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Abstract: The crux of policy analyses rests with its effectiveness in altering consumer behavior. However, the vast difference across individuals gives rise to a substantial variation in their response to policy shocks. One of representative heterogeneities is the level of liquid assets held by each family. Using the macro-level and household-level data from 20 European countries, this paper attempts to unravel how Hand-to-Mouth (HtM) households, who retain little or no liquid wealth, affects the transmission of fiscal or monetary measures. After separating poor HtM from wealthy HtM consumers, we discover that both are able to ameliorate spending (tax) multipliers. Additionally, we detect a similar role of HtM families in improving the efficacy of monetary policies.

Keywords: Fiscal Multiplier; Monetary Shock; Hand-to-Mouth; Household Heterogeneity

JEL Classification: E21, E62, H20

1. Introduction

In the face of severe economic downturn, massive relief measures are always an inevitable option for policymakers in any countries. Due to the recent Coronavirus breakout, some economies (e.g., UK and U.S.) adopt the coordinated policy mix to combat the pandemic-driven recession, whereas others (e.g., ECB) emphasize more on fiscal support than rate cuts. Against this backdrop, the debate grows over which course of action performs better in addressing economic maelstrom (Blanchard and Perotti, 2002). Essentially, the effectiveness of macroeconomic policies heavily hinges on how individuals react to external shocks dissimilarly. Consistent with previous literature (Kaplan and Violante, 2014; Kaplan, Violante, and Weidner, 2014), the most convenient way to capture heterogeneous household response is to recognize the presence of Hand-to-Mouth (HtM) families, who tend to consume all disposable incomes in each pay-period. Because of keeping little or no liquid assets, HtM agents are more vulnerable to macroeconomic turbulences relative to non-HtM counterparts. Thus, it is plausible to expect that HtM households matter to the policy effectiveness.

According to Kaplan et al. (2014), HtM households generally manifest a high marginal propensity to consume (MPC) given temporary income shocks. Such an inference persists although HtM families hold no (poor HtM) or ample illiquid assets (wealthy HtM). The rationale behind is that liquidity constraints prompt HtM agents to increase their inclinations to spend more if receiving a windfall income. When the change of transitory incomes is induced by either fiscal or monetary measure, the existence of HtM population would affect the policy transmission, which ultimately strengthen or weaken its efficacy. Therefore, our paper aims to shed light on this issue by investigating how HtM households interact with both fiscal

multipliers and monetary shocks. More importantly, our empirical findings can yield some insights into the pervasive controversy surrounding which type of initiative acts as a more effective manner in managing the macro-economy: fiscal or monetary.

In light of prior research (Ilzetzki, Mendoza, and Vegh, 2013; Nakamura and Steinsson, 2014), a lot of macro-level determinants are identified to impact the magnitude of fiscal multipliers, such as the trade openness, degree of development, level of governmental debt, exchange rate regime, and recession status. However, little attention is directed to the micro-level variable that are equally of importance to the success of macro-control stimulus. To fill this literature gap, the present study attempts to probe the specific role of household heterogeneity in fiscal and monetary interventions.

Our paper resembles Farhi and Werning (2016), Kaplan and Violante (2014), and Kaplan et al. (2014). Kaplan and Violante (2014) develops a model to rationalize wealthy HtM and verify their prevalence in U.S. Meanwhile, Kaplan et al. (2014) report favorable evidence in line with the occurrence of wealthy HtM in eight countries. Besides, Farhi and Werning (2016) theoretically corroborate that liquidity-constrained HtM agents help magnify the multiplier for temporary shocks of government spending. By contrast, our article demonstrates its distinction in four aspects. First, we take advantage of the micro-level survey conducted in 20 European markets to inspect the role of HtM households in policy efficacy, allowing us to draw a more generalized conclusion based on a cross-country study. Second, two empirical approaches, consisting of SVAR and local projection models, are leveraged to ensure that reliable statistical inferences can be made. Third, unlike related work focusing on wealthy HtM, we compare poor HtM with wealthy HtM after gauging respective impact on the policy transmission. Lastly, we

look into the interdependence between HtM families and monetary interferences, which is missing in these papers.

When it comes to fiscal shocks, we uncover the contributing role of wealthy HtM irrespective of how to quantify the policy effectiveness. Concretely, we detect a significantly positive (negative) association between wealthy HtM and spending (tax) multipliers, suggesting that increased government spending (reduced tax levy) appear more effective in fueling the growth for countries with greater wealthy HtM. With regard to poor HtM, the positive effect prevails for spending multipliers, whereas we cannot witness the significance if evaluating tax multipliers. These findings comply with Kaplan and Violante (2014), who unveil that wealthy HtM households generate a bigger MPC out of tax cuts relative to poor HtM ones. Put differently, the stimulation of tax reduction vanishes for poor HtM agents in that they are taxed less at the beginning. Finally, we document that wealthy and poor HtM families benefit the transmission of monetary shocks.

This paper makes several contributions to the extant literature. First, we dissect how fiscal multipliers are associated with HtM households located in 20 European countries, which complements Farhi and Werning (2016) and Kaplan and Violante (2014) by rendering fresh empirical evidence using a cross-sectional and updated sample. Our findings validate the linkage between macro-level fiscal multipliers and micro-level household heterogeneities. From this perspective, the policymaker should contemplate the impact of HtM consumers when smoothing economic fluctuations. Second, we corroborate the equally crucial role of wealthy HtM and poor HtM in improving the policy efficacy, therefore contributing to previous studies only stressing wealthy HtM (Cui and Feng, 2017; Hara, Unayama, and Weidner, 2016; Kaplan

et al., 2004; Park, 2017). Third, compared to earlier work that separately examine liquidity, credit, and saving constraints, we incorporate them in a uniform framework where type-I HtM (liquidity-constrained) households and type-II HtM (liquidity-, credit-, and saving-constrained) households are shown to respond differently to either fiscal or monetary interferences.

The rest of our paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes the data and measurement. While Section 4 examines the relationship between HtM households and fiscal multipliers, Section 5 assesses the impact of HtM families on monetary shocks. Section 6 concludes and summarizes.

2. Literature Review

Leveraging the lens of liquid assets, HtM households are firstly recognized in Kaplan and Violante (2014) as those who consume nearly all their incomes in every period. After mulling the level of illiquid wealth, a two-asset model is subsequently built to divide HtM families into two categories. One refers to poor HtM (P-HtM) households without holding liquid or illiquid assets, while the other is dubbed wealthy HtM (W-HtM) households who hoards no liquid but enormous illiquid assets. Compared to non-HtM ones, HtM consumers are prone to display a higher MPC in response to temporary income changes because of being liquidity-constrained. This reasoning is compatible with Broda and Parker (2014) and Souleles (1999), who document that the consumption driven by tax reduction magnifies for agents subject to liquidity pressures (or little liquid wealth). Moreover, using mortgage debt as a proxy for liquidity constraints, Cloyne and Surico (2017) find that households bound by mortgage are inclined to react more vigorously to income tax changes than those without such liability.

Motivated by this phenomenon, Farhi and Werning (2016) erect a theoretical framework to explicate how present or future expansionary policies (e.g. tax cuts and fiscal aids) promote more consumption from HtM families than non-HtM counterparts. In their setting, the identical scale of stimulus packages would trigger a different reaction from HtM and non-HtM households. Specifically, provided a tax cut in the current period, HtM agents engender a positive and contemporary response in terms of consumption, whereas non-HtM ones fail to behavior in this way because of being modelled as the Ricardian. Likewise, a spike in government procurement bolsters household incomes in the economy (Hagedorn, Manovskii, and Mitman, 2019)[1]. Thus, positive income shocks may encourage HtM outlay to a greater extent. Despite balanced-budget fiscal stimulus, the concurrent increase in HtM consumption persists.

On top of the above model, Farhi and Werning (2016) deduce two testable predictions. First, the magnitude of tax (spending) multipliers rises with a country's share of HtM population. Second, household heterogeneity induces an asymmetric response from P-HtM (W-HtM) to tax cuts and fiscal supports. In concrete terms, P-HtM households matter more to spending multipliers, while W-HtM ones are more relevant with tax multipliers.

Such an asymmetry can be justifiable with several explanations. First, as Kaplan and Violante (2014) argue, tax reduction enables W-HtM families to yield a larger MPC because they opt for a higher target of desirable consumption. Hence, lowering tax burden could solicit a stronger response from W-HtM households in terms of disbursement. Second, to alleviate the income disparity, W-HtM agents are supposed to encounter a heavier tax liability relative. As

[1] Despite various channels via which government spending spurs consumption, the positive effect of household incomes dominates (Hagedorn et al., 2019).

such, tax cuts are more favorable in easing budget constraints for W-HtM consumers. Lastly, fiscal expansion inevitably redistributes the income among different classes in the society, thus allocating more benefits to P-HtM families. It is equivalent to exacerbating the interdependence between spending multipliers and P-HtM households (Ma, 2019).

As a key feature of HtM families, a large MPC occurs due to the liquidity constraint. Based on the degree of constraints, Kaplan and Violante (2014) further categorize HtM consumers into two groups: one bound by zero liquid assets and the other bound by unsecure credit limits. Unlike the former one, the latter group is able to take loans within the line of credit, thus confronting an extra credit constraint. Recently, Miranda-Pinto, Murphy, Walsh, and Young (2020) ascribe a lower-than-average MPC to the presence of saving-constrained households. Their findings are in compliance with Chetty and Szeidl's (2007) view that every consumer prefer to maintain its minimum consumption by means of borrowings. Against this backdrop, when receiving the windfall income, the priority would be given to settle households' debt, ultimately attenuates their MPCs.

If aggregating liquidity, credit, and saving constraints, whether the final MPC of HtM families increases or decreases is controversial. More specifically, given credit constraints undermine the borrowing capacity, individuals may have trouble realizing the minimum consumption using loans. When there is a stimulus shock, excess incomes would be used to boost the consumption or clear the liability. From this angle, the overall effect on MPC remains ambiguous, which warrants an empirical investigation. For easy illustration, households confined to liquidity (three) constraints are denoted by type-I (type-II) HtM in this paper.

To gain a better understanding, Figure 1 depicts the relation between MPC and

consumption under various constraints. Following the previous literature, households tend to materialize two consumption thresholds: the minimum level and the desired level. If people are able to attain the desired consumption, we term them as first-tier households who have an average MPC. Similarly, individuals with the consumption ranging from the minimum to desired levels are dubbed second-tier households. They produce a larger MPC since more consumption helps achieve the desired level given extra incomes. In this sense, second-tier agents are akin to liquidity-constrained households. When consumers are unable to afford the minimum outlay, they have no other choice but to resort to the credit market. As long as borrowings can fill the shortage, we assign them to third-tier households. According to the above reasoning, these families subject to liquidity and saving constraints exhibit the lowest MPC. Eventually, fourth-tier households are defined as those who fail to harness loans to sustain the minimum consumption because of credit constraints. In other words, these households encounter liquidity, saving, and credit constraints so that their MPCs are greater than those of third-tier ones. However, it remains unclear whether these MPCs are bigger or smaller compared to the average level. Based on such a categorization, second-tier households capture type-I HtM, fourth-tier households represent type-II HtM, and first-tier households equate to non-HtM.

