The Effect of Monetary Policy on Household Consumption Expenditures in Portugal: A Decomposition of the Transmission Channel*

João B. Duarte† Nuno Pereira‡

May 11, 2022

Abstract

We follow Slacalek et al. (2020) monetary transmission decomposition approach to investigate the effects of monetary policy shocks on household consumption expenditures in Portugal since joining the euro area. Extending their analysis to Portugal, we quantify the monetary policy transmission channels using a combination of micro-level household data from the 3rd wave of the Household Finance and Consumption Survey and structural vector autoregressions estimated using aggregate-level data and identified using high-frequency data around monetary policy meetings. We find that the wealthy hand-to-mouth households' consumption has the most significant reaction to monetary shocks because of extensive housing wealth and net interest rate exposure channels. In addition, due to its large size as a group in the Portuguese economy, we find that the wealthy hand-to-mouth households' consumption response explains why the aggregate consumption reacts more to monetary shocks in Portugal than in other European countries.

JEL Classification: D31, E21, E52, E58
Keywords: Consumption, High-frequency Identification, Monetary Transmission, Dynamic Factor Models, VAR, Heterogeneous Agents

*We thank the Fundação Francisco Manuel dos Santos financial support. Joao Duarte acknowledges funding from Fundação para a Ciência e a Tecnologia (UIDB/00124/2020, UIDP/00124/2020 and Social Sciences DataLab - PINFRA/22209/2016), POR Lisboa and POR Norte (Social Sciences DataLab, PINFRA/22209/2016), PTDC/EGE-ECO/7620/2020 and CEECIND/03227/2018.

†Nova School of Business and Economics, Universidade NOVA de Lisboa. Email: joao.duarte@novasbe.pt.
‡Nova School of Business and Economics, Universidade NOVA de Lisboa.

1 Introduction

New monetary policy transmission channels have been unveiled in recent years by incorporating heterogeneous economic agents into standard New Keynesian models. This agenda has been the main objective of the self-named Heterogeneous Agent New Keynesian (HANK) literature. Seminal contributions include Kaplan and Violante (2014), McKay and Reis (2016), Kaplan et al. (2018) and Auclert (2019). While in a standard Representative Agent New Keynesian (RANK), the monetary policy transmission to consumption is almost entirely composed of a direct intertemporal substitution effect, in a HANK model, the transmission is composed of many other direct (partial equilibrium) and indirect (general equilibrium) effects. Namely, direct income effects due to net interest rate exposure, valuation effects from inflation (Fisher effects), and indirect effects stemming from changes in asset prices, labor income and fiscal policy. In addition, by having different agents in the model one can study the consumption responses across different groups of households.

Solving HANK models is challenging and involves advanced numerical methods. As a result, the quantitative decomposition of each monetary policy transmission channel can be difficult to implement. In the face of such difficulties, Slacalek et al. (2020) proposes a back-of-the-envelop approach to decompose the quantitative importance of monetary transmission channels in a HANK model and develop equations corresponding to each separate channel. They then quantitatively measure each channel for Germany, France, Italy, and Spain using micro-level data and a structural VAR model on aggregate data.

In this paper, we extend Slacalek et al. (2020) analysis to Portugal. We follow their decomposition of the monetary transmission channels, empirical definitions and implementation closely. First, we use Portuguese household microdata from the third wave of the Household Finance and Consumption Survey (HFCS) from the European Central Bank (ECB) and, following recent literature on this topic, divide households into three groups according to their possession of assets and liabilities: Non-Hand-to-Mouth (NHtM), Wealthy Hand-to-Mouth (WHtM) and Poor Hand-to-Mouth (PHtM). Second, we calibrate the model parameters. Improving on Slacalek et al. (2020) we use the HFCS data for Portugal to calibrate the marginal propensity to consume of each household[1] — this is only possible since the 3rd wave, as previous waves did not include a question related to how much households would spend when facing a cash windfall. For the parameters for which we do not have data, we used previous literature estimates. Third, using the high-frequency database around monetary policy announcements developed by Altavilla et al. (2019) we construct an external instrument variable for monetary policy shocks. Fourth, we then include this external instrumental variable in a quarterly Vector Autoregressive (VAR) model to identify monetary policy shocks and to estimate how these get transmitted to several macro variables of interest. The

[1] We thank an anonymous referee for suggesting the usage of HFCS 3rd wave data to calibrate the marginal propensity to consume for each household in Portugal.

responses of these aggregates to monetary shocks are essential to quantify monetary policy channels such as those operating through housing and stock prices, for example. Lastly, we feed the analytical decomposition of monetary policy transmission of Slacalek et al. (2020) with data and parameters values from previous steps to quantify each transmission channel.

We find that WHtM households have the most significant reaction to monetary shocks because of large housing wealth and net interest rate exposure effects. Due to its large size as a group in the economy, we find that WHtM households' consumption response explains why aggregate consumption reacts more to monetary shocks in Portugal than in Germany and France. In line with Slacalek et al. (2020) findings for Spain, most of this effect is made through capital gains on housing. The identified importance of housing in the WHtM consumption response in Portugal and Spain is also in line with the findings of Corsetti et al. (2022). For NHtM and PHtM the consumption change following a surprise monetary easing is much more contained. The channels through which monetary transmission is made for these two groups is rather distinct. For the former, the most relevant channel is again housing, while it is the interest rate exposure for the latter.

Our first contribution lies in adding Portugal to the list of countries where consumer responses to monetary shocks decomposition have been studied. Hence, our exercise allows for the comparison of monetary transmission to consumption in Portugal with other EU member states. Our second contribution relates to uncovering the crucial role of the housing channel for monetary transmission in Portugal. Previous literature (Burriel and Galesi (2018), Corsetti et al. (2022) or Slacalek et al. (2020)), has shown that monetary policy decisions made by the ECB deliver heterogeneous effects across member countries and that the source of this heterogeneity correlates with differences in housing markets. Our paper provides evidence that, for Portugal, the larger reaction of aggregate consumption to monetary policy shocks, when compared to other European countries, is indeed driven by monetary policy transmission channels working through housing.

Our paper is organized as follows. Section 2 briefly describes the theoretical model borrowed from Slacalek et al. (2020) that decomposes the monetary transmission to consumption. Section 3 explains the empirical implementation regarding households' division into NHtM, WHtM and PHtM and the respective parameters and the VAR model. Section 4 reports the main findings. Section 5 concludes.

2 Theoretical Framework

To perform the decomposition of the consumption response to monetary policy shocks, it is first necessary to define the channels through which monetary transmission occurs. Hence, we borrow the analytical decomposition of monetary transmission from Slacalek et al. (2020). This decomposition is derived from a HANK model. Since we merely intend to extend their study to

Portugal and for simplicity of exposition purposes, we only describe the main equations that relate to each different channel of monetary transmission to consumption. Hence, we do not show here the full derivation of this decomposition as it can be found, with much more detail, in Slacalek et al. (2020).

There are five transmission channels, each of them corresponding to a different equation. They are divided into direct effects– those that are affected proportionally by the change in the policy interest rate– and indirect effects– those affected proportionally by changes in macroeconomic variables. Our main interest is to investigate the differences in consumption expenditures adjustment between households with different wealth levels. Therefore, each group has a different set of parameters (we discuss their calibration in the empirical implementation) and, in two cases, even a different equation for the same channel, as each group is exposed differently to some effects.

The analytical monetary transmission decomposition entails some assumptions. The elasticities of intertemporal substitution and individual income to aggregate income are assumed to be constant. Also, marginal propensities to consume out of transitory income or wealth do not change after the policy shock, i.e., households may not incur extra savings to prevent an unexpected expense, meaning that there is no change between hand-to-mouth status due to the effect. Notation wise, the formulas on the changes in consumption from the different exposure channels will be depicted as X_i, representing the change in consumption through the X channel for the household type i, with $i = \{NHtM, PHtM, WHtM\}$.

2.1 Direct effects

2.1.1 Intertemporal Substitution Effect

An increase in the interest rate r leads to households increasing their savings in the current period and deferring consumption into the future. The higher the interest rate, the greater is the opportunity cost of buying goods and services today. The first channel is thus given by the following negative relationship between interest rate changes and consumption:

$$IES_i = -\frac{1}{\gamma}(1-\mu_i)c_i \cdot dr \qquad \text{for } i = NHtM, \tag{1}$$

where $\frac{1}{\gamma}$ is the elasticity of intertemporal substitution, $(1-\mu)$ the marginal propensity to save, (being μ the marginal propensity to consume), c the consumption expenditures, and dr the change in the interest rate.

