ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Albacete, Nicolas; Fessler, Pirmin; Pekanov, Atanas

Working Paper

The role of MPC heterogeneity for fiscal and monetary policy in the Euro Area

Working Paper, No. 254

Provided in Cooperation with:
Oesterreichische Nationalbank (OeNB), Vienna

Suggested Citation: Albacete, Nicolas; Fessler, Pirmin; Pekanov, Atanas (2024) : The role of MPC heterogeneity for fiscal and monetary policy in the Euro Area, Working Paper, No. 254, Oesterreichische Nationalbank (OeNB), Vienna

This Version is available at:
https://hdl.handle.net/10419/286405

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

WORKING PAPER 254

The Role of MPC Heterogeneity for Fiscal and Monetary Policy in the Euro Area

Nicolas Albacete, Pirmin Fessler, Atanas Pekanov

The *Working Paper series of the Oesterreichische Nationalbank* is designed to disseminate and to provide a platform for discussion of either work of the staff of the OeNB economists or outside contributors on topics which are of special interest to the OeNB. To ensure the high quality of their content, the contributions are subjected to an international refereeing process. The opinions are strictly those of the authors and do in no way commit the OeNB.

The Working Papers are also available on our website (http://www.oenb.at) and they are indexed in RePEc (http://repec.org/).

Publisher and editor *Oesterreichische Nationalbank*
Otto-Wagner-Platz 3, 1090 Vienna, Austria
PO Box 61, 1011 Vienna, Austria
www.oenb.at
oenb.info@oenb.at
Phone (+43-1) 40420-6666
Fax (+43-1) 40420-046698

Editor *Martin Summer*

Cover Design *Information Management and Services Division*

DVR 0031577

ISSN 2310-5321 (Print)
ISSN 2310-533X (Online)

© Oesterreichische Nationalbank, 2024. All rights reserved.

The Role of MPC Heterogeneity for Fiscal and Monetary Policy in the Euro Area

Nicolas Albacete[1], Pirmin Fessler[2] and Atanas Pekanov[3]

Abstract

Closely following the seminal contribution of Jappelli and Pistaferri (2014) – based on Italian household survey data – we employ data of 22 European countries to assess the role of heterogeneity of the marginal propensity to consume (MPC) for fiscal policy in the Euro area. We document an average MPC of 0.46 in the Euro area and illustrate its heterogeneity across countries, household-characteristics, and major items of the households' balance sheets such as cash-on-hand, liquid, and illiquid wealth. Households with low cash-on-hand have on average higher MPCs. Policy experiments show how the (empirically measured heterogeneity of) MPC affects fiscal policy and makes it more effective in stimulating GDP growth than under the assumption of uniform MPCs. We also illustrate how different MPC patterns lead to similar policies having different effects across the members of the Euro area. Therefore, MPC heterogeneity matters for efficient policy design at the national as well as multinational level. Additionally, we also highlight the role of MPC heterogeneity for monetary policy and deliver a large set of parameters ready to be used in calibrations of Heterogenous Agent New Keynesian and similar economic models.

JEL Codes: D12, D14, E21, E62, H23, H24

Key Words: MPC, household survey, fiscal policy, simulations, HANK,

Disclaimer: The views and opinions expressed in this paper are strictly those of the authors and do not necessarily reflect the views of the Austrian Institute of Economic Research, the Austrian National Bank or the ESCB. The authors take responsibility for any errors.

[1] nicolas.albacete@oenb.at, Economic Micro Data Lab, Research Section, Oesterreichische Nationalbank (Austrian National Bank)
[2] pirmin.fessler@oenb.at, Economic Micro Data Lab, Research Section, Oesterreichische Nationalbank (Austrian National Bank)
[3] atanas.pekanov@wifo.ac.at, Austrian Institute of Economic Research (WIFO) and Vienna University of Business and Economics (WU Wien)

0. Non-Technical Summary

Building upon the seminal work of Jappelli and Pistaferri (2014), our study extends the investigation of the Marginal Propensity to Consume (MPC) heterogeneity's implications for fiscal and monetary policy effectiveness across 22 European countries. We document how different MPCs among households, with an observed average of 0.46 but significantly divergent across nations, household characteristics, and financial standings, influence policy outcomes. Particularly noteworthy is the elevated MPC among households with lesser liquidity, underscoring the pronounced impact of fiscal policies on GDP growth when MPC heterogeneity is taken into account. Through a series of policy experiments, our research not only corroborates but also expands upon the findings of Jappelli and Pistaferri (2014) by applying them across a wider geographic spectrum and incorporating additional simulations to assess policy effectiveness.

Our analysis reveals that fiscal measures targeted at segments with higher MPCs yield more potent economic stimuli, highlighting the critical importance of recognizing MPC variability in policy design. This insight is pivotal for tailoring fiscal strategies that maximize economic uplift across the heterogeneous economic landscape of the Euro area. Moreover, our study enhances the discourse on monetary policy by supplying a comprehensive parameter set that refines economic models' ability to predict policy impacts.

We build on the groundwork laid by Jappelli and Pistaferri (2014), extending their methodology to a broader European context and introducing novel simulations that further elucidate the role of MPC heterogeneity in economic policy. This approach not only enriches the empirical analysis but also provides a more granular understanding of the fiscal and monetary dynamics at play, reinforcing the necessity for policy formulations that take into account the diverse economic fabric of the Euro area. Our findings advocate for an informed approach to economic policy-making, emphasizing the strategic consideration of household consumption behaviors to foster more effective and equitable growth.

1. Introduction

The marginal propensity to consume (MPC) is an essential object in modern day macroeconomics. Both in traditional, basic IS-LM-AS-AD frameworks, as well as in modern, state-of-the-art heterogeneous agents New Keynesian DSGE models, the MPC of agents is central in determining their responses to different economic policies and macroeconomic shocks. Information on the value of the marginal propensity to consume is required to assess the effects of both monetary and fiscal policy measures, as it disciplines the main channel of effects on output – the consumption response to interest rate, tax, or government spending changes. For a long-time in the literature, the marginal propensity to consume of households was calibrated such that the underlying model matches some specific targeted variables or moments or was theoretically assumed to take certain values. New and more detailed data, as well as new methods have however led to increased exploration of the MPC of households lately, how it varies along different household characteristics and what are the repercussions of this variation for economic policy. Furthermore, it is important to explain factors that contribute to differences between the MPCs of households.

Modern DSGE models have used for a long time the simplifying assumption of two types of households – liquidity constrained, rule-of-thumb Keynesian households that spend all their additional income and have an MPC of 1; and households, acting according to the permanent income hypothesis, which save almost all their extra income, with an MPC close to 0. This is the framework used in the canonical paper by Galí, López-Salido and Vales (2007). Other structural models have used precautionary savings, bequest motives or liquidity constraints as mechanisms through which to replicate differences in household MPCs. On the empirical side, newer datasets and evidence from micro-level (household) surveys have presented in recent years rich information of the consumption behaviour of households, including different methods and ways to obtain a full distribution of the MPCs of households and therefore also the opportunity to analyse the heterogeneity of households in terms of their consumption responses to income shocks.

We employ the third wave of the ECB Household Finance and Consumption Survey (HFCS) to describe the distribution of MPCs of households in the Euro area. We do so by using a unique direct survey question introduced in the third wave of the HFCS on how the household would hypothetically respond to a transitory income increase. Using self-reported answers of respondents regarding consumption responses, is one of three leading approaches to estimate MPCs. The other two revolve around using actual quasi-experiments to identify how different groups reacts after being treated differently and around using purely statistics methods and panel on household income and consumption to estimate the MPC. Our approach has the main advantages that it does not require imposing any structural assumptions on the relationships between income and consumption, nor does it require evidence from an actual historical tax policy experiment. In using self-reported MPCs we implicitly assume that the actual response following an income shock would be the same as the self-reported intention. While this can be a downside to our results, this method of assessing MPCs, enables us to use a full distribution of MPCs and therefore see the heterogeneity of MPCs across household types, unlike other methods which often estimate MPCs only for some pre-specified groups. We can thus analyse the heterogeneity of the MPC across a representative sample of households and how different household characteristics help determines this heterogeneity. While there have been important contributions to analyse the distribution of households MPCs at the country level for numerous countries (Drescher et al. 2020), this is the first paper to combine such data for the Euro area as a whole and for all Euro area countries (and beyond) to examine implications for fiscal and (to a lesser degree) monetary policy.

In the sample of 22 countries we analyse, the average MPC is 0.46. It varies between 0.33 in the Netherlands to 0.57 in Lithuania. We document the heterogeneity of MPCs between 0 and 1 across the distribution of income and assets, similar to previous studies. Households with low amounts of liquid assets particularly have higher MPCs on average than richer households. Furthermore, along the characteristics correlated with lower MPCs are large household size, age, education and having a mortgage (Table 2).

Our main contribution is to illustrate how the heterogeneity of MPCs matter for the effects of macroeconomic policies by exploring several counterfactual simulations to assess the quantitative repercussions of household having unequal MPCs in comparison to all households having uniform MPCs, as classical representative agent models will presuppose. The effects of fiscal policy, e.g. the very generous policy measures implemented in the aftermath of the pandemic, are closely dependent on the consumption responses of households. Even more crucial, the heterogeneity of MPCs becomes even more relevant for policies that have a redistributive element – if they impose a tax on one part of the population and constitute a lump-sum transfer for another. In the traditional representative agent models these effects cancel each other, because both groups have a uniform MPC – and therefore the consumption responses of rich households are only a scaled-up version of the consumption responses of poorer households. With MPC heterogeneity this is not the case and this has implications for the effects of different redistributive and stimulus policies.

We evaluate the importance of household MPC heterogeneity by several simulations, which can be grouped in such that such constitute a lump-sum transfer to poorer households financed by debt and such that constitute a direct redistributionary policy from rich(er) to poor(er) households. In general, we find that with MPC heterogeneity the response of aggregate consumption is substantially higher than when the MPC across households is uniform. Throughout the paper, we follow the structure of the seminal paper by Jappelli and Pistaferri (2014) on Italy, as well as build on the findings about the third wave of the HFCS presented in Drescher et al. (2020). With regard to monetary policy, we provide information on many important statistics used to inform standard macroeconomic models to assess the effects of monetary policy. To do so we deliver a large set of parameters ready to be used in calibrations of Heterogenous Agent New Keynesian and similar economic models.

This paper proceeds as follows. In section 2 we discuss the empirical literature and methods used to estimate and analyse the marginal propensity to consume given the available data and how the growing strand of heterogeneous agents New Keynesian (HANK) models embeds the empirical stylized facts from this line of the literature. Note that we also deliver the necessary data to calibrate typical HANK models in the accompanying result dataset to this publication. Section 3 describes our dataset – the ECB Household Finance and Consumption Survey (HFCS). In result section 4 we present the distribution of household MPCs, conditional MPCs and predictive effects of different characteristics on the MPC as well as our main policy experiments. In section 5 several parameters useful to calibrate micro founded macroeconomic models are presented for each country. Finally, Section 6 concludes.

2. Literature

In this section we deliver an overview over selected literature on gathering empirical MPCs in subsection 2.1 as well as using them to calibrate models in subsection 2.1.

2.1 Gathering empirical MPCs

The question of evaluating the consumption responses of households to changes in income is not trivial, since it involves decomposing and isolating the response of consumption to the unexpected and transitory change in income. Table 1 shows an overview over selected literature gathering empirical MPCs.

Table 1: MPC estimates as generated in selected studies

Study	MPC estimate	Type of MPC estimated	Method and dataset
Jappelli and Pistaferri (2014)	0.48	Aggregate MPC	Self-reported MPCs from the Italian SHIW
	0.62	Poor HtM households	
	0.58	Wealthy HtM households	
	0.44	Non HtM households	
Fagereng et. al (2018)	0.43	Poor HtM households	Norwegian data from administrative tax data on consumption and income and lottery winnings
	0.46	Wealthy HtM households	
	0.32	Non HtM households	
	0.51	Aggregate MPC, Period 0	
	0.18	Aggregate MPC, Period 1	
	0.1	Aggregate MPC, Period 2	
Kaplan et. al (2014)	0.24	Poor HtM households	
	0.3	Wealthy HtM households	
	0.13	Non HtM households	
Johnson et. al (2006)	0.25	Quarterly average MPC for non-durables	Tax variation quasi-natural experiment
	0.34	6-month average for non-durables	
Patterson (2019)	0.5	Aggregate MPC	
Ganong and Noel (2017)	0.4	Aggregate MPC	Structural identifying assumptions and credit card data on income and consumption
McKee and Verner (2015)	0.6 – 0.9	MPC out of unemployment insurance benefits	Nielsen Consumer Panel data

Source: Own litertature survey.

Three strands of empirical studies have tried to document MPCs out of transitory income shocks with different methodologies. The first approach has focused on using different quasi-natural experiments to distinguish these effects by using the variation of treatment of different household groups. The advantage of this approach is that natural experiments normally result in unanticipated shocks, as required by theory, so that agents only react to the innovation to their income process, without adjusting their behaviour beforehand and without permanent effects. The disadvantage however spurs from the fact that such natural experiments are very seldom. Two examples of such cases of surprising income shocks are unanticipated tax changes and lottery winnings.

The literature on tax changes has used episodes of unanticipated tax rebate policies, e.g. in the United Stated, to study how consumption responses vary by households. Johnson, Parker and

Souleles (2006) and Parker et. al (2013) examine how the different timing of the receipt of the tax benefit can be used to identify distinct consumption responses to it[4]. These papers point towards higher consumption responses for low-income and low-asset households, which is in line with theoretical models of households facing liquidity constraints. The small samples however only enable these studies to estimate average MPCs for different groups in the population. A further difference of this strand of the literature is that it actually calculates MPCs out of anticipated income changes, such as pre-announced tax policies, and these are theoretically to be lower than unanticipated income changes.

The literature on lottery winnings on the other side uses a real, realized shock to incomes of households, which is not expected and is of transitory, one-time character. The work of Fagereng, Holm and Natvik (2016) uses administrative data from Norway to explore the consumption behaviour of around 30 000 lottery winners. It therefore overcomes much of the problems of papers using natural tax experiments. The big sample enables the researchers to estimate both the MPCs and relate them to important household characteristics such as holdings of liquid and illiquid wealth and their income. Consistently with other work, they document a declining MPC along the distribution of liquid wealth – households with higher holdings of liquid wealth tend to have lower MPCs on average.

The second strand of the literature uses a semi-structural approach, based on panel data on consumption and income. It uses structural econometric estimations, developed first by Blundell, Pistaferri and Preston (2008), to analyse the joint behaviour of income and consumption by implementing a structural decomposition and imposing covariance restrictions to obtain the coefficient on the effect from changes in income to changes in consumption.

Crawley and Kuchler (2020) extend the semi-structural approach of Blundell, Pistaferri and Preston (2008) by addressing the time aggregation problem. They estimate consumption responses for permanent and transitory income shocks for different household groups using administrative data from Denmark. Their panel consists of registry data from 2003 to 2015 and overcomes some of the standard problems of survey-based measures of income and assets. The authors document a strong relation between holdings of liquid wealth and consumption smoothing. They find that liquid wealth is the most important factor explaining differences in consumption behaviour in comparison to other household characteristics – liquidity constraints can therefore be seen as the main factor driving agents to diverge from consumption smoothing behaviour.

A further specific question of interest for researchers is also how persistent the consumption response is – that is, how large are marginal propensities to consume out of the income shocks in the periods following the initial period. There is no direct evidence from surveys regarding this question, as normally participants are asked only about one specific number in terms of their MPC, but other methods using time-series data on household responses in multiple periods can be useful in estimating these responses. Gelman (2016) and Fagereng, Holm and Natvik (2016) explore the question and find that the consumption response to the shock has almost completely decayed two years after the shock. Straub, Auclert, Rognlie and Bardoszy (2021) call these the intertemporal marginal propensities to consume (iMPCs) and extend a traditional HANK framework by adding

[4] Further specifics of the tax system such as social security payroll caps, pre-announced tax cuts and tax refunds can also be used to identify exogeneous shocks to incomes across the population (Parker 1999, Souleles 1999, Souleles 2002).

a two-asset structure and adjustment costs for illiquid wealth to enable it to replicate such high persistence of MPCs.

