The Macroeconomic Implications of Coholding

Michael Boutros Andrej Mijakovic*

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Abstract

In the U.S., over 25% of households are coholders who simultaneously borrow on credit cards and hold cash. This generates rich marginal distributions of gross positions that underpin the distribution of net wealth often used to calibrate macroeconomic models. We show that, beyond constructing net wealth, gross positions of liquid assets and debt are important determinants of how households consume, save, and deleverage in response to income shocks. We build a model that generates aggregate distributions and household behavior in line with the data, and use it to study the implications of coholding for fiscal and monetary policy.

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1 Introduction

Modern macroeconomic models increasingly recognize that household heterogeneity plays a crucial role in determining aggregate economic outcomes. How households respond to income changes and policy interventions significantly shapes the effectiveness of fiscal stimulus, the transmission of monetary policy, and the dynamics of business cycles. Central to this heterogeneity is the distribution of wealth across households, which fundamentally influences consumption and saving decisions.

The macroeconomic literature has traditionally focused on *net total* wealth positions when modeling household behavior, while more recent contributions highlight the role of *net liquid* wealth (Kaplan and Violante, 2014). These approaches implicitly assume that, for a given level of net wealth, the underlying gross positions of assets and liabilities are either irrelevant or degenerate. However, a substantial body of evidence from household finance suggests this assumption may be problematic. In the United States, around one-third of households regularly cohold revolving credit card debt and cash, which cannot be captured by models that focus on net positions alone (Gross and Souleles, 2002).

In this paper, we integrate the concept of coholding from the household finance literature into a wider macroeconomic context and study the relevance of the joint distribution of liquid assets and debt for macroeconomic policy. Empirically, we contribute two important facts about household balance sheets and their implications for macroeconomic policy. First, the distribution of liquid wealth is underpinned by a rich, non-degenerate joint distribution of liquid assets and liquid debt. Second, liquid debt dampens the marginal propensity to consume out of income shocks.

To examine the macroeconomic implications of these empirical facts, we construct a quantitative model that endogenously generates coholding behavior. The model incorporates two key innovations: explicit saving and borrowing decisions as distinct controls, and a liquidity-in-advance constraint that creates rational demand for liquid assets even while holding debt. This approach allows us to match the empirically observed marginal propensities to consume (MPC), save (MPS), and deleverage (MPD) across the joint distribution of liquid assets and debt and then use our model to study how coholding affects fiscal and monetary policy transmission. While previous work has focused primarily on the MPC and its connection to net liquid wealth, we demonstrate the importance of decomposing net liquid wealth into liquid assets and debt and studying the corresponding marginal propensities to save and deleverage.

In the first part of the paper, we use the Survey of Consumer Finances and the Survey of Consumer Expectations to document the prevalence of coholding and its impact

on the marginal propensities to consume, save, and deleverage. Our key contribution is documenting that for a given level of net liquid wealth, credit card debt dampens the marginal propensity to consume. For example, consider a household with zero net liquid wealth underpinned by zero cash and no credit card debt. This financially constrained "hand-to-mouth household" has a large MPC out of transitory income shocks. For comparison, consider a household with zero net liquid wealth but $5,000 in both credit card debt and cash. Our analysis demonstrates that this "coholder household" has a significantly lower MPC than the true hand-to-mouth household. We show that this is true across the distribution of net liquid wealth.

This analysis has direct implications for recent advances in macroeconomics that emphasize the importance of correctly identifying high-MPC households to evaluate macroeconomic policies. Our findings challenge the conventional approach of using low net liquid wealth to identify hand-to-mouth households with high MPCs. This approach confounds two distinct groups: true hand-to-mouth households with low net positions and low gross positions, and coholding households with low net positions due to large and offsetting gross positions. This distinction is crucial because our empirical analysis shows that while true hand-to-mouth households exhibit larger immediate consumption responses to income shocks, coholders primarily use windfall income to deleverage in the short run.

Further, we extend our analysis beyond the marginal propensity to consume to also study the marginal propensities to save and deleverage. Recent open-ended survey responses from households, especially coholders, have highlighted a clear distinction between the choice to save or deleverage (Colarieti, Mei and Stantcheva, 2025; Batista, Mao and Sussman, 2024). Traditionally, the literature has focused on the marginal propensity to consume, grouping the propensities to save and deleverage into a residual marginal propensity to increase wealth. We argue that this reduction misses important dynamics with respect to the relationship between gross positions and the marginal propensities to adjust them. These dynamics are interesting at the household level and integral for understanding the full impact of macroeconomic policies.

Our contribution to the literature is to document the levels and slopes of the MPC, MPS, and MPD across the joint distribution of liquid assets and debt. These will serve as important benchmarks against which we measure the success of our model in matching household behavior. Unconditionally, higher debt households have larger propensities to deleverage, while higher asset households have larger propensities to save. Holding fixed liquid wealth at any level and varying liquid debt and assets, we find that the deleveraging effect from more debt dominates the saving effect from more assets. As a result,

coholders with dampened MPCs have larger MPDs, choosing to use direct fiscal transfers to repair their balance sheets as opposed to increasing consumption. As our model will show, these coholders, having repaired their balance sheets, subsequently display larger consumption responses in the medium to long term.