2.1.2 Net Interest Rate Exposure

The second channel that directly exposes households to changes in the interest rate is conditional on their net financial position. Auclert (2019) defines unhedged interest rate exposure (URE) as a measure that captures the difference between all household's maturing assets and liabilities at one period in time, reflecting the gains and losses following an interest rate change. This gain/loss depends on whether the household is a net saver or borrower. Accordingly, for NHtM households, the quantification of the net interest rate channel is defined as:

$$NIE_i = \mu_i[(b_i + y_i - c_i) + \delta_i^B B_i - \delta_i^l l_i] \cdot dr \qquad \text{for } i = NHtM. \tag{2}$$

In this context, b is a short-term liquid asset and y the household income. This formula also includes the difference between the portions δ^B and δ^l of long-term assets B and long-term liabilities l that mature every year.

However, HtM households, i.e., families for which borrowing constraints do bind, are not on the Euler equation as they spend the totality of their income to make ends meet. These households cannot defer consumption, which is given by:

$$c_i = y_i - \underline{b}r - \frac{\delta_i^m m_i}{p} \qquad \text{for } i = PHtM, WHtM, \tag{3}$$

where $\underline{b}$ is the value of the household's unsecured credit limit, δ^m is the proportion of nominal debt that is maturing and p is the price level. Taking the derivative of (3) with respect to r and c, one gets the net interest rate exposure of the PHtM:

$$NIE_i = -\underline{b} \cdot dr \qquad \text{for } i = PHtM. \tag{4}$$

In addition, there is a slight difference between WHtM and PHtM households as the former are (at least partially) homeowners and thus have the possibility of holding adjustable rate mortgages:

$$NIE_i = (-\underline{b} - \delta_i^l l_i) \cdot dr \qquad \text{for } i = WHtM. \tag{5}$$

2.2 Indirect effects

2.2.1 Labor Income Effects

According to the HANK model, which features sticky prices, monetary policy can impact the real economy. Equation (6) is a representation of this statement. A decrease in the current interest rate boosts aggregate demand, which, in turn, leads to higher labor demand and earnings. In

addition, because of incomplete markets, the aggregate shock affects different agents differently. Hence, the income channel of monetary transmission is represented by:

$$INC_i = \mu_i \varepsilon_{y,Y,i} \left(\frac{y_i}{Y}\right) \cdot dY \qquad \text{for } i = NHtM, WHtM, PHtM, \tag{6}$$

where μ is the marginal propensity to consume, $\varepsilon_{y,Y}$ is the elasticity of individual income to aggregate income, $\left(\frac{y}{Y}\right)$ is the share household income relative to aggregate income and dY is the income response following a change in the interest rate.

2.2.2 Fisher Effects

Shifts in the interest rate also affect the real value of debt, namely long-term debt. As stated in Auclert (2019), a cut in r by generating inflation decreases the value of debt, thus benefiting debtors. For NHtM households, the magnitude of the consumption increase due to changes in the value of long-term debt is measured by:

$$NOM_i = \mu_i m_i \cdot dp \qquad \text{for } i = NHtM, \tag{7}$$

where m is a stock of nominal debt and dp the inflation change following an interest rate adjustment. Once again, the equation for Hand-to-Mouth households is different due to the nature of the budget constraint from equation (3). Differentiating it with respect to p and setting p to 1, one gets:

$$NOM_i = \delta_i^m m + i \cdot dp \qquad \text{for } i = WHtM, PHtM, \tag{8}$$

meaning that the so-called Fisher Effect only applies to the proportion of maturing debt.

2.2.3 Capital Gains on Real Assets

Lastly, there is an evaluation of the monetary shock through capital gains on illiquid real assets. Here, we focus on two broader asset categories: stock prices and house prices. The wealth effects occurring through changes in real long-term assets generated following a monetary adjustment are given by:

$$CAP_i^{sto} = \lambda_i \mu_i k_i \cdot dq^{sto} \qquad \text{for } i = WHtM, PHtM \tag{9}$$

$$CAP_i^{hou} = \lambda_i \mu_i k_i \cdot dq^{hou} \qquad \text{for } i = WHtM, PHtM \tag{10}$$

Table 1: Formulas for the change in consumption expenditures for the various exposures

	Channel	Equation
Non Hand-to-Mouth	IES	$-\frac{1}{\gamma}(1-\mu_{NHtM})c_{NHtM}\cdot dr$
	NIE	$\mu_{NHtM}[(b_{NHtM}+y_{NHtM}-c_{NHtM})+\delta^{B}_{NHtM}B_{NHtM}-\delta^{l}_{NHtM}l_{NHtM}]\cdot dr$
	INC	$\mu_{NHtM}\varepsilon_{y,Y,_{NHtM}}\left(\frac{y_{NHtM}}{Y}\right)\cdot dY$
	NOM	$\mu_{NHtM}m_{NHtM}\cdot dp$
	CAP	$\lambda_{NHtM}\mu_{NHtM}k_{NHtM}\cdot dq^{i}$
Wealthy Hand-to-mouth	IES	-
	NIE	$(-\underline{b}-\delta^{l}_{WHtM}l_{WHtM})\cdot dr$
	INC	$\mu_{WHtM}\varepsilon_{y,Y,WHtM}\left(\frac{y_{WHtM}}{Y}\right)\cdot dY$
	NOM	$\delta^{m}_{WHtM}m_{WHtM}\cdot dp$
	CAP	$\lambda_{WHtM}\mu_{WHtM}k_{WHtM}\cdot dq^{i}$
Poor Hand-to-Mouth	IES	-
	NIE	$-\underline{b}\cdot dr$
	INC	$\mu_{PHtM}\varepsilon_{y,Y,PHtM}\left(\frac{y_{PHtM}}{Y}\right)\cdot dY$
	NOM	$\delta^{m}_{PHtM}m_{PHtM}\cdot dp$
	CAP	-

Source: Slacalek et al. (2020) **Note:** The table displays the equations necessary to perform the consumption decomposition of the several transmission channels following a monetary shock.

Slacalek et al. (2020) states that not all households react to real asset price changes and for that reason, only a proportion λ of people will accommodate the gain. The change in consumption expenditures following the adjustment in the interest rate is directly proportional to the marginal propensity to consume out of a capital gain $\lambda\mu$ (which is smaller than μ), to the value of the underlying asset k and to the change in the asset price dq^{i}. For this channel, we use two separate equations (9) and (10) to identify the effects through housing and stock prices. While the equations are similar, it is useful to analyze both effects separately as they entail different policy implications. Table 1 summarizes the decomposition. For further details see section 2 of Slacalek et al. (2020). Notice that there is no equation for the intertemporal substitution channel for HtM households as, by definition, they do not have the option to adjust consumption given their preferences. Therefore, monetary policy yields no effect through this channel for HtM families. By the same token, PHtM households do not have an equation for capital gains on real assets as they do not possess any.

For a given household, the total change in consumption expenditures is given by the sum of the previous five components:

$$dc_i = IES_i + NIE_i + INC_i + NOM_i + CAP_i \qquad \text{for } i = NHtM, WHtM, PHtM \tag{11}$$

The next section presents the estimates, parameters and monetary shock identification that allow for the quantification of each transmission channel.

3 Empirical Implementation

Using data from the third wave of the Household Finance and Consumption Survey, we divide Portuguese households into three categories according to their liquid and illiquid wealth. We then construct an external instrument that is used to identify a monetary policy shock. The intention here is to compute the impulse response functions for several macroeconomic variables to a drop of 100 bps in the Euro Overnight Index Average (EONIA) and use them on the equations for the indirect effects that we presented in the previous section. To get the external instrument, we use a factor model and extract two principal components from changes in the EONIA swap rates for several maturities. Following the same approach as in Slacalek et al. (2020), we focus on the first factor (that corresponds to the so-called *policy target surprise* in Altavilla et al. (2019)), which will be the basis for the instrument. Next, we calibrate the model parameters. For this last part, we borrow some estimates from the existing literature, such as the marginal propensities to consume, the elasticity of intertemporal substitution, and the elasticity of individual income to aggregate income. The list of HFCS variables used in both the household classification and the expenditure decomposition can be found in the appendix in section 6.1. Also, as HFCS does not include a variable for net income, we use Portugal's marginal tax rates from the OECD (see table 5). The present section describes the implementation of all these procedures.

3.1 Household classification

Following the lines of Kaplan et al. (2014), we make a subdivision of households into three categories: NHtM, PHtM and WHtM. First, to be defined as hand-to-mouth, a household must have non-positive net liquid wealth. We define it as liquid assets net of liquid liabilities (see section 6.1 for the specific variables). Second, while poor hand-to-mouth households will have zero or negative net illiquid wealth, wealthy hand-to-mouth households have a positive position of net illiquid wealth (essentially the value real estate property, being it or not the household's main residence, discounted on the amount still owed on those or other properties). The remaining share

of households, NHtM, are grouped and have positive net liquid wealth. For further information, see Slacalek et al. (2020) appendix.