[Insert Figure 1 Here]

Similar to fiscal shocks, the positive impact of liquidity constraints can be extended to the monetary aspect. Amid booming credit, liquidity-constrained families gain easier access to the loan to elevate their consumption. By the same token, heterogeneity is anticipated to surface between type-I and type-II HtM households responding to monetary shocks. Nevertheless,

there are two distinctions in terms of underlying mechanisms when comparing fiscal and monetary expansions. On the one hand, easing monetary measures enable HtM consumers to obtain excess liquidity from the market instead of government. One the other hand, credit-constrained agents yet find it hard to exploit the market liquidity despite massive money supply. This consideration acts another force dwindling the efficacy of monetary policies, which is non-existent for fiscal ones.

3. Data and Measurement

3.1 Data

The data used by this study is collected from multiple sources. Our first one originates from the Eurosystem Household Finance and Consumption Survey (HFCS), which provides a multinational micro-level data. Given the adoption of uniform rules, this survey harmonizes household-level data across different markets and thus is suitable for a cross-country study. We download the second wave of survey data in 2016, which covers 84,665 households across 20 countries.[2]

To estimate fiscal multipliers, we continue to gather the quarterly GDP and government spending from Eurostat, quarterly tax revenues from CEIC, and quarterly CPI from Federal Reserve Bank of St. Louis from 1999 to 2018. Meanwhile, the population data is pulled from World Development Indicator (WDI) for normalization. All macro-level variables are deflated and deseasonalized and then taken to calculate the first difference to get a stationary series.

To quantify monetary shocks, we retreat the interest rate of main refinancing operations

[2] The latest wave of HFCS is released in 2020, which produces quantitatively similar results as those reported in this paper.

from CEIC, total assets of central banks from ECB, and real effective exchange rates from Eurostat from the first quarter of 1995 to the second quarter of 2019.

3.2 Measurement of HtM Households

Regardless of W-HtM or P-HtM households, there are two kinks where MPC overreacts to a tiny income change (Kaplan et al., 2014), namely, the zero kink and the credit-limit kink. Therefore, our identification strategy for HtM families closely pertains to these two kinks. At the zero kink, consumers with average liquid asset balances less than half their earnings per pay-period are regarded as HtM. If considering the credit-limit kink, HtM households are characterized as those with their average liquid asset balances smaller than the difference between half earnings per pay-period and unsecure credit limits. Moreover, we partition HtM into W-HtM families holding positive illiquid wealth and P-HtM families keeping non-positive illiquid wealth.

Mathematically, we let y_{it} denote household *i*'s income in pay period *t*, a_{it} denote household *i*'s net illiquid asset balance in pay period *t*, m_{it} denote household *i*'s net liquid asset balance in pay period *t*, and $\underline{m_{it}}$ denote household *i*'s unsecured credit limit in pay period *t*. Thus, P-HtM households meet

$$\begin{aligned} a_{it} \le 0,\ 0 \le m_{it} \le y_{it}/2 \ \text{ for } \ m_{it} \ge 0 \ \text{ at the zero kink} \\ a_{it} \le 0,\ m_{it} \le y_{it}/2 - \underline{m_{it}} \ \text{ for } \ m_{it} \le 0 \ \text{ at the credit-limit kink} \end{aligned} \tag{1}$$

and W-HtM households satisfy

$$\begin{aligned} a_{it} > 0,\ 0 \le m_{it} \le y_{it}/2 \ \text{ for } \ m_{it} \ge 0 \ \text{ at the zero kink} \\ a_{it} > 0,\ m_{it} \le y_{it}/2 - \underline{m_{it}} \ \text{ for } \ m_{it} \le 0 \ \text{ at the credit-limit kink} \end{aligned} \tag{2}$$

In the spirit of Kaplan et al. (2014), we screen the raw data from HFCS by removing households: (i) with members aged below 20 or above 79; and (ii) with negative incomes or self-employment incomes. Next, we construct four key variables, including the pay-period income, net liquid wealth, net illiquid wealth, and pay-period unsecured credit limit.

After setting two weeks as a pay period, income is computed by summing up gross wages, salaries and self-employment incomes, and routine public and private transfers. Net liquid wealth is proxied by the difference between liquid assets and liquid debt. Liquid assets contain cash[3], sight accounts, mutual fund holdings, publicly traded shares, and corporate and government bonds. Liquid debts include the credit card balance after the most recent payment and balance on credit lines or bank overdrafts. Net illiquid wealth aggregates the value of households' main residence and other properties net of mortgages and unsecured loans, occupational and voluntary pension plans, and cash values of life insurance policies. Unsecured credit limit is measured by one month's income, as suggested by Kaplan et al. (2014).

Table 1 tabulates the composition of household portfolios for 20 countries. As reflected, illiquid assets account for the bulk of families' wealth. Apart from this, we observe a substantial household-level gap between net liquid wealth and monthly incomes. Specifically, the median of monthly incomes (1,892) is triple that of net liquid wealth (633), indicating that a large fraction of population may be viewed as HtM consumers.

[Insert Table 1 Here]

After acquiring W-HtM and P-HtM, we transform them into the ratio using the total number of households. The W-HtM (P-HtM) ratio is calculated for each country in Appendix

[3] Except for Spain and U.S., we use the ratio of cash over sight accounts from U.S. to estimate the cash balance for other countries without available data.

1 (2) where the baseline represents the result in strict conformity with our above identification strategy. For robustness, we also compute the ratios associating with alternative constructions of W-HtM (P-HtM). Overall, countries with low W-HtM (P-HtM) ratios appear relatively affluent, whereas those with high W-HtM (P-HtM) ratios are mostly with relatively lower GDP.

3.3 Measurement of Fiscal Multipliers

Fiscal multipliers gauge an increase in output resulted from one unit shock of government spending (tax reduction), which is named spending multipliers (tax multipliers). The estimation of multipliers are prone to suffer the endogenity problem in that economic conditions affect the formulation of fiscal measures (Nakamura and Steinsson, 2014). To address the concern, three methodologies are proposed to obtain an unbiased estimator in previous research.

The first one relates to the structural vector autoregression (SVAR), which is commonly used to compute a dynamic fiscal multiplier (Blanchard and Perotti, 2002; Ilzetzki et al., 2013; Ramey, 2011). The second one is to look for instrumental variables (IV). According to earlier studies, military spending (Nakamura and Steinsson, 2014), "windfall" financing (Clemens and Miran, 2012), and changes of census in counting local population (Suarez Serrato and Wingender, 2016) serve a plausible IV to estimate fiscal multipliers. Finally, Jorda (2005) develops the local projection method, which gains popularity in a large body of recent work (Jorda, Schularick, and Taylor, 2019; Ramey and Zubairy, 2018). This technique appears superior to SVAR in dealing with the model misspecification. However, it is costly and time-consuming if we can set up an accurate SAVR. Therefore, we decide to adopt SVAR in our main analysis with the local projection as a robustness check.

Referring to Blanchard and Perotti (2002), we establish SVAR to capture the dynamic interaction among tax revenues, government spending, and output. The general model is specified as follows:

$$Y_t = A(L)Y_{t-1} + U_t \tag{3}$$

where $Y_t \equiv [Tax_t, Spend_t, Output_t]'$ is a three-dimensional vector, including the logarithms of tax revenues, of government spending, and of GDP, $U_t \equiv [u_t^{tax}, u_t^{spend}, u_t^{output}]'$ is the vector of reduced-form residuals, and $A(L)$ is the polynomials in the lag operator. To get the orthogonal impulse response function, we transform Eq. (3) into a representation expressed by reduce-form residuals.

$$\begin{aligned} u_t^{tax} &= a_1 u_t^{output} + a_2 e_t^{spend} + e_t^{tax} \\ u_t^{spend} &= b_1 u_t^{output} + b_2 e_t^{tax} + e_t^{spend} \\ u_t^{output} &= c_1 u_t^{tax} + c_2 u_t^{spend} + e_t^{output} \end{aligned} \tag{4}$$

Next, we determine three conditions that are used to recover the mutually uncorrelated structural shocks (e_t^{tax}, e_t^{spend} and e_t^{output}). First, b_1 is set to 0 after assuming no contemporary responses of fiscal spending to economic environment. Second, either a_2 or b_2 equals 0, in line with an idea that mutual responses are forbidden between tax policies and fiscal spending. In other words, $a_2 = 0$ $(b_2 = 0)$ indicates that tax measure (government spending) are rolled out first. Third, a_1 is directly extracted from Price, Dang, and Botev (2015) who provide the tax-output elasticity separately for OECD countries[4]. The impulse response analysis ultimately enables us to estimate the spending (tax) multiplier by the output

[4] Tax-output elasticity is given in Appendix 3. Since Price et al. (2015) render tax-output elasticities for 18 countries in our study, we use the average elasticity of EU members as a proxy for the remainder: Malta and Cyprus. Such practice makes sense in that the elasticity should not alter drastically across EU countries.

response to one unit shock of government spending (tax revenue).

Depending on $a_2 = 0$ or $b_2 = 0$, each version of multiplier is supposed to carry two different values. For brevity, if postulating a_2 (b_2) is equal to 0, we label the estimated multiplier as Multiplier 1 (2). Furthermore, fiscal multipliers may vary with the response period in accordance with prior literature. Ilzetzki et al. (2013) gauge the multiplier (impact multiplier) using the output response in the quarter when a shock arrives, while Blanchard and Perotti (2002) define the peak of output responses as the multiplier (peak multiplier). Following their practices, we compute the impact multiplier and peak multiplier[5], respectively.

To get an intuitive impression, Figure 2 plots the box graph for spending (tax) multipliers, involving four separate charts. As shown, tax multipliers have a constantly larger magnitude than spending counterparts, in tandem with Romer and Romer (2010). Meanwhile, our spending multipliers are comparable to Ilzetzki's et al. (2013) finding that GDP increases by 0.02%-0.09% given 1% extra spending.

[Insert Figure 2 Here]

3.4 Measurement of Monetary Shocks

Inspired by the literature on fiscal multipliers, we quantify monetary shocks using the panel local projection model in which the setting resembles Burriel and Galesi (2018). The specific model is stated below.

$$Y_{i,t+h} = \alpha_h + \psi_h(L)z_{i,t-1} + \phi_h(L)z^*_{i,t-1} + \beta_h shock_{i,t} + a_{i,h} + \tau_{t,h} + \varepsilon_{i,t+h} \qquad (5)$$

where $Y_{i,t+h}$ is country i's annual growth rate of output at period $t+h$. $z_{i,t-1}$ is a vector

[5] The peak refers to the maximal output response over the next four quarters upon the arrival of a shock.

controlling for domestic conditions at period *t-1*, encompassing the output, inflation rate, and real effective exchange rate. $z^*_{i,t-1}$ is the condition of country *i*'s trading partners at period *t-1*, involving the weighted average of output and inflation rates among different partners, respectively. The weight adopted here is the bilateral trade between country *i* and each partner over country *i*'s total trade volume. $Shock_{i,t}$ is country *i*'s conventional (unconventional) expansionary monetary policy at period *t*. The conventional one refers to the decrease in interest rates in main refinancing operations, while the unconventional one points to the increase in total assets of central banks. $a_{i,h}$ ($\tau_{t,h}$) is the country (time) fixed effect. Eventually, monetary shocks are measured by the output response to one unit variation in *Shock*.