The second part of the paper contributes a model that endogenously features both true hand-to-mouth and coholding households. In the model, households make explicit saving and borrowing decisions, represented by two distinct controls and corresponding state variables, allowing us to study both net liquid wealth and gross wealth positions. Households face a liquidity-in-advance constraint, in the style of Svensson (1985), that reflects real-life frictions in paying for certain goods using non-cash transaction instruments. This constraint incentivizes households to hold a specific amount of liquid assets. Combined with the standard mechanism of holding a buffer-stock level of net wealth to smooth consumption over time, households have a distinct demand for both liquid assets and liquid debt. As *ex ante* identical households are exposed to heterogeneous income shocks, a subset become true hand-to-mouth households while another subset become coholders.

This difference in behavior reflects distinct underlying constraints. True hand-to-mouth households are consumption-constrained because they have few resources overall and use positive income shocks to immediately increase consumption. In contrast, coholders are typically satisfied with their current consumption level but are financing it using a costly combination of assets and debt. When they receive a positive income shock, they maintain their consumption level but optimize their financing by reducing expensive debt, which allows them to increase consumption in the future. This consumption smoothing behavior is fundamentally different from that of the true hand-to-mouth, yet looking only at net wealth positions would not allow us to distinguish between these groups. Our empirical findings on the joint distribution of assets and debt and their relationship to consumption behavior can be used immediately to improve measurement of household constraints.

Key to our theoretical contribution is the parsimonious addition of a single parameter that is clearly identified: the strength of the liquidity-in-advance constraint. In a simple stylized model, we show how this parameter dictates the allocation of liquid wealth between liquid assets and debt without affecting the level of liquid wealth. The calibrated quantitative model leverages this insight to target the marginal distribution of liquid debt, while following the standard technique of targeting liquid wealth using the discount rate. The calibrated model is also successful in several non-targeted dimensions, including the joint distribution of liquid assets and debt and the marginal propensities to consume,

save, and deleverage over this joint distribution.

Our model then allows us to study the implications of coholding for macroeconomic policy. For fiscal policy, our analysis suggests that untargeted stimulus programs may become less effective at stimulating immediate consumption as coholding increases in the economy. Coholders, who represent a significant portion of households with low net wealth, have lower short-run MPCs and higher marginal propensities to deleverage. As a result, a larger fraction of fiscal transfers may go toward debt repayment rather than consumption in the short run. This dynamic may explain why the effectiveness of fiscal stimulus has varied over time as the prevalence and intensity of coholding have changed.

For monetary policy, coholding affects both the substitution and interest rate exposure channels of monetary policy (Auclert, 2019) across the joint distributions of liquid assets and debt. The substitution channel operates through the impact of interest rate changes on consumption decisions. We show that the consumption response to monetary policy shocks varies across the distribution of net wealth in a way that cannot be captured by standard models focusing solely on net positions. Specifically, we find an inverse-U-shaped response pattern consistent with empirical evidence but challenging to generate in conventional models. The interest rate exposure channel operates through differential exposure to interest rate changes on both assets and debts. Our model of liquid assets and debt allows us to study how monetary policy shocks differentially affect saving and borrowing decisions, jointly determining the ultimate consumption response. This dual exposure allows us to show that the transmission of monetary policy depends crucially on the pass-through of policy rates to both saving and borrowing rates, which can vary substantially across financial instruments and over time.

Related Literature This paper adds to the large literature on coholding of liquid assets and debt. Several theoretical explanations of the coholding puzzle have been put forward (Bertaut, Haliassos and Reiter, 2009; Telyukova and Wright, 2008; Telyukova, 2013; Fulford, 2015; Druedahl and Jørgensen, 2018; Gorbachev and Luengo-Prado, 2019). We build on the idea in Telyukova (2013) that households cohold debt and assets due to liquidity demand. Batista et al. (2024) survey coholder households, and even when explicitly confronted with the financial implications of holding costly revolving debt and low-yield chequing balances, these households maintain a preference to cohold for transactional purposes.

Our contribution is to model this mechanism in a standard consumption-savings framework and study its implications for fiscal and monetary policy. Our model generates coholding of liquid assets and debt, while the model built in Kaplan and Violante (2014) generates coholding of liquid and illiquid wealth. Kosar, Melcangi, Pilossoph and Wiczer

(2022) and Lee and Maxted (2023) also focus on understanding the relevance of debt for stimulative fiscal transfers in models with a single asset. Kosar et al. (2022) introduce a debt price schedule into a standard incomplete markets model and show that by using transfers to reduce debt, households increase their individual welfare by reducing the interest rate paid on debt. Lee and Maxted (2023) show that in an economy with present bias, credit card borrowers do not need to be close to their borrowing constraint to have an elevated marginal propensity to consume. Relative to these papers, our focus is on studying marginal propensities to consume and deleverage along the joint distribution of liquid assets and debt in an otherwise standard model.