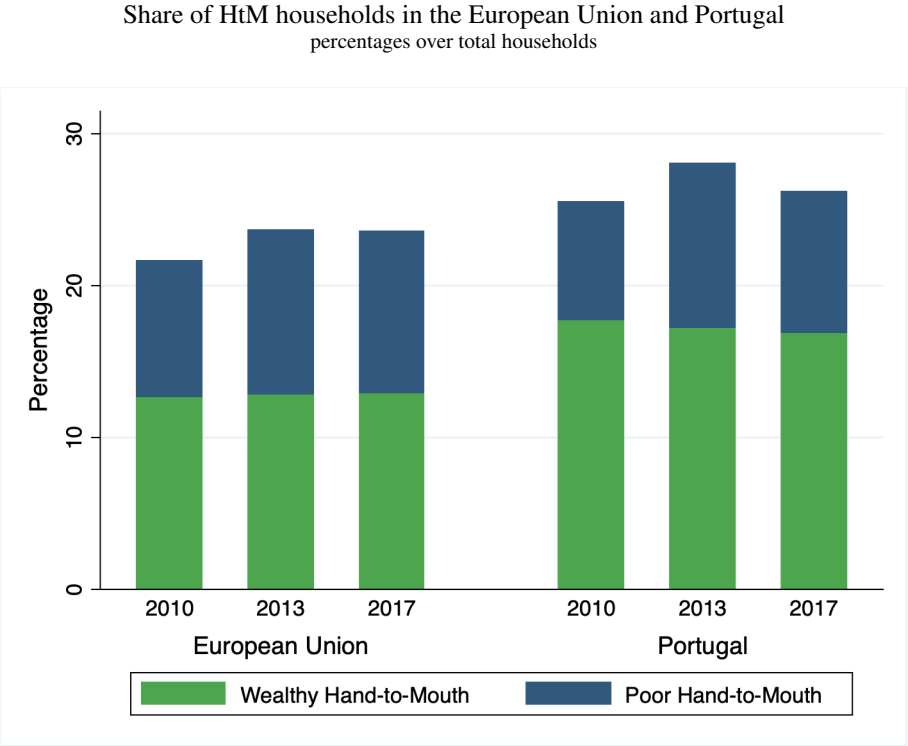
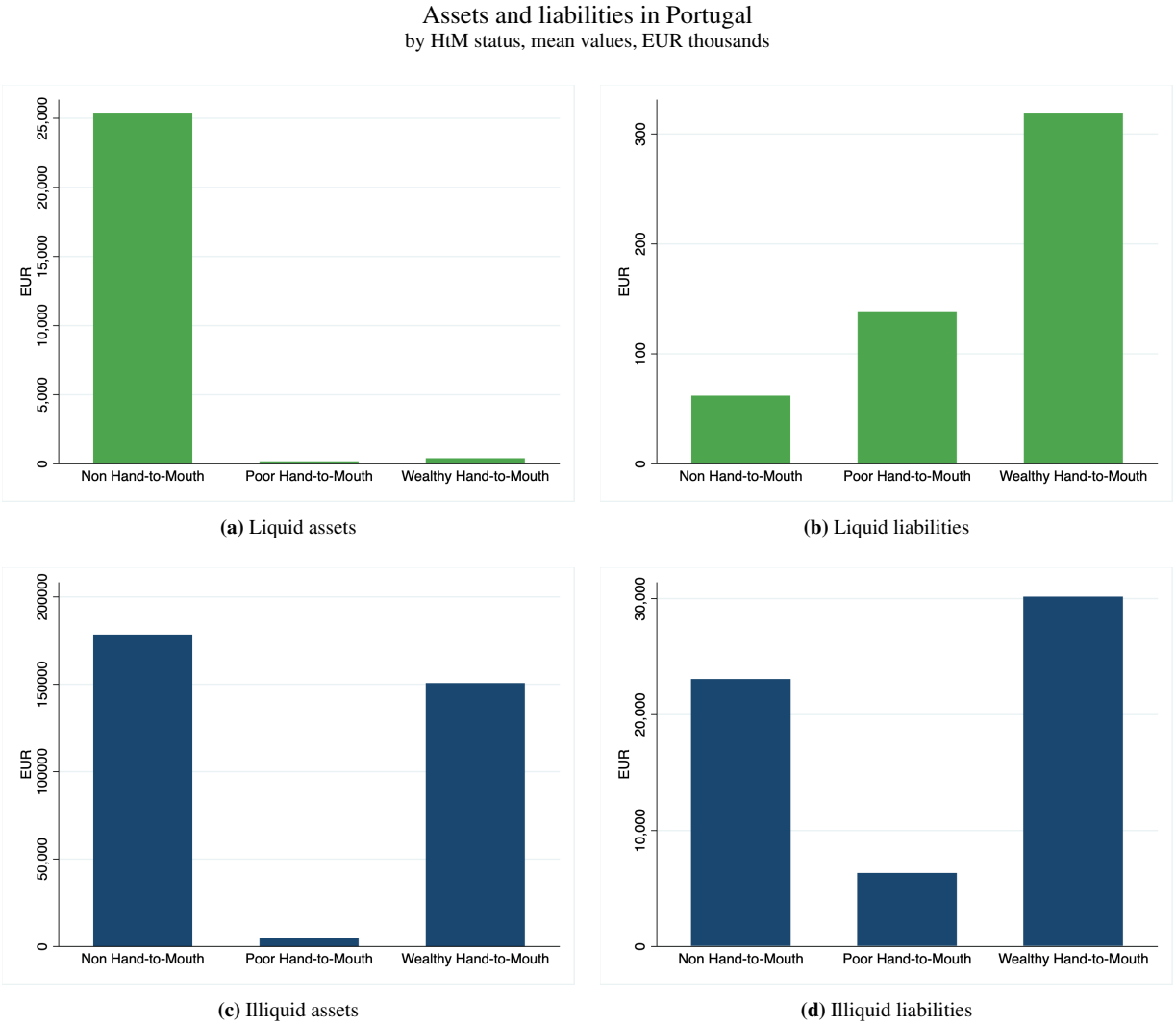


Fig. 1 Share of Hand-to-Mouth households in the European Union and in Portugal in 2010, 2013 and 2017, percent. **Source:** Household Finance and Consumption Survey, waves 1, 2 and 3 **Note:** For consistency purposes we only consider the countries for which there was data in the three waves of the HFCS, namely Austria, Belgium, Cyprus, Germany, Finland, France, Greece, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia and Slovakia.

Figure 1 displays hand-to-mouth households' evolution in the European Union (EU) and Portugal throughout the last decade. Portugal exhibits similar behavior to the European Union average, while having the total percentage of hand-to-mouth families above the EU in the three years analyzed. While the number of WHtM families has stayed stable during this period (around 17% of total households), the amount of Portuguese PHtM households rose by almost three percentage points (from 7.86% to 10.9%) from 2010 to 2013. Then, from 2013 this value decreased again, but to 9.39%, a value still higher than the one from 2010. While the left side of this figure is relevant as a benchmark, Slacalek et al. (2020) perform similar calculations for the four most prominent countries in the Euro Area, unraveling significant country-level heterogeneity regarding the number of hand-to-mouth families in these countries.

Figure 2 shows the mean values for liquid and illiquid assets and liabilities for Portuguese households. Panel (a) shows that, while the mean liquid assets value for NHtM household is set around EUR 25,000, it is EUR 400 and EUR 160 for WHtM and PHtM, respectively. For liquid



(a) Liquid assets

(b) Liquid liabilities

(c) Illiquid assets

(d) Illiquid liabilities

Fig. 2 Assets and liabilities in Portugal by Hand-to-Mouth status, mean values **Source:** Household Finance and Consumption 3rd wave **Note:** Liquid assets are composed by deposits, mutual funds and shares. Liquid liabilities are composed by outstanding balances of non-mortgage loans and adjustable rate mortgages. Illiquid assets are composed by real estate property, self-employment businesses and pensions. Illiquid liabilities are composed by amount owed on real estate mortgages. For more details, see section 6.1.

liabilities (panel (b)) the differences between the three groups are not large, but constrained households are the ones displaying higher debt. The bottom line is that NHtM households have positive holdings of net liquid wealth while hand-to-mouth households have it negative. Panels (c) and (d) illustrate the difference with regards to illiquid wealth. While the values for NHtM and WHtM households do not differ a lot, both in terms of illiquid assets (EUR 178,000 and EUR 150,000, respectively) and liabilities (EUR 23,000 and EUR 30,000, respectively), the situation for the PHtM is rather different with EUR 4,600 in assets and EUR 6,300 in liabilities.

3.2 Household parameters

We borrow some parameters on household characterization from the existing literature, namely the values for the marginal propensities to consume out of a capital gains, the elasticity of intertemporal substitution and the elasticity of individual income to aggregate income.

According to Kaplan et al. (2014), changes in consumption are, to a large extent, driven by the hand-to-mouth households as this type of household spends all their available resources in each period. In theory, hand-to-mouth families will have higher marginal propensities to consume (MPCs) than households that are not constrained, i.e., have savings or access to credit. When we look at the empirical evidence on differences in marginal propensities to consume, the previous result is confirmed, as consumers with little economic means have higher MPCs in general (see for example Jappelli and Pistaferri (2010), Parker et al. (2013), Jappelli and Pistaferri (2014) and Kaplan and Violante (2014)).