4. Fiscal Multipliers and HtM Households

4.1 Baseline Regressions

To unravel the impact of HtM households on fiscal multipliers, we perform the ensuing baseline regression as follows:

$$FM_i = \beta_0 + \beta_1 HtM_i + \beta_2 TradeOpen_i + \beta_3 Exchange_i + \beta_4 Debt_i + u_i \quad (6)$$

where FM_i is the measure of country *i*'s fiscal multipliers, including spending multipliers and tax multipliers, and HtM_i is the ratio of W-HtM (P-HtM) in country *i*. Accordance to prior literature (Ilzetzki et al., 2013; Ilzetzki, Reinhart, and Rogoff, 2019), we introduce three control variables in Eq. (6): the trade openness (*TradeOpen*), exchange rate regime (*Exchange*) and governmental debt to GDP ratio (*Debt*). Specifically, the trade openness is calculated by total trade over GDP, while the exchange rate regime is taken from the index constructed by Ilzetzki et al. (2019).

Table 2 examines whether W-HtM (P-HtM) families affect fiscal multipliers in Panel A (B) by running a cross-country regression of Eq. (6). As articulated in Subsection 3.2, we construct four versions of fiscal multipliers depending on the identification restriction and response period. They are represented by impact multiplier 1, peak multiplier 1, impact multiplier 2, and peak multiplier 2. After accounting for a small sample size (20 observations), we additionally report the significant levels of both 15% and 20%, similar to the procedure in Mishra, Montiel, Pedroni, and Spilimbergo (2014).

[Insert Table 2 Here]

Overall, four findings emerge after analyzing the results in Table 2. First, we observe the negative (positive) impact of HtM on tax (spending) multipliers, confirming earlier anticipation that HtM households are able to amplify fiscal multipliers. Economically, given income shocks from tax cuts or government spending, a larger MPC driven by liquidity constraints prompts HtM families to consume much more than non-HtM ones, thus leading to an improvement in output to a greater extent.

Second, W-HtM yields a significant, albeit weak, effect on tax multipliers, while P-HtM remains insignificant across the board. Put differently, W-HtM families serve an overriding driver of the efficacy of tax policies. These findings make sense for two reasons. W-HtM agents possess a larger MPC out of tax cuts relative to P-HtM counterparts (Kaplan and Violante, 2014). In addition, W-HtM consumers are levied more heavily so that lowering tax burden would leave greater incomes at their wallets.

Third, regardless of being wealthy or poor, HtM exerts a positive influence on the spending multiplier from the statistical standpoint. In terms of the magnitude, the effect of P-

HtM appears to be more prominent, implying that spending multipliers are likely attributed to P-HtM households. These results are consistent with the notion that P-HtM families reap more benefits from government measures aimed at income redistribution. With greater fiscal supports, P-HtM agents respond by lifting their consumption and then contribute to spending multipliers, which is compatible with Ma (2019).

Fourth, W-HtM seems to play a bigger role in spending multipliers than tax multipliers, as evidenced by a larger magnitude of estimated coefficients. We ascribe such an uneven effect to three potential explanations. The first one closely connects with Hagedorn's et al. (2019) argument that tax cuts fuel economic growth through two mechanisms. Apart from the direct transfer channel, there exists a labor supply one in which tax reduction encourages employees to work more by pushing up leisure costs and ultimately boosts the equilibrium output. However, when reacting to tax shocks, HtM and non-HtM households only manifest their distinctions in the direct transfer aspect. Hence, the impact of W-HtM presumably abates in that it fails to capture the total effect of tax shocks from both channels.

Another interpretation is that HtM families may affect tax multipliers and spending multipliers at different response periods. To verify this idea, we repeat the same regression but use tax (spending) multipliers measured by the output response at the 2^{nd}, 3^{rd}, 4^{th} quarters, respectively. The re-estimation results are shown in Table 3 where we present the coefficient concerned for brevity. As indicated, the significant impact of W-HtM on tax multipliers is postponed to the 3^{rd} and 4^{th} quarters. By contrast, W-HtM families have an immediate influence on spending multipliers in the 1^{st} and 2^{nd} quarter. Despite no literature showing that tax cuts require a prolonged interval to spur growth, we do uncover that W-HtM households take a

longer time to digest tax shocks relative to spending shocks.

[Insert Table 3 Here]

The final reason is likely pertinent to a lack of identification power for fiscal multipliers using SVAR (Jorda, 2005). To address this concern, we build an alternative proxy for fiscal multipliers by means of the local projection model in the next subsection.

4.2 Impact of type-I and type-II HtM

When defining HtM households, we comprehensively take into account two kinks: the zero kink and the credit-limit kink. Specifically, HtM at the zero kink is labelled as type-I HtM merely confined to liquidity constraints, while HtM at the credit-limit kink is called type-II HtM constrained by liquidity, saving, and credit. As reasoning before, type-I and type-II HtM families are likely to behave dissimilarly in face of fiscal policies. Without distinguishing respective effects, our prior findings may be questionable and misleading. Besides, decoupling type-I and type-II HtM allows us to ascertain who is more vulnerable to fiscal shocks and thus contribute to the multiplier.

To address this problem, we re-run the baseline model after treating type-I and type-II HtM as the main independent variable separately. We tabulate the regression results in Table 4 where two inferences can be drawn. First, in terms of type-I households, W-HtM (P-HtM) retains its significant impact on fiscal multipliers, analogous to those reported in Table 2. These findings illustrate that type-I HtM facilitates the successful implementation of fiscal aid. Second, either W-HtM or P-HtM families under the type-II category lose their salutary roles, as suggested by the insignificant coefficients of interest in Panel C or D. That is to say, the pull-

up of MPC out of liquidity and credit constraints might be offset by the drag-down from saving constraints, which eventually leads to the observed insignificance. To summarize, evidence in Table 4 indicates that type-I HtM consumers act a primary driver to improve the effectiveness of fiscal measures.

[Insert Table 4 Here]

4.3 Robustness Check I: Alternative Proxies for HtM

As one of the robustness checks, we construct eleven alternative proxies for W-HtM and P-HtM in accordance with Kaplan et al., (2014). In the next step, we revisit the baseline regression with these new measures on the right-hand side individually and report the results in Table 5. To sum up, we document similar findings as before, demonstrating that this adjustment virtually has no impact on the W-HtM (P-HtM) coefficient.

[Insert Table 5 Here]

4.4 Robustness Check II: Alternative Estimations of Fiscal Multipliers

Our prior conclusion may be contaminated by the mismeasurement of fiscal multipliers, which is caused by the SVAR misspecification. To ease this worry, we recalibrate tax multipliers and spending multipliers by virtue of the local projection model. As claimed by Jorda (2005), such an approach is conducive to overcoming the misspecification in connection with SVAR. Subsequently, we take reference from Jorda et al. (2015) and specify the panel local projection model as follows.

$$x_{i,t+h} = \alpha_h + \psi_h(L)z_{i,t-1} + \beta_h shock_{i,t} + a_{i,h} + \tau_{t,h} + \varepsilon_{i,t+h} \quad (7)$$

where $x_{i,t+h}$ is country i's output at period $t+h$. $z_{i,t-1}$ is a vector of control variables in country i at period t-1, containing the government consumption, tax revenue, output, exchange rate regime, trade openness and debt to GDP ratio. $Shock_{i,t}$ is country i's increase in government spending (decrease in tax collection) at period t. Meanwhile, fixed effects of both country ($a_{t,h}$) and time ($\tau_{t,h}$) are incorporated.

Owing to contemporaneous correlations, the endogeneity could arise in estimating fiscal multipliers. Therefore, we follow Jorda et al. (2019) to solve the problem by applying the instrumental variable technique. To acquire an ideal instrument, we take advantage of Eq. (4) in Subsection 3.3, which helps deduce two relationships below:

$$\begin{aligned} E\left[(Tax_t - a_1 Output_t)u_t^{output}\right] = 0 \\ E\left[(Spend_t - b_1 Output_t)u_t^{output}\right] = 0 \end{aligned} \tag{8}$$

As aforementioned, a_1 is the tax-output elasticity pulled directly out of Price et al. (2015), while b_1 is set to 0. Under this circumstance, $Tax_t - a_1 Output_t$ or $Spend_t - b_1 Output_t$ should be uncorrelated with u_t^{output} (the reduced-form residual from the output equation). Hence, these two terms can be instrumented for Tax_t and $Spend_t$, respectively. Subsequently, based on two subsamples classified by W-HtM (P-HtM), we estimate the regression of Eq. (7) with the results plotted in Figure 3. For a better illustration, the dark solid line denotes the response of the high HtM group with dash lines depicting its 90% confidence interval, while the grey one with white squares captures the response of the low HtM group with grey boundaries portraying the corresponding 90% confidence interval.

[Insert Figure 3 Here]

Overall, these results concerning the local projection model are qualitatively analogous to

those hinging on the baseline regression. Irrespective of household illiquid wealth, high-HtM subsamples produce a greater spending multiplier than low-HtM counterparts. This relation is also applied to the tax multiplier if focusing on its magnitude. If benchmarking against SVAR, absolute values of spending (tax) multipliers appear bigger in Figure 3 where the local projection approach is leveraged. Furthermore, our estimated multipliers are generally comparable to earlier work using the local projection method (Nakamura and Steinsson, 2014; Ramey and Zubairy, 2018; Romer and Romer, 2010).

Notably, we discover that P-HtM families play a significant role in tax multipliers, at odd with the insignificance of P-HtM if being investigated by the SVAR approach. Despite the discrepancy, our preceding conclusion somewhat remains valid in that the trough difference associated with W-HtM in Figure 3(2) (2.452) is much greater than that pertinent to P-HtM in Figure 3(4) (1.309). From this perspective, the local projection technique seems more powerful in identifying fiscal multipliers.

To inspect whether the above inference holds for households encountering different constraints, we continue to replicate the local projection regression for two groups partitioned by type-I (type-II) HtM and visualize the results in Figure 4. With regard to the type-I category, we reveal that low-HtM and high-HtM agents slap divergent influences on fiscal multipliers. More concretely, families with a high type-I HtM value tend to come with a strong multiplication effect, which echoes the results in Table 4. However, we see an inconsistent dynamic pattern of fiscal multipliers if examining type-II HtM consumers. On this occasion, high and low groups make no difference in impacting multipliers, parallel to our findings based on SVAR. Taken together, graphical evidence here re-confirms our earlier argument that saving

constraints are able to blunt the positive effect on MPC from liquidity and credit constraints.

[Insert Figure 4 Here]

5. Monetary Shocks and HtM

5.1 Impact of HtM on Monetary Shocks

Similar as above, we harness a panel local projection model to explore the interaction between HtM households and monetary shocks. Using the pre-specified Eq. (5), we perform the regression on two subsamples divided by W-HtM (P-HtM) and summarize these results in Figure 5.

[Insert Figure 5 Here]

As shown, the contribution of low-HtM families to output responses subsides for expansionary monetary shocks that are either conventional (decrease in policy rates) or non-conventional (increase in asset sizes). Noticeably, the response to conventional policies is negative but insignificant for the low HtM group. The negative sign may be explained by that a decreasing interest rate hurts low-HtM consumers who are more likely to be lenders. By contrast, high-HtM ones help monetary stimulus propel economic growth, as supported by their corresponding output responses moving in the positive territory from the statistical perspective.