We also contribute to the empirical literature on marginal propensities to consume by focusing on the role of gross wealth instead of net wealth. In general, the literature has focused on the negative relation between the marginal propensity to consume and wealth (Kueng, 2018; Jappelli and Pistaferri, 2020; Fagereng, Holm and Natvik, 2021; Ganong, Jones, Noel, Farrell, Greig and Wheat, 2023; Graham and McDowall, 2024), and standard one- and two-asset models can be calibrated to closely match this empirical evidence (see Kaplan and Violante, 2022). However, others have recently found a flat MPC across the distribution of liquid wealth (Bunn, Le Roux, Reinold and Surico, 2018; Christelis, Georgarakos, Jappelli, Pistaferri and Van Rooij, 2019; Fuster, Kaplan and Zafar, 2021).

We contribute to a small but growing literature that focus on household responses beyond consumption and their relation to balance sheets. Colarieti et al. (2025) use open-ended surveys to study household consumption, saving, and deleveraging behavior in response to positive income shocks. They show that, unlike the standard practice of grouping the two non-consumption responses together, households clearly distinguish between deleveraging and saving. We contribute a model with distinct saving and borrowing decisions that generates behavior consistent with their findings.

A number of other papers have documented the relation between debt and MPCs (Jappelli and Pistaferri, 2014; Sala and Trivin, 2021; Kosar et al., 2022) and how households adjust their debt positions in response to income changes (Agarwal, Liu and Souleles, 2007; Sahm, Shapiro and Slemrod, 2010, 2015; Boutros, 2019; Coibion, Gorodnichenko and Weber, 2020; Fagereng et al., 2021). Our contribution is to highlight that studying assets, debt, or net wealth in isolation is not sufficient to characterize household behavior. Overall, we provide empirical and theoretical analysis to demonstrate that consumption, saving, and debt repayment behavior are functions of the joint distribution of assets and debt.

Finally, our fiscal policy analysis adds to the literature on debt-dependent fiscal multipliers. While previous studies show that multipliers rise with higher debt levels (Dynan,

Edelberg et al., 2013; Mian, Rao and Sufi, 2013; Klein, 2017; Baker, 2018; Bernardini and Peersman, 2018; Demyanyk, Loutskina and Murphy, 2019; Bernardini, De Schryder and Peersman, 2020), they largely focus on aggregate or non–credit card debt. We suggest instead that debt composition matters: credit card debt dampens short-run consumption responses by raising the propensity to deleverage. Evaluating macroeconomic shocks or policies requires fully understanding how MPCs, MPS, and MPDs operate independently and jointly, and our model contributes a setting that enables such analysis.

2 Empirical Facts

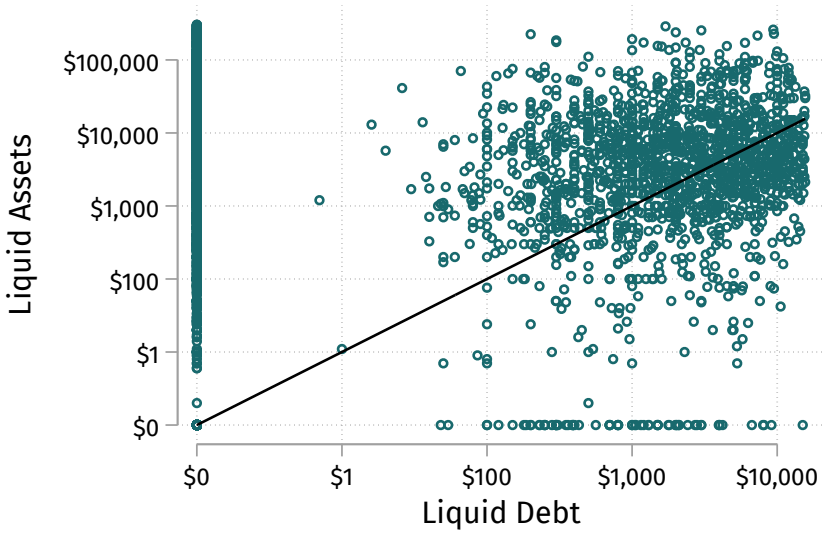
Household wealth plays a central role in determining consumption, saving, and borrowing behavior. Traditional macroeconomic analysis focuses primarily on net wealth positions, assuming that the underlying gross positions are either irrelevant or can be summarized by the net position alone. We challenge this assumption by documenting two key empirical facts. First, the distribution of liquid wealth is underpinned by rich, non-degenerate joint distributions of liquid assets and debt that vary meaningfully across households. Second, liquid debt dampens the marginal propensity to consume, both unconditionally and conditional on the level of net liquid wealth. Together, these facts have implications for both fiscal and monetary policy. In this section, we discuss the implications of coholding for the measurement of households with high MPCs using only liquid wealth, and then we develop a quantitative model in the next section to match these facts and perform policy analysis.