For the marginal propensity to consume out of transitory income, the third wave of the HFCS includes a variable that asks each respondent the following question: "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 question allowed one to compute MPC for the three household groups (which was not possible in previous HFCS waves as this question was not included).

Figure 3 displays the densities of the estimated MPC out of transitory income using HFCS data. While the distribution for unconstrained households is more skewed to the right (meaning that when facing a temporary income gain, they spend a smaller relative amount than constrained households), the three distributions are quite similar, suggesting that the MPCs are not as distinct as they are in Slacalek et al. (2020), which set their MPCs out of transitory income at 0.5 and 0.05 for constrained and unconstrained households, respectively, based in existing literature. This considerable difference for NHtM households will affect substantially the final decomposition in section 4 and will be a source of divergence between this study and Slacalek et al. (2020).

As it is common in survey data, we also observe some bunching around some specific values such as at 0, 50 and 100 for the three groups in figure 3. Consequently, one should take these estimates with a grain of salt as they are survey-based and could differ from the actual MPCs (as an example Lovallo and Kahneman (2003) develop the so called *planning fallacy* concept, which explains the tendency to underestimate costs (among other dimensions) of future actions.)

Furthermore, there is a distinction between the marginal propensity to consume out of transitory income and out of wealth as not everyone reacts to capital gains as described in (9) and (10). De Castro (2007) estimates an MPC of 0.03 out of wealth gains in Portugal. While the former

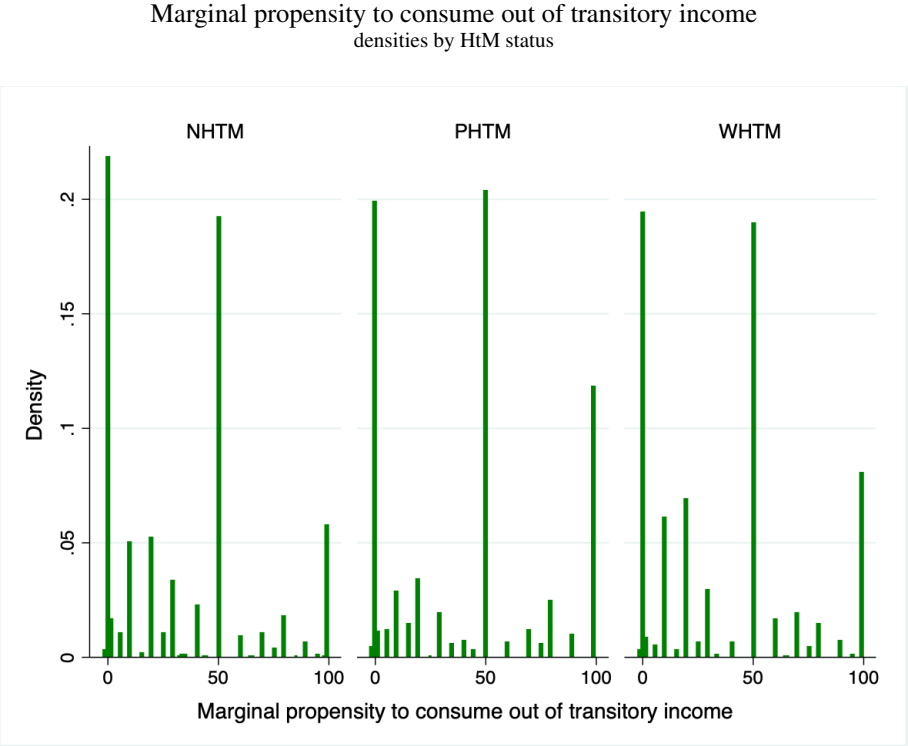


Fig. 3 Marginal propensity to consume out of transitory income for non, poor and wealthy Hand-to-Mouth households. **Source:** Household Finance and Consumption Survey 3rd wave **Note:** The figure display the densities of answers to the question "Imagine you unexpectedly receive money from a lottery, 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?" for each kind of household

study does not present a household separation based on its wealth status, this value seems to be close to an intermediate value between the estimates for NHtM and hand-to-mouth households in Slacalek et al. (2020). Henceforth, we use the MPCs for capital gains from this study, which are presented in table 2.

Two other parameters are necessary for the decomposition exercise: the elasticities of intertemporal substitution and individual to aggregate income. Estimates for the former have been around for the last two decades, and Havránek (2015) finds that these values are positively biased. While the range for this parameter's values is rather large, we follow Slacalek et al. (2020) and set it to 0.5. Regarding the elasticity of individual aggregate income, Lenza and Slacalek (2018) concludes that monetary expansion affects much more incomes at the bottom of the income distribution. Slacalek et al. (2020) results go in line with these findings. As such, we use a weighted average for their values of Spain and Italy. Theses two display similarities with Portugal on reactions to monetary policy shocks (see the reaction of GDP or housing prices to a contractionary monetary shock in Corsetti et al. (2022)). Table 3 summarizes these elasticities.

Table 2: Marginal Propensities to Consume

	Transitory Income	Real Estate Wealth	Stock Market Wealth
Non Hand-to-Mouth	0.25	0.01	0.01
Wealthy Hand-to-Mouth	0.3	0.07	0.07
Poor Hand-to-Mouth	0.5	-	-

Source: Slacalek et al. (2020) and Household Finance and Consumption Survey, 3rd wave **Note:** The table displays the marginal propensities to consume out of transitory income, real estate wealth and stock market wealth.

Table 3: Elasticities

	Elasticity of individual to aggregate income	Elasticity of intertemporal substitution
Non Hand-to-Mouth	0.8	
Wealthy Hand-to-Mouth	1.6	0.5
Poor Hand-to-Mouth	2.4	

Source: Slacalek et al. (2020) **Note:** The table displays the elasticity of individual to aggregate income and the elasticity of intertemporal substitution.

3.3 Modeling monetary policy communication

To identify the monetary policy shocks, we use the policy event-study database (EA-MPD) developed in Altavilla et al. (2019) that reports changes in assets prices following monetary policy announcements made by the Governing Council of the European Central Bank. Before explaining the scenario under which the model is developed, it is relevant to clarify the communication of the policy announcements.

Since the ECB's creation in 1999, monetary policy meetings and announcements have changed several times. It started with two policy meetings a month and shifted to one meeting a month after November 2001. Later, since January 2015, these gatherings have occurred, on average, every six weeks.

After these meetings, the communication goes in the following way: at 13:45 (Central European Time), the ECB releases a short briefing containing all the decisions that were taken regarding the current stance of monetary policy. Later, at 14:30, the ECB president goes on a press conference to explain the reasoning behind each one of the decisions. After this speech, there is a 45-minute session for questions and answers with journalists. Throughout the whole, market participants identify not only the current but also the future monetary policy path and react according to their perceptions. Altavilla et al. (2019) register the changes of several asset prices and yields 10 minutes before the press release until 10 minutes after the communication moment is over in a database that

is routinely updated. Also, they report two moments separately: the press release and the press conference.

The scope of this paper is to study the effect of changes in policy rates. Therefore, unlike Slacalek et al. (2020), we focus only on the press release window instead of the whole monetary event. The rationale behind this decision lies in the fact that all the information regarding changes in policy rates is revealed during the press release disclosure, and asset prices react accordingly. Later, during the press conference, the information disclosed relates more to unconventional monetary policy measures.

The type of monetary policy communication is also relevant in the development of this model. For instance, as shown in Altavilla et al. (2019), during the press release, the surprise perceived by economic agents is relative to policy rates targeting. Later, during the press conference, the surprises are related to medium and long-term information regarding monetary policy, namely forward guidance and Quantitative Easing (QE). Gürkaynak et al. (2005) find that two monetary policy factors affect asset prices in the United States. They interpret the first factor as a target for the federal funds rate and the second as a description of the future monetary policy path, similar to what is described as forward guidance. Based on this analysis, we do a similar one and form a hypothesis where two factors represent surprises that affect asset prices in the Euro Area: changes in policy rates and forward guidance. A third factor that influences asset prices could be QE, as it refers to a more distant horizon for monetary policy than forward guidance. Nevertheless, we abstract from this third factor as QE as it is a relatively recent form of unconventional monetary policy in the Euro Area, and the amount of available data is relatively small. Also, the strength of QE effects is much higher during the press conference (Altavilla et al., 2019). The critical aspect for the analysis is the first factor that corresponds to what Slacalek et al. (2020) calls the current policy surprise.

