	0.891
Has adj. int. rate	-0.003	0.088	0.000	0.236
Has fixed rate	0.000	0.668	0.000	0.701
Retired	-0.001	0.000	-0.002	0.000
Unemployed	0.000	0.011	0.000	0.012
Number of adults	-0.001	0.023	0.005	0.022
Constant			-0.001	0.593

Notes: Detailed results of the threefold Oaxaca-Blinder decomposition - Endowment and Coefficients parts

C Additional figures

Figure C1: Heterogeneity in assets composition and in debt across countries and by net wealth decile (% of total assets), for Belgium, Cyprus and Italy



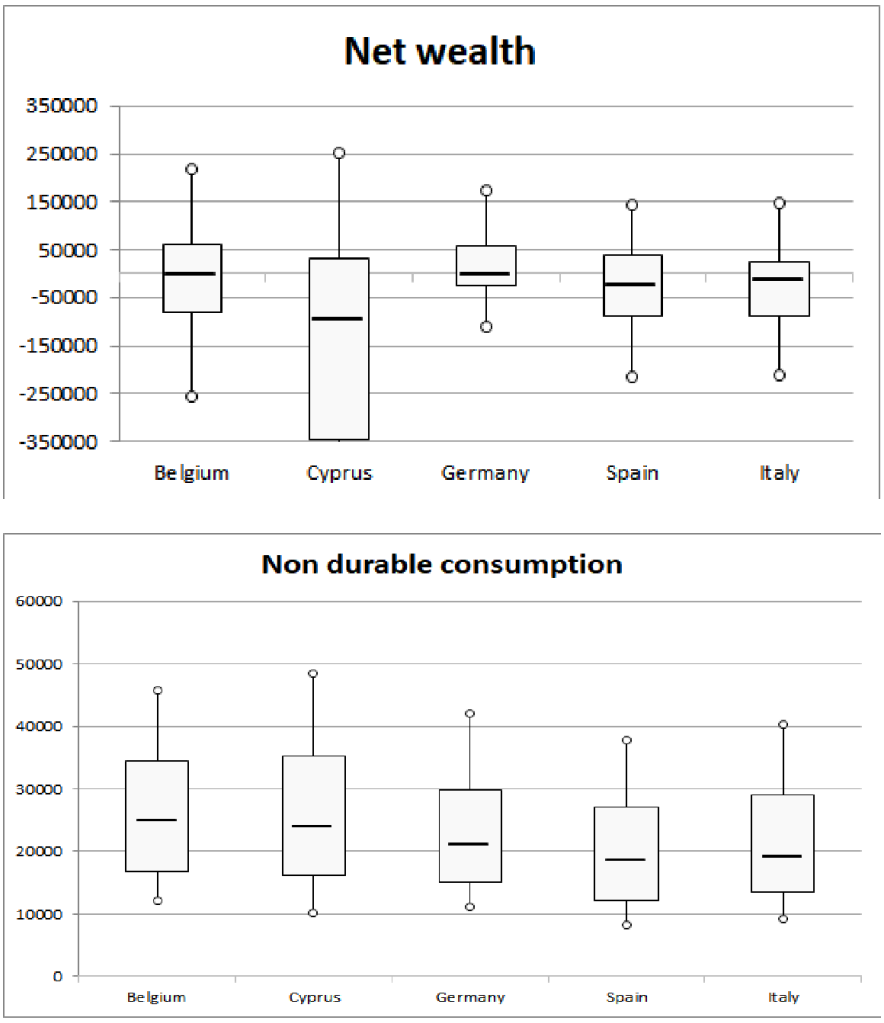
Notes: The vertical axis is limited to - 60%. The percentage of debt in total assets for the first net wealth decile (D1) amounts to 460% in Belgium, and 200% in Cyprus. Figures based on the Wave 1 of the HFCS.

Financial wealth: all financial assets owned by the household (sight accounts, saving accounts, mutual funds, bonds, non-self-employment private business, shares, managed accounts, private lending, voluntary pension plans or whole life insurance contracts, and 'other' financial assets).

Other assets: household's vehicles, valuables, and the value of self-employment businesses.

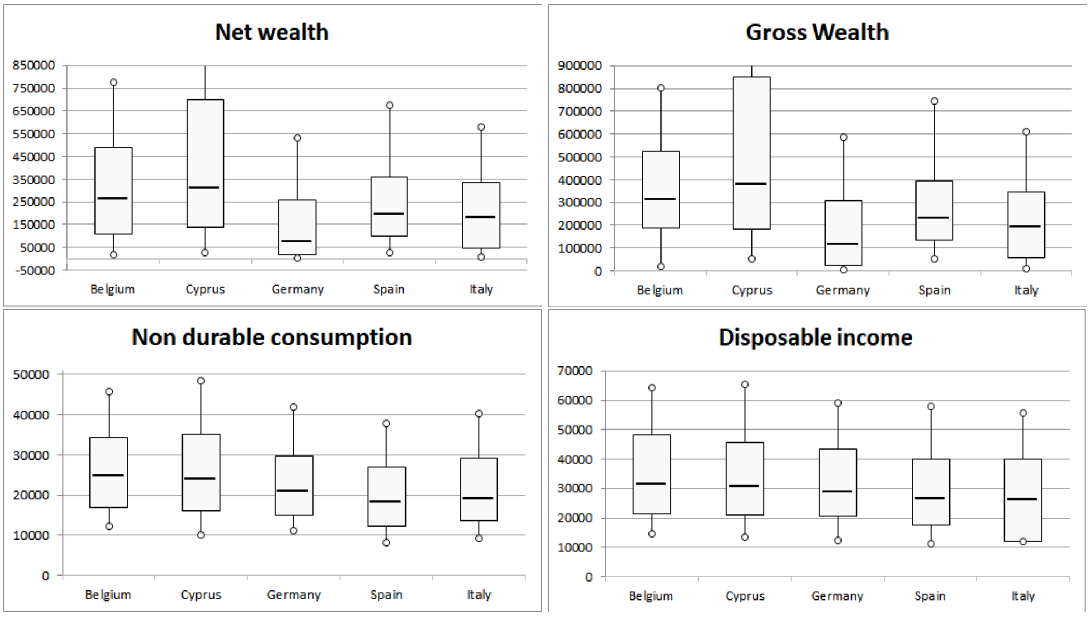
Debt: all types of debts (mortgages and non-collateralized debt).

Figure C2: Distribution of the changes in net wealth and non-durable consumption between Wave 1 and Wave 2 (median, Q1, Q3, P10, P90)



Notes: Distributions of the differences between the value of net wealth (non-durable consumption) in Wave 2 and in Wave 1 at the household level. Values are adjusted for inflation between Wave 1 and Wave 2. Weighted statistics based on the estimation sample. (Sources: HFCS-HBS-SILC).

Figure C3: The distributions of net wealth, non-durable consumption, and disposable income (median, Q1, Q3, P10, P90)



Notes: Distribution of net wealth, gross wealth, non-durable consumption, and disposable income in Wave 1. Weighted statistics based on the estimation sample. (Sources: HFCS-HBS-SILC).

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