The third strand of the literature uses direct survey question to document the MPCs of households. This is the strand that we built our results on, as the third wave of the ECB Households Finance and Consumption Survey contains such a direct question to infer how much consumption of the particular household will change after a certain transitory income shock. The approach was first widely developed in Shapiro and Slemrod (1995; 2003), as well as Sahm, Shapiro and Slemrod (2009) to document consumption responses to changes in tax policies. Their approach however does not fully quantify a number for the MPC, as the data used is the Michigan survey which only provides three possible closed-form answers to households regarding their response to a tax rebate[5] – mostly to lead to an increase in spending, to an increase in saving or to paying off existing debt. This still however enables the authors to then approximate an average MPC for the population.

This approach is also used by Jappelli and Pistaferri (2012). In their paper they use the Italian Survey of Household Income and Wealth (SHIW), which includes such a question already since 2010. The authors report an average MPC for all households of 0.48. They document the substantial heterogeneity of self-reported MPCs across the income and liquid wealth distribution, as household with low cash-on-hand have higher MPCs than richer households. This is in line with the theoretical considerations regarding the savings patterns of poor versus rich households. The authors also analyse how the heterogeneity in MPCs affects taxation and redistribution policies. In this paper we largely follow the same approach, which can now be extended to all countries that are part of the HFCS sample.

2.2 Using empirical MPCs to calibrate models

The empirical estimates of the MPC and the factors explaining them are also essential in disciplining micro founded macroeconomic models. From a theoretical point of view, the modelling framework for a long time was to assume that representative agents act according to the permanent income hypothesis (PIH) and therefore have almost negligible MPC - if the agents follow the permanent income hypothesis (PIH) and has quadratic utility, MPCs should equal the annuity and are therefore given by 1-0.95 = 0.05. The conclusions from RANK models about the consumption-smoothing behaviour of individuals however contradicts much of the empirical evidence of relatively high MPCs of households presented above. To ensure a more realistic set-up, the RANK model has been expanded to include two types of households. The canonical paper in this literature, Galí, López-Salido and Vales (2007), embeds two types of households – Ricardian households that are on their Euler equation, make an optimal saving-spending decision and are therefore acting according to the permanent income hypothesis. The MPC of such households is therefore 0 or close to it – equal to the annuity 0.05. The second type of households – non-Ricardian, consume all their extra income – therefore the term hand-to-mouth. Their MPC is 1. Models are then calibrated so that they match the assumed aggregate MPC in the economy, which is normally between 0.3 and 0.6.

Besides this simplified manner of targeting some aggregate MPC in the economy, models of household heterogeneity have been developed where idiosyncratic risk and incomplete markets

[5] The studies and the accompanying surveys aim at documenting household responses to the temporary reduction in income tax withholding in 1992, the 2001 income tax rebate and the 2008 tax stimulus

drive consumption behaviour which diverges from the permanent income hypothesis. Important milestones in this literature have been the work by Bewley (1983), Imrohoroglu (1989), Huggett (1993) and Aiyagari (1994). In recent years, growing computational capabilities and new and detailed microeconomic evidence enabled these earlier models to be significantly extended. The developing Heterogeneous Agents New Keynesian (HANK) framework builds on this earlier work on household heterogeneity and income inequality and aligns it with the New Keynesian literature. The rich evidence on household heterogeneity in terms of household balance sheets, as well as household behaviour to different shocks, described above, is then used to discipline these models and asses how realistic they are. In most of the literature on heterogeneity, liquidity constraints are the main micro founded factor that explains the lack of consumption smoothing of agents. The seminal work of Kaplan, Moll and Violante (2018) shows how the transmission of monetary policy changes when the model realistically can replicate moments from the distribution of household income and wealth and to reproduce realistic MPCs documented in the empirical literature. The effects of monetary policy on consumption are then dominantly driven by the indirect effects of interest rate changes on income, taxes and labour supply, instead of intertemporal substitution as in the classical RANK model. Auclert (2019) also shows how implicit redistribution channels of household heterogeneity affects the transmission of monetary policy – because of the redistributive effects of interest rate changes affecting differently high and low MPC households. Work by Maniovskii, Krussel and Mitman (2019) similarly dissects and explores how fiscal and redistribution policies are reinterpreted under a model with heterogeneous agents. In all these more recent works, the evidence of consumption responses to income shocks – estimated by the MPCs of households – are the central object to discipline the model and obtain realistic aggregate outcomes.

3. Data

The ECB Household Finance and Consumption Survey (HFCS) is a detailed microdata survey, where households in all Euro area countries respond to an extensive questionnaire regarding their household characteristics, income, consumption, assets, and liabilities, as well as further information.

We use the third wave, which was mostly collected in 2017. The survey consists of country-level surveys which are coordinated at the ECB and closely follow the common rules regarding all steps of data production. All the data are then validated at and provided by the ECB. The net sample size for the countries covered is more than 91,000 households representing about 170 million European households. A detailed overview of the first results of the third wave of the HFCS is presented in ECB (2020a), while ECB (2020b) delivers a detailed methodological report including information about data gathering, sampling, editing, and multiple imputation.

For our purposes, we focus on 22 countries[6] and an underlying representative sample of overall 91.242 households. A household is defined as including all persons residing in the same dwelling who share household expenses and jointly take expenditure decisions. The HFCS collects data through personal interviews with the household head or the person most knowledgeable about the family's finances. Most importantly for our purposes, the third wave of the HFCS also includes a unique direct question to assess consumption behaviour after surprising, transitory income shocks. The question asks:

> *"Imagine you unexpectedly receive money from a lottery, equal to the amount of income your household receives in a month. What percent would you spend over the next 12 months on goods and services, as opposed to any amount you would save for later or use to repay loans?"*

This type of question enables our further analysis in important ways. First, this question correctly asks about the reaction of households to a surprising income shock. It therefore reports the effects of a relevant, exogenous income change. Second, the HFCS data provides us with a precise quantitative MPC value for each household, making it possible to analyse the specific household characteristic that determine heterogenous MPCs. In contrast, many of the existing studies, which estimate MPCs, do that as average MPCs for specific groups e.g. per age, per income quintile or per household assets. Furthermore, the question relates to a hypothetical change that is proportional to the income of the household, rather than a fixed nominal sum, that would mean different magnitude of the income change for different households. Further advantages are related to the framing of the question in terms of spending rather than consuming and to offering a period of reference for the planned expenditure (12 months).

The self-reported responses to the question however also have their disadvantages. First, these are household intentions, and we need to make the assumption that the intentions will indeed be followed if the income shock truly materializes. Second and following the first problem is that we observe two psychological effects from the self-reported results, as discussed below – the rounding of responses and the bunching of responses around three specific values. It is questionable how

[6] The countries in question are all euro area countries: Austria, Belgium, Cyprus, Germany, Estonia, Finland, France, Greece, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Portugal, Slovenia, Slovakia, Spain; and additionally: Croatia, Hungary, and Poland.

realistic it is that this will be the exact consumption behaviour after an actual transitory income change.

4. Results

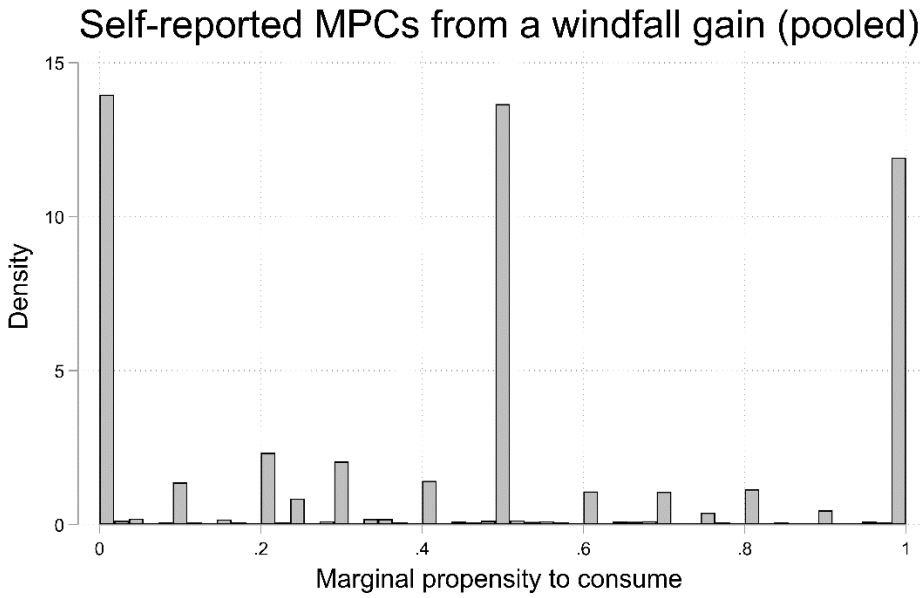
In this section we present descriptive statistics on MPC heterogeneity in subsection 4.1, discuss conditional MPCs across the distributions of cash-on-hand, gross income, financial assets as well as socioeconomic characteristics in subsection 4.2 and use predictive regressions to assess conditional correlations with regard to MPC heterogeneity in subsection 4.3. Finally, subsection 4.4 includes our main policy experiments closely following the seminal contribution of Jappelli and Pistaferri (2014). Throughout this paper we appropriately take into account the complex survey structure (survey design, weights, multiple imputations).

4.1 MPC Heterogeneity

Figure 1 plots the empirical distribution of the MPCs of households for our sample of countries for the Euro area[7]. Two clear trends emerge from this. First, the answers are clustered around three points, where most of the distribution is concentrated – 0, 0.5 and 1. The first group of households, with an MPC of 0, can be called Ricardian households, which act as permanent-income consumers and do not adjust their imminent consumption patterns to income changes – they save the extra income and spend only the annuity of it. The second group seems to use a rule-of-thumb to decide how they will respond to such an income change by stating that they will follow a simple rule to spend half of the extra income and save the rest. The third group is the group of liquidity-constrained households, with an MPC of 1. These households just consume all the extra income and are therefore hand-to-mouth. Such patterns reflect behavioural patterns to simplify and round consumption responses towards a behaviour of either saving all the extra income, spending all the extra income or for using a rule-of-thumb to simplify the decision. Furthermore, we see the pattern of "heaping" – that almost all the answers of respondents are around round numbers.

[7] A few countries are missing in this sample. Data is missing on the specific MPC question for Estonia and Finland, so these countries are dropped from the sample. Even so, our sample of countries includes 98% of the Euro area GDP. Furthermore, 2.4% of households are missing on the MPC question in some remaining countries due to item-nonresponse, so these households are also dropped from the sample. The resulting sample size is N=63.593. Only 1.2% of these observations have imputed values in the MPC question.

Figure 1: Self-Reported MPC from Transitory Income Shock, Euro area, Third Wave of the HFCS

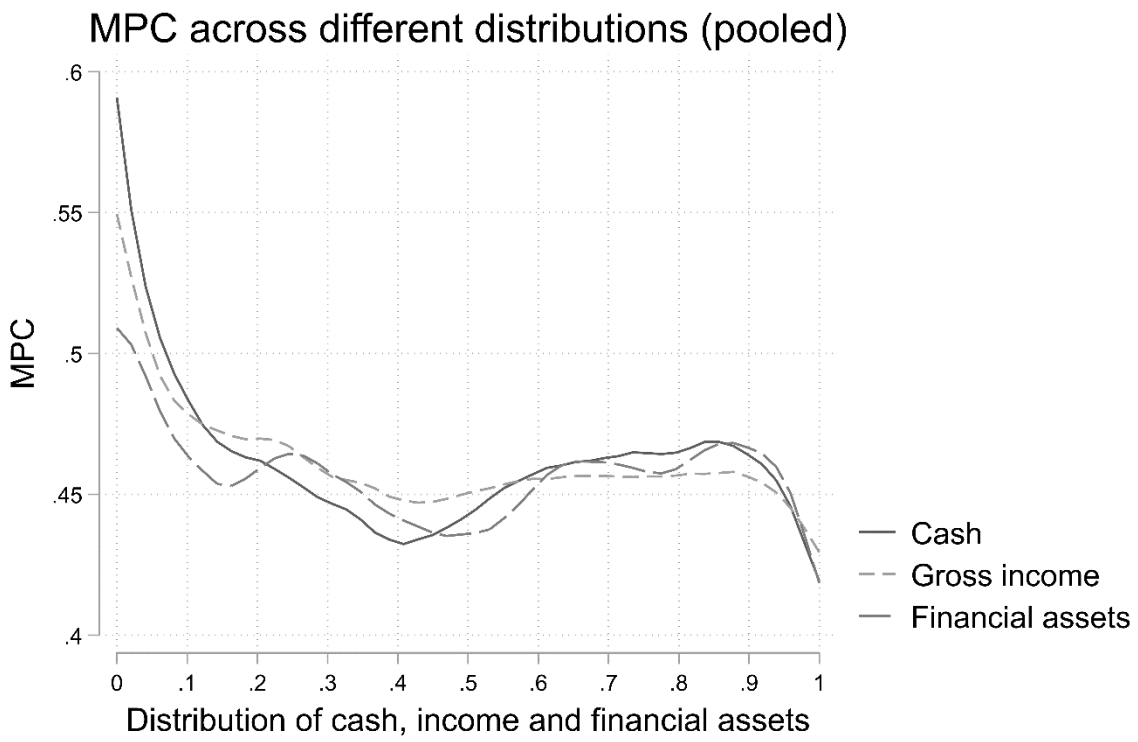


The MPC mean across the sample is 0.46. This is in line with the theoretical literature and models that use liquidity constraints, myopia or differences in household patience and discount factors to enable high values of the MPC, in contrast to standard consumption models. There is also slight variation throughout countries – the lowest average MPC is found in the Netherlands with 0.33, while the highest is in Lithuania with 0.57.

4.2 Conditional MPCs

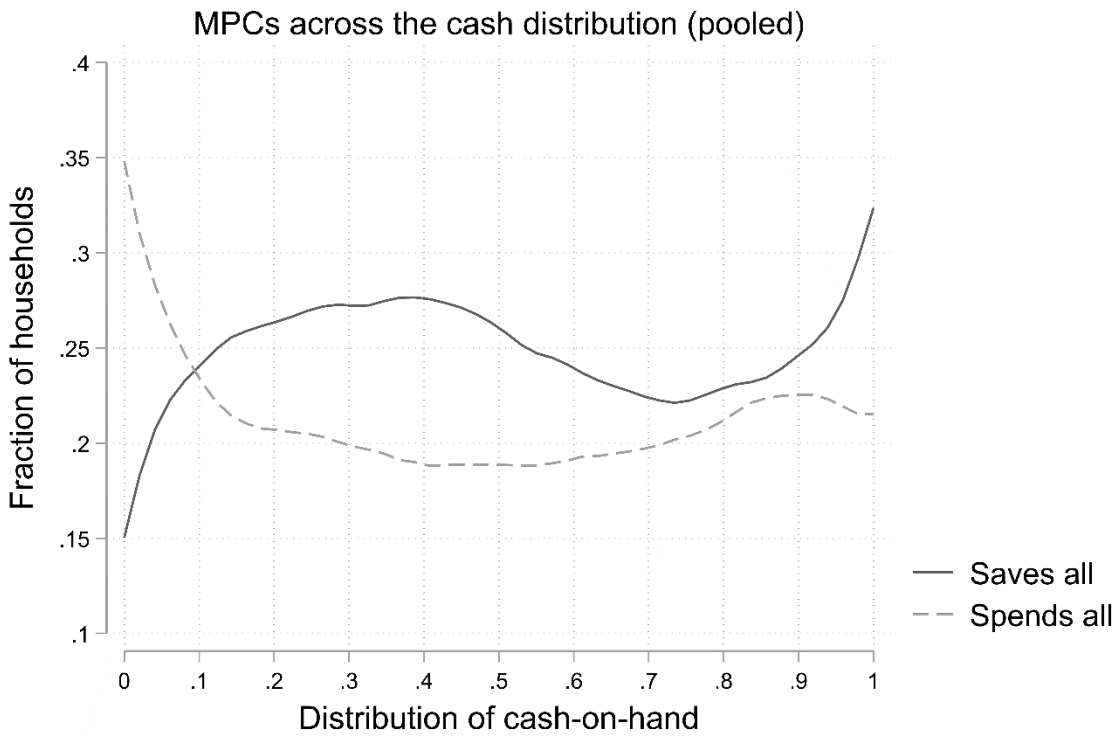
Next, we report the MPC across different percentiles of the household distribution regarding its asset holdings. Figure 2 reports the average MPC of different households regarding their cash holdings defined as the sum of their gross income and their financial assets. In line with the theoretical considerations regarding these three dimensions, a negative relationship can be observed for all three - the average MPC of household decreases with higher cash-on-hand holdings, with higher income and with higher holdings of financial assets. While for the lowest percentiles in terms of cash holdings this average MPC equals around 59%, it declines to around 42% for the households with the highest cash-on-hand. The decline in the polynomial function is the steepest when observing household MPC regarding their cash-on-hand holdings – pointing to the fact that liquid wealth is the most direct factor explaining differences in MPCs. This fact has been pointed out in numerous studies recently and has been used to discipline the new class of heterogeneous agents New Keynesian (HANK) models by introducing a two-asset structure of liquid and illiquid wealth. Such a framework has been found essential for models to replicate the relative differences in households MPCs across the two ends of the distribution (Kaplan, Moll and Violante 2018). In terms of the steepness of the reduction of MPCs along the distribution, the variation of MPCs is higher for gross income and the lowest along the distribution of financial assets. The steepness of the reduction is however lower than that reported in Jappelli and Pistaferri (2014), which evaluate and analyse only Italian data.