The biggest challenge in evaluating the true effects of monetary policy shocks lies in its identification, namely in the isolation of the effect of the shock itself. The strategy used here is based on the assumption that all the changes in the financial asset prices occurring during the whole monetary event are caused only by the communication moment. By being a relatively narrow time window, it is unlikely that changes in asset prices to be caused by sources other than the central bank communication. Using high-frequency data and following the procedure of Corsetti et al. (2022) allows for the creation of an external instrument variable that is exclusively correlated with the monetary shock. To create an instrument for monetary policy shocks, we select the changes in the Euro Area Overnight Indexed Swap (OIS) rates for 1-week, 1-, 3-, 6-months, 1- and 2-year maturities during policy communication from the EAMPD database that take place during the press release window. By being the reference overnight rate for intra-bank lending until the end of 2021, EONIA was in the front line for the monetary policy transmission (Linzert and Schmidt, 2011), and for that reason, it is closely monitored by the ECB. We follow Corsetti et al. (2022) and Slacalek

et al. (2020) and use changes in this rate for measuring monetary surprises in the Euro Area.

Assuming that changes in OIS swap rates that occur within the press conference window for each day, from 13.25 to 14.10, are caused only by the monetary policy announcements, we estimate a Factor Model using those changes. The framework under which we identify monetary policy shocks starts with the following equation:

$$X_t = \Lambda F_t + e_t \tag{12}$$

where $\boldsymbol{X_t}$ and $\boldsymbol{e_t}$ are n x 1 matrices corresponding to a series of macroeconomic observable variables and disturbance errors, respectively, $\boldsymbol{\Lambda}$ is a n x m matrix of factor loadings and $\boldsymbol{F_t}$ is a m x 1 matrix of unobserved factors, corresponding to "Target" and "Forward Guidance". Applying the general model in (12) to the specific case of our study yields:

$$\begin{bmatrix} OIS\ 1W_t \\ OIS\ 1M_t \\ OIS\ 3M_t \\ OIS\ 6M_t \\ OIS\ 1Y_t \\ OIS\ 2Y_t \end{bmatrix} = \begin{bmatrix} \lambda_{11} & 0 \\ \lambda_{12} & 0 \\ \lambda_{13} & \lambda_{23} \\ \lambda_{14} & \lambda_{24} \\ \lambda_{15} & \lambda_{25} \\ \lambda_{16} & \lambda_{26} \end{bmatrix} \begin{bmatrix} f_{1t} \\ f_{2t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \end{bmatrix} \tag{13}$$

Another relevant aspect of the identification strategy lies in dissociating the effects of forward guidance on the short-sighted OIS. To do so, we force λ_{21} and λ_{22} to be zero so that all fluctuations during the monetary window occur due to changes in policy rates. A similar procedure is done by Altavilla et al. (2019) and Slacalek et al. (2020). We follow Stock and Watson (2016) for the estimation of the parameters. For a principal components estimation, one needs to solve the following least-squares minimization:

$$\underset{F_1,\ldots,F_T,\Lambda}{\text{minimize}} \quad \frac{1}{NT}\sum_{t=1}^{N}(X_t - \Lambda F_t)'(X_t - \Lambda F_t) \tag{14}$$

N being the number of observations for the time series in question and T the number of latent factors. Then, it is possible to get estimators both for $\boldsymbol{F_t}$ and $\boldsymbol{\Lambda}$ as follows:

$$\hat{F}_t = N^{-1}\hat{\Lambda}' X_t \tag{15}$$

$\boldsymbol{\Lambda}$ being the two eigenvectors associated with the highest eigenvalues of the variance-covariance matrix of the observed variables $\boldsymbol{X_t}$:

$$\hat{\Sigma}_X = T^{-1} \sum_{t=1}^{T} X_t X_t' \tag{16}$$

After the estimation, we are left with two factors with 245 observations, matching the number of policy announcements from 2000 to 2019. As the main interest of this study is to investigate the effects of surprises in policy rates, we focus on the first factor to build a quarterly instrument of communication shocks, z_t. As mentioned before, the structure of monetary policy communication has not always been the same, meaning that our data does not have a regular frequency. To overcome this, we sum the first factor's values for each quarter and get a regular quarterly time series for z_t. This new variable is then introduced in a VAR model that is presented in the following subsection. We end up with a time series for 80 quarters, which goes from the first quarter of 2000 to the fourth quarter of 2019.

3.4 Vector Autoregressive Model for Monetary Shocks

To estimate the impulse response functions (IRFs) of a negative monetary policy shock on several macrovariables, we construct a 1-lag (according to the Schwarz information criterion) quarterly VAR with the following components: the constructed indicator z_t, the EONIA rate, a house price index, the Harmonized Index of Consumer Prices (HICP), GDP, non-durable consumption and a stock price index (see section 6.3 for more details on these series). Nevertheless, we estimate two smaller VAR models instead to overcome the burden of estimating a VAR with seven variables. In addition to the external instrument z_t, which is included in both models, the first one is also composed of the EONIA rate and the HICP and the second model contains GDP, non-durable consumption and indices for house and stock prices. The external instrument and the EONIA rate enter the VAR without transformations. The HICP is in quarterly differences, while the remaining variables are in log levels. We estimate the IRFs on the first VAR with a shock on the monetary instrument z_t big enough to cause an initial drop of EONIA by 100 basis points, unraveling the response of the HICP as well. After that, we follow a similar procedure on the second VAR, i.e., we compute the IRFs after a shock on z_t with the same size as the one in the first VAR and get the responses of the remaining variables.

We plot the series of the estimated instrument for monetary policy shocks z_t in figure 4. One can observe that these shocks' magnitude has not always been the same since the beginning of the millennium. While in the first years, volatility was higher in the sense that a negative shock was followed by a positive one (and vice versa), between 2003 and 2008, it decreased significantly. Later, during the period characterized by the great recession and the European sovereign debt crisis, volatility increased once again. Finally, in 2015 when the ECB's rates became closer to the zero lower bound, these shocks' magnitude is closer to zero.

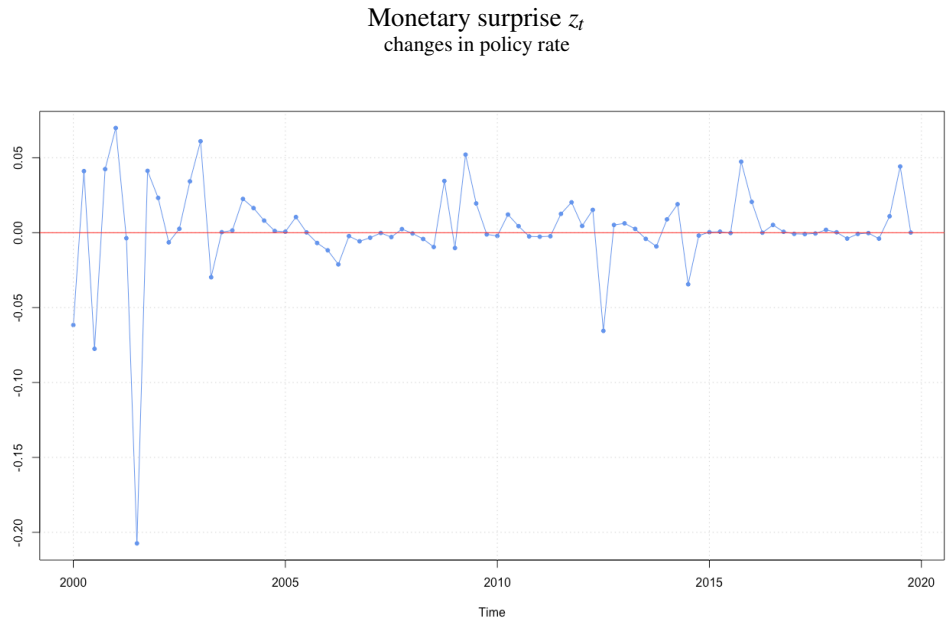


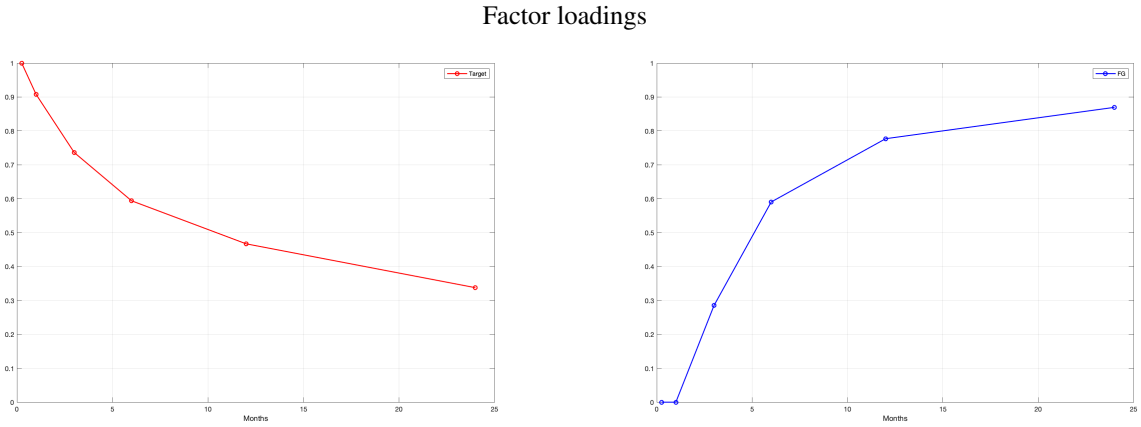
Fig. 4 Monetary surprise z_t from 2000 to 2019 **Note:** The figure shows the time-series of the monetary surprise variable, built by summing the intra-day values for each quarter of the first factor model, which corresponds to changes in policy rate made by the European Central Bank.