2.1 The Joint Distribution of Liquid Assets and Liquid Debt

We examine the joint distribution of liquid assets and liquid debt using the 2016 wave of the Survey of Consumer Finances.[1] In Figure 1, each point represents a household's gross asset positions, with the 45-degree line indicating zero net liquid wealth. In this figure, roughly two-thirds of households lie along either axis, indicating that they either have positive liquid assets and no liquid debt or vice versa. The remaining one-third have significant positive positions in both liquid assets and liquid debt. This scatter plot reveals that households with identical net liquid wealth positions can have vastly different combinations of gross assets and liabilities. For example, there are hundreds of combinations of liquid assets and liquid debt that yield zero net wealth, and focusing only on net wealth

[1] Liquid assets are defined as funds held in checking and savings accounts. Liquid debt denotes revolving credit card debt.

Figure 1: Joint Distribution of Liquid Assets and Debt



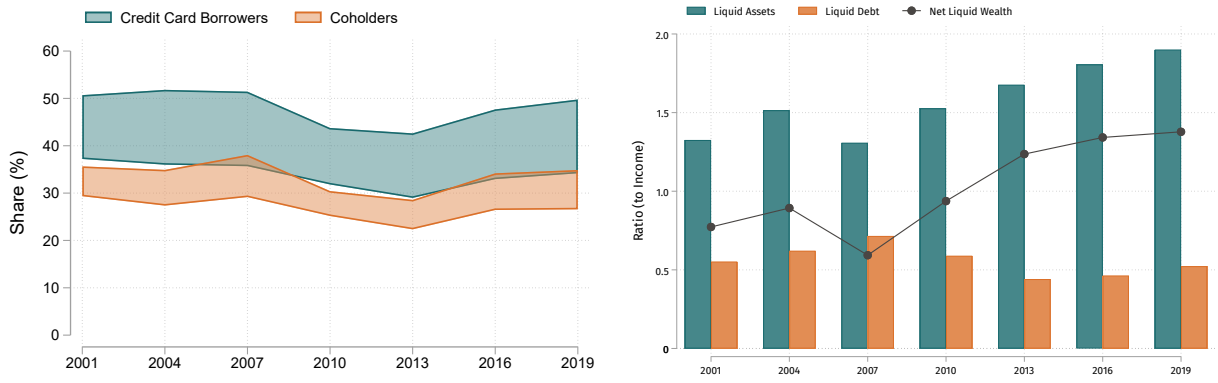
Notes: Data from 2016 SCF. Observations with extreme values were excluded by removing those below the 1st percentile or above the 95th percentile for liquid assets, liquid debt, or liquid wealth. Values greater than zero are plotted on a logarithmic scale.

masks this important heterogeneity in underlying gross positions.

The coholding of liquid assets and liquid debt is a well-documented phenomenon in household finance. While we leave detailed analysis of coholding to the literature reviewed in Appendix A.1, we focus here on documenting its prevalence and stability over time in the United States. Figure 2a reports the percentage of credit card borrowers and coholders across several waves of the Survey of Consumer Finances from 2001–2019. On the extensive margin, the share of households engaged in coholding has remained remarkably stable over this period, and represents the majority of households who borrow on their credit cards. For the sake of robustness, we report these statistics using various measures from the literature to define credit card borrowers and coholders in the data. The upper bound of credit card borrowers is given by households that report not paying off their credit card balance fully, while the lower bound further restricts to those who report habitually revolving debt. Households are coholders if they are credit card borrowers with more than 10% of monthly income in liquid assets and debt. Overall, regardless of the specific definitions used, the patterns remain identical. The share of coholders has largely tracked the share of credit card borrowers and has fluctuated around one-third of households for the majority of the sample period.

While the extensive margin of coholding has been fairly stable over time, the intensive margin with respect to the level of gross positions has experienced larger changes. Figure

Figure 2: Coholding and Composition of Liquid Wealth Over Time



(a) Share of Credit Card Borrowers and Coholders

(b) Composition of Liquid Wealth

Notes: Data from triennial SCF waves between 2001 and 2019. The left panel plots the fraction of all households that are credit card borrowers and coholders. Credit card borrowers are households that report having a credit card and not paying off their credit card balance fully (upper bound), and additionally report revolving debt habitually (lower bound). Coholders are households that hold more than 10% of monthly income in liquid assets and debt (upper bound) and report revolving credit card debt habitually (lower bound). The right panel reports average liquid wealth, asset, and debt holdings relative to income. Liquid asset and debt ratios are winsorized at the 99th percentile.