Collectively, these findings in Figure 5 motivate us to make two inferences. First, the output responses for the high-HtM group beats our expectation that easing monetary measures is beneficial for an increase in outputs. Second, monetary shocks become more effective in countries where HtM population accounts for a higher proportion. The rationale behind is that these HtM families prefer to unleash their restrained consumption with exorbitant liquidity.

5.2 Separation between Type-I and Type-II HtM

Consistent with prior studies (Alpanda and Zubairy, 2019; Burriel and Galesi, 2018), credit constraints undermine the efficacy of monetary shocks in that consumers are hampered from accessing excess credit. Therefore, such a consideration complicates the impact of type-II HtM on output responses due to monetary relaxation. In comparison, type-I HtM households subject to liquidity constraints appear to play a more unequivocal role. To evaluate individuals' net effect, we capitalize on type-I (type-II) HtM to cut 20 countries into two groups where Eq. (5) is re-estimated.

When analyzing type-II households in Figure 6, the output growth is generally more sensitive to monetary shocks for the low type-II HtM subsample. In economic terms, monetary policy in one country is annulled as type-II HtM households increase, substantiating that credit constraints discourage these families from borrowing to lift their consumption. These findings are in tandem with Alpanda and Zubairy (2019) and Burriel and Galesi (2018).

[Insert Figure 6 Here]

Despite insignificance, we discern a negative output response to unconventional monetary measures in countries with high type-II HtM. To some degree, this counterintuitive evidence agrees with Guerello (2018), who argue unconventional monetary shocks exacerbate income inequalities. When bond-purchase programs are underway, grass-root families holding little financial assets fail to benefit from the market rally. Instead, they have to bear the potential costs of inflation, which erodes their purchasing power and thus discounts the effectiveness of nonstandard monetary policies.

Lastly, the results on type-I HtM in Figure 6 resemble what is graphed in Figure 5, in line with our prior view that these households play a more certain role in facilitating the transmission of monetary policies.

6. Conclusion

Various countrywide factors, including the degree of economic development, exchange rate regime, trade openness, government debt, and recession status, are documented to have an impact on the effectiveness of macroeconomic policies in previous literature (Ilzetzki et al., 2013; Nakamura and Steinsson, 2014). As far as we know, little work has been done to explore whether a micro-level determinant, household heterogeneities, matters to the policy efficacy. As inspired by Kaplan et al. (2014), HtM is one of multiple dimensions to capture the behavioral heterogeneity among different families. Therefore, this paper specifically examines the impact of HtM households on the transmission of fiscal (monetary) stimulus, a hitherto untapped area in the research.

Using a sample consisting of 20 European countries, we discover that HtM consumers are conducive to improving fiscal multipliers. After isolating wealthy from poor HtM, we unveil that tax (spending) multipliers are more susceptible to W-HtM (P-HtM) families. When it comes to monetary shocks, both standard and nonstandard measures reveal more effective in countries with a higher level of HtM households. Besides, we categorize HtM agents into two types depending on the degree of constraints. Our results indicate that type-I HtM households contribute to the efficacy of fiscal or monetary policies, whereas type-II HtM families are unable to transmit fiscal or monetary shocks to the consumption.

Our findings provide two practical implications for policymakers as well. First, when formulating macroeconomic policies, household-level elements have to be taken on board. Spending increases can be leveraged to bolster the economy when there are more P-HtM (less W-HtM). Conversely, for countries with less P-HtM (more W-HtM), tax cuts are a feasible way out. Second, HtM households subject to various constraints ought to be treated in different manners. In other words, type-I households help strengthen the policy effectiveness, while type-II ones appear neutral amid expansionary measures.

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References

Alpanda, S., & Zubairy, S. (2019). Household debt overhang and transmission of monetary policy. *Journal of Money, Credit and Banking*, 51(5), 1265-1307.

Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *Quarterly Journal of Economics*, 117(4), 1329-1368.

Broda, C., & Parker, J. (2014). The economic stimulus payments of 2008 and the aggregate demand for consumption. *Journal of Monetary Economics*, 68, S20-S36.

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

Chetty, R., & Szeidl, A. (2007). Consumption commitments and risk preferences. *Quarterly Journal of Economics*, 122(2), 831-877.

Clemens, J., & Miran, S. (2012). Fiscal policy multipliers on subnational government spending. *American Economic Journal: Economic Policy*, 4(2), 46-68.

Cloyne, J., & Surico, P. (2017). Household debt and the dynamic effects of income tax changes. *Review of Economic Studies*, 84(1), 45-81.

Cui, Z., & Feng, Y. (2017). Wealthy hand-to-mouth households in China. *Asian Economic Journal*, 31(3), 275-297.

Farhi, E., & Werning, I. (2016). Fiscal multipliers: Liquidity traps and currency unions. *Handbook of Macroeconomics*, 2, 2417-2492.

Guerello, C. (2018). Conventional and unconventional monetary policy vs. households income distribution: An empirical analysis for the Euro Area. *Journal of International Money and Finance*, 85, 187-214.

Hagedorn, M., Manovskii, I., & Mitman, K. (2019). The fiscal multiplier. *Working Paper*, National Bureau of Economic Research.

Hara, R., Unayama, T., & Weidner, J. (2016). The wealthy hand to mouth in Japan. *Economic Letters*, 141, 52-54.

Ilzetzki, E., Mendoza, E., & Vegh, C. (2013). How big (small?) are fiscal multipliers? *Journal of Monetary Economics*, 60(2), 239-254.

Ilzetzki, E., Reinhart, C., & Rogoff, K. (2019). Exchange arrangements entering the twenty-first century: Which anchor will hold? *Quarterly Journal of Economics*, 134(2), 599-646.

Jorda, O. (2005). Estimation and inference of impulse responses by local projections. *American Economic Review*, 95(1), 161-182.

Jorda, O., Schularick, M., & Taylor, A. (2015). Betting the house. *Journal of International Economics*, 96, S2-S18.

Jorda, O., Schularick, M., & Taylor, A. (2019). The effects of quasi-random monetary experiments. *Journal of Monetary Economics*, 112, 22-40.

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

Kaplan, G., Violante, G., & Weidner, J. (2014). The wealthy hand-to-mouth. *Working Paper*, National Bureau of Economic Research.

Ma, E. (2019). The heterogeneous responses of consumption between poor and rich to government spending shocks. *Journal of Money, Credit and Banking*, 51(7), 1999-2028.

Miranda-Pinto, J., Murphy, D., Walsh, K., & Young, E. (2020). Saving constraints, debt, and the credit market response to fiscal stimulus. *Working Paper*, Social Science Research Network.

Mishra, P., Montiel, P., Pedroni, P., & Spilimbergo, A. (2014). Monetary policy and bank lending rates in low-income countries: Heterogeneous panel estimates. *Journal of Development Economics*, 111, 117-131.

Nakamura, E., & Steinsson, J. (2014). Fiscal stimulus in a monetary union: Evidence from US regions. *American Economic Review,* 104(3), 753-792.

Park, K. (2017). The wealthy hand-to-mouth households in South Korea. *Global Economic Review*, 46(3), 299-324.

Price, R., Dang, T., & Botev, J. (2015). Adjusting fiscal balances for the business cycle: New tax and expenditure elasticity estimates for OECD countries. *Working Paper*, OECD Economic Department.

Ramey, V. (2011). Identifying government spending shocks: It's all in the timing. *Quarterly Journal of Economics*, 126(1), 1-50.

Ramey, V., & Zubairy, S. (2018). Government spending multipliers in good times and in bad: Evidence from US historical data. *Journal of Political Economy*, 126(2), 850-901.

Romer, C., & Romer, D. (2010). The macroeconomic effects of tax changes: Estimates based on a new measure of fiscal shocks. *American Economic Review*, 100(3), 763-801.

Souleles, N. (1999). The response of household consumption to income tax refunds. *American Economic Review,* 89(4), 947-958.

Suarez Serrato, J., & Wingender, P. (2016). Estimating local fiscal multipliers. *Working Paper*, National Bureau of Economic Research.

Table 1 Household Portfolios

	Household-Level		Country-Level		
	Median	Mean	Mean	Maximum	Minimum
Annual Income (age 20-65)	22,709	36,486	30,118	60,199	2,777
Monthly Income (age 20-65)	1,892	3,041	2,510	5,017	231
Net Wealth	71,213	245,497	230,941	802,483	35,956
Net Liquid Wealth	633	30,812	22,835	155,314	95
Cash, Checking & Saving	425	6,467	4,954	26,606	450
Mutual Funds, Stocks & Bonds	0	24,897	18,490	131,983	196
Credit Card Debt & Credit Line debt	0	551	609	3,275	57
Net Illiquid Wealth	65,527	214,633	208,054	731,265	32,958
Housing Net of Mortgages	42,647	169,477	173,906	646,917	28,496
Vehicles	4,005	11,151	9,048	27,767	1,593
Retirement Accounts	0	1,908	1,828	11,591	0
Life Insurance	0	18,320	9,488	97,455	37
Certificates of Deposit	0	14,061	13,812	40,645	0

Notes: This table presents the components of household portfolios at the household (Country) level. All values are expressed in EUR.

Table 2 Impact of HtM Households on Fiscal Multipliers

	Tax Multiplier 1		Tax Multiplier 2		Spending Multiplier 1		Spending Multiplier 2	
	Impact	Peak	Impact	Peak	Impact	Peak	Impact	Peak
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Impact of W-HtM								
W-HtM	0.003	-0.291^	-0.128	-0.354*	0.606***	0.297*	1.070^	0.87
	[0.192]	[0.193]	[0.137]	[0.169]	[0.165]	[0.162]	[0.733]	[0.751]
Trade Openness	0.005	0.033	0.021	0.041^	0.010	-0.008	-0.119	-0.128
	[0.027]	[0.027]	[0.022]	[0.028]	[0.047]	[0.036]	[0.105]	[0.105]
Exchange Regime	-0.012	-0.005	-0.005	-0.002	-0.021**	-0.012^	-0.050^	-0.044
	[0.009]	[0.009]	[0.006]	[0.008]	[0.007]	[0.008]	[0.034]	[0.035]
Debt to GDP	-0.001	0.002*	-0.000	0.002**	-0.003***	-0.003**	-0.008^^	-0.008^
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.005]	[0.005]
Constant	-0.894***	-1.059***	-0.964***	-1.081***	0.174^	0.267**	0.699^^	0.763^^
	[0.129]	[0.103]	[0.099]	[0.100]	[0.126]	[0.106]	[0.430]	[0.443]
Observation	20	20	20	20	20	20	20	20
R^2	0.142	0.257	0.167	0.297	0.523	0.477	0.429	0.38
Panel B: Impact of P-HtM								
P-HtM	0.387	0.028	0.047	-0.109	1.649***	1.111**	3.629*	3.194^^
	[0.477]	[0.420]	[0.334]	[0.430]	[0.497]	[0.467]	[1.963]	[2.005]
Trade Openness	0.004	0.033	0.021	0.041	0.008	-0.009	-0.124^^	-0.133^^
	[0.027]	[0.032]	[0.022]	[0.032]	[0.030]	[0.023]	[0.081]	[0.086]
Exchange Regime	-0.013^	-0.009	-0.007	-0.006	-0.017**	-0.010^^	-0.045^^	-0.040^
	[0.009]	[0.011]	[0.006]	[0.011]	[0.007]	[0.006]	[0.026]	[0.028]
Debt to GDP	-0.001	0.001*	-0.000	0.001*	-0.003***	-0.003**	-0.009*	-0.008^^
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.005]	[0.005]
Constant	-0.933***	-1.130***	-0.999***	-1.152***	0.145	0.221**	0.573^^	0.636*
	[0.117]	[0.113]	[0.098]	[0.115]	[0.110]	[0.081]	[0.347]	[0.362]
Observation	20	20	20	20	20	20	20	20
R^2	0.186	0.173	0.114	0.159	0.555	0.602	0.528	0.478

Notes: This table examines the impact of W-HtM (P-HtM) households on fiscal multipliers in Panel A (B). Heteroskedasticity robust standard errors are reported in brackets underneath each coefficient. *** (**, *, ^^, ^) indicates the significance level of 1% (5%, 10%, 15%, 20%).