This scenario gives strength and robustness to the policy surprise z_t as it matches the Euro Area's macroeconomic narrative during these 20 years. Another relevant aspect is to examine the lambdas from equation 13, presented in figure 5. These figures go in line with our main hypothesis that the first factor corresponds to surprise changes in policy rates and the second factor to guidance about the future path of monetary policy in the medium-run. A similar result is obtained in Altavilla et al. (2019), as the target factor affects the OIS with the shorter maturities more than the ones with longer maturity and the inverse situation for the forward guidance factor.

Figure 6 displays the impulse response functions of the most relevant variables following a monetary easing that leads to an initial drop of the EONIA rate of -100 basis points. The black line represents the median value, while the blue bands denote the 16 to 84 and 5 to 95 percentiles, respectively. While on the one hand, there is still a lack of a common agreement regarding the effects of monetary policy surprises in the European countries (as it is a relatively recent topic and there is still a small amount of literature, particularly for Portugal), on the other hand, the results obtained seem to be relevant from a theoretical point of view.

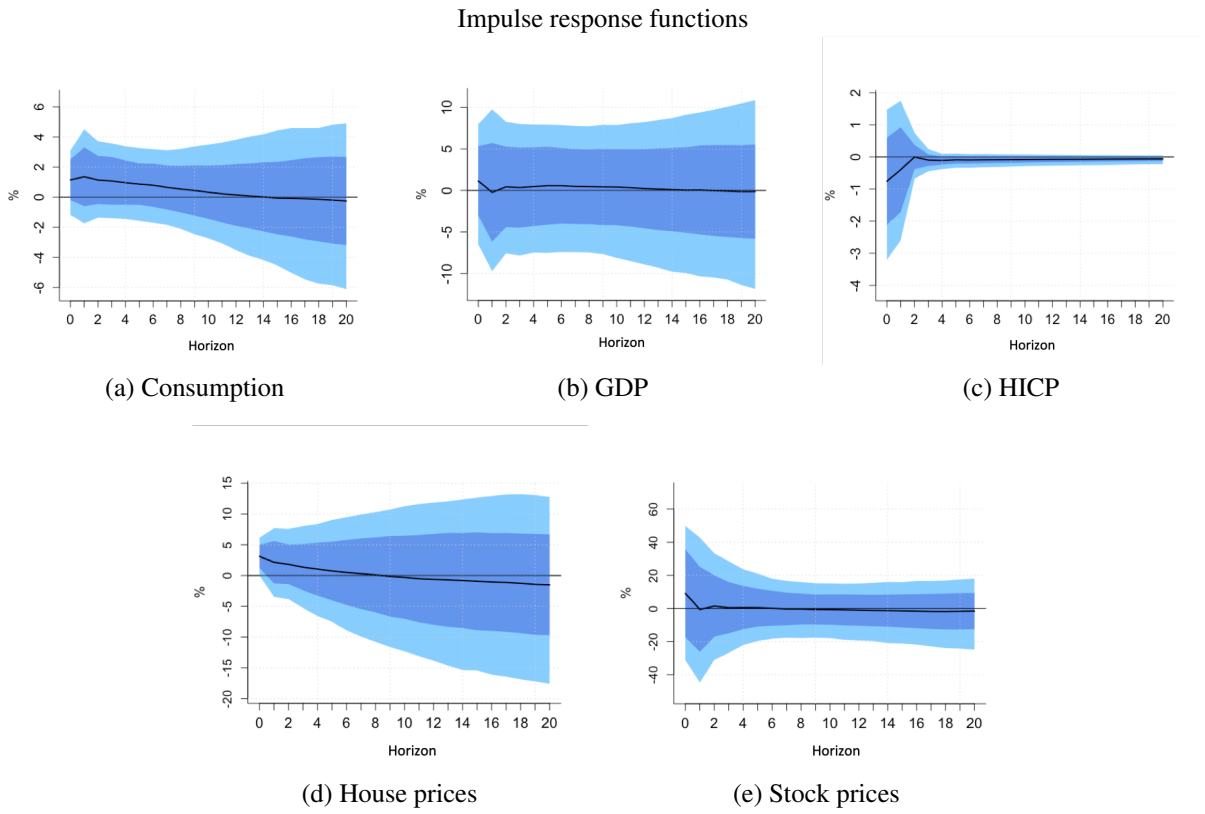
To abstract from measurement error and to go in line with the approach of the reference for this study, we ignore the responses at the impact and focus on the average of the median values of the IRFs for the quarters 1 to 3 on the remaining of the analysis.

Non-durable consumption displays a positive reaction following the monetary easing, showing that consumption is a strong channel for monetary policy transmission, a conclusion that goes in



(a) Target **(b)** Forward Guidance

Fig. 5 Factor loadings for the press release for the following OIS maturities: 1-week, 1-, 3- and 6-months, 1- and 2-years. **Note:** All loadings are normalized so that the first loading on equation 13 has unit size (λ_{11}).



(a) Consumption (b) GDP (c) HICP

(d) House prices (e) Stock prices

Fig. 6 Impulse responses of non durable consumption, GDP, HICP, house prices and Portuguese stock prices following a monetary shock that leads to a fall of the interest rate of -100bp. **Source:** see section 6.3 **Note:** The black line represents the median values for 1,000 draws. The blue bands delimit the 16-84 and 5-95 percentiles of the distribution.

line with Lenza and Slacalek (2018). Not only does it display a positive response following the shock, but this effect remains persistent throughout time. This result seems considerably consistent

with the findings of Corsetti et al. (2022) that estimate a negative and persistent effect on private consumption after a contraction of 25 bp in interest rates. For consumer prices, the negative reaction might be surprising but this result is in line with Corsetti et al. (2022) who estimate a positive of response of prices in Portugal to a monetary contraction. Their results suggest that prices react differently across the Euro Area.

House prices are also responsive to monetary policy shocks. In Portugal, house prices also tend to go up following a monetary easing, an event also observed in Spain (Slacalek et al., 2020). In Slacalek et al. (2020), the authors find that the capital gains through housing are the largest effect on Spain's consumption expenditures, particularly for WHtM households. Portugal seems to display a similar narrative, as it will be seen in figure 7. However, this effect seems to fade over a longer horizon. Table 4 summarizes the values used for the consumption decomposition. As mentioned previously, we use the average of the median values of the impulse responses for quarters 1 to 3. The last step is to to feed all the ingredients into the analytical decomposition described in section 2. We present our main results in the next section.

Table 4: IRFs summary estimates

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 5	Average 1-3
Stock prices	-0.58	1.49	0.47	0.55	0.52	0.47
Consumption	1.4	1.14	1.07	0.96	0.86	1.19
House prices	2.15	1.82	1.35	1.03	0.72	1.77
HICP	-0.40	0.00	-0.10	-0.11	-0.09	-0.17
GDP	-0.23	0.43	0.34	0.46	0.58	0.18

Source: see section 6.3 **Note:** The table displays the median values of the impulse responses following a monetary easing of 100 bp for quarters 1, 2, 3, 4 and 5 and the average values for quarters 1 to 3.

4 Results

In this section, we show the consumption expenditures response to monetary surprises decomposition results. Figure 7 displays the magnitude of each channel in the consumption response for each one of the household types (with the respective confidence intervals in table 6 in the appendix). We start by analyzing the effects on the WHtM, as they are the ones where the change in consumption expenditures is greater with an increase of 7.3% on average. The majority of this change is made through the housing channel, which accounts for six percentage points. Being net debtors, as shown in panels (a) and (b) from figure 2, WHtM families benefit from an interest rate

drop as the value of their short-term debt decreases with the net interest rate channel accounting for 1.3 percentage points. The third major effect is the income effect accounting for 0.2 percentage points. As the reaction from HICP is negative, the Fisher effect is also negative with -0.1 percentage points.

While the monetary surprise affects the three different groups distinctively, the composition of PHtM households' response is similar to WHtM except for one aspect: the housing channel. This is no surprise, as the difference between the two groups is the amount of net illiquid wealth one possesses and the other not. The strongest effect for this group is through the interest rate exposure channel (0.5 percentage points) as a typical PHtM household is also a net debtor. The income effect accounts for 0.3 percentage points and the Fisher is negative but very close to zero.