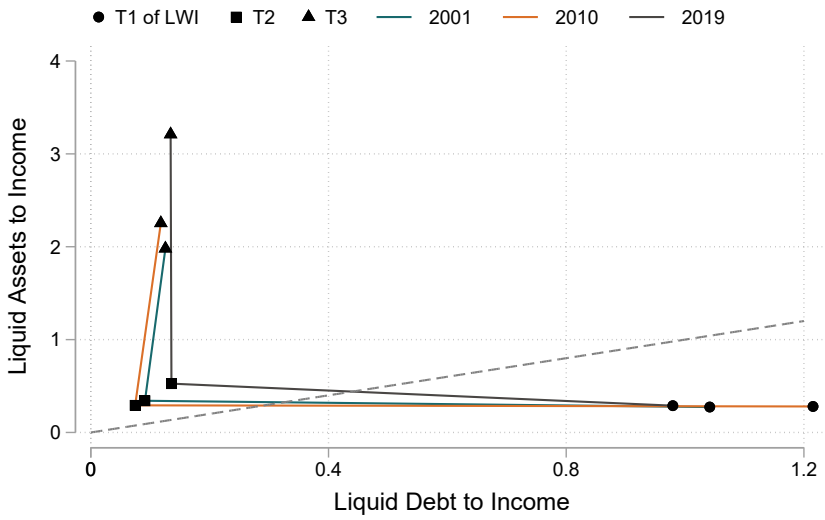
2b reports the evolution of the aggregate stock of liquid assets and debt (normalized by income) over time. After contracting during the global financial crisis, both net and gross wealth positions have expanded. Between 2007 and 2013, net liquid wealth increased due to growth in liquid assets and reduction in liquid debt. More recently, however, liquid debt has begun to increase again. From 2016 to 2019, net wealth remained almost flat despite an increase in liquid assets, as liquid debt increased by nearly the same amount. As the intensity of coholding increases, household responses to income shocks and policy interventions change in ways that cannot be captured by models focused solely on net wealth. This compositional shift in liquid wealth, which would be entirely missed by examining only net positions, has important implications for aggregate household behavior.

2.2 The Underlying Components of Liquid Wealth

To better understand how coholding relates to the overall distribution of wealth, Figure 3 plots the average liquid assets and debt within terciles of the net liquid wealth distribution for three different years and the 45-degree line represents zero net wealth. This presentation reveals several important patterns.

Each point is on the interior of the graph, reflecting that even at the lower and upper

Figure 3: Liquid Wealth and Joint Distribution of Liquid Assets and Debt



Notes: Data from SCF waves 2001, 2010, and 2019. Observations with extreme values were excluded by removing those below the 1st percentile or above the 95th percentile for liquid wealth.

terciles of liquid wealth, coholding is prevalent. Households in the lowest tercile of liquid wealth have low but positive cash balances combined with substantial credit card debt, resulting in negative net positions. Those in the highest tercile have large cash balances and moderate credit card debt, yielding positive net positions.

Interestingly, households in the middle tercile hold similar levels of liquid assets as those in the lowest tercile, but with less debt, resulting in positive net positions. This illustrates how households with similar levels of liquid assets can have substantially different net positions depending on their debt levels. Traditional analyses focusing solely on net wealth would incorrectly group the middle tercile households with the highest tercile, despite their asset positions being more similar to the lowest tercile.

The figure also shows the increasing intensity of coholding over time, as the L-distribution shifts northeast across years. If this shift occurred precisely along the 45-degree line, gross positions would increase proportionally while net wealth remained constant. As discussed above (see Figure 2b), net wealth did increase slightly over time, but the changes in L-distributions demonstrate that substantial changes in gross positions underlie relatively modest changes in net positions over time.

This evidence establishes our first key empirical fact: the distribution of liquid wealth is underpinned by rich, non-degenerate joint distributions of liquid assets and debt. In the next section, we examine how these gross positions relate to household consumption, saving, and debt repayment behavior in response to income shocks.

2.3 Liquid Debt and the Marginal Propensity to Consume

Having established the prevalence of coholding, we now turn to our second empirical fact: liquid debt dampens the marginal propensity to consume out of income shocks. This relationship has significant implications for how we measure household constraints and understand policy effectiveness.

We begin by analyzing how the joint distribution of liquid assets and debt affects household responses to income changes. Most studies in the literature focus exclusively on the marginal propensity to consume (MPC), treating the residual (non-consumption) portion of income shocks allocated towards saving or deleveraging as a homogeneous increase in wealth. We extend this approach by separately examining the propensities to save and deleverage, recognizing that households may allocate income shocks differently across these margins. For this analysis, we use the Survey of Consumer Expectations (SCE), a nationally representative survey of US households fielded by the Federal Reserve Bank of New York, which has been used extensively in studies such as Fuster et al. (2021). Detailed information on the dataset is provided in Appendix A.2.