Figure 2. Average MPC by Cash-on-Hand Percentiles, Euro area, Third Wave of the HFCS



We also report how the share of respondents with an MPC of either 0 or 1 varies with the distribution of cash-on-hand. Figure 3 reports the share of households with an MPC = 0 (savers) and the share of households with a reported MPC=1 (spenders) along the distribution of cash-on-hand. As expected, the first fraction increases for richer households, which tend more often to be savers, while the second fraction decreases with an increasing cash-on-hand, as the highest spenders are concentrated in the lower percentiles. These figures only reiterate the main theoretical conclusions regarding the heterogeneity of consumption responses and therefore of MPCs along the distribution of household income and wealth, as well as that this heterogeneity is documented in terms of decreasing MPCs with higher household resources.

Figure 3: Fraction of Households reporting MPC = 0 (saves all) and MPC = 1 (spends all), Euro area, Third Wave of the HFCS



Furthermore, to understand better what is driving MPC heterogeneity we show descriptive statistics of MPCs, cash, income and financial assets by household characteristics in table 2.

Table 2: The distribution of the MPC in the Euroarea by socioeconomic characteristics

			MPC				Cash				Income				Financial assets			
Variable		Share in %	Mean	P10	P50	P90	Mean	P10	P50	P90	Mean	P10	P50	P90	Mean	P10	P50	P90
All households		100.0	0.46	0.00	0.50	1.00	91.6	12.9	47.0	186.6	42.1	9.9	30.8	83.1	50.7	0.2	10.3	113.4
Age (RP)																		
	0-24 years	2.5	0.44	0.00	0.50	1.00	36.2	6.1	20.8	60.1	19.9	3.2	14.3	41.5	16.6	0.2	2.7	23.1
	25-39 years	19.5	0.43	0.00	0.50	1.00	63.9	12.2	42.8	130.7	39.9	9.8	32.8	76.1	24.6	0.2	6.6	59.8
	40-59 years	38.8	0.45	0.00	0.50	1.00	103.1	15.0	55.8	211.1	50.7	11.9	37.9	98.3	53.6	0.2	12.0	126.6
	60+ years	39.2	0.49	0.00	0.50	1.00	96.2	12.3	43.9	195.4	35.4	9.5	26.0	69.2	62.3	0.3	13.0	135.1
Gender (RP)																		
	Male	62.2	0.46	0.00	0.50	1.00	103.6	15.3	55.1	207.5	47.2	12.0	36.1	90.5	57.6	0.4	12.9	129.0
	Female	37.8	0.46	0.00	0.50	1.00	71.9	10.2	35.5	148.1	33.7	7.9	23.9	68.4	39.3	0.2	7.6	87.7
Marital status (RP)																		
	Not married	49.5	0.46	0.00	0.50	1.00	67.2	9.9	33.5	137.0	30.8	7.6	22.9	60.1	37.4	0.2	7.0	85.7
	Married	50.5	0.46	0.00	0.50	1.00	115.6	19.0	63.0	230.1	53.2	14.9	42.0	99.5	63.6	0.5	15.3	143.6
Education (RP)																		
	Primary	15.9	0.44	0.00	0.50	1.00	44.4	8.8	24.5	80.8	22.0	7.2	17.6	40.8	23.4	0.1	4.0	48.0
	Lower Secondary	14.5	0.47	0.00	0.50	1.00	52.7	9.5	31.2	102.2	29.1	7.8	23.3	55.4	25.0	0.1	4.9	57.8
	Upper Secondary	40.7	0.48	0.00	0.50	1.00	80.4	14.6	47.9	162.6	40.6	11.1	32.4	74.4	40.4	0.3	10.0	95.6
	Tertiary	28.9	0.45	0.00	0.50	1.00	153.0	21.9	83.7	307.1	61.8	15.2	48.3	117.1	91.7	1.3	26.8	201.5
Household size																		
	1-person	34.6	0.47	0.00	0.50	1.00	60.1	9.0	29.2	125.0	25.4	6.5	19.5	47.0	35.8	0.1	7.0	85.2
	2-persons	31.6	0.47	0.00	0.50	1.00	111.0	16.6	58.8	222.9	46.2	12.8	36.4	86.9	66.1	0.5	15.9	151.5
	3-persons	15.4	0.45	0.00	0.50	1.00	98.5	17.2	54.9	195.0	51.4	14.0	40.2	95.9	48.0	0.3	10.0	102.0
	4+-persons	18.5	0.44	0.00	0.50	1.00	111.8	19.6	62.9	213.5	58.7	16.5	46.9	107.5	54.2	0.2	11.0	116.5
Ownership main residence																		
	Non-owner	39.7	0.46	0.00	0.50	1.00	57.9	10.3	31.6	115.3	32.3	8.0	24.0	62.5	26.5	0.1	4.5	59.5
	Owner	60.3	0.46	0.00	0.50	1.00	113.8	16.3	61.1	227.8	48.5	11.6	36.9	93.4	66.3	0.6	17.6	148.4
Debt participation		0.0																
	No	58.0	0.48	0.00	0.50	1.00	86.7	11.0	39.0	177.4	34.7	8.6	25.0	68.4	53.8	0.3	10.0	119.3
	Yes	42.0	0.43	0.00	0.50	1.00	98.4	17.2	57.7	194.9	52.2	14.0	41.3	97.5	46.6	0.2	10.8	105.2
Credit constrained																		
	No	93.2	0.46	0.00	0.50	1.00	95.1	13.2	49.1	192.8	42.8	10.0	31.4	84.2	53.5	0.3	11.6	120.0
	Yes	6.8	0.45	0.00	0.50	1.00	47.0	8.9	27.7	93.9	30.6	7.0	22.5	59.4	16.9	-	2.0	32.1
Cash																		
	First quintile	20.0	0.49	0.00	0.50	1.00	12.1	4.4	12.9	18.6	10.5	3.1	10.9	17.0	1.8	-	0.7	5.1
	Second quintile	20.0	0.45	0.00	0.50	1.00	27.3	21.3	27.1	33.9	22.3	14.4	22.4	30.2	5.1	0.1	3.0	12.9
	Third quintile	20.0	0.44	0.00	0.50	1.00	47.5	37.9	47.0	58.0	34.9	19.5	36.0	48.8	12.7	1.0	10.0	29.1
	Fourth quintile	20.0	0.46	0.00	0.50	1.00	83.7	64.2	81.6	106.4	51.7	25.9	51.8	77.5	32.0	5.2	29.1	62.9
	Fifth quintile	20.0	0.46	0.00	0.50	1.00	287.6	124.8	186.6	488.5	91.1	32.5	76.1	152.6	196.5	38.3	110.9	361.4
Income																		
	First quintile	20.0	0.49	0.00	0.50	1.00	20.8	4.4	12.9	34.9	9.0	2.3	9.9	14.1	12.8	0.0	1.9	27.7
	Second quintile	20.0	0.45	0.00	0.50	1.00	36.8	17.8	24.8	60.4	20.0	16.0	20.0	24.0	17.2	0.1	4.3	40.9
	Third quintile	20.0	0.45	0.00	0.50	1.00	62.9	28.9	41.1	113.1	31.1	26.1	30.8	36.8	32.0	0.5	9.3	81.9
	Fourth quintile	20.0	0.46	0.00	0.50	1.00	96.5	46.2	67.3	164.6	47.8	40.0	47.1	57.0	48.9	1.5	18.9	117.3
	Fifth quintile	20.0	0.45	0.00	0.50	1.00	241.5	78.6	144.5	434.3	102.7	63.3	83.2	152.7	139.0	5.0	52.5	281.2
Financial wealth																		
	First quintile	20.1	0.47	0.00	0.50	1.00	22.1	6.4	17.9	41.1	21.7	6.1	17.4	40.7	0.4	-	0.3	1.0
	Second quintile	20.2	0.45	0.00	0.50	1.00	33.5	12.4	27.7	60.7	30.3	9.7	24.6	57.4	3.2	1.5	3.0	5.2
	Third quintile	19.7	0.44	0.00	0.50	1.00	48.3	21.8	42.5	78.8	37.2	11.8	31.3	67.4	11.0	6.7	10.4	16.2
	Fourth quintile	20.0	0.46	0.00	0.50	1.00	81.7	44.7	75.3	125.5	48.6	15.9	41.5	88.0	33.1	20.1	31.0	49.6
	Fifth quintile	20.0	0.46	0.00	0.50	1.00	282.1	104.6	184.0	491.0	76.2	23.7	59.5	137.2	206.0	62.8	113.4	367.2
Real wealth																		
	First quintile	20.1	0.47	0.00	0.50	1.00	42.0	10.3	27.2	81.6	26.7	8.1	21.6	50.8	16.0	0.0	3.0	38.4
	Second quintile	19.9	0.45	0.00	0.50	1.00	56.9	10.1	35.0	116.9	32.0	8.0	24.8	62.2	25.5	0.2	6.3	62.9
	Third quintile	20.0	0.46	0.00	0.50	1.00	65.7	15.9	44.0	132.9	35.7	11.5	29.1	63.7	30.6	0.4	10.0	76.2
	Fourth quintile	20.0	0.45	0.00	0.50	1.00	99.9	25.0	69.9	197.7	48.2	17.0	41.9	85.6	52.4	1.5	20.7	125.5
	Fifth quintile	20.0	0.45	0.00	0.50	1.00	222.5	40.3	124.0	426.2	78.3	24.1	62.0	141.0	144.5	4.0	51.4	302.9
Net wealth																		
	First quintile	20.0	0.48	0.00	0.50	1.00	25.0	6.7	19.5	49.5	22.6	5.8	17.9	44.5	2.7	-	0.9	5.6
	Second quintile	20.0	0.45	0.00	0.50	1.00	42.9	12.5	37.2	79.1	30.9	8.7	25.6	58.2	12.1	0.4	8.1	30.6
	Third quintile	20.0	0.45	0.00	0.50	1.00	57.8	14.1	44.1	121.3	35.6	9.8	28.7	69.2	22.6	0.5	10.0	66.0
	Fourth quintile	20.0	0.46	0.00	0.50	1.00	85.5	22.6	67.2	169.8	46.3	14.6	37.7	86.0	39.6	1.5	22.0	103.8
	Fifth quintile	20.0	0.46	0.00	0.50	1.00	247.1	45.5	147.8	477.9	75.0	23.2	58.3	137.8	172.2	6.9	77.9	361.4

Source: Euroarea HFCS 2017
Notes: MPC as proportion; Cash, Income and Financial Assets in Euro thousands

Across our sample, the mean reported MPC is 0.46 and the median reported MPC is 0.50. Both the mean and median age of the household head[8] is 54 years. Mean cash holdings of the household are about 92,000 Euro, while the median cash holdings are much lower at around 47,000 Euro. The mean income of the households in the sample stands at around 42,000 Euro, while the median income at 31,000 Euro. The mean total financial assets (excluding public and occupational pensions plans) are around 51,000 Euro, while the median total financial assets are only at about 10,000 Euro. From the respondents, around 62% are male and 38% are female. The respondents are equally divided into married and not married individuals. Regarding the educational categories, around 16% have primary level of education and another 15% have lower secondary level of

[8] Throughout this paper we always use the Canberra definition of household head.

education; 40% of respondents have upper secondary education, while 29% have tertiary education. Note, that we provide this large table to inform macroeconomic models. It can not only be used to get a better understanding of the (conditional) distributions of the major variables across the population but also to develop or calibrate models based on these empirical distributions.

4.3 Predictive Effects

Using this sample of data, we then analyse the factors that can explain differences in MPCs of households by using a regression analysis with a Tobit model. The results with a baseline set of explanatory variables for the whole population are provided in Table 3, column 1. For this first specification, the correlation between MPCs and the dummy of being part of the lowest cash on hand quintile is statistically significant – households with the lowest cash on hand holdings tend to have 9 percentage points higher MPCs than the household in the highest quintile of cash-on-hand. MPCs correlate also significantly with being married and with the education category. Furthermore, household size signal that the reported MPC tends to be lower for larger households. These relations hold also on the level of most individual countries. Surprisingly, the results at the Euro area sample do not find that age explains higher MPCs, in contrast to the predictions of standard consumption models. Much more MPC is found to be roughly constant throughout the working life. One possible explanation is that bequest motives, survival risk or risk of large medical expenses lead elderly households to still save a large fraction of their windfall income similar to the one saved by young households.

We also ran several robustness checks. First, for the sample where the household reference person is below 60 years, so that we focus on people in the labour force for whom shocks are mostly related to shock to their income (in contrast to health shocks or bequest motives that are more related to the elderly). In table 3, column 2, we report the results of this smaller sample. We see that households in the first cash-on-hand quintile have on average 14 percentage points higher MPCs than the ones in the last quintile pointing to the stronger relevance of cash on hand in the working population. This is about half of the effect reported in Jappelli and Pistaferri (2014) for Italy alone – of a 30-percentage point decline in MPC when moving from the first to the fifth cash-on-hand quintile. Note however, that our country level regressions (see Annex) replicate the size of the effect measured by Jappelli and Pistaferri (2014) almost exactly with 0.28 (full sample) and 0.32 (RP age<60 sample).

Second, we also consider whether households are credit-constrained, which we can observe from a direct question asked in the survey. As is clear from the theoretical considerations, credit constrained households should have the highest MPCs. They cannot smooth out negative shocks by taking in debt and since they are credit constrained that means they live on the edge of their consumption requirements – which means they will significantly increase their spending after a positive income shock and can also spend the whole additional sum. Deaton (1991) points out that the distinction between credit constraints and precautionary savings might be difficult to make empirically. This is why the direct question asked in the HFCS about households being neglected access to credit is useful. The effect of the household answering that it has been denied borrowing from a financial institution on MPCs is however two-fold. On one hand, it should lead to high MPCs, since households are constrained today. On the other hand, it could also lead them to believe they will be constrained in the future, which increase their incentives for precautionary savings against future shocks, meaning lower MPCs. The results are reported in table 3, column 3, by adding to the regressions with cash-on-hand quintiles the variable that indicates whether the

household has been turned down. While the coefficient is negative, pointing towards the precautionary savings motive dominating when households have already been rejected credit from a financial institution, it is not statistically significant, and all other relevant relationships remain stable.

Third, we decompose cash-on-hand in its two main components – income and net financial assets and run the regression with the additional variables for household income, assets, and liabilities. Results are reported in Annex table A1.