Table 3 Impact of W-HtM Households on Fiscal Multipliers: Dynamic Analyses

	Tax Multiplier 1			Tax Multiplier 2			Spending Multiplier 1			Spending Multiplier 2		
	2nd Quarter	3rd Quarter	4th Quarter	2nd Quarter	3rd Quarter	4th Quarter	2nd Quarter	3rd Quarter	4th Quarter	2nd Quarter	3rd Quarter	4th Quarter
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
W-HtM	-0.243	-0.774^^	-0.840^^	-0.348	-0.865*	-0.913^^	1.039**	0.186	-0.296	2.861^^	2.661	2.288
	[0.390]	[0.497]	[0.539]	[0.365]	[0.493]	[0.539]	[0.430]	[0.418]	[0.615]	[1.816]	[2.252]	[2.369]
Trade Openness	0.010	0.116^	0.290***	0.019	0.121*	0.293***	-0.02	0.019	0.041	-0.128^^	-0.104	-0.075
	[0.049]	[0.067]	[0.057]	[0.050]	[0.067]	[0.056]	[0.025]	[0.042]	[0.060]	[0.083]	[0.111]	[0.129]
Exchange Regime	0.017	0.012	0.011	0.023^	0.017	0.014	0.000	-0.004	-0.010	-0.027	-0.039	-0.046
	[0.019]	[0.021]	[0.017]	[0.017]	[0.020]	[0.017]	[0.006]	[0.011]	[0.017]	[0.026]	[0.037]	[0.043]
Debt to GDP	-0.000	0.004**	0.007***	0.000	0.004**	0.007***	-0.002^	-0.000	0.001	-0.006^	-0.007	-0.006
	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]	[0.005]	[0.006]	[0.006]
Constant	-0.726***	-0.872***	-1.151***	-0.763***	-0.884***	-1.148***	0.056	0.021	-0.061	0.426	0.496	0.413
	[0.156]	[0.193]	[0.246]	[0.139]	[0.189]	[0.242]	[0.095]	[0.117]	[0.171]	[0.341]	[0.446]	[0.483]
Observation	20	20	20	20	20	20	20	20	20	20	20	20
R^2	0.064	0.234	0.449	0.112	0.265	0.463	0.466	0.068	0.11	0.418	0.311	0.235

Notes: This table examines the dynamic impact of W-HtM households on fiscal multipliers measured at various response periods. 2nd (3rd, 4th) Quarter refers to the output response in the second, third or fourth quarter after a shock in the first quarter. Heteroskedasticity robust standard errors are reported in brackets underneath each coefficient. *** (**, *, ^^, ^) indicates the significance level of 1% (5%, 10%, 15%, 20%).

Table 4 Impact of Type-I and Type-II HtM Households

	Tax Multiplier 1		Tax Multiplier 2		Spending Multiplier 1		Spending Multiplier 2	
	Impact	Peak	Impact	Peak	Impact	Peak	Impact	Peak
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Impact of Type-I W-HtM								
Type-I W-HtM	0.035	-0.311	-0.116	-0.381*	0.663***	0.328*	1.292$^{\wedge\wedge}$	1.065
	[0.222]	[0.235]	[0.149]	[0.206]	[0.173]	[0.182]	[0.804]	[0.829]
Trade Openness	0.005	0.031	0.020	0.038	0.015	-0.006	-0.110	-0.121
	[0.026]	[0.028]	[0.022]	[0.029]	[0.047]	[0.035]	[0.100]	[0.101]
Exchange Regime	-0.013	-0.005	-0.005	-0.002	-0.022***	-0.012$^{\wedge}$	-0.053$^{\wedge\wedge}$	-0.047
	[0.009]	[0.008]	[0.006]	[0.008]	[0.007]	[0.009]	[0.035]	[0.036]
Debt to GDP	-0.001	0.001*	-0.000	0.001**	-0.003***	-0.003**	-0.008$^{\wedge\wedge}$	-0.008$^{\wedge}$
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.005]	[0.005]
Constant	-0.900***	-1.059***	-0.968***	-1.080***	0.170$^{\wedge}$	0.264**	0.665$^{\wedge\wedge}$	0.732*
	[0.125]	[0.110]	[0.097]	[0.107]	[0.117]	[0.101]	[0.394]	[0.411]
Observation	20	20	20	20	20	20	20	20
R^2	0.144	0.259	0.153	0.302	0.537	0.486	0.466	0.410
Panel B: Impact of Type-I P-HtM								
Type-I P-HtM	0.472	-0.001	0.095	-0.147	1.827***	1.210**	4.265**	3.741*
	[0.525]	[0.476]	[0.356]	[0.468]	[0.438]	[0.426]	[1.923]	[2.015]
Trade Openness	0.006	0.033	0.021	0.040	0.015	-0.005	-0.108$^{\wedge}$	-0.118$^{\wedge}$
	[0.026]	[0.032]	[0.023]	[0.033]	[0.030]	[0.023]	[0.074]	[0.079]
Exchange Regime	-0.013$^{\wedge}$	-0.009	-0.007	-0.006	-0.017**	-0.010$^{\wedge}$	-0.044$^{\wedge\wedge}$	-0.039$^{\wedge}$
	[0.009]	[0.011]	[0.006]	[0.011]	[0.006]	[0.007]	[0.026]	[0.028]
Debt to GDP	-0.001	0.002*	-0.000	0.001*	-0.003***	-0.003**	-0.008*	-0.008$^{\wedge\wedge}$
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.004]	[0.005]
Constant	-0.941***	-1.127***	-1.004***	-1.149***	0.127	0.211**	0.509$^{\wedge\wedge}$	0.580*
	[0.112]	[0.116]	[0.099]	[0.117]	[0.105]	[0.076]	[0.301]	[0.322]
Observation	20	20	20	20	20	20	20	20
R^2	0.199	0.173	0.117	0.161	0.569	0.607	0.571	0.513
Panel C: Impact of Type-II W-HtM								
Type-II W-HtM	-0.468	-0.230	-0.401	-0.223	0.247	0.071	-1.434	-1.380
	[0.450]	[0.675]	[0.516]	[0.711]	[0.774]	[0.397]	[1.523]	[1.196]
Trade Openness	0.008	0.035	0.024	0.042	0.009	-0.008	-0.109	-0.119
	[0.026]	[0.031]	[0.021]	[0.033]	[0.050]	[0.039]	[0.114]	[0.114]
Exchange Regime	-0.012$^{\wedge}$	-0.009	-0.007	-0.006	-0.014	-0.008	-0.036	-0.033
	[0.008]	[0.011]	[0.006]	[0.011]	[0.012]	[0.007]	[0.030]	[0.029]
Debt to GDP	-0.001	0.002*	-0.000	0.001**	-0.003*	-0.003*	-0.008$^{\wedge}$	-0.008
	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.006]	[0.006]
Constant	-0.886***	-1.123***	-0.988***	-1.160***	0.311*	0.335**	0.967	0.984$^{\wedge\wedge}$
	[0.143]	[0.085]	[0.089]	[0.086]	[0.172]	[0.150]	[0.652]	[0.649]
Observation	20	20	20	20	20	20	20	20
R^2	0.167	0.176	0.145	0.161	0.326	0.373	0.318	0.305
Panel D: Impact of Type-II P-HtM								
Type-II P-HtM	-0.420	0.701	-0.731	0.467	1.528	1.440	-1.146	-0.780
	[1.293]	[2.380]	[1.354]	[2.324]	[1.782]	[1.534]	[3.233]	[3.097]
Trade Openness	0.006	0.031	0.024	0.039	0.004	-0.014	-0.114	-0.125
	[0.027]	[0.035]	[0.021]	[0.037]	[0.049]	[0.037]	[0.120]	[0.119]
Exchange Regime	-0.012$^{\wedge}$	-0.010	-0.006	-0.007	-0.014	-0.008	-0.036	-0.033
	[0.009]	[0.012]	[0.006]	[0.011]	[0.012]	[0.007]	[0.031]	[0.030]
Debt to GDP	-0.001	0.001*	-0.000	0.001*	-0.003*	-0.003*	-0.008	-0.008
	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.006]	[0.006]
Constant	-0.893***	-1.127***	-0.993***	-1.164***	0.314*	0.335**	0.948$^{\wedge}$	0.965$^{\wedge}$
	[0.143]	[0.085]	[0.089]	[0.087]	[0.167]	[0.145]	[0.650]	[0.645]
Observation	20	20	20	20	20	20	20	20
R^2	0.145	0.177	0.126	0.159	0.333	0.390	0.306	0.292

Notes: This table examines the impact of Type-I W-HtM (Type-I P-HtM, Type-II W-HtM, Type-II P-HtM) households on fiscal multipliers in Panel A (B, C, D). Heteroskedasticity robust standard errors are reported in brackets underneath each coefficient. *** (**, *, $^{\wedge\wedge}$, $^{\wedge}$) indicates the significance level of 1% (5%, 10%, 15%, 20%).