To elicit marginal propensities across spending, saving, and deleveraging, we use a hypothetical income shock question included in the SCE. Respondents are asked:

"Suppose next year you were to find your household with 10% more income than you currently expect. What would you do with the extra income?"

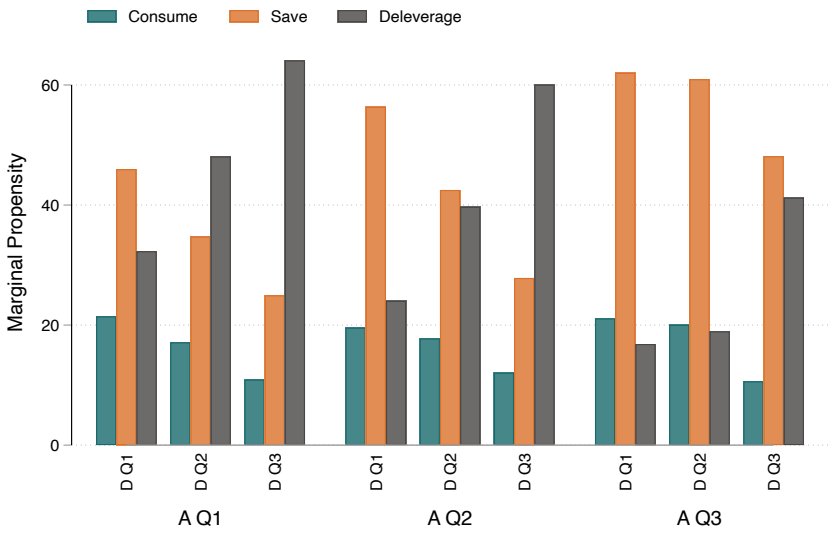
Participants report both a qualitative breakdown and a quantitative allocation of the additional income, specifying what share they would consume, save, or use to reduce debt.[2]

Figure 4 plots the average propensities to consume, save, and deleverage along the joint distribution of liquid assets and liquid debt, relative to income. In this analysis, we double-cut the data by dividing households into terciles based on each marginal distribution. The key insight from this figure is that even after controlling for liquid assets, increasing liquid debt consistently dampens the marginal propensity to consume while increasing the propensity to deleverage. This pattern holds across all terciles of liquid assets, including households in the highest tercile who typically have large positive net wealth positions. Similarly, the pattern persists across all terciles of liquid debt, from those with minimal debt to those with substantial liabilities. The fact that even wealthy households with high liquid assets adjust their consumption and debt repayment behavior based on their debt positions demonstrates that gross positions matter independently from net positions. This finding challenges the conventional approach in macroeconomics

[2]Evidence from Parker and Souleles (2019) and Colarieti et al. (2025) supports the validity of self-reported spending intentions as proxies for actual MPCs.

that relies solely on net wealth and highlights the importance of considering underlying gross positions in both measurement and modeling.

Figure 4: Marginal Propensities Across the Joint Distributions of Gross Liquid Wealth



Notes: Marginal propensities from the SCE 2015–2019. The figure reports average propensities by tercile of liquid assets and liquid debt, relative to income. Liquid assets are defined as the sum of checking and savings accounts plus idle money in brokerage accounts. Liquid debt is defined as credit card debt.

To quantify these relationships more precisely, we estimate a series of linear regression models. Table 1 presents our baseline results. In Column 1, we regress the marginal propensity to consume on liquid debt, finding a strong negative relationship: a $1,000 increase in liquid debt is associated with a 0.215 percentage point decrease in MPC. This relationship is both economically meaningful and statistically significant at the 1% level.

In Column 2, we estimate the impact of liquid debt on the marginal propensity to consume conditional on liquid wealth. The coefficient on liquid debt remains virtually unchanged at -0.209 percentage points per $1,000, while the coefficient on liquid wealth is small and statistically insignificant. This confirms that liquid debt dampens consumption responses independently of its effect on net wealth positions. Column 3 adds a comprehensive set of additional controls, including illiquid assets and debt, income, housing status, and measures of financial literacy. Even with these extensive controls, the coefficient on liquid debt remains stable at -0.194 percentage points per $1,000. This robustness across specifications underscores that the relationship between liquid debt and lower MPCs is not merely a proxy for other household characteristics.

In Appendix A.3, we demonstrate the robustness of these results to alternative specifications, including quantiles of balance sheet items instead of levels and additional con-

Table 1: Regressions of Marginal Propensities on Household Liquid Balance Sheet

Y = MPC	(1)	(2)	(3)
Liquid Debt	-0.215***	-0.209***	-0.194***
	(0.035)	(0.039)	(0.032)
Liquid Wealth		0.005	0.010
		(0.014)	(0.015)
Demographics	X	X	X
Illiquid Assets/Debt			X
Other Financial Variables			X
N	3,388	3,388	3,236
R^2	0.053	0.053	0.066
Adj. R^2	0.034	0.033	0.043

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Demographic controls include age, gender, race, marital status, education, geography, and survey date. Financial controls include income, housing tenure, and financial literacy.