Table 3: Main estimates of the Euroarea household-level MPCs

		(1) Full sample	(2) Age of RP<60	(3) FS liquidity contraint
	Age (RP)	-0.001	0.008	-0.000
		(0.002)	(0.006)	(0.002)
	Age squarred (RP)	0.000	-0.000	0.000
		(0.000)	(0.000)	(0.000)
	Female (RP)	-0.009	-0.017	-0.007
		(0.013)	(0.016)	(0.013)
	Married (RP)	0.040**	0.031*	0.042**
		(0.013)	(0.015)	(0.013)
Education (RP)	Lower secondary	0.102***	0.149***	0.105***
(Ref.cat.: Primary)		(0.020)	(0.028)	(0.021)
	Upper secondary	0.142***	0.154***	0.146***
		(0.017)	(0.027)	(0.017)
	Tertiary	0.108***	0.117***	0.111***
		(0.017)	(0.028)	(0.018)
	Household Size	-0.012*	-0.012*	-0.012*
		(0.006)	(0.006)	(0.006)
Cash-on-hand quintiles	First quintile	0.091***	0.142***	0.093***
(Ref. cat.: 5th quintile)		(0.021)	(0.024)	(0.021)
	Second quintile	-0.012	0.015	-0.012
		(0.020)	(0.023)	(0.020)
	Third quintile	-0.019	-0.021	-0.020
		(0.020)	(0.021)	(0.020)
	Fourth quintile	0.014	0.024	0.015
		(0.018)	(0.021)	(0.018)
	Credit contrained			-0.022
				(0.022)
	Constant	0.251***	0.075	0.241***
		(0.072)	(0.128)	(0.072)
	Residual variance	0.436***	0.382***	0.439***
		(0.009)	(0.011)	(0.009)
	N	58,038	33,768	57,381

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

4.4 Policy experiments

How does the heterogeneity of consumption responses to surprising income changes affect our standard evaluation of fiscal measures on the economy? In this subsection we analyse this question. The following policy experiments, which are replicating those of Jappelli and Pistaferri (2014) for Italy document how the fact that households have different MPCs affects the aggregate response of consumption to a set of different measures targeted either at the whole population or at specific groups, e.g. households with low cash-on-hand. The experiment used revolves around

stipulating some form of fiscal measure and analysing how the fact that MPCs vary relates to the overall consumption effect of the measure.

We start with the following experiment, reported in Table 4 for the euro area as a whole. The experiment consists of a transfer of 1% of the aggregate annual gross household income to the lowest 10% of households by giving them an equal, lump-sum transfer. This transfer is financed by issuing debt, therefore without imposing new taxes. The experiment is to calculate how much would aggregate consumption increase after this increase in income, given two different distributions of MPCs – one that is homogeneous and where the MPC of each household is given by the mean MPC, and another whether we take the MPCs actually reported by each household in the sample. In the first case, the aggregate MPC obviously is equal to the mean MPC of 0.46. This leads to an increase in consumption by 1.25%.

When we instead use the heterogeneous MPCs obtained by using the distribution of self-reported MPCs, the aggregate MPC is higher, as the lower income households have higher than average MPCs and equals 0.47. Thus, it leads to an increase in consumption by 1.29%. To compare this result, let us imagine the transfer is instead a lump-sum transfer to the highest income decile. The average MPC is then instead only 0.43 and leads to a consumption response of 1.16%. Comparing the two results, the consumption response is therefore 11% higher when the fiscal stimulus is targeted to the lowest income deciles instead of the highest income deciles.

Finally, we calculate how the MPC will be affected if the transfer goes only to households with at least 1 unemployed member. Interestingly then, the aggregate MPC is in line with the average one calculated above and equals to 0.45 and leads to a similar consumption growth of 1.22%

Table 4: Euroarea results of fiscal policy simulations: Transfers financed by debt

Transfer (1 percent of aggregate annual gross household income) to	MPC = ΔC / ΔY (1)	Aggregate consumption growth (2)
(a) bottom income decile (homogenous MPC)	0.46	1.25%
(b) bottom income decile	0.47	1.29%
(c) top income decile	0.43	1.16%
(d) unemployed	0.45	1.22%

Notes: The aggregate MPC and the estimated aggregate consumption growth in the economy in each of the following four scenarios are reported – 1. All MPCs are homogenous and equal the average MPCs in the sample as in a representative agent model; 2. MPCs are heterogeneous following the HFCS data and the fiscal transfer goes to the poorest 10%; 3. MPCs are heterogeneous, and the fiscal transfer goes to the richest 10%; 4. MPCs are heterogeneous, and the fiscal transfer goes to the unemployed.

The results for all individual countries in the sample are reported in Table A2 below. These back-of-the-envelope calculations can also be related to recent government policies implemented during the COVID-19 pandemic, where fiscal policy measures were very active. During the pandemic European governments opted for direct fiscal measures. In 2020, all EU member states experienced a deep and abrupt drop in economic performance. In response to this various aid

packages were adopted to help the private sector, households and households and companies during the during the crisis months. Pekanov (2020) reports that, based on IMF calculations, "additional expenditure and foregone government revenue" as a result of the crisis were in the range of 5.5% of GDP in the EU member states in 2020. According to the ECB, for a selected sample of Euro area countries, on average these packages accounted for a good 4% of GDP in 2020 (ECB 2020c). These were very significant fiscal policy packages, with also a redistributionary character. Let us assume that these were lump sum transfers with deficit financing, without imposing any new taxes, which most of these measures indeed were. We can thereby simulate the results of such measures. They could have two further implications in comparison to the simpler calculations above based on Jappelli and Pistaferri (2016).

Firstly, if the transfers are significant, they can also move households along the distribution of income. This has been noted in the case of the American fiscal stimulus, where the significant sums send via checks directly to households were in some cases higher in their amount than the traditional monthly income of households. This therefore lead to movements along the distribution of income.

Second, the pandemic was a very specific type of economic downturn, which had the unique dynamics of affecting some sectors much more deeply than others. Contact-intensive sectors were the most affected and in some of them the economic activity was halted completely for several months. In many of these contact-intensive sectors the predominant workers are younger, and jobs are less stable. Patterson (2020)[9] therefore documents that workers in contact-intensive industries, which were the most affected during the corona pandemic, had the highest MPCs.

We explore this phenomenon in our sample for two specific NACE sectors: one more contact-intensive sector (R: Arts, entertainment and recreation) and one less contact-intensive sector (K: Financial and insurance activities). We run a specific experiment for Austria – a transfer directed at either one or the other of these two specific sectors – to explore whether the more contact-intensive professions have higher MPCs and thus whether well targeted fiscal policy measures only directed at such sectors and jobs would have contributed to higher consumption responses and therefore fiscal multipliers. We find that this is indeed the case (see Table A3) – while the aggregated MPC for the members of the non contact-intensive sector K is a mere 0.40, the aggregated MPC for the contact-intensive sector R is much higher at 0.59. A fiscal transfer directed at the first sector will result in a multiplier of 1.17%, while the same transfer directed at the second sector results in a considerably higher multiplier of 1.70%. This example clearly shows the importance of well targeted fiscal and stimulus policies and how they can be used to maximize the macroeconomic benefits of government programmes in a crisis.

[9] https://equitablegrowth.org/the-most-exposed-workers-in-the-coronavirus-recession-are-also-key-consumers-making-sure-they-get-help-is-key-to-fighting-the-recession/

5. Household balance sheet data as a guide for heterogeneous agents macromodels

For a long time, the approach at the centre of the calibration exercise for models using a representative agent framework was to replicate and analyse the average or median income, capital or other variables in an economy. The first wave of models embedding household heterogeneity also firstly analysed whether using only average values of some specific key macroeconomic aggregates would suffice for a proper matching of household behaviour to the data. In a classical paper introducing heterogeneity in income risk, Krussell and Smith (1998) concluded that „the behaviour of the macroeconomic aggregates can be almost perfectly described using only the mean of the wealth distribution ". Since agents can accurately predict all relevant prices only given the mean of the wealth distribution, the other moments of wealth and income variables seem to become irrelevant, including the current income and wealth of households. These findings led many of the authors on heterogeneous agents models to the "presumption in the literature that the distribution does not matter in the determination of aggregates" (Krusell 2017).

When using household data to discipline macroeconomic models therefore, it is informative to start by looking at the average or the median of key variables to identify some important patterns and differences. The median value of key household variables can be thought of as the representative agent value of this variable. Table 5 presents detailed evidence on the median household income, liquid and illiquid wealth holdings and the overall portfolio composition of households at the median for the third wave of the HFCS. Income, defined as wages or replacement income (employee income, self-employment income, income from pensions and unemployment benefits), varies between 6,616 EUR and 7,769 euro for the median household respectively in Lithuania and Croatia up to 41,008 euro in Ireland, 41,411 Euro in the Netherlands, with the highest median household income of 65,000 Euro recorded in Luxembourg. In terms of savings, median net wealth varies from 20,477 Euro in Latvia, 36,283 Euro in Hungary and up to much higher levels in Cyprus (195,852 Euro), Belgium (212,450 Euro), Malta (236,052 Euro) and Luxembourg (498,454 Euro). Notably here, the median net worth in Germany (70,780 Euro) and the Netherlands (67,427 Euro) is relatively low – lower by almost a half than e.g. in Spain (119,774 Euro) and Italy (132,266 Euro).

Table 5: Household income, Liquid and Illiquid Wealth Holdings, Portfolio Composition, HFCS 3. Wave (Part 1)

	AT		BE		CY		DE		EE		ES	
Variable	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.
Wages or replacements income	39,040	0.990	39,700	0.957	22,956	0.952	36,746	0.965	15,205	0.984	22,840	0.983
Net wealth	82,681	0.991	212,450	0.992	195,852	0.978	70,780	0.985	47,724	0.994	119,774	0.990
Net liquid assets	12,937	0.983	12,269	0.975	439	0.790	6,960	0.965	1,364	0.979	3,507	0.971
Deposits	12,724	0.961	10,857	0.960	1,000	0.657	7,700	0.925	1,918	0.964	5,000	0.942
Shares, publicly traded	0	0.050	0	0.098	0	0.138	0	0.108	0	0.044	0	0.116
Bonds	0	0.026	0	0.029	0	0.012	0	0.031	0	0.004	0	0.004
Credit line/overdraft and credit card debt	0	0.122	0	0.115	0	0.235	0	0.150	0	0.271	0	0.100
Net illiquid assets	50,247	0.877	181,540	0.899	182,672	0.941	43,000	0.884	41,900	0.888	107,406	0.941
Real estate net of mortgages	16,031	0.511	150,700	0.723	139,696	0.749	0	0.495	36,920	0.798	92,274	0.807
Public and occupational pension plans	0	0.074	0	0.193	0	0.033	0	0.235	2,250	0.613	0	0.055
Voluntary pension/whole life insurance	0	0.123	0	0.429	0	0.240	0	0.432	0	0.185	0	0.234

Source: Euroarea HFCS 2017

Table 5: Household income, Liquid and Illiquid Wealth Holdings, Portfolio Composition, HFCS 3. Wave (Part 2)

	FI		FR		GR		HR		HU		IE	
Variable	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.
Wages or replacements income	37,670	0.988	28,630	0.952	18,417	0.959	7,769	0.874	9,712	0.984	41,008	0.957
Net wealth	107,207	0.995	117,551	1.000	60,036	0.986	61,472	0.983	36,283	0.970	179,090	0.985
Net liquid assets	3,953	0.988	5,327	0.990	500	0.915	0	0.767	318	0.785	2,950	0.936
Deposits	5,000	0.978	6,709	0.980	615	0.904	112	0.636	387	0.743	4,261	0.918
Shares, publicly traded	0	0.210	0	0.113	0	0.009	0	0.047	0	0.012	0	0.103
Bonds	0	0.010	0	0.009	0	0.001	0	0.004	0	0.058	0	0.072
Credit line/overdraft and credit card debt	0	0.181	0	0.053	0	0.047	0	0.297	0	0.099	0	0.181
Net illiquid assets	94,028	0.861	103,553	1.000	56,086	0.926	61,531	0.942	33,178	0.928	168,900	0.959
Real estate net of mortgages	80,970	0.700	71,205	0.623	50,000	0.783	56,700	0.868	32,400	0.867	142,640	0.712
Public and occupational pension plans	0	0.000	0	0.051	0	0.000	1,787	0.571	0	0.000	0	0.178
Voluntary pension/whole life insurance	0	0.297	0	0.384	0	0.003	0	0.056	0	0.161	0	0.150

Source: Euroarea HFCS 2017

Table 5: Household income, Liquid and Illiquid Wealth Holdings, Portfolio Composition, HFCS 3. Wave (Part 3)

	IT		LT		LU		LV		MT		NL	
Variable	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.
Wages or replacements income	24,090	0.965	6,616	0.846	65,000	0.977	9,338	0.989	23,178	0.986	41,411	0.946
Net wealth	132,266	0.983	45,880	0.994	498,454	0.996	20,477	0.965	236,052	0.991	67,427	0.994
Net liquid assets	5,000	0.868	432	0.894	16,380	0.973	47	0.900	15,875	0.967	14,679	0.988
Deposits	5,000	0.834	500	0.889	18,640	0.954	188	0.877	12,000	0.963	13,543	0.980
Shares, publicly traded	0	0.031	0	0.010	0	0.078	0	0.004	0	0.099	0	0.046
Bonds	0	0.100	0	0.007	0	0.014	0	0.001	0	0.217	0	0.006
Credit line/overdraft and credit card debt	0	0.047	0	0.139	0	0.109	0	0.046	0	0.154	0	0.112
Net illiquid assets	121,500	0.964	44,582	0.968	456,100	0.945	20,129	0.861	196,800	0.952	36,806	0.869
Real estate net of mortgages	105,000	0.705	40,000	0.941	418,200	0.746	19,842	0.783	175,001	0.834	0	0.586
Public and occupational pension plans	0	0.079	0	0.264	41,800	0.765	1,627	0.710	0	0.000	0	0.000
Voluntary pension/whole life insurance	0	0.082	0	0.090	0	0.178	0	0.218	0	0.191	0	0.263

Source: Euroarea HFCS 2017

Table 5: Household income, Liquid and Illiquid Wealth Holdings, Portfolio Composition, HFCS 3. Wave (Part 4)

	PL		PT		SI		SK	
Variable	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.	Uncond. median	Pos. frac.
Wages or replacements income	12,915	0.982	16,698	0.975	15,694	0.926	15,043	0.985
Net wealth	60,479	0.978	74,780	0.982	91,555	0.989	70,302	0.987
Net liquid assets	1,501	0.871	2,449	0.963	500	0.907	1,374	0.912
Deposits	1,800	0.839	3,000	0.958	800	0.839	1,625	0.886
Shares, publicly traded	0	0.023	0	0.039	0	0.059	0	0.018
Bonds	0	0.008	0	0.012	0	0.005	0	0.008
Credit line/overdraft and credit card debt	0	0.156	0	0.086	0	0.171	0	0.064
Net illiquid assets	55,023	0.934	68,354	0.912	88,580	0.945	64,982	0.959
Real estate net of mortgages	46,259	0.822	57,272	0.781	80,000	0.802	57,397	0.901
Public and occupational pension plans	6,704	0.976	0	0.019	0	0.141	0	0.353
Voluntary pension/whole life insurance	0	0.386	0	0.132	0	0.153	0	0.155

Source: Euroarea HFCS 2017

Recent findings and developments from the HANK literature however disprove the thesis that replicating the average or median („representative agent ") value of key variables suffices for a proper macroeconomic analysis. The new line of Heterogeneous Agents New Keynesian (HANK) model makes use of distributional evidence on household portfolios, consumption behaviour and incomes to give a more realistic picture of how macroeconomic aggregates respond to shocks and policy changes. HANK models extend the mainstream New Keynesian model by focusing mainly on the consumption response to interest rate changes. An exogenous stochastic process for labour earnings in these types of models is the source of earnings inequality. The monetary policy

transmission mechanism is affected in HANK by amending consumption behaviour so that the model replicates heterogeneous MPCs of households, earnings inequality between different household types and percentiles and heterogenous household balance sheets. Kaplan, Moll and Violante (2018) point out that the empirically documented heterogeneity of household MPCs is essential for replicating realistic consumption responses to macroeconomic shocks.