Table 5 Robustness Checks: Alternative Constructions of HtM Households

	Panel A: Impact of W-HtM				*Panel B: Impact of P-HtM*			
	Tax Multiplier 1	Tax Multiplier 2	Spending Multiplier 1	Spending Multiplier 2	Tax Multiplier 1	Tax Multiplier 2	Spending Multiplier 1	Spending Multiplier 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Measure 1	-0.651	-0.147	0.496	-0.390	-0.104	0.312	**2.826****	5.637
	[0.966]	[0.957]	[0.679]	[1.746]	[1.070]	[0.906]	**[0.982]**	[4.517]
Measure 2	**-0.412**$^{\wedge\wedge}$	**-0.471****	0.245	0.844	0.416	0.285	**0.675****	**2.080**$^{\wedge\wedge}$
	[0.235]	**[0.207]**	[0.184]	[0.738]	[0.401]	[0.395]	**[0.291]**	**[1.269]**
Measure 3	**-0.326**$^{\wedge}$	**-0.396***	**0.337***	1.106	0.012	-0.127	**1.228****	**3.755***
	[0.225]	**[0.196]**	**[0.182]**	[0.851]	[0.458]	[0.460]	**[0.451]**	**[2.087]**
Measure 4	**-0.268**$^{\wedge}$	**-0.333***	**0.304***	0.982	0.004	-0.146	**1.138****	**3.545**$^{\wedge\wedge}$
	[0.189]	**[0.164]**	**[0.165]**	[0.797]	[0.415]	[0.428]	**[0.493]**	**[2.207]**
Measure 5	**-0.360**$^{\wedge\wedge}$	**-0.412***	**0.279**$^{\wedge\wedge}$	0.692	0.016	-0.068	**1.015****	**2.669**$^{\wedge\wedge}$
	[0.217]	**[0.194]**	**[0.166]**	[0.664]	[0.395]	[0.408]	**[0.391]**	**[1.601]**
Measure 6	-0.218	**-0.281***	**0.283***	0.799	-0.262	-0.367	**1.671****	**5.251**$^{\wedge\wedge}$
	[0.177]	**[0.157]**	**[0.141]**	[0.669]	[0.595]	[0.568]	**[0.589]**	**[3.005]**
Measure 7	**-0.291**$^{\wedge}$	**-0.354***	**0.297***	0.870	0.029	-0.109	**1.109****	**3.189**$^{\wedge\wedge}$
	[0.193]	**[0.169]**	**[0.162]**	[0.751]	[0.420]	[0.430]	**[0.466]**	**[2.002]**
Measure 8	**-0.281**$^{\wedge}$	**-0.343***	**0.302***	0.888	0.008	-0.136	**1.149****	**3.294**$^{\wedge\wedge}$
	[0.191]	**[0.167]**	**[0.160]**	[0.752]	[0.442]	[0.449]	**[0.486]**	**[2.093]**
Measure 9	**-0.273**$^{\wedge}$	**-0.341***	**0.312***	0.838	0.055	-0.051	**1.070****	**3.005**$^{\wedge\wedge}$
	[0.194]	**[0.165]**	**[0.161]**	[0.757]	[0.400]	[0.408]	**[0.414]**	**[1.784]**
Measure 10	-0.264	**-0.337***	**0.297***	0.876	-0.080	-0.132	**1.052****	**2.963**$^{\wedge}$
	[0.198]	**[0.173]**	**[0.164]**	[0.728]	[0.436]	[0.430]	**[0.471]**	**[2.045]**
Measure 11	**-0.290**$^{\wedge}$	**-0.353***	**0.298***	0.870	0.030	-0.109	**1.119****	**3.229**$^{\wedge\wedge}$
	[0.192]	**[0.168]**	**[0.163]**	[0.753]	[0.421]	[0.431]	**[0.465]**	**[2.009]**

Notes: This table examines the impact of W-HtM (P-HtM) on fiscal multipliers in Panel A (B) using alternative constructions of HtM households. For simplicity, only the estimated coefficient concerned is reported. W-HtM (P-HtM) is identified by alternative methods: Measure 1 = Consumption is larger than income in last year; Measure 2 = Households with liquid assets less than within 2000 local currency units; Measure 3 = One year's income as the credit limit; Measure 4 = Weekly pay period; Measure 5 = Monthly pay period; Measure 6 = Vehicles as illiquid assets; Measure 7 = Retirement account as liquid assets for households with 60-year-old-above members; Measure 8 = Self-employment business is counted as illiquid assets; Measure 9 = Direct investment (mutual funds, bonds and stocks) is counted as illiquid assets; Measure 10 = Other valuables are counted as illiquid assets; Measure 11 = HELOCs (home equity lines of credit) are counted as liquid debt. Heteroskedasticity robust standard errors are reported in brackets underneath each coefficient. *** (**, *, $^{\wedge\wedge}$, $^{\wedge}$) indicates the significance level of 1% (5%, 10%, 15%, 20%).

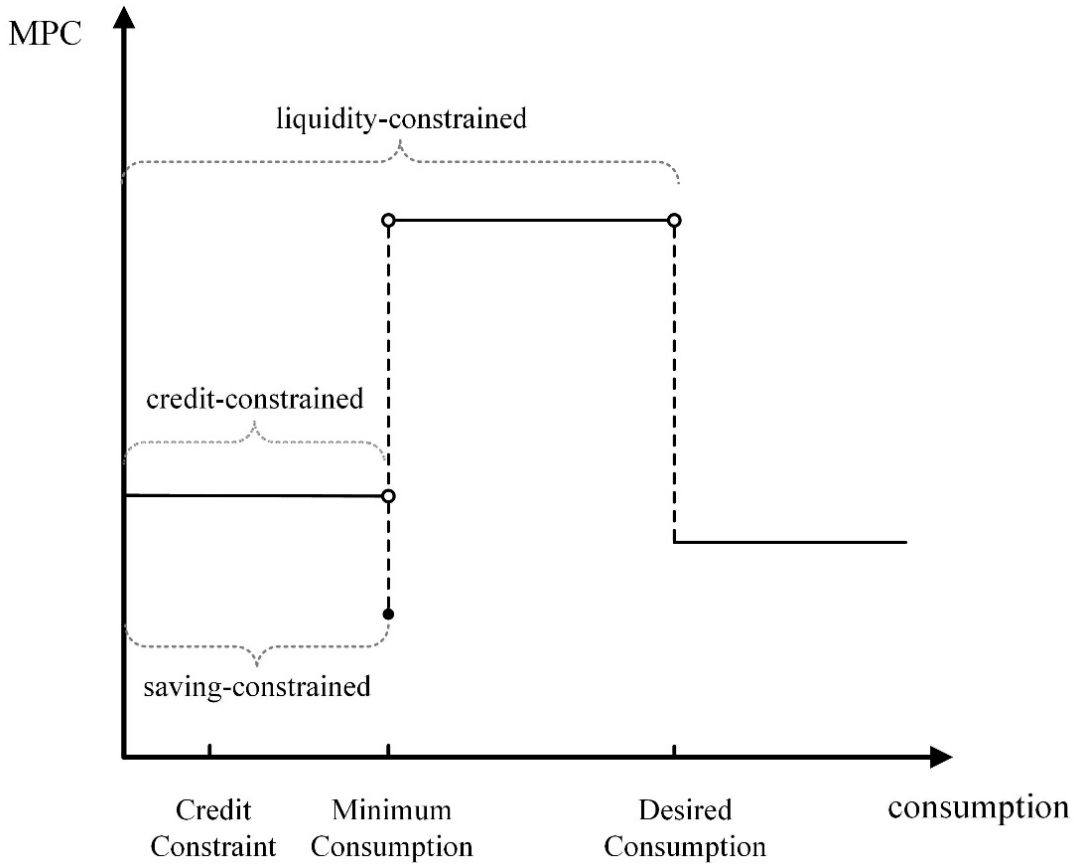


Figure 1 MPC and Various Constraints

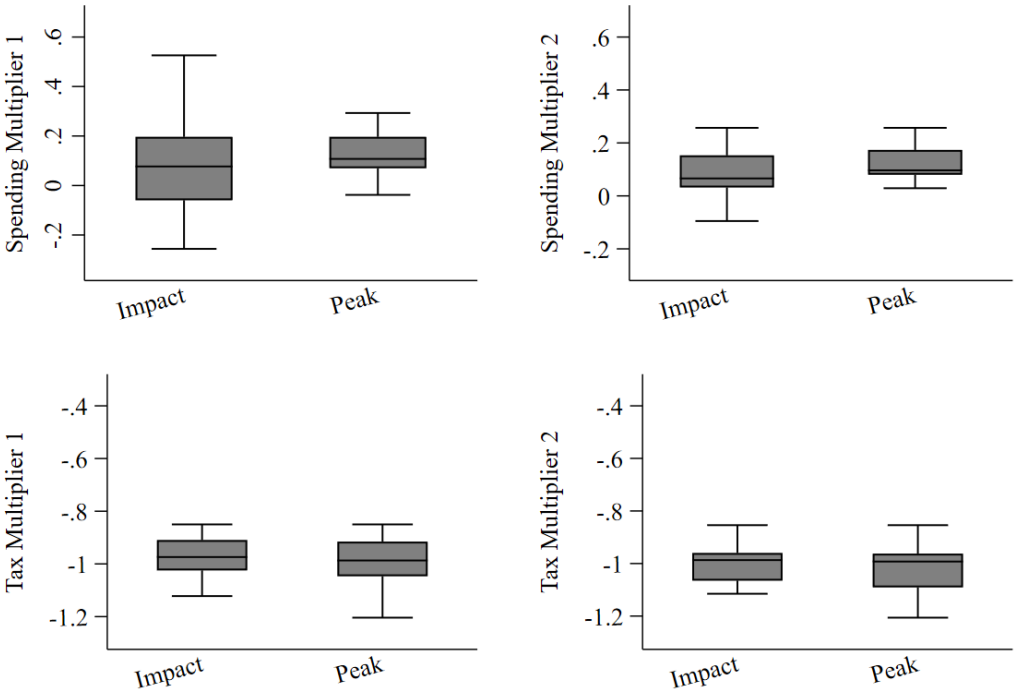
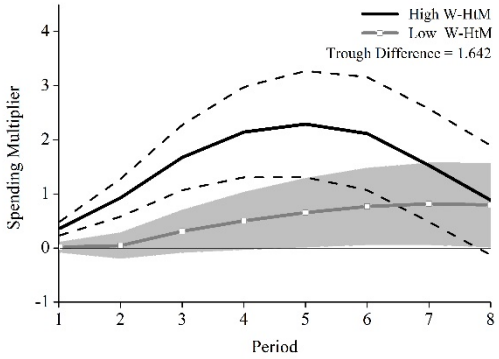
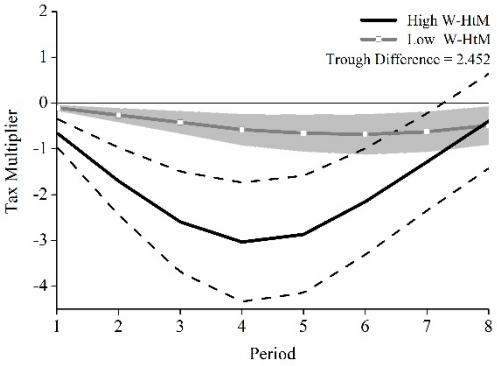


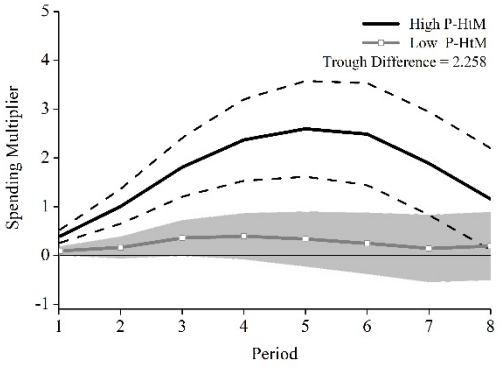
Figure 2 Fiscal Multipliers



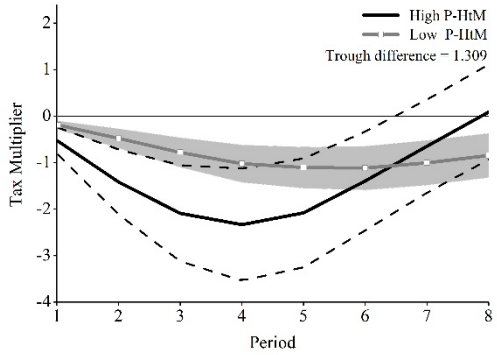
(1) Spending Multiplier Grouped by W-HtM