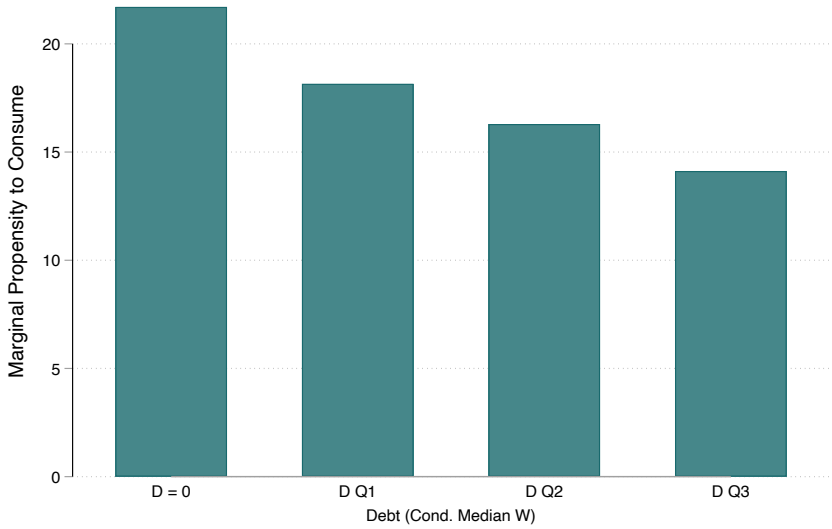
trols. Our key finding that liquid debt dampens the MPC remains consistent across specifications. These findings also extend beyond the US context. In Appendix A.4, we revisit studies by Jappelli and Pistaferri (2014) and Christelis et al. (2019), who examine marginal propensities in Italian and Dutch data. By extending their analyses to incorporate the joint distribution of assets and debt, we find consistent evidence that liquid debt dampens the MPC independently of its effect on net wealth across different countries and institutional settings.

To interpret the regression coefficients and illustrate the economic significance of our findings, Figure 5 shows how the MPC varies with liquid debt for households with the same level of net liquid wealth. Focusing on households at the median of the liquid wealth distribution, we observe a clear negative relationship between liquid debt and the MPC. A household with median liquid wealth and no debt has an MPC of 21.7%, while a similar household with high debt (top tercile) has an MPC of only 14.1%. This substantial difference in consumption behavior would be entirely missed by approaches that characterize households solely by their net wealth position.

2.4 Connection to Measurement of Constrained Households

Our findings on the prevalence of coholding and how liquid debt dampens the MPC have important implications for identifying financially constrained households in macroeconomic models. The fraction of "spender" or "hand-to-mouth" households, i.e., those

Figure 5: Marginal Propensity to Consume Conditional on Liquid Wealth



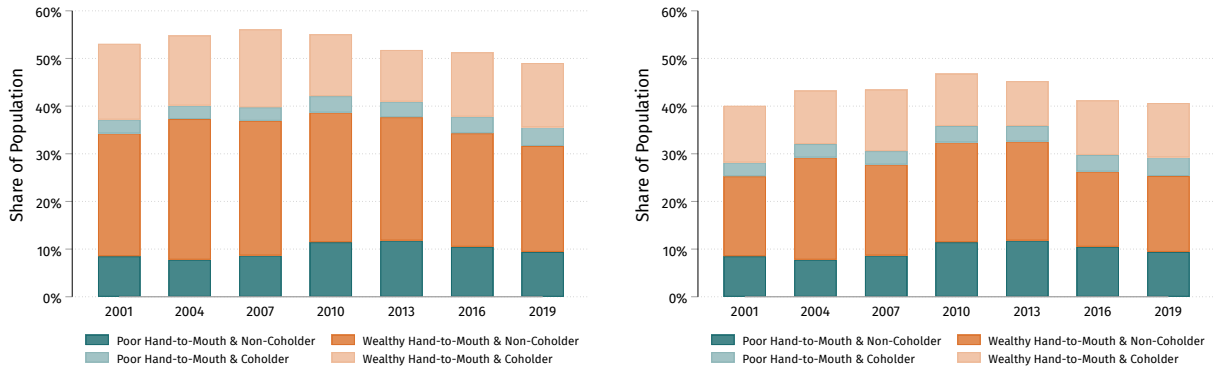
Notes: Marginal propensities to consume for households with median liquid wealth further divided into four groups (zero liquid debt and terciles of liquid debt). Median liquid wealth denotes the middle quintile of the liquid wealth distribution.

with large and immediate consumption responses to income shocks, serves as a critical calibration target in heterogeneous agent models. Since hand-to-mouth status is a latent variable, researchers typically proxy it using observable balance sheet characteristics, particularly low levels of net liquid wealth.