To replicate such heterogeneous MPCs however it is necessary to introduce a well detailed household portfolio, and households choose how to save their accumulated wealth– as liquid or illiquid assets. Broadly defined, liquid assets are those that can relatively easily be used as source of liquidity. There is a wedge in the interest rate between the two since illiquid assets bring higher returns but at the cost of convenience. Illiquid assets are such that involve significant transaction costs. Illiquid assets cannot be used immediately in the face of shocks to provide consumption smoothing so agents that have most of their wealth in illiquid assets are susceptible to small income shocks. This translates furthermore into strong effects from policies that increase transitory the income of these households, since this increased income is used for consumption right away. This resonates closely with the idea of (Muellbauer 2007, Muellbauer and Hendry 2017) about the different "spendability" of different asset types and how this affects the marginal propensity to consume.

This heterogeneity thus affects the transmission mechanism of monetary policy. In representative agent models, the responses to monetary policy shocks are mostly transmitted via the direct interest rate channel, which affects output, consumption, and investment through the intertemporal substitution channel, whereas in HANK the effects tend to be more differentiated. While changes to the real interest rate still affect the intertemporal substitution, they do not really influence the decisions of hand-to-mouth agents – those that do not possess liquid assets and therefore cannot pursue consumption smoothing anyways, but consume all of their available income.[10] For those liquidity constrained agents the increase in wages and income coming from an aggregate demand impulse has a more important effect, as their MPC is higher.[11] To obtain consumption responses of households at the microeconomic level, the authors then need to generate a realistic distribution of liquid and illiquid assets. Essentially, the skewness of liquid wealth holdings has direct quantitative relevance – the households with low or no liquid wealth have a high sensitivity of consumption to income changes, as they or are very close to being Keynesian, hand-to-mouth consumers. Both the fraction of poor hand-to-mouth consumers and their aggregate liquid wealth therefore influence the overall consumption response to monetary policy. On the other side of the distribution, the households at the top of the liquid wealth distribution are also affected by monetary policy interventions – there the redistributive effects of interest rate changes are the strongest since these are the households with the most interest rate sensitive assets. The HFCS is a detailed database for the euro area which provides details on the complicated balance sheets of the household sector and can be used to discipline HANK models.

Given the two types of assets, the modeller then needs to both match the aggregate holdings of both types of assets in the economy to some macro aggregate such as GDP, but also to match some inequality measures such as a Gini coefficient or the wealth holdings of the bottom 50% or the top 10%. By doing so, the modeller aims to have different types of households represented in

[10] Monetary policy has another, yet indirect and sometimes small effect on Ricardian agents – the second-round general equilibrium effect coming from boosting output and thus wages and incomes.

[11] As Ampudia, Georgarakos, et al. (2018) point out, the boost in output itself results in increased employment, which again benefits mostly the bottom of the income distribution, which is under the highest probability of being unemployment, but also of then being employed during a recovery.

a weight similar to the real empirical distribution of income and wealth since these different types of households have different consumption behaviour and affect aggregate consumption behaviour.

Based on the definition by Kaplan, Moll, and Weidner (2014), which are the first to introduce this distinction of assets for macroeconomic modelling purposes, we define net liquid assets as including the holdings of deposits, mutual funds, bonds, the value of non-self-employment private business, publicly traded shares, managed accounts minus the outstanding balance of credit line/overdraft, and the outstanding balance of credit card debt. Moreover, net illiquid assets include total real assets, money owed to households, other financial assets, voluntary pension/whole life insurance minus the outstanding balance of mortgage debt and the outstanding balance of non-mortgage loans. Table 5 above also provides the median values for the liquid wealth (net liquid assets) and illiquid wealth (net illiquid assets) of households.

We therefore look at the holdings of liquid and illiquid wealth of households. First, looking at the median values for net liquid and net illiquid assets we see significant variation across the HFCS countries, similar to the one in income and net wealth. Median net liquid assets start from very low levels at 47 Euro in Latvia, 318 Euro in Hungary and go up to considerably higher levels – 14,679 Euro in the Netherlands, 15,875 Euro in Malta, 16,380 Euro in Luxembourg. Notably, the median net liquid asset holdings in Croatia are 0. Median net illiquid assets vary from 20,129 Euro in Latvia and 36,806 Euro in the Netherlands and up to considerably higher levels – 181,540 Euro in Belgium, 182,672 Euro in Cyprus and 456,100 Euro in Luxembourg. In all countries net liquid wealth is a small share both of income and of net worth for the median household. The median holdings of directly held bonds, directly held stocks, retirement accounts and life insurance are essentially zero everywhere.

Notably, median net illiquid assets are relatively low in some countries with very high incomes – in the Netherlands (36,806 Euro), Germany (43,000 Euro) and Austria (50,247 Euro). This phenomenon is driven by low homeownership rates in these countries and particularly in this case by the fact that the median household in both the Netherlands and Germany does not own a house and their real estate net of mortgages is 0. This was the case also for Austria in the second wave of the HFCS, but is not the case in the third wave, where median real estate net of mortgages amounts to 16,031 Euro.

In all other countries in the sample, the median real estate net of mortgages is considerable, and this constitutes a large part of both the net worth and of the net illiquid assets of a median household. This points to one stark contrast in household balance sheets of the median household in countries with low home ownership rate such as Austria, Germany, and the Netherlands and those with high home ownership. For example, the median real estate net of mortgages in Austria (16,031 Euro) is multiple times lower than the median real estate net of mortgages even in the income poorest country in the sample – Lithuania, where it stands at 40,000 Euro.

Finally, comparing the median values, net wealth is multiple times higher than median household income in all countries. The median net worth to median income varies across the countries from below 2 in Germany and the Netherlands to the more often observed value of between 3 and 6 to the countries where it exceeds 8 such as Cyprus, Luxembourg, and Malta.

Beyond the individual household statistics such as the mean or the median of household variables, overall macroeconomic effects are generated mainly from the macroeconomic aggregates and their volume in relation to GDP, income, or consumption. This is why Kaplan, Moll and Violante

(2018) discipline their model by choosing parameters that would ensure a match of certain key macroeconomic aggregates to the data – such as the relation of liquid wealth to output and illiquid wealth to output. Calculating such moments for all euro area Member States is therefore of practical relevance for users of HANK models focused on euro area countries. In Kaplan, Moll, and Weidner (2018), the mean liquid assets to annual GDP ratio is reported to be 26% for the US given the data from the Survey of Consumer Finance 2004, while the ratio of mean illiquid assets to annual GDP is more than tenfold higher - at around 292%. For comparison, Table 6 below reports the same ratios for our dataset of HFCS countries.

Table 6: Aggregate Asset Holdings in Relation to GDP per Capita

Country	Net liquid assets to GDP per capita in %	Net illiquid assets to GDP per capita in %	Net wealth to GDP per capita in %
AT	77.5	518.4	595.9
BE	184.4	751.5	935.9
CY	64.6	2,050.1	2,114.7
DE	91.7	497.2	588.9
EE	60.3	557.2	617.5
ES	157.1	874.9	1,032.0
FI	83.4	438.6	522.0
FR	75.8	631.2	706.9
GR	29.3	532.1	561.4
HR	16.1	923.5	939.5
HU	63.9	498.6	562.5
IE	61.5	481.0	542.5
IT	86.1	654.3	740.3
LT	18.0	603.4	621.4
LU	103.8	805.5	909.3
LV	5.9	303.8	309.7
MT	204.4	1,528.1	1,732.4
NL	142.3	289.3	431.6
PL	60.1	804.5	864.6
PT	94.3	758.9	853.2
SI	30.1	663.1	693.2
SK	42.2	622.4	664.6

Source: Euroarea HFCS 2017

Note: Variable definitions according to the ones used by the ECB/HFCN.

This exercise is useful to compare how much of the savings and therefore capital in an economy is in a liquid form and can be used by households for consumption smoothing and what share of their savings is invested in illiquid assets, which are not easily used as a reaction to shocks. The ratio of mean liquid assets to GDP per capita varies between a mere 5.9% in Latvia and 29.3% in Greece to well above 150% of GDP in the case of Spain (157.1%), Belgium (184.4%) and Malta (204.4%). As discussed, countries with low liquid assets to GDP are countries with households that are poor on liquid assets on average meaning that these households respond more in their

consumption to shocks. Vice versa, in countries where household are rich on liquid assets, we should expect lower consumption multipliers to unexpected shocks or policy interventions.

The ratio of mean illiquid assets to GDP per capita varies between 289.3% in the Netherlands and 303.8% in Latvia to much higher levels in countries with high homeownership rates in Eastern Europe where it varies between 600% and 900% of GDP and goes to even higher levels in countries with large holdings of real estate related to the tourist sector such as Spain (874.9%), Croatia (923.5%), Malta (1528.1%) and Cyprus (2050.1%). The ratio of mean illiquid to mean liquid assets is between 5 and 10 in most countries but increases above 10 in countries with high homeownership rates in Eastern Europe and reaches very high levels where households have low liquid assets, but large illiquid holdings – such as in Greece, Croatia, Lithuania, Slovenia, Cyprus, and Latvia. The implications from the HANK literature are that in these countries, aggregate demand impulses – whether from monetary or from fiscal policy, should be much larger, as the savings of households are invested in illiquid assets, which cannot be easily used for consumption smoothing or to react to unexpected macroeconomic or idiosyncratic shocks. And vice versa – in countries such as Austria, Germany, and the Netherlands, with relatively low ratios of illiquid to liquid wealth, households have on average more liquid savings in relation to the size of the economy, which can be used as a buffer in case of need. These statistics are therefore useful both as a comparison between different countries for applied policy implications, as well as for users of HANK models for the exact calibration and disciplining of HANK models for individual countries.

6. Conclusions

In this paper, we document and analyse the heterogeneity of household marginal propensity to consume using the third wave of the Eurosystem Household Finance and Consumption Survey. It provides us with a unique answer to a hypothetical question about spending outcomes after a surprising and transitory positive income shock. We report and document the MPCs across the countries that are part of the study.

We find that in the countries in our sample, the mean reported MPC is 0.46 and the median reported MPC is 0.50. It also varies throughout countries – the lowest average MPC is found in the Netherlands – 33% while the highest is in Lithuania –57%. In line with theory, it also varies with household income and assets. A negative relationship can be observed for all three main dimensions - the average MPC of household decreases with higher cash-on-hand holdings, with higher income and with higher holdings of financial assets. While for the lowest percentiles in terms of cash holdings this average MPC equals around 59%, it declines to around 42% for the households with the highest cash-on-hand. The decline in the polynomial function is the steepest when observing household MPC regarding their cash-on-hand holdings – pointing to the fact that liquid wealth can be seen as a main factor explaining differences in MPCs.

Furthermore, we analyse the factors behind the heterogeneity of the intended MPCs. First, there is a clear and strong relationship between MPCs and financial resources of households. Both along the income distribution and along the wealth distribution, poorer households have on average considerably higher MPCs, as expected from theory. This is most clearly the case when looking at holdings of liquid wealth. Other characteristics such as age, marital status or education of the household reference person are also analysed. MPCs (positively) correlate significantly with being married and with the education category. However, they are found to be roughly constant throughout the working life, suggesting the importance of health risks and bequest motives in shaping consumption decisions.

Finally, we analyse how redistribution and tax policies are affected by the fact that households have different MPCs, and these differences systematically vary along some specific household characteristics. We explore how is the effectiveness of fiscal policy – in terms of the aggregate MPC and the aggregate consumption responses – affected from a specific policy in the case of MPC homogeneity and in the case of MPC heterogeneity, such as the one observed in our data. We find that a debt-financed increase in transfers of 1 percent of aggregate gross household income in the euro area targeted to the bottom decile of income distribution would increase aggregate consumption by 1.29 percent (11 percentage points more than when targeted to the top decile of the income distribution).

We furthermore explore an additional experiment, where the same fiscal transfer is given to either of one groups – to the members of households working in a contact intensive sector and to those that work in a less contact-intensive sector. The difference between the mean MPC in the two sectors – 0.40 in the Financial services sector versus the much higher mean MPC of 0.59 in the Arts sector results in a significantly more efficient fiscal stimulus. The multiplier increases from 1.17% to 1.70% if the fiscal transfer is correctly targeted to the high MPC sector of the economy. This has important implications for the optimal targeting of government measures in future crises when fiscal stimulus is again needed.

Literature:

Aiyagari, S. Rao (1994): Uninsured Idiosyncratic Risk and Aggregate Saving, Quarterly Journal of Economics, 109, 659-684.

Auclert, Adrien (2019): Monetary Policy and the Redistribution Channel, American Economic Review, 109(6), 2333-67.

Adrien Auclert & Bence Bardóczy & Matthew Rognlie & Ludwig Straub, 2021. "Using the Sequence-Space Jacobian to Solve and Estimate Heterogeneous-Agent Models," Econometrica, Econometric Society, vol. 89(5), pages 2375-2408, September.

Bewley, Truman (1983): A Difficulty with the Optimum Quantity of Money, Econometrica, 51(5), 1485-504.

Blundell, Richard, Luigi Pistaferri, and Ian Preston. 'Consumption Inequality and Partial Insurance'. American Economic Review 98, no. 5 (December 2008): 1887–1921. https://doi.org/10.1257/aer.98.5.1887.

Cloyne, James, Clodomiro Ferreira, and Paolo Surico (2019): Monetary Policy when Households Have Debt: New Evidence on the Transmission Mechanism, Review of Economic Studies, Forthcoming.

Crawley, Edmund and Kuchler, Andreas, Consumption Heterogeneity: Micro Drivers and Macro Implications (January 2020). FEDS Working Paper No. 2020-5, Available at SSRN: https://ssrn.com/abstract=3881608 or http://dx.doi.org/10.17016/FEDS.2020.005

Drescher, K., Fessler, P. and Lindner, P. (2020). Helicopter Money in Europe: New Evidence on the Marginal Propensity to Consume across European Households. Economics Letters.

Fagereng, Andreas, Martin B. Holm, and Gisle J. Natvik (2016): MPC Heterogeneity and Household Balance Sheets, Discussion Paper, Statistics Norway, Research Department.

European Central Bank (2020a), The Household Finance and Consumption Survey: results from the third wave, Statistical Paper Series, March 2020, European Central Bank,

European Central Bank (2020b), Methodological Report, Statistical Paper Series, March 2020, European Central Bank.

European Central Bank (2020c), Public loan guarantees and bank lending in the COVID-19 period, ECB Economic Bulletin, 2020, (6).

Galí, Jordi, López-Salido, David and Valles, Javier, (2007), Understanding the Effects of Government Spending on Consumption, Journal of the European Economic Association, 5, issue 1, p. 227-270, https://EconPapers.repec.org/RePEc:tpr:jeurec:v:5:y:2007:i:1:p:227-270.

Gelman, Michael (2016): What Drives Heterogeneity in the Marginal Propensity to Consume? Temporary Shocks vs Persistent Characteristics, Working Paper.

Huggett, Mark (1993): The risk-free rate in heterogeneous-agent incomplete-insurance economies, Journal of Economic Dynamics and Control, 17(5), 953 - 69.

Imrohoroglu, Ayse (1989): Cost of Business Cycles with Indivisibilities and Liquidity Constraints, Journal of Political Economy, 97(6), 1364-83.

Jappelli, Tullio, and Luigi Pistaferri (2014): Fiscal Policy and MPC Heterogeneity, American Economic Journal: Macroeconomics, 6(4), 10736.

Jappelli, Tullio, and Luigi Pistaferri. 'Fiscal Policy and MPC Heterogeneity'. American Economic Journal: Macroeconomics 6, no. 4 (October 2014): 107–36. https://doi.org/10.1257/mac.6.4.107.

Johnson, David S., Jonathan A. Parker, and Nicholas S. Souleles. 'Household Expenditure and the Income Tax Rebates of 2001'. American Economic Review 96, no. 5 (December 2006): 1589–1610. https://doi.org/10.1257/aer.96.5.1589.

Kaplan, G. and G. L. Violante. "Microeconomic Heterogeneity and Macroeconomic Shocks". In: Journal of Economic Perspectives 32.3 (2018), pp. 167–194

Kaplan, Greg, Benjamin Moll, and Giovanni L. Violante (2018): Monetary Policy According to HANK,American Economic Review, 108(3), 697-743.

Kaplan, G., G. L. Violante, and J.Weidner. "The Wealthy Hand-to-Mouth". In: Brookings Papers on Economic Activity, (2014), pp. 77–153

Krusell, P. (2017), "AKMWW: a weapon of Mass Creation?", comment on Ahn, Kaplan, Moll, Winberry and Wolf (2017) "When inequality matters for Macro and Macro matters for Inequality", NBER Macroeconomics Annual.