(2) Tax Multiplier Grouped by W-HtM

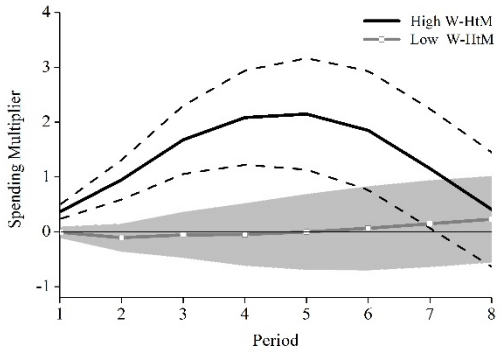


(3) Spending Multiplier Grouped by P-HtM

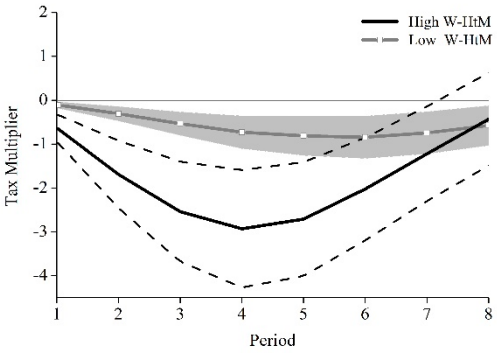


(4) Tax Multiplier Grouped by P-HtM

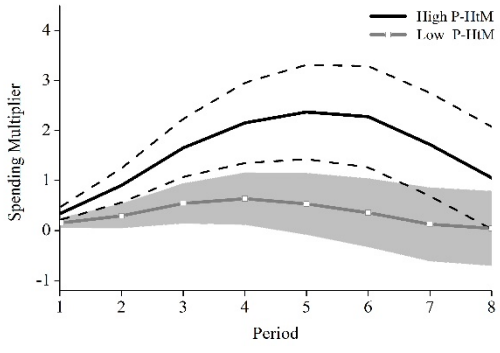
Figure 3 Fiscal Multipliers Grouped by W-HtM/P-HtM



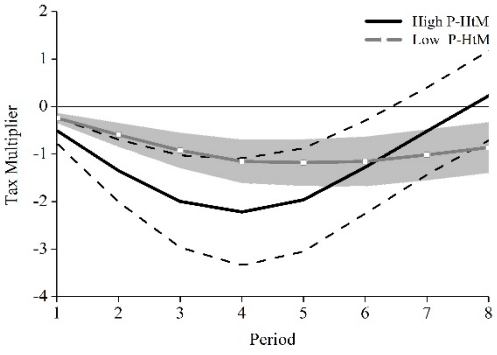
(1) Spending Multiplier Grouped by Type-I W-HtM



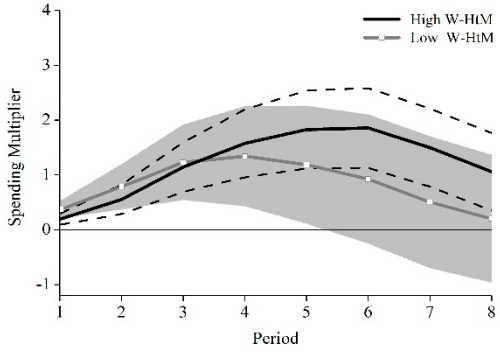
(2) Tax Multiplier Grouped by Type-I W-HtM



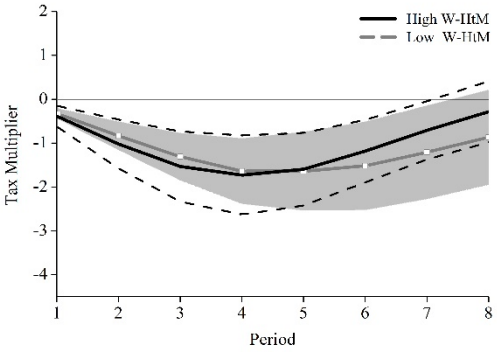
(3) Spending Multiplier Grouped by Type-I P-HtM



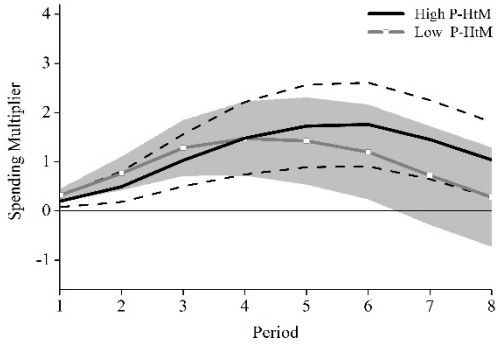
(4) Tax Multiplier Grouped by Type-I P-HtM



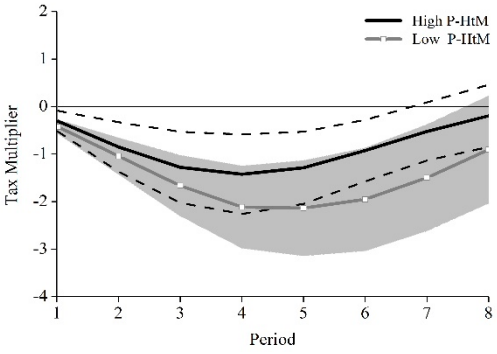
(5) Spending Multiplier Grouped by Type-II W-HtM



(6) Tax Multiplier Grouped by Type-II W-HtM

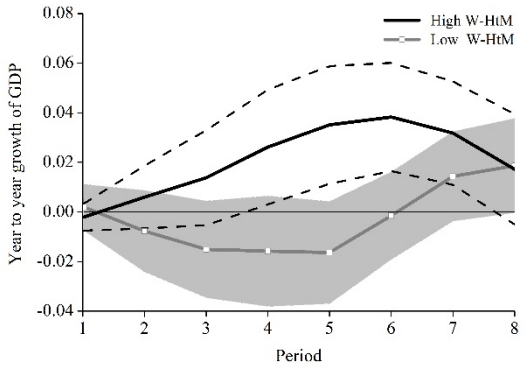


(7) Spending Multiplier Grouped by Type-II P-HtM

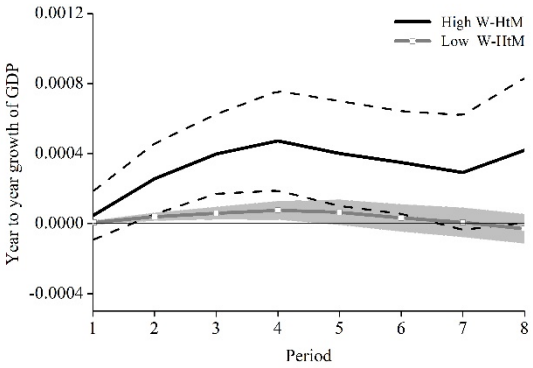


(8) Tax Multiplier Grouped by Type-II P-HtM

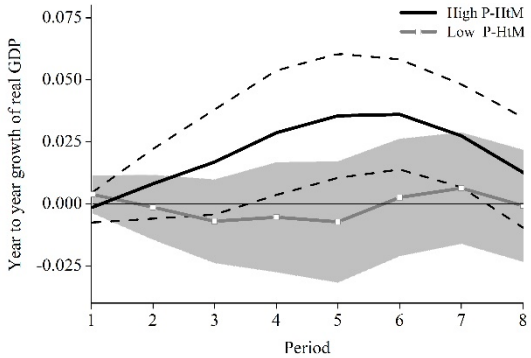
Figure 4 Fiscal Multipliers Grouped by Type-I/Type-II and W-HtM/P-HtM



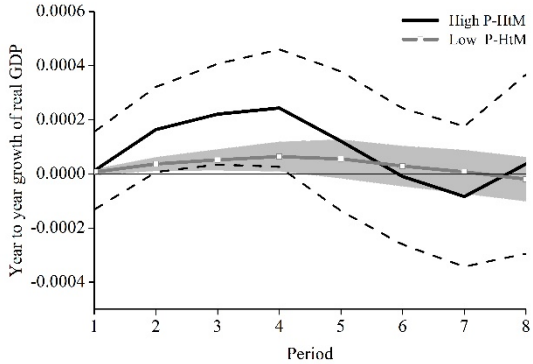
(1) Output Response to Conventional Monetary Shock Grouped by W-HtM



(2) Output Response to Unconventional Monetary Shock Grouped by W-HtM

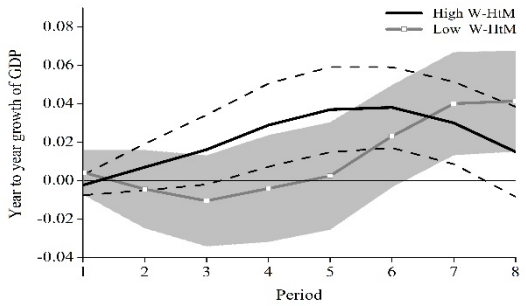


(3) Output Response to Conventional Monetary Shock Grouped by P-HtM

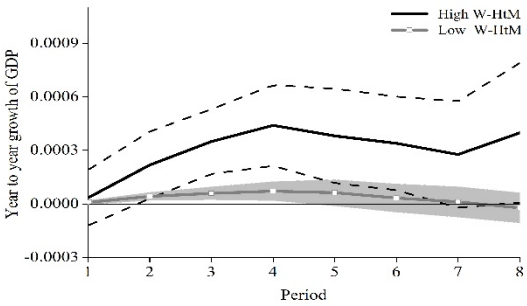


(4) Output Response to Unconventional Monetary Shock Grouped by P-HtM

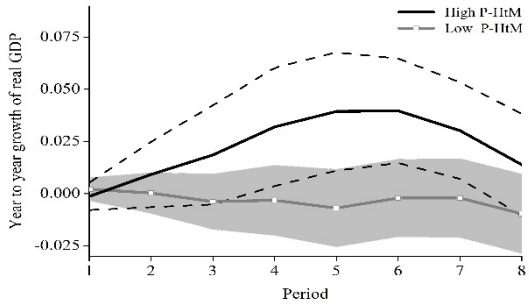
Figure 5 Monetary Shocks Grouped by W-HtM/P-HtM



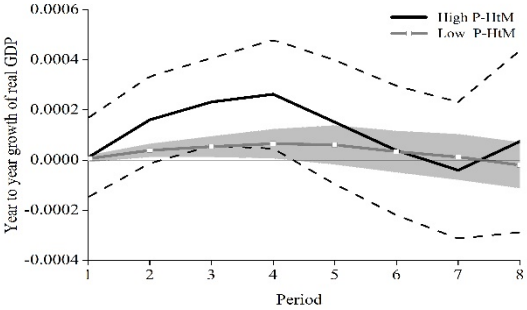
(1) Output Response to Conventional Monetary Shock Grouped by Type-I W-HtM



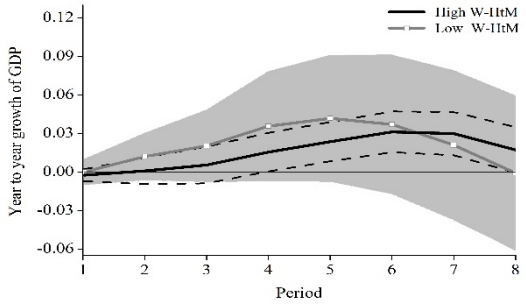
(2) Output Response to Unconventional Monetary Shock Grouped by Type-I W-HtM