Lastly, NHtM households display a consumption reduction following the monetary shock of -1.4%. Part of this small value is caused by two negative channels. First, NHtM households are, on average, net creditors, and thus, they are subject to an adverse effect through the interest rate exposure channel (-2.2 percentage points). Second, this seems to be the group to be most affected by the decrease in the price level (-0.4 percentage points). With regards to the positive effects, the housing channel leads, accounting for 0.7 percentage points, followed by the intertemporal substitution effect (which is unique to this group) with 0.4 percentage points. The income effect is almost nonexistent (0.1 percentage points).

Regarding the capital effects through stocks (only applied to NHtM and WHtM households), one must consider that this analysis considers only holdings of Portuguese stocks, meaning that capital gains based on international stocks are ignored. This occurs because, according to the HFCS data, the distribution of Portuguese stocks is extremely uneven (see figure 8 in the appendix), which makes the effects of the monetary policy shock almost null.

As this study is an extension to Slacalek et al. (2020), it is relevant to analyze our results in the light of its main predecessor. Slacalek et al. (2020) perform the consumption decomposition in Germany, Spain, France and Italy. On the aggregate level, they find that the main driver of NHtM consumption increase is the intertemporal substitution effect accounting for more than 70% of the total increase. Housing, stocks and the income effect have the same positive magnitude accounting for most of the remaining increases. Regarding hand-to-mouth households, the most important channel is the income effect, particularly for PHtM households. Wealthy Hand-to-Mouth are the ones where the consumption increase is the bigger of all three groups. In addition to the income effect, the housing and the net interest rate exposure are also relevant for this group. Overall, their main statement is monetary policy shocks unravel very different quantitative responses from these three types of households. Also, the channels through which monetary transmission is made differ from household to household. However, the authors find that the decomposition yields different results in the four countries where they perform the analysis. While the magnitude of the

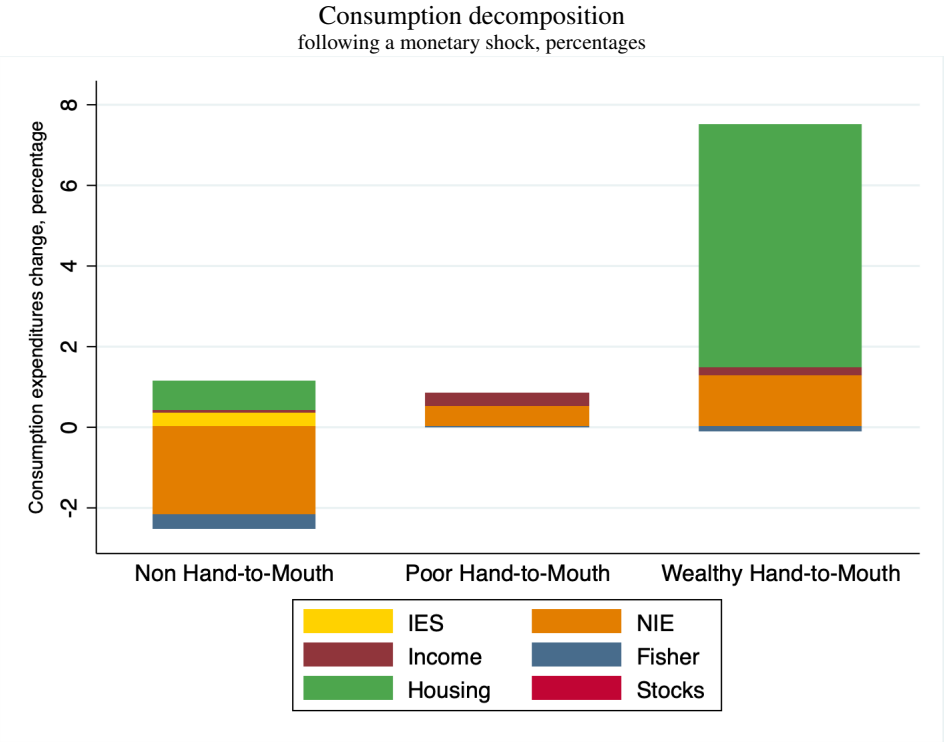


Fig. 7 Consumption response following an initial fall on EONIA rate of 100bp, by Hand-to-Mouth status. **Source:** Household Finance and Consumption Survey 3rd wave **Note:** The figure displays the decomposition of the consumption increment following a monetary easing into six channels: intertemporal substitution (IES), net interest rate exposure (NIE), labor income, long-term debt (Fisher), capital gains on housing wealth and capital gains on stock market wealth.

intertemporal substitution effect seems reasonably similar in all countries, the remaining effects differ mainly in Spain and Germany (the countries with the largest and lower responses, respectively). They state that the aggregate impulse response functions explain the main difference in the indirect effects following a monetary shock. For instance, the housing channel's size is rather significant in Spain than in Germany because Spain displays a higher homeownership rate and more sensitive house prices. France and Italy remain as middle points between the other two extremes.

When compared with the results from Slacalek et al. (2020), the main contrast is on the net interest rate exposure for non Hand-to-Mouth households and its roots lie in the values for the MPC. Using the same estimate of 0.05 for the MPC out of a transitory income would yield a small but positive increase in consumption expenditures with 0.1% for this group. Nevertheless, for consistency purposes we proceeded with the decomposition using our estimate of MPC using HFCS data.

In addition, our findings also show a similarity of Portuguese and Spanish household's reactions. In both countries, the vastly better group is wealthy Hand-to-Mouth, and the most significant effect is through the housing channel. Portugal and Spain have higher homeownership rates than other European countries (like France and Germany) and this dominance of the housing channel

goes in line with that fact. The significant difference between Slacalek et al. (2020) and this study lies in the behavior of the Fisher effect due to the negative response of the HICP on our VAR model.

5 Conclusion

In this paper, we follow Slacalek et al. (2020) to perform a decomposition of the change in Portuguese households' consumption expenditures following a shock that leads to a fall on the EONIA rate by -100 basis points. We combine high-frequency data to identify monetary shocks with household-level data and estimates from a VAR model to perform this decomposition.

Our results show that households consumption in Portugal reacts similarly to Spain and quite differently from France and Germany, which gives strength to the premise that there is heterogeneity among Eurozone members. WHtM households are the ones with the most significant consumption increase, followed by PHtM and NHtM households. In line with Slacalek et al. (2020), households that are constrained are the ones where monetary policy shocks impact the most. Regarding macroeconomic variables, this sort of monetary shock appears to generate positive and permanent impacts on consumption and house prices, while it generates a strong positive impact on the stock market that appears to vanish after some time.

Our results motivate a deeper investigation of the transmission channels of monetary policy. High levels of heterogeneity within and between members of the Euro Area provide a worthwhile experiment setting to disentangling each channel's quantitative importance. We leave such considerations to future research.

Declarations

Funding

We thank the Fundação Francisco Manuel dos Santos financial support. Joao Duarte work was funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, LISBOA-01-0145-FEDER-022209), POR Lisboa (LISBOA-01-0145-FEDER-007722, LISBOA-01-0145-FEDER-022209) and POR Norte (LISBOA-01-0145-FEDER-022209).

Conflicts of Interest/Competing interests

Not applicable.

Availability of data and material

The data from HFCS data is not publicly available. Joao Duarte was granted access to the data for research purposes following the ECB microdata request procedure.

Code availability

All code was written in R, Stata and Matlab and can be made available.

References

Altavilla, C., L. Brugnolini, R. S. Gürkaynak, R. Motto, and G. Ragusa (2019). Measuring euro area monetary policy. *Journal of Monetary Economics 108*, 162–179.

Auclert, A. (2019). Monetary policy and the redistribution channel. *American Economic Review 109*(6), 2333–67.

Burriel, P. and A. Galesi (2018). Uncovering the heterogeneous effects of ecb unconventional monetary policies across euro area countries. *European Economic Review 101*, 210–229.

Corsetti, G., J. B. Duarte, and S. Mann (2022). One Money, Many Markets. *Journal of the European Economic Association 20*(1), 513–548.

De Castro, G. L. (2007). The wealth effect on consumption in the portuguese economy. *Bank of Portugal Economic Bulletin 13*, 37–55.

Gürkaynak, R. S., B. P. Sack, and E. T. Swanson (2005). Do actions speak louder than words? the response of asset prices to monetary policy actions and statements. *International Journal of Central Banking 1*, 55–93.

Havránek, T. (2015). Measuring intertemporal substitution: The importance of method choices and selective reporting. *Journal of the European Economic Association 13*(6), 1180–1204.

Jappelli, T. and L. Pistaferri (2010). The consumption response to income changes. *Annu. Rev. Econ. 2*(1), 479–506.

Jappelli, T. and L. Pistaferri (2014). Fiscal policy and mpc heterogeneity. *American Economic Journal: Macroeconomics 6*(4), 107–36.

Kaplan, G., B. Moll, and G. L. Violante (2018). Monetary policy according to hank. *American Economic Review 108*(3), 697–743.

Kaplan, G. and G. L. Violante (2014). A model of the consumption response to fiscal stimulus payments. *Econometrica 82*(4), 1199–1239.