Krusell, P. and Jr. A. A. Smith. "Income and Wealth Heterogeneity in the Macroeconomy". In: Journal of Political Economy, 106.5 (1998), pp. 867–96

Marcus Hagedorn & Iourii Manovskii & Kurt Mitman, 2019. "The Fiscal Multiplier," NBER Working Papers 25571, National Bureau of Economic Research, Inc.

Muellbauer, J. N. "Housing, credit and consumer expenditure". In: Proceedings – Economic Policy Symposium - Jackson Hole, Federal Reserve Bank of Kansas City, (2007), pp. 267–334

Muellbauer, J. N. and D. Hendry. "The future of macroeconomics: Macro theory and models at the Bank of England". In: Oxford Review of Economic Policy, 34.1-2 (2017), pp. 287–328

Parker, Jonathan A. 'The Reaction of Household Consumption to Predictable Changes in Social Security Taxes'. American Economic Review 89, no. 4 (September 1999): 959–73. https://doi.org/10.1257/aer.89.4.959.

Parker, Jonathan A, Nicholas S Souleles, David S Johnson, and Robert McClelland (2013): Consumer Spending and the Economic Stimulus Payments of 2008, American Economic Review, 103(6), 530-53.

Pekanov, A. (2021). Europäische Wirtschaftspolitik in der COVID-19-Krise. Zwischen Rettungspaketen und Maßnahmen zur Konjunkturbelebung. WIFO-Monatsberichte, 94(3), 193–203. http://www.wifo.ac.at/wwa/pubid/67037

Sahm, Claudia R., Matthew D. Shapiro, and Joel Slemrod. 2010. "Household Response to the 2008 Tax Rebates: Survey Evidence and Aggregate Implications." In Tax Policy and the Economy, Vol. 24, edited by Jeffrey R. Brown, 69–110.

Shapiro, Matthew D., and Joel Slemrod. 'Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding'. The American Economic Review 85, no. 1 (1995): 274–83.

Shapiro, Matthew D., and Joel Slemrod. 2003. "Did the 2001 Tax Rebate Stimulate Spending? Evidence from Taxpayer Surveys." In Tax Policy and the Economy, Vol. 17, edited by James M. Poterba, 83–110. Cambridge, MA: MIT Press.

Souleles, Nicholas S. 1999. "The Response of Household Consumption to Income Tax Refunds." American Economic Review 89 (4): 947–58.

Souleles, Nicholas S. 2002. "Consumer Response to the Reagan Tax Cuts." Journal of Public Economics 85 (1): 99–120.

Appendix

Table A1: Estimates of the Euroarea MPC taking into account income, financial assets and debt

		Full Sample
	Age (RP)	0.001
		(0.002)
	Age squarred (RP)	0.000
		(0.000)
	Female (RP)	-0.010
		(0.013)
	Married (RP)	0.043**
		(0.013)
Education (RP)	Lower secondary	0.098***
(Ref.cat.: Primary)		(0.019)
	Upper secondary	0.140***
		(0.017)
	Tertiary	0.106***
		(0.017)
	Household Size	-0.008
		(0.006)
Gross income quintiles	First quintile	0.069**
(Ref. cat.: 5th quintile)		(0.022)
	Second quintile	-0.004
		(0.022)
	Third quintile	-0.009
		(0.018)
	Fourth quintile	0.005
		(0.018)
Financial wealth quintiles	First quintile	-0.018
(Ref. cat.: 5th quintile)		(0.020)
	Second quintile	-0.032
		(0.020)
	Third quintile	-0.058**
		(0.018)
	Fourth quintile	-0.016
		(0.017)
	Homeowner	-0.021
		(0.012)
	Has debt	-0.075***
		(0.013)
	Constant	0.303***
		(0.072)
	Residual variance	0.434***
		(0.009)
	N	58,038

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A2: Country results of fiscal policy simulations: Transfers financed by debt

	Transfer (1 percent of aggregate household gross income) to	AT	BE	CY	DE	ES	FR	GR	HR	IE
MPC = ΔC / ΔY	(a) bottom income decile (homogenous MPC)	0.47	0.42	0.44	0.51	0.41	0.42	0.57	0.56	0.52
	(b) bottom income decile	0.53	0.39	0.45	0.53	0.44	0.39	0.63	0.47	0.46
	(c) top income decile	0.46	0.40	0.44	0.46	0.43	0.47	0.55	0.45	0.48
	(d) unemployed	0.49	0.37	0.43	0.54	0.39	0.37	0.60	0.58	0.56
Aggregate consumption growth	(a) bottom income decile (homogenous MPC)	1.35%	1.14%	0.95%	1.85%	0.96%	1.04%	1.06%	0.80%	1.44%
	(b) bottom income decile	1.55%	1.05%	0.98%	1.90%	1.01%	0.97%	1.18%	0.68%	1.27%
	(c) top income decile	1.34%	1.07%	0.95%	1.66%	1.00%	1.16%	1.02%	0.64%	1.31%
	(d) unemployed	1.42%	1.01%	0.94%	1.93%	0.89%	0.91%	1.12%	0.84%	1.52%

	Transfer (1 percent of aggregate household gross income) to	IT	LT	LU	LV	MT	NL	PT	SI	SK
MPC = ΔC / ΔY	(a) bottom income decile (homogenous MPC)	0.48	0.57	0.37	0.51	0.49	0.33	0.33	0.49	0.54
	(b) bottom income decile	0.60	0.44	0.40	0.57	0.57	0.16	0.35	0.58	0.55
	(c) top income decile	0.40	0.52	0.34	0.35	0.39	0.27	0.28	0.39	0.57
	(d) unemployed	0.57	0.44	0.32	0.54	0.54	0.22	0.40	0.58	0.56
Aggregate consumption growth	(a) bottom income decile (homogenous MPC)	0.96%	0.90%	0.99%	0.99%	1.29%	1.30%	0.75%	0.97%	1.13%
	(b) bottom income decile	1.20%	0.72%	1.05%	1.09%	1.49%	0.67%	0.79%	1.17%	1.14%
	(c) top income decile	0.79%	0.79%	0.91%	0.67%	1.03%	1.02%	0.63%	0.79%	1.19%
	(d) unemployed	1.14%	0.70%	0.85%	1.04%	1.42%	0.88%	0.91%	1.16%	1.18%

Notes: The first four rows report the aggregate MPC in the four different scenarios – 1. All MPCs are homogenous and equal the average MPCs in the sample as in a representative agent model; 2. MPCs are heterogeneous following the HFCS data and the fiscal transfer goes to the poorest 10%; 3. MPCs are heterogeneous, and the fiscal transfer goes to the richest 10%; 4. MPCs are heterogeneous, and the fiscal transfer goes to the unemployed

The second four rows report the estimated aggregate consumption growth in the economy in each of these four scenarios.

Table A3: Extra experiment for Austria - transfer to specific sector / job group

Transfer (1 percent of aggregate annual gross household income) to	MPC = ΔC / ΔY (1)	Aggregate consumption growth (2)
(1) households with at least 1 member working in NACE sector K: Financial and insurance activities	0.40	1.17%
(2) households with at least 1 member working in NACE sector R: Arts, entertainment and recreation	0.59	1.70%

Notes: The first column, MPC, reports the aggregate MPC in two scenarios – 1. MPCs are heterogeneous following the HFCS data and the fiscal transfer goes to the sector K: Financial and insurance activities; 2. MPCs are heterogeneous and the fiscal transfer goes to the sector R: Arts, entertainment and recreation. The second column, aggregate consumption growth, reports the estimated aggregate consumption growth in the economy in each of these two scenarios.

Table A4.1: Austria - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.004	-0.004	0.004	0.004
		(0.002)	(0.007)	(0.002)	(0.002)
	Age squarred (RP)	-0.000	0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.032*	-0.026	-0.031	-0.029
		(0.016)	(0.019)	(0.016)	(0.016)
	Married (RP)	-0.030	-0.041	-0.029	-0.038
		(0.020)	(0.027)	(0.020)	(0.020)
Education (RP)	Lower secondary	-0.026	-0.023	-0.030	-0.014
(Ref.cat.: Primary)		(0.118)	(0.221)	(0.118)	(0.118)
	Upper secondary	0.029	0.005	0.027	0.036
		(0.117)	(0.224)	(0.117)	(0.117)
	Tertiary	0.078	0.057	0.078	0.084
		(0.119)	(0.227)	(0.119)	(0.119)
	Household Size	-0.011	-0.007	-0.011	-0.011
		(0.008)	(0.010)	(0.008)	(0.009)
Cash-on-hand quintiles	First quintile	0.064*	0.046	0.061*	
(Ref. cat.: 5th quintile)		(0.027)	(0.036)	(0.027)	
	Second quintile	0.016	0.021	0.014	
		(0.027)	(0.033)	(0.027)	
	Third quintile	-0.001	-0.023	-0.002	
		(0.025)	(0.027)	(0.025)	
	Fourth quintile	-0.009	-0.008	-0.009	
		(0.024)	(0.022)	(0.024)	
	Credit constrained			0.097*	
				(0.043)	
Gross income quintiles	First quintile				-0.028
(Ref. cat.: 5th quintile)					(0.032)
	Second quintile				-0.016
					(0.032)
	Third quintile				-0.035
					(0.023)
	Fourth quintile				-0.016
					(0.027)
Financial wealth quintiles	First quintile				0.103**
(Ref. cat.: 5th quintile)					(0.031)
	Second quintile				0.010
					(0.027)
	Third quintile				0.023
					(0.024)
	Fourth quintile				0.017
					(0.026)
	Homeowner				-0.002
					(0.017)
	Has debt				-0.030
					(0.018)
	Constant	0.336*	0.514	0.335*	0.356*
		(0.146)	(0.270)	(0.146)	(0.149)
	Residual variance	0.137***	0.132***	0.136***	0.136***
		(0.005)	(0.005)	(0.005)	(0.005)
	N	3072	1984	3072	3072

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.2: Belgium - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.011	0.005	-0.012	-0.012
		(0.009)	(0.021)	(0.009)	(0.009)
	Age squarred (RP)	0.000	-0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.001	0.037	-0.004	-0.004
		(0.043)	(0.056)	(0.043)	(0.042)
	Married (RP)	0.014	-0.024	0.009	0.012
		(0.052)	(0.070)	(0.053)	(0.055)
Education (RP)	Lower secondary	0.090	-0.109	0.092	0.106
(Ref.cat.: Primary)		(0.106)	(0.133)	(0.107)	(0.109)
	Upper secondary	0.166	0.019	0.168	0.170
		(0.101)	(0.134)	(0.101)	(0.100)
	Tertiary	0.246*	0.092	0.246*	0.244*
		(0.100)	(0.134)	(0.101)	(0.101)
	Household Size	-0.038*	-0.028	-0.037*	-0.028
		(0.017)	(0.018)	(0.017)	(0.018)
Cash-on-hand quintiles	First quintile	-0.035	0.105	-0.034	
(Ref. cat.: 5th quintile)		(0.069)	(0.088)	(0.069)	
	Second quintile	0.069	0.130	0.071	
		(0.068)	(0.089)	(0.068)	
	Third quintile	0.023	0.060	0.021	
		(0.064)	(0.069)	(0.065)	
	Fourth quintile	0.025	0.051	0.023	
		(0.053)	(0.064)	(0.053)	
	Credit constrained			-0.081	
				(0.093)	
Gross income quintiles	First quintile				0.072
(Ref. cat.: 5th quintile)					(0.090)
	Second quintile				0.092
					(0.084)
	Third quintile				0.072
					(0.070)
	Fourth quintile				-0.040
					(0.064)
Financial wealth quintiles	First quintile				-0.050
(Ref. cat.: 5th quintile)					(0.080)
	Second quintile				-0.033
					(0.071)
	Third quintile				0.040
					(0.069)
	Fourth quintile				-0.025
					(0.062)
	Homeowner				0.099
					(0.060)
	Has debt				-0.024
					(0.047)
	Constant	0.481	0.202	0.496	0.444
		(0.276)	(0.468)	(0.283)	(0.291)
	Residual variance	0.389***	0.318***	0.389***	0.385***
		(0.028)	(0.028)	(0.028)	(0.027)
	N	2275	1308	2275	2275

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.3: Cyprus - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.017		0.017	0.020
		(0.014)		(0.015)	(0.017)
	Age squarred (RP)	-0.000		-0.000	-0.000
		(0.000)		(0.000)	(0.000)
	Female (RP)	-0.099		-0.099	-0.100
		(0.086)		(0.086)	(0.086)
	Married (RP)	-0.047		-0.047	-0.046
		(0.103)		(0.103)	(0.104)
Education (RP)	Lower secondary	-0.023		-0.023	-0.024
(Ref.cat.: Primary)		(0.176)		(0.175)	(0.183)
	Upper secondary	-0.131		-0.131	-0.119
		(0.107)		(0.106)	(0.113)
	Tertiary	-0.139		-0.139	-0.103
		(0.112)		(0.112)	(0.127)
	Household Size	0.001		0.001	0.004
		(0.032)		(0.033)	(0.032)
Cash-on-hand quintiles	First quintile	-0.116		-0.116	
(Ref. cat.: 5th quintile)		(0.150)		(0.149)	
	Second quintile	-0.059		-0.059	
		(0.125)		(0.125)	
	Third quintile	-0.047		-0.047	
		(0.112)		(0.113)	
	Fourth quintile	-0.055		-0.055	
		(0.124)		(0.125)	
	Credit constrained			-0.011	
				(0.175)	
Gross income quintiles	First quintile				0.022
(Ref. cat.: 5th quintile)					(0.151)
	Second quintile				0.031
					(0.139)
	Third quintile				0.107
					(0.120)
	Fourth quintile				0.038
					(0.114)
Financial wealth quintiles	First quintile				-0.082
(Ref. cat.: 5th quintile)					(0.131)
	Second quintile				-0.065
					(0.141)
	Third quintile				-0.022
					(0.124)
	Fourth quintile				-0.034
					(0.111)
	Homeowner				-0.025
					(0.099)
	Has debt				0.056
					(0.076)
	Constant	-0.024		-0.018	-0.218
		(0.370)		(0.375)	(0.411)
	Residual variance	0.711***		0.711***	0.710***
		(0.085)		(0.085)	(0.084)
	N	1303		1303	1303

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.4: Germany - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.004	0.019	-0.004	-0.004
		(0.006)	(0.015)	(0.006)	(0.006)
	Age squarred (RP)	0.000	-0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	0.026	-0.007	0.027	0.023
		(0.039)	(0.046)	(0.039)	(0.040)
	Married (RP)	0.055	0.061	0.055	0.059
		(0.042)	(0.044)	(0.042)	(0.043)
Education (RP)	Lower secondary	0.036	0.139	0.040	0.031
(Ref.cat.: Primary)		(0.132)	(0.168)	(0.133)	(0.136)
	Upper secondary	0.093	0.108	0.097	0.087
		(0.115)	(0.135)	(0.117)	(0.118)
	Tertiary	0.085	0.116	0.090	0.082
		(0.119)	(0.140)	(0.119)	(0.121)
	Household Size	0.011	0.001	0.010	0.013
		(0.019)	(0.019)	(0.019)	(0.019)
Cash-on-hand quintiles	First quintile	0.124*	0.212**	0.120	
(Ref. cat.: 5th quintile)		(0.062)	(0.072)	(0.064)	
	Second quintile	0.071	0.090	0.068	
		(0.056)	(0.070)	(0.058)	
	Third quintile	0.151**	0.166**	0.149**	
		(0.049)	(0.064)	(0.049)	
	Fourth quintile	0.081	0.064	0.081	
		(0.047)	(0.053)	(0.047)	
	Credit constrained			0.042	
				(0.070)	
Gross income quintiles	First quintile				0.103
(Ref. cat.: 5th quintile)					(0.068)
	Second quintile				0.033
					(0.062)
	Third quintile				0.015
					(0.049)
	Fourth quintile				0.036
					(0.049)
Financial wealth quintiles	First quintile				0.037
(Ref. cat.: 5th quintile)					(0.065)
	Second quintile				0.099
					(0.056)
	Third quintile				0.078
					(0.053)
	Fourth quintile				0.045
					(0.050)
	Homeowner				-0.007
					(0.038)
	Has debt				0.040
					(0.037)
	Constant	0.349	-0.118	0.350	0.311
		(0.243)	(0.365)	(0.243)	(0.240)
	Residual variance	0.508***	0.434***	0.508***	0.508***
		(0.027)	(0.032)	(0.027)	(0.027)
	N	4917	2693	4917	4917