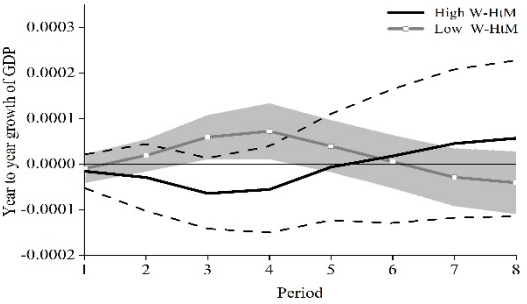
(3) Output Response to Conventional Monetary Shock Grouped by Type-I P-HtM



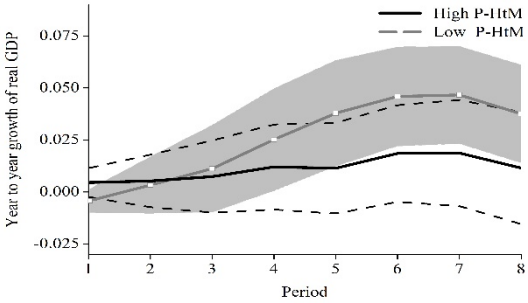
(4) Output Response to Unconventional Monetary Shock Grouped by Type-I P-HtM



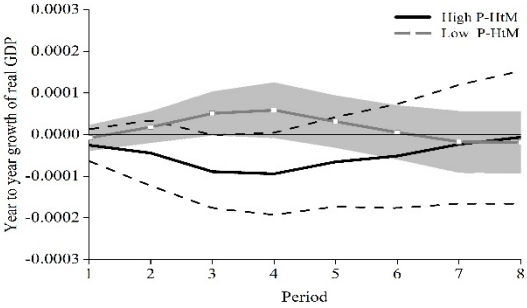
(5) Output Response to Conventional Monetary Shock Grouped by Type-II W-HtM



(6) Output Response to Unconventional Monetary Shock Grouped by Type-II W-HtM



(7) Output Response to Conventional Monetary Shock Grouped by Type-II P-HtM



(8) Output Response to Unconventional Monetary Shock Grouped by Type-II P-HtM

Figure 6 Monetary Shocks Grouped by Type-I/Type-II and W-HtM/P-HtM

Appendix 1 W-HtM across Various Countries

	Austria	Belgium	Cyprus	Germany	Estonia	Spain	Finland	France	Greece	Hungary
Baseline	22.0	13.5	41.3	15.8	42.7	13.1	12.0	17.7	49.4	41.0
c > y in the past year [a]	8.9	8.0	16.6	9.5	8.5	15.6	NA	10.5	18.0	8.7
Financially fragile households [b]	41.6	34.1	53.8	31.5	59.3	25.2	22.0	31.9	69.2	64.8
One-year income as credit limit	20.6	12.5	29.1	13.2	41.9	12.5	10.3	17.7	46.4	39.0
Weekly pay period [c]	15.7	10.8	39.4	11.2	41.2	10.8	8.7	13.7	48.8	38.2
Monthly pay period [d]	31.6	19.0	45.1	25.7	45.5	18.3	19.2	27.3	50.9	44.3
Vehicles as illiquid assets	28.4	15.9	51.2	18.5	47.3	15.4	14.6	28.1	56.7	43.0
Retirement account as liquid assets for 60+ [e]	22.0	13.5	41.3	15.8	42.7	13.1	12.0	17.7	49.4	41.0
Business as illiquid assets [f]	21.9	13.4	42.1	15.7	43.2	13.3	12.1	19.2	49.8	41.5
Direct as illiquid assets [g]	23.7	17.1	43.6	20.2	43.6	15.8	17.9	24.5	49.9	45.5
Other valuables as illiquid assets	22.4	13.7	41.9	16.2	43.0	13.5	12.0	21.2	49.6	41.3
HELOCs as liquid debt [h]	22.0	13.5	41.7	16.0	42.7	13.4	12.0	17.8	49.5	41.4
S.D. of different constructions	7.7	6.2	9.3	5.8	11.1	3.6	3.9	6.0	11.0	11.8
S.D. except for the second and third cases [i]	4.1	2.3	5.2	3.8	1.7	2.0	3.1	4.5	2.5	2.1

	Ireland	Italy	Luxembourg	Latvia	Malta	Netherlands	Poland	Portugal	Slovenia	Slovakia
Baseline	28.0	28.9	18.5	48.3	23.1	13.8	12.5	21.2	47.8	39.6
c > y in the past year [a]	13.6	7.1	6.4	7.1	10.0	11.2	8.0	9.4	6.3	10.9
Financially fragile households [b]	42.7	40.6	34.2	67.3	38.3	43.3	48.3	49.3	68.0	68.7
One-year income as credit limit	25.0	28.2	17.2	47.1	21.1	10.0	12.3	19.9	41.4	38.5
Weekly pay period [c]	22.3	28.5	15.0	42.1	22.0	10.8	12.0	18.8	45.1	35.7
Monthly pay period [d]	36.7	30.3	23.6	54.6	24.2	20.6	13.7	26.7	52.1	47.3
Vehicles as illiquid assets	35.1	37.0	22.7	50.4	27.8	15.5	15.1	25.9	56.6	42.6
Retirement account as liquid assets for 60+ [e]	28.0	28.8	18.5	48.3	23.1	13.8	12.5	21.2	47.8	39.6
Business as illiquid assets [f]	28.2	29.6	18.4	48.3	23.4	13.8	13.0	21.4	48.4	39.5
Direct as illiquid assets [g]	32.0	33.2	21.8	49.0	31.1	16.1	12.9	22.3	53.5	40.3
Other valuables as illiquid assets	33.9	37.4	18.7	48.5	23.2	13.8	13.0	21.3	47.9	40.8
HELOCs as liquid debt [h]	28.2	28.9	18.5	48.2	23.1	14.2	12.7	21.4	47.8	39.6
S.D. of different constructions	7.2	8.0	6.1	13.3	6.3	8.5	10.0	8.9	13.8	12.1
S.D. except for the second and third cases [i]	4.3	3.3	2.5	2.9	2.8	2.8	0.8	2.3	4.1	2.8

Notes: a. c > y indicates consumption is larger than output in the last year; b. Households with liquid balances lower than 2,000 local currency units; c. The pay period in equation (1) and (2) is set to one week; d. The pay period in equation (1) and (2) is set to one month; e. Retirement account as liquid assets for households with heads older than 60 years old; f. Business as liquid assets means that self-employment business is counted as employment assets; g. Direct includes mutual funds, bonds and stocks; h. HELOCs indicate home equity lines of credit; i. Except for the case "c > y in the last year" and the case "financially fragile households".

Appendix 2 P-HtM across Different Countries

	Austria	Belgium	Cyprus	Germany	Estonia	Spain	Finland	France	Greece	Hungary
Baseline	13.3	5.1	22.6	7.4	18.9	5.0	4.7	16.5	14.6	13.3
c > y in the past year [a]	4.2	2.7	7.3	2.1	4.5	3.6	NA	5.8	8.0	4.2
Financially fragile households [b]	25.6	13.0	29.7	12.1	25.6	8.7	9.0	23.3	24.3	22.2
One-year income as credit limit	12.3	4.8	19.5	6.5	18.2	4.8	4.2	16.4	13.9	12.7
Weekly pay period [c]	11.1	4.5	21.8	6.2	18.6	4.4	3.6	13.9	14.5	12.3
Monthly pay period [d]	16.0	6.2	24.0	9.1	19.7	6.1	6.5	22.2	15.2	14.7
Vehicles as illiquid assets	6.9	2.7	12.7	4.7	14.3	2.8	2.1	6.1	7.3	11.3
Retirement account as liquid assets for 60+ [e]	13.3	5.1	22.6	7.4	18.9	5.0	4.7	16.5	14.6	13.3
Business as illiquid assets [f]	13.3	5.1	21.8	7.2	18.4	4.9	4.6	15.0	14.2	12.8
Direct as illiquid assets [g]	13.5	5.2	22.7	7.5	19.0	5.2	5.0	19.8	14.6	14.0
Other valuables as illiquid assets	12.8	4.8	22.0	6.9	18.6	4.6	4.7	13.1	14.4	13.0
HELOCs as liquid debt [h]	13.3	5.1	22.4	7.3	18.9	5.0	4.7	16.5	14.6	13.3
S.D. of different constructions	4.9	2.5	5.4	2.3	4.7	1.4	1.6	5.2	4.0	3.8
S.D. except for the second and third cases [i]	2.2	0.8	3.0	1.1	1.4	0.8	1.1	4.0	2.2	0.9

	Ireland	Italy	Luxembourg	Latvia	Malta	Netherlands	Poland	Portugal	Slovenia	Slovakia
Baseline	15.8	12.2	6.2	15.3	16.0	4.0	7.7	12.5	14.2	10.9
c > y in the past year [a]	7.5	2.0	1.6	3.4	4.5	2.9	5.6	5.1	2.7	4.0
Financially fragile households [b]	22.0	17.2	14.3	20.1	40.2	9.6	36.8	27.2	21.8	16.2
One-year income as credit limit	14.4	12.1	5.9	15.0	14.7	3.0	7.4	12.0	12.3	10.6
Weekly pay period [c]	13.3	12.0	5.7	14.0	15.7	3.1	7.5	11.7	13.1	10.3
Monthly pay period [d]	18.6	12.5	6.8	17.0	16.3	5.6	8.3	14.1	15.9	12.1
Vehicles as illiquid assets	8.7	4.1	2.0	13.2	11.3	2.2	5.1	7.9	5.4	7.9
Retirement account as liquid assets for 60+ [e]	15.8	12.3	6.2	15.3	16.0	4.0	7.7	12.5	14.3	10.9
Business as illiquid assets [f]	15.4	11.4	6.2	15.3	15.7	3.9	7.2	12.2	13.4	10.7
Direct as illiquid assets [g]	16.4	12.5	6.3	15.4	16.8	4.0	7.8	12.7	14.8	10.9
Other valuables as illiquid assets	10.0	3.6	5.9	15.1	15.9	3.9	7.2	12.4	14.2	9.7
HELOCs as liquid debt [h]	15.8	12.2	6.2	15.2	16.0	4.0	7.7	12.5	14.2	10.9
S.D. of different constructions	3.9	4.4	3.0	3.7	7.8	1.8	8.2	5.0	4.7	2.7
S.D. except for the second and third cases [i]	2.9	3.3	1.3	0.9	1.5	0.8	0.8	1.5	2.8	1.0

Notes: a. c > y indicates consumption is larger than output in the last year; b. Households with liquid balances lower than 2,000 local currency units; c. The pay period in equation (5), (6), (7) and (8) is set to one week; d. The pay period in equation (5), (6), (7) and (8) is set to one month; e. Retirement account as liquid assets for households with heads older than 60 years old; f. Business as liquid assets means that self-employment business is counted as employment assets; g. Direct includes mutual funds, bonds and stocks; h. HELOCs indicate home equity lines of credit; i. Except for the case "c > y in the last year" and the case "financially fragile households".

Appendix 3 Tax-Output Elasticity

Country	Elasticity	Country	Elasticity	Country	Elasticity
Austria	1.06	Greece	0.93	Netherlands	0.99
Belgium	1.04	Hungary	1.03	Poland	0.98
Cyprus	1.00	Ireland	1.02	Portugal	1.03
Estonia	1.14	Italy	1.01	Slovakia	0.89
Finland	0.93	Latvia	0.92	Slovenia	0.90
France	1.00	Luxembourg	1.09	Spain	1.16
Germany	0.92	Malta	1.00		

Notes: Data is pulled from Price et al. (2015).