Kaplan, G., G. L. Violante, and J. Weidner (2014). The wealthy hand-to-mouth. *Brookings Papers on Economic Activity*, 139–153.

Lenza, M. and J. Slacalek (2018). How does monetary policy affect income and wealth inequality? evidence from quantitative easing in the euro area. Technical report, ECB Working Paper.

Linzert, T. and S. Schmidt (2011). What explains the spread between the euro overnight rate and the ecb's policy rate? *International Journal of Finance & Economics 16*(3), 275–289.

Lovallo, D. and D. Kahneman (2003). Delusions of success. *Harvard business review 81*(7), 56–63.

McKay, A. and R. Reis (2016). The role of automatic stabilizers in the us business cycle. *Econometrica 84*(1), 141–194.

Parker, J. A., N. S. Souleles, D. S. Johnson, and R. McClelland (2013). Consumer spending and the economic stimulus payments of 2008. *American Economic Review 103*(6), 2530–53.

Slacalek, J., O. Tristani, and G. L. Violante (2020). Household balance sheet channels of monetary policy: A back of the envelope calculation for the euro area. *Journal of Economic Dynamics and Control 115*, 103879.

Stock, J. H. and M. W. Watson (2016). *Dynamic factor models, factor-augmented vector autoregressions, and structural vector autoregressions in macroeconomics*, Volume 2. Elsevier.

6 Appendix

6.1 HFCS 3rd ave variables

Consumption

hi0220 - monthly expenses on consumer goods and services

Income

di1300 - rental income from real estate property

di1400 - income from financial assets

di1412 - interest payments

di1500 - income from pensions

di1420 - income from private business other than self-employment

di1600 - Regular social transfers (except pensions)

di1700 - income from regular private transfers

di1800 - income from other sources

di2000 - total household gross income

Liquid assets

da2101 - deposits

da2102 - mutual funds

da2103 - bonds

da2105 - shares, publicly traded

Liquid liabilities

dl1210 - outstanding balance of credit line/overdraft

dl1220 - outstanding balance of credit card debt

dl1230 - outstanding balance of other non-mortgage loans

Illiquid assets

da1110 - value of household's main residence

da1120 - value of other real estate property

da1140 - value of self-employment businesses

da2109 - voluntary pension/whole life insurance

pf0710 - current value of all occupational pension plans that have an account

Illiquid liabilities

hb170$ - household main residence mortgage $x: amount still owed

hb180$ - household main residence mortgage $x: adjustable interest rate

hb370$ - other property mortgage $x: amount still owed

Stocks

hd1510 - value of publicly traded shares

hd1520 - any shares issued by foreign companies? (1 - Yes, 2 - No)

6.2 Marginal tax rates

Table 5: Tax rates for Portugal, 2014

Taxable Income (€)	Tax Rate (%)
$<$ 7,000	14.5
€7,000 - 20,000	28.5
€20,000 - 40,000	37
€40,000 - 80,000	45
$>$ €80,000	48

Source: OECD Tax Database https://stats.oecd.org/index.aspx?DataSetCode=TABLE_I1

6.3 Sources for macroeconomic variables

Interest rate

Euro area (changing composition) - Money Market - Eonia rate - Historical close, average of observations through period. End of March, June, September and December are used as quarterly values. Source: European Central Bank

Non-durable consumption

Private consumption of resident households by durability - chain linked volume data. Sum of consumption of non-durable goods and services Source: Statistics Portugal, National Accounts

House prices

The nominal house price index covers the sales of newly-built and existing dwellings. Source: OECD

Stock prices

A share price index measures how the value of the stocks on the national stock exchange in the index is changing. Source: OECD

HICP

Portugal - HICP - Overall index, Monthly Index, seasonally adjusted by the authors. Quarterly values are obtained by averaging monthly values. Source: European Central Bank

GDP

Gross domestic product at market prices - Portugal - Total economy, Euro, Current prices. Seasonally adjusted by the authors. Source: European Central Bank

6.4 Portuguese stock market wealth

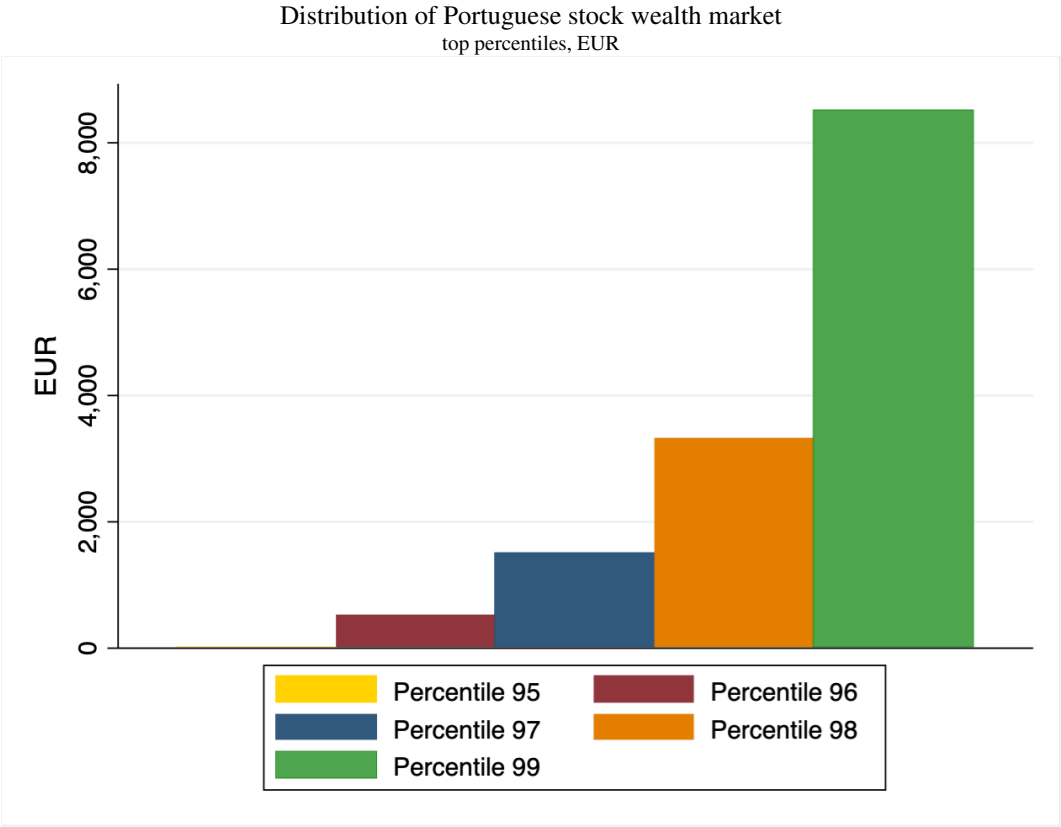


Fig. 8 Percentiles 95, 96, 97, 98 and 99 of Portuguese stock market wealth, EUR **Source:** Household Finance and Consumption Survey 3rd wave

Table 6: Decomposition means and confidence intervals

		Mean	Std. Err.	95% confidence interval
IES	Non Hand-to-Mouth	.3551618	.0000000	[.3551618, .3551618]
	Wealthy Hand-to-Mouth	0	(omitted)	
	Poor Hand-to-Mouth	0	(omitted)	
NIE	Non Hand-to-Mouth	-2.179129	.0011182	[-2.181321, -2.176938]
	Wealthy Hand-to-Mouth	1.280615	.0008189	[1.27901, 1.28222]
	Poor Hand-to-Mouth	.49714	.0002086	[.4967312, .4975488]
Fisher	Non Hand-to-Mouth	-.3554657	.0001817	[-.3558219, -.3551095]
	Wealthy Hand-to-Mouth	-.1154122	.0001212	[-.1156498, -.1151746]
	Poor Hand-to-Mouth	-.0247527	.0001616	[-.0250694, -.0244361]
Income	Non Hand-to-Mouth	.0718804	.0000122	[.0718566, .0719042]
	Wealthy Hand-to-Mouth	.1865197	.0001255	[.1862736, .1867657]
	Poor Hand-to-Mouth	.3423026	.0001436	[.3420211, .3425841]
Housing	Non Hand-to-Mouth	.7226838	.0001959	[.7222999, .7230676]
	Wealthy Hand-to-Mouth	6.028855	.0030868	[6.022805, 6.034905]
	Poor Hand-to-Mouth	0	(omitted)	
Stocks	Non Hand-to-Mouth	.0009333	.0000069	[.0009196, .0009469]
	Wealthy Hand-to-Mouth	.0000418	.0000005	[.0000407, .0000429]
	Poor Hand-to-Mouth	0	(omitted)	

Source: Household Finance and Consumption Survey 3rd wave **Note:** The table displays the mean, standard errors and confidence intervals for the several monetary transmission channels equations by Hand-to-Mouth status following a monetary shock that leads to fall of 100 bp in the interest rate