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.5: Spain - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.005	-0.028	0.005	0.009
		(0.008)	(0.018)	(0.008)	(0.008)
	Age squarred (RP)	-0.000	0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.044	-0.046	-0.043	-0.049
		(0.040)	(0.042)	(0.041)	(0.041)
	Married (RP)	-0.024	-0.045	-0.026	-0.027
		(0.043)	(0.053)	(0.044)	(0.043)
Education (RP)	Lower secondary	0.045	-0.001	0.046	0.043
(Ref.cat.: Primary)		(0.055)	(0.068)	(0.055)	(0.055)
	Upper secondary	0.119*	0.107	0.120*	0.117*
		(0.058)	(0.075)	(0.059)	(0.058)
	Tertiary	0.125*	0.093	0.124*	0.118*
		(0.056)	(0.075)	(0.057)	(0.057)
	Household Size	-0.041*	-0.026	-0.040*	-0.041*
		(0.017)	(0.018)	(0.017)	(0.018)
Cash-on-hand quintiles	First quintile	-0.046	-0.084	-0.037	
(Ref. cat.: 5th quintile)		(0.060)	(0.077)	(0.062)	
	Second quintile	-0.031	-0.080	-0.028	
		(0.058)	(0.070)	(0.058)	
	Third quintile	-0.036	-0.096	-0.033	
		(0.055)	(0.067)	(0.055)	
	Fourth quintile	-0.042	-0.064	-0.042	
		(0.045)	(0.050)	(0.045)	
	Credit constrained			-0.046	
				(0.055)	
Gross income quintiles	First quintile				-0.214**
(Ref. cat.: 5th quintile)					(0.067)
	Second quintile				-0.087
					(0.066)
	Third quintile				-0.056
					(0.051)
	Fourth quintile				-0.061
					(0.051)
Financial wealth quintiles	First quintile				0.097
(Ref. cat.: 5th quintile)					(0.059)
	Second quintile				-0.002
					(0.054)
	Third quintile				0.044
					(0.055)
	Fourth quintile				0.043
					(0.050)
	Homeowner				-0.013
					(0.054)
	Has debt				-0.231***
					(0.037)
	Constant	0.149	0.920*	0.148	0.257
		(0.257)	(0.413)	(0.257)	(0.262)
	Residual variance	0.681***	0.538***	0.680***	0.668***
		(0.036)	(0.037)	(0.036)	(0.035)
	N	6405	3212	6405	6405

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.6: France - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.001	0.004	0.001	0.003
		(0.004)	(0.011)	(0.004)	(0.004)
	Age squarred (RP)	0.000*	0.000	0.000*	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.000	-0.006	-0.000	-0.002
		(0.021)	(0.024)	(0.021)	(0.021)
	Married (RP)	0.061*	0.024	0.060*	0.052
		(0.028)	(0.030)	(0.028)	(0.029)
Education (RP)	Lower secondary	0.105*	0.062	0.105*	0.118*
(Ref.cat.: Primary)		(0.047)	(0.067)	(0.047)	(0.047)
	Upper secondary	0.038	-0.020	0.039	0.057*
		(0.030)	(0.040)	(0.030)	(0.029)
	Tertiary	0.016	-0.021	0.016	0.045
		(0.037)	(0.045)	(0.037)	(0.036)
	Household Size	-0.028*	-0.007	-0.027*	-0.019
		(0.011)	(0.011)	(0.011)	(0.012)
Cash-on-hand quintiles	First quintile	-0.231***	-0.105*	-0.225***	
(Ref. cat.: 5th quintile)		(0.039)	(0.045)	(0.038)	
	Second quintile	-0.317***	-0.256***	-0.312***	
		(0.037)	(0.046)	(0.037)	
	Third quintile	-0.246***	-0.195***	-0.244***	
		(0.035)	(0.039)	(0.035)	
	Fourth quintile	-0.157***	-0.134***	-0.156***	
		(0.031)	(0.033)	(0.030)	
	Credit constrained			-0.036	
				(0.043)	
Gross income quintiles	First quintile				-0.111*
(Ref. cat.: 5th quintile)					(0.048)
	Second quintile				-0.163***
					(0.042)
	Third quintile				-0.074*
					(0.035)
	Fourth quintile				-0.052
					(0.036)
Financial wealth quintiles	First quintile				-0.107*
(Ref. cat.: 5th quintile)					(0.043)
	Second quintile				-0.211***
					(0.040)
	Third quintile				-0.186***
					(0.037)
	Fourth quintile				-0.129***
					(0.032)
	Homeowner				0.117***
					(0.029)
	Has debt				-0.252***
					(0.026)
	Constant	0.202	0.151	0.198	0.258*
		(0.105)	(0.204)	(0.106)	(0.114)
	Residual variance	0.665***	0.519***	0.665***	0.653***
		(0.024)	(0.022)	(0.024)	(0.024)
	N	13682	8872	13682	13682

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.7: Greece - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.002	0.008	0.002	0.001
		(0.004)	(0.012)	(0.004)	(0.004)
	Age squarred (RP)	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.001	0.019	-0.000	-0.002
		(0.022)	(0.024)	(0.021)	(0.020)
	Married (RP)	-0.016	-0.024	-0.014	-0.018
		(0.027)	(0.034)	(0.026)	(0.025)
Education (RP)	Lower secondary	-0.061	-0.099	-0.061	-0.058
(Ref.cat.: Primary)		(0.033)	(0.059)	(0.033)	(0.033)
	Upper secondary	-0.052	-0.063	-0.053	-0.052
		(0.033)	(0.058)	(0.033)	(0.031)
	Tertiary	-0.045	-0.076	-0.044	-0.041
		(0.037)	(0.068)	(0.037)	(0.036)
	Household Size	0.014	0.005	0.014	0.012
		(0.011)	(0.013)	(0.011)	(0.012)
Cash-on-hand quintiles	First quintile	0.133***	0.155**	0.133***	
(Ref. cat.: 5th quintile)		(0.039)	(0.059)	(0.039)	
	Second quintile	0.042	0.010	0.044	
		(0.031)	(0.038)	(0.031)	
	Third quintile	0.021	0.001	0.022	
		(0.036)	(0.043)	(0.036)	
	Fourth quintile	-0.017	-0.020	-0.017	
		(0.035)	(0.042)	(0.035)	
	Credit constrained			-0.048	
				(0.042)	
Gross income quintiles	First quintile				0.082
(Ref. cat.: 5th quintile)					(0.043)
	Second quintile				0.026
					(0.034)
	Third quintile				0.031
					(0.034)
	Fourth quintile				-0.018
					(0.030)
Financial wealth quintiles	First quintile				0.112**
(Ref. cat.: 5th quintile)					(0.036)
	Second quintile				0.021
					(0.028)
	Third quintile				0.018
					(0.030)
	Fourth quintile				-0.055
					(0.030)
	Homeowner				0.023
					(0.021)
	Has debt				-0.034
					(0.030)
	Constant	0.549***	0.483	0.552***	0.568***
		(0.123)	(0.249)	(0.123)	(0.121)
	Residual variance	0.135***	0.127***	0.135***	0.133***
		(0.008)	(0.009)	(0.008)	(0.008)
	N	2964	1713	2964	2964

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.8: Croatia - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.008	-0.060**	-0.008	-0.008
		(0.007)	(0.020)	(0.007)	(0.007)
	Age squarred (RP)	0.000	0.001**	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.018	-0.032	-0.017	-0.012
		(0.035)	(0.045)	(0.035)	(0.034)
	Married (RP)	-0.011	-0.031	-0.015	-0.007
		(0.054)	(0.076)	(0.054)	(0.056)
Education (RP)	Lower secondary	0.120	-0.103	0.120	0.108
(Ref.cat.: Primary)		(0.110)	(0.324)	(0.110)	(0.110)
	Upper secondary	0.144	-0.038	0.146	0.125
		(0.102)	(0.302)	(0.101)	(0.099)
	Tertiary	0.058	-0.179	0.061	0.036
		(0.102)	(0.302)	(0.101)	(0.100)
	Household Size	0.020	0.032	0.022	0.020
		(0.016)	(0.018)	(0.015)	(0.017)
Cash-on-hand quintiles	First quintile	0.241***	0.283**	0.242***	
(Ref. cat.: 5th quintile)		(0.066)	(0.089)	(0.066)	
	Second quintile	0.102	0.092	0.104	
		(0.069)	(0.086)	(0.069)	
	Third quintile	0.131*	0.122	0.132*	
		(0.058)	(0.066)	(0.059)	
	Fourth quintile	0.111*	0.134*	0.112*	
		(0.055)	(0.066)	(0.056)	
	Credit constrained			-0.048	
				(0.074)	
Gross income quintiles	First quintile				0.181**
(Ref. cat.: 5th quintile)					(0.064)
	Second quintile				0.174*
					(0.069)
	Third quintile				0.130
					(0.066)
	Fourth quintile				0.148*
					(0.064)
Financial wealth quintiles	First quintile				0.066
(Ref. cat.: 5th quintile)					(0.070)
	Second quintile				0.025
					(0.059)
	Third quintile				-0.110*
					(0.053)
	Fourth quintile				-0.050
					(0.051)
	Homeowner				0.067
					(0.058)
	Has debt				-0.042
					(0.043)
	Constant	0.605**	1.816***	0.603**	0.593**
		(0.201)	(0.483)	(0.201)	(0.192)
	Residual variance	0.268***	0.246***	0.267***	0.265***
		(0.019)	(0.022)	(0.019)	(0.019)
	N	1335	777	1335	1335

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.9: Italy - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.007	-0.024	-0.008	-0.004
		(0.006)	(0.016)	(0.006)	(0.006)
	Age squarred (RP)	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.008	0.016	0.009	-0.005
		(0.022)	(0.033)	(0.024)	(0.022)
	Married (RP)	-0.023	-0.051	-0.011	-0.018
		(0.026)	(0.035)	(0.026)	(0.026)
Education (RP)	Lower secondary	0.005	0.009	0.019	0.004
(Ref.cat.: Primary)		(0.040)	(0.069)	(0.041)	(0.040)
	Upper secondary	0.027	0.010	0.045	0.025
		(0.039)	(0.074)	(0.039)	(0.040)
	Tertiary	-0.026	-0.057	-0.009	-0.029
		(0.049)	(0.080)	(0.048)	(0.050)
	Household Size	0.030**	0.034*	0.032**	0.032**
		(0.011)	(0.014)	(0.010)	(0.011)
Cash-on-hand quintiles	First quintile	0.283***	0.320***	0.280***	
(Ref. cat.: 5th quintile)		(0.038)	(0.064)	(0.036)	
	Second quintile	0.171***	0.199***	0.169***	
		(0.035)	(0.056)	(0.033)	
	Third quintile	0.080*	0.102*	0.071*	
		(0.032)	(0.045)	(0.032)	
	Fourth quintile	0.082*	0.090	0.093**	
		(0.034)	(0.047)	(0.034)	
	Credit constrained			0.235***	
				(0.058)	
Gross income quintiles	First quintile				0.227***
(Ref. cat.: 5th quintile)					(0.045)
	Second quintile				0.155***
					(0.039)
	Third quintile				0.051
					(0.034)
	Fourth quintile				0.056
					(0.030)
Financial wealth quintiles	First quintile				-0.033
(Ref. cat.: 5th quintile)					(0.034)
	Second quintile				0.043
					(0.031)
	Third quintile				-0.055
					(0.029)
	Fourth quintile				-0.022
					(0.026)
	Homeowner				-0.088***
					(0.021)
	Has debt				0.035
					(0.027)
	Constant	0.578***	0.933**	0.586***	0.590***
		(0.164)	(0.339)	(0.161)	(0.158)
	Residual variance	0.292***	0.281***	0.290***	0.291***
		(0.012)	(0.016)	(0.012)	(0.012)
	N	7420	3334	6763	7420

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.10: Lithuania - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.008	-0.008	-0.008	-0.011
		(0.011)	(0.026)	(0.011)	(0.011)
	Age squarred (RP)	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	0.042	0.062	0.042	0.032
		(0.044)	(0.057)	(0.043)	(0.044)
	Married (RP)	0.055	0.076	0.054	0.045
		(0.037)	(0.050)	(0.037)	(0.039)
Education (RP)	Lower secondary	0.216	0.007	0.216	0.192
(Ref.cat.: Primary)		(0.199)	(0.365)	(0.200)	(0.192)
	Upper secondary	0.236	-0.072	0.236	0.214
		(0.214)	(0.317)	(0.214)	(0.203)
	Tertiary	0.237	-0.072	0.237	0.225
		(0.221)	(0.307)	(0.222)	(0.209)
	Household Size	-0.005	-0.024	-0.005	-0.012
		(0.021)	(0.021)	(0.021)	(0.021)
Cash-on-hand quintiles	First quintile	0.078	0.104	0.078	
(Ref. cat.: 5th quintile)		(0.091)	(0.126)	(0.092)	
	Second quintile	-0.002	-0.103	-0.002	
		(0.084)	(0.100)	(0.085)	
	Third quintile	0.029	0.062	0.029	
		(0.067)	(0.090)	(0.067)	
	Fourth quintile	-0.020	-0.037	-0.020	
		(0.084)	(0.091)	(0.084)	
	Credit constrained			0.002	
				(0.064)	
Gross income quintiles	First quintile				0.047
(Ref. cat.: 5th quintile)					(0.089)
	Second quintile				-0.051
					(0.102)
	Third quintile				-0.067
					(0.086)
	Fourth quintile				-0.007
					(0.089)
Financial wealth quintiles	First quintile				0.170*
(Ref. cat.: 5th quintile)					(0.066)
	Second quintile				0.060
					(0.066)
	Third quintile				0.001
					(0.051)
	Fourth quintile				-0.004
					(0.078)
	Homeowner				0.085
					(0.091)
	Has debt				-0.133*
					(0.058)
	Constant	0.475	0.805	0.474	0.571
		(0.344)	(0.755)	(0.346)	(0.323)
	Residual variance	0.308***	0.299***	0.308***	0.299***
		(0.064)	(0.065)	(0.063)	(0.061)
	N	1444	912	1444	1444

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.11: Luxembourg - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.005	-0.045	0.005	0.004
		(0.010)	(0.023)	(0.010)	(0.009)
	Age squarred (RP)	0.000	0.001*	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	0.031	0.035	0.032	0.030
		(0.041)	(0.042)	(0.042)	(0.043)
	Married (RP)	0.091	0.021	0.091	0.089
		(0.052)	(0.050)	(0.052)	(0.052)
Education (RP)	Lower secondary	0.029	0.012	0.029	0.032
(Ref.cat.: Primary)		(0.077)	(0.092)	(0.077)	(0.077)
	Upper secondary	0.037	0.008	0.037	0.030
		(0.067)	(0.082)	(0.067)	(0.067)
	Tertiary	0.029	-0.001	0.030	0.038
		(0.068)	(0.079)	(0.068)	(0.066)
	Household Size	-0.047*	-0.021	-0.047*	-0.048*
		(0.021)	(0.020)	(0.021)	(0.022)
Cash-on-hand quintiles	First quintile	0.139	0.059	0.141	
(Ref. cat.: 5th quintile)		(0.085)	(0.082)	(0.087)	
	Second quintile	-0.021	-0.073	-0.021	
		(0.077)	(0.083)	(0.078)	
	Third quintile	0.038	-0.034	0.038	
		(0.084)	(0.079)	(0.084)	
	Fourth quintile	0.063	-0.006	0.063	
		(0.073)	(0.065)	(0.073)	
	Credit constrained			-0.015	
				(0.080)	
Gross income quintiles	First quintile				0.116
(Ref. cat.: 5th quintile)					(0.081)
	Second quintile				0.103
					(0.085)
	Third quintile				0.026
					(0.064)
	Fourth quintile				0.130*
					(0.062)
Financial wealth quintiles	First quintile				0.062
(Ref. cat.: 5th quintile)					(0.082)
	Second quintile				-0.008
					(0.076)
	Third quintile				-0.033
					(0.063)
	Fourth quintile				0.036
					(0.063)
	Homeowner				0.077
					(0.047)
	Has debt				-0.035
					(0.045)
	Constant	-0.003	1.069*	-0.002	-0.021
		(0.251)	(0.483)	(0.249)	(0.243)
	Residual variance	0.363***	0.301***	0.363***	0.363***
		(0.027)	(0.026)	(0.027)	(0.027)
	N	1616	1215	1616	1616

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.12: Latvia - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.073***		0.074***	0.069***
		(0.018)		(0.017)	(0.018)
	Age squarred (RP)	-0.001***		-0.001***	-0.001***
		(0.000)		(0.000)	(0.000)
	Female (RP)	0.014		0.009	0.021
		(0.084)		(0.083)	(0.087)
	Married (RP)	-0.077		-0.065	-0.071
		(0.097)		(0.096)	(0.096)
Education (RP)	Lower secondary	-0.575		-0.596	-0.564
(Ref.cat.: Primary)		(0.588)		(0.585)	(0.600)
	Upper secondary	-0.790		-0.799	-0.786
		(0.592)		(0.589)	(0.604)
	Tertiary	-0.941		-0.930	-0.928
		(0.580)		(0.578)	(0.596)
	Household Size	0.058		0.052	0.046
		(0.034)		(0.035)	(0.036)
Cash-on-hand quintiles	First quintile	0.603**		0.613***	
(Ref. cat.: 5th quintile)		(0.184)		(0.177)	
	Second quintile	0.433***		0.432***	
		(0.131)		(0.126)	
	Third quintile	0.267		0.260	
		(0.155)		(0.148)	
	Fourth quintile	0.134		0.145	
		(0.113)		(0.112)	
	Credit constrained			0.415**	
				(0.159)	
Gross income quintiles	First quintile				0.552**
(Ref. cat.: 5th quintile)					(0.198)
	Second quintile				0.347*
					(0.150)
	Third quintile				0.309
					(0.160)
	Fourth quintile				0.172
					(0.119)
Financial wealth quintiles	First quintile				0.143
(Ref. cat.: 5th quintile)					(0.129)
	Second quintile				0.065
					(0.110)
	Third quintile				-0.004
					(0.126)
	Fourth quintile				0.062
					(0.116)
	Homeowner				0.020
					(0.102)
	Has debt				0.091
					(0.100)
	Constant	-0.798		-0.875	-0.827
		(0.777)		(0.785)	(0.817)
	Residual variance	0.788***		0.775***	0.789***
		(0.097)		(0.093)	(0.097)
	N	1196		1196	1196

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.13: The Netherlands - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	-0.003	-0.006	-0.003	-0.001
		(0.004)	(0.008)	(0.004)	(0.004)
	Age squarred (RP)	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	0.023	0.005	0.023	0.020
		(0.020)	(0.023)	(0.019)	(0.020)
	Married (RP)	-0.037	-0.017	-0.037	-0.034
		(0.021)	(0.024)	(0.021)	(0.020)
Education (RP)	Lower secondary	0.039	0.026	0.039	0.031
(Ref.cat.: Primary)		(0.037)	(0.048)	(0.037)	(0.037)
	Upper secondary	0.050	0.066	0.050	0.042
		(0.036)	(0.039)	(0.036)	(0.035)
	Tertiary	0.057	0.074*	0.057	0.054
		(0.035)	(0.037)	(0.035)	(0.034)
	Household Size	0.012	0.005	0.012	0.016
		(0.009)	(0.010)	(0.009)	(0.009)
Cash-on-hand quintiles	First quintile	0.031	0.019	0.031	
(Ref. cat.: 5th quintile)		(0.035)	(0.048)	(0.035)	
	Second quintile	0.019	0.016	0.019	
		(0.034)	(0.044)	(0.034)	
	Third quintile	0.027	0.032	0.027	
		(0.027)	(0.036)	(0.027)	
	Fourth quintile	0.035	0.033	0.035	
		(0.030)	(0.038)	(0.030)	
	Credit constrained			-0.003	
				(0.050)	
Gross income quintiles	First quintile				0.031
(Ref. cat.: 5th quintile)					(0.033)
	Second quintile				0.034
					(0.030)
	Third quintile				-0.004
					(0.033)
	Fourth quintile				-0.003
					(0.024)
Financial wealth quintiles	First quintile				0.022
(Ref. cat.: 5th quintile)					(0.035)
	Second quintile				0.042
					(0.033)
	Third quintile				0.022
					(0.031)
	Fourth quintile				0.070**
					(0.023)
	Homeowner				0.022
					(0.029)
	Has debt				-0.040
					(0.028)
	Constant	0.247*	0.303	0.247*	0.197
		(0.109)	(0.170)	(0.110)	(0.111)
	Residual variance	0.102***	0.090***	0.102***	0.101***
		(0.005)	(0.007)	(0.005)	(0.005)
	N	1735	990	1735	1735

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.14: Portugal - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.008	-0.020	0.008	0.011*
		(0.005)	(0.012)	(0.005)	(0.005)
	Age squarred (RP)	-0.000	0.000	-0.000	-0.000*
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.025	-0.030	-0.024	-0.023
		(0.028)	(0.031)	(0.027)	(0.028)
	Married (RP)	-0.019	-0.062	-0.019	-0.020
		(0.027)	(0.032)	(0.027)	(0.027)
Education (RP)	Lower secondary	0.032	0.061	0.032	0.033
(Ref.cat.: Primary)		(0.031)	(0.043)	(0.031)	(0.031)
	Upper secondary	-0.022	0.013	-0.023	-0.023
		(0.032)	(0.039)	(0.032)	(0.034)
	Tertiary	0.029	0.061	0.028	0.039
		(0.031)	(0.039)	(0.031)	(0.031)
	Household Size	0.007	0.020	0.008	0.006
		(0.011)	(0.013)	(0.011)	(0.012)
Cash-on-hand quintiles	First quintile	0.150***	0.177**	0.155***	
(Ref. cat.: 5th quintile)		(0.040)	(0.055)	(0.041)	
	Second quintile	0.082	0.102	0.085*	
		(0.042)	(0.052)	(0.042)	
	Third quintile	0.078*	0.054	0.080*	
		(0.034)	(0.037)	(0.034)	
	Fourth quintile	0.043	0.071	0.044	
		(0.035)	(0.042)	(0.035)	
	Credit constrained			-0.050	
				(0.049)	
Gross income quintiles	First quintile				0.079
(Ref. cat.: 5th quintile)					(0.043)
	Second quintile				0.035
					(0.037)
	Third quintile				0.063
					(0.036)
	Fourth quintile				0.075*
					(0.035)
Financial wealth quintiles	First quintile				0.084*
(Ref. cat.: 5th quintile)					(0.038)
	Second quintile				0.051
					(0.034)
	Third quintile				0.061
					(0.033)
	Fourth quintile				0.004
					(0.033)
	Homeowner				-0.058*
					(0.028)
	Has debt				-0.038
					(0.023)
	Constant	-0.058	0.487	-0.053	-0.090
		(0.152)	(0.274)	(0.153)	(0.153)
	Residual variance	0.239***	0.226***	0.239***	0.237***
		(0.016)	(0.017)	(0.016)	(0.015)
	N	5816	3430	5816	5816

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.15: Slovenia - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.010	-0.004	0.009	0.006
		(0.009)	(0.017)	(0.009)	(0.009)
	Age squarred (RP)	-0.000	0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.120**	-0.093	-0.122**	-0.117**
		(0.041)	(0.052)	(0.041)	(0.041)
	Married (RP)	-0.115*	-0.139*	-0.113*	-0.097
		(0.055)	(0.067)	(0.054)	(0.053)
Education (RP)	Lower secondary	0.171	-0.025	0.155	0.186
(Ref.cat.: Primary)		(0.112)	(0.123)	(0.113)	(0.115)
	Upper secondary	0.128	-0.060	0.113	0.145
		(0.119)	(0.124)	(0.119)	(0.123)
	Tertiary	0.120	-0.025	0.112	0.129
		(0.120)	(0.143)	(0.120)	(0.123)
	Household Size	0.057**	0.061**	0.053**	0.056**
		(0.018)	(0.020)	(0.018)	(0.017)
Cash-on-hand quintiles	First quintile	0.442***	0.439***	0.432***	
(Ref. cat.: 5th quintile)		(0.082)	(0.114)	(0.081)	
	Second quintile	0.366***	0.425***	0.352***	
		(0.080)	(0.093)	(0.080)	
	Third quintile	0.172**	0.182*	0.161*	
		(0.063)	(0.075)	(0.064)	
	Fourth quintile	0.161*	0.159	0.150*	
		(0.073)	(0.082)	(0.073)	
	Credit constrained			0.200***	
				(0.055)	
Gross income quintiles	First quintile				0.421***
(Ref. cat.: 5th quintile)					(0.087)
	Second quintile				0.225**
					(0.074)
	Third quintile				0.116
					(0.063)
	Fourth quintile				0.100
					(0.062)
Financial wealth quintiles	First quintile				0.262***
(Ref. cat.: 5th quintile)					(0.069)
	Second quintile				0.029
					(0.075)
	Third quintile				0.032
					(0.063)
	Fourth quintile				0.063
					(0.069)
	Homeowner				-0.024
					(0.057)
	Has debt				0.064
					(0.042)
	Constant	-0.098	0.323	-0.077	-0.077
		(0.260)	(0.398)	(0.260)	(0.260)
	Residual variance	0.620***	0.588***	0.616***	0.611***
		(0.047)	(0.058)	(0.047)	(0.045)
	N	2014	1263	2014	2014

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Table A4.16: Slovakia - Main estimates of the household-level MPCs

		Full sample	Age of RP<60	FS liquidity contraint	FS cash disaggregation
	Age (RP)	0.013	0.001	0.013	0.008
		(0.009)	(0.023)	(0.010)	(0.009)
	Age squarred (RP)	-0.000	0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
	Female (RP)	-0.063	-0.004	-0.061	-0.063
		(0.040)	(0.050)	(0.040)	(0.041)
	Married (RP)	0.020	-0.002	0.017	-0.004
		(0.053)	(0.062)	(0.053)	(0.055)
Education (RP)	Lower secondary	-0.028	-0.105	0.007	-0.061
(Ref.cat.: Primary)		(0.272)	(0.297)	(0.267)	(0.254)
	Upper secondary	-0.021	-0.217	0.025	-0.069
		(0.272)	(0.295)	(0.267)	(0.254)
	Tertiary	-0.011	-0.209	0.033	-0.073
		(0.281)	(0.311)	(0.276)	(0.262)
	Household Size	0.010	0.018	0.009	0.019
		(0.016)	(0.018)	(0.016)	(0.016)
Cash-on-hand quintiles	First quintile	0.151	0.152	0.139	
(Ref. cat.: 5th quintile)		(0.087)	(0.110)	(0.085)	
	Second quintile	0.057	0.033	0.051	
		(0.083)	(0.100)	(0.081)	
	Third quintile	0.005	-0.013	-0.004	
		(0.086)	(0.093)	(0.086)	
	Fourth quintile	-0.036	-0.033	-0.037	
		(0.073)	(0.076)	(0.073)	
	Credit constrained			0.192*	
				(0.079)	
Gross income quintiles	First quintile				0.054
(Ref. cat.: 5th quintile)					(0.084)
	Second quintile				0.028
					(0.073)
	Third quintile				-0.002
					(0.072)
	Fourth quintile				0.031
					(0.079)
Financial wealth quintiles	First quintile				0.108
(Ref. cat.: 5th quintile)					(0.065)
	Second quintile				-0.077
					(0.067)
	Third quintile				-0.012
					(0.058)
	Fourth quintile				-0.035
					(0.066)
	Homeowner				-0.024
					(0.053)
	Has debt				-0.267***
					(0.045)
	Constant	0.178	0.613	0.105	0.536
		(0.392)	(0.604)	(0.393)	(0.360)
	Residual variance	0.342***	0.300***	0.339***	0.327***
		(0.028)	(0.030)	(0.027)	(0.025)
	N	2179	1217	2179	2179

Notes: Estimation performed using Tobit. Standard Errors in parentheses. ***significant at 1 percent level, **significant at 5 percent level, *significant at 10% level

Index of Working Papers:

January 13, 2021	Maximilian Böck, Martin Feldkircher, Burkhard Raunig	233	A View from Outside: Sovereign CDS Volatility as an Indicator of Economic Uncertainty
May 20, 2021	Burkhard Raunig	234	Economic Policy Uncertainty and Stock Market Volatility: A Causality Check
July 8, 2021	Thomas Breuer, Martin Summer, Branko Uroševic	235	Bank Solvency Stress Tests with Fire Sales
December 14, 2021	Michael Sigmund, Kevin Zimmermann	236	Determinants of Contingent Convertible Bond Coupon Rates of Banks: An Empirical Analysis
February 14, 2022	Elisabeth Beckmann, Christa Hainz, Sarah Reiter	237	Third-Party Loan Guarantees: Measuring Literacy and its Effect on Financial Decisions
February 16, 2022	Markus Knell, Reinhard Koman	238	Pension Entitlements and Net Wealth in Austria
May 9, 2022	Nicolás Albacete, Pirmin Fessler, Peter Lindner	239	The Wealth Distribution and Redistributive Preferences: Evidence from a Randomized Survey Experiment
June 20, 2022	Erwan Gautier, Cristina Conflitti, Riemer P. Faber, Brian Fabo, Ludmila Fadejeva, Valentin Jouvanceau, Jan-Oliver Menz, Teresa Messner, Pavlos Petroulas, Pau Roldan-Blanco, Fabio Rumler, Sergio Santoro, Elisabeth Wieland, Hélène Zimmer	240	New Facts on Consumer Price Rigidity in the Euro Area
June 29, 2022	Svetlana Abramova, Rainer Böhme, Helmut Elsinger, Helmut Stix	241	What can CBDC designers learn from asking potential users? Results from a survey of Austrian residents

July 1, 2022	Marcel Barmeier	242	The new normal: bank lending and negative interest rates in Austria
July 14, 2022	Pavel Ciaian, Andrej Cupak, Pirmin Fessler, d'Artis Kancs	243	Environmental-Social-Governance Preferences and Investments in Crypto-Assets
October 18, 2022	Burkhard Raunig, Michael Sigmund	244	The ECB Single Supervisory Mechanism: Effects on Bank Performance and Capital Requirements
April 5, 2023	Norbert Ernst, Michael Sigmund	245	Are zombie firms really contagious?
May 8, 2023	Richard Sellner, Nico Pintar, Norbert Ernst	246	Resource Misallocation and TFP Gap Development in Austria
September 5, 2023	Katharina Allinger, Fabio Rumler	247	Inflation Expectations in CESEE: The Role of Sentiment and Experiences
October 16, 2023	Pietro Saggese, Esther Segalla, Michael Sigmund, Burkhard Raunig, Felix Zangerl, Bernhard Haslhofer	248	Assessing the Solvency of Virtual Asset Service Providers: Are Current Standards Sufficient?
October 20, 2023	Pirmin Fessler, Severin Rapp	249	The subjective wealth distribution: How it arises and why it matters to inform policy?
October 27, 2023	Burkhard Raunig, Michael Sigmund	250	Watching over 21,000 Billion Euros: Does the ECB Single Supervisory Mechanism Affect Bank Competition in the Euro Area?
December 5, 2023	Markus Knell	251	Housing and the secular decline in real interest rates
December 14, 2023	Niko Hauzenberger, Florian Huber, Thomas O. Zörner	252	Hawks vs. Doves: ECB's Monetary Policy in Light of the Fed's Policy Stance
February 28, 2024	Lukas Olbrich, Elisabeth Beckmann, Joseph W. Sakshaug	253	Multivariate assessment of interviewer-related errors in a cross-national economic survey

March 5, 2024	Nicolas Albacete, Pirmin Fessler, Atanas Pekanov	254	The Role of MPC Heterogeneity for Fiscal and Monetary Policy in the Euro Area