In seminal work, Kaplan and Violante (2014) identify two types of hand-to-mouth households: poor hand-to-mouth (low total net wealth) and wealthy hand-to-mouth (substantial total assets but low liquid net wealth). Both classifications rely on net liquid wealth positions. Our analysis suggests this approach confounds two distinct groups: true hand-to-mouth households with low net and gross positions, and coholders with low net positions but substantial gross positions on both sides of the balance sheet. Figure 6 illustrates this distinction by decomposing hand-to-mouth households into coholders and non-coholders over time. Following convention, we classify households as hand-to-mouth if their net worth is less than two weeks of earnings, with Panel (a) using our narrow definition of liquid wealth and Panel (b) using the broader definition from Kaplan, Violante and Weidner (2014).

The evidence suggests that failing to account for coholding may significantly overcount the share of true "hand-to-mouth" households with high MPCs. In 2016, 51.3% of households would be classified as hand-to-mouth based on net liquid wealth, but excluding coholders reduces this share to 34.3%. Most of this reduction comes from wealthy

Figure 6: Coholding and Hand-to-Mouth Households Over Time



(a) Narrow Definition of Liquid Wealth (b) Broad Definition of Liquid Wealth

Notes: Population shares of hand-to-mouth and coholder households in SCF waves from 2001 to 2019. See Section 2.4 for more details and definitions.

hand-to-mouth households who are also coholders, and nearly one-third of all wealthy hand-to-mouth households fall into this category. With the broader definition of liquid wealth, the share of hand-to-mouth households decreases from 41.2% to 26.3% when excluding coholders.

This distinction matters because, as our empirical analysis demonstrates, true hand-to-mouth households and coholders exhibit fundamentally different behavior in response to income shocks. While true hand-to-mouth households have high MPCs due to binding liquidity constraints, coholders prioritize debt repayment over consumption. Including coholders in the hand-to-mouth category therefore substantially overestimates the share of high-MPC households in the economy. This misclassification has significant implications for modeling household behavior and evaluating policy effectiveness. Models calibrated to match the conventional hand-to-mouth share will overestimate the aggregate consumption response to income shocks and underestimate the debt repayment response. As we demonstrate in subsequent sections, accurately distinguishing between these groups leads to substantially different conclusions about the transmission of fiscal and monetary policy.

3 Model

To explore the prevalence of credit card debt and the implications of coholding on the response to income shocks, we build a model of consumption and savings in which households optimally and rationally cohold both liquid assets and debt. Our approach to ar-

riving at the macroeconomic implications of coholding is to aggregate microeconomic coholding at the individual household level across the entire distribution of households in the economy.

3.1 Environment and Financial Markets

The model environment is populated by a continuum of households that are *ex ante* identical and live infinitely. Time is discrete and the model period is one month. In each period, households receive stochastic endowment income, y_t, which will be calibrated in the next section.

A representative financial institution serves households by inelastically providing two financial instruments. Households can save in a one-period liquid asset, a_{t+1}, and simultaneously borrow in one-period liquid debt, d_{t+1}. The rate of return on saving is $R_a = 1+r$, and there is a positive wedge between borrowing and saving, $\delta > 0$, such that $R_d = R_a+\delta$.

3.2 Households

In each period, households take as given their stochastic income process and the interest rates set by the financial institution. Each household then makes consumption, saving, and borrowing decisions subject to its budget constraint, borrowing constraint, and liquidity-in-advance constraint.

3.2.1 Consumption and Utility

Households derive utility from consumption. We consider a consumption aggregator that distinguishes between two types of consumption goods: those that can be purchased with credit (c_1) and those that require liquid assets (c_2). The consumption aggregator is a CES function with η measuring the elasticity of substitution between the two types of consumption goods:

$$C(c_1, c_2) = \left[\alpha_1 c_1^{\frac{\eta-1}{\eta}} + \alpha_2 c_2^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

To interpret the CES weights as consumption shares, we define θ as the share of total consumption dedicated to the cash-only good, c_2:

$$\theta \equiv \alpha_2^{\eta}.$$

This will be a key parameter in our calibration. Households value consumption and have standard time preferences governed by a discount factor, β, with lifetime utility given by:

$$E_0 \sum_{t=0}^{\infty} \beta^t \frac{C_t^{1-\gamma}}{1-\gamma},$$

with $C_t \equiv C(c_{1,t}, c_{2,t})$.

3.2.2 Budget Constraint

In each period, the household's budget constraint equates income to expenditure:

$$y_t + a_t - d_t = c_{1,t} + c_{2,t} + \frac{a_{t+1}}{R_a} - \frac{d_{t+1}}{R_a + \delta}$$

Income consists of endowment income, y_t, and liquid assets, a_t, net of liquid debt, d_t. On the expenditure side, the household chooses consumption of both types of goods ($c_{1,t}$ and $c_{2,t}$), saves into the liquid asset at price R_a^{-1}, and borrows with liquid debt at price $(R_a + \delta)^{-1}$.

The household is subject to an exogenous borrowing constraint, ϕ, such that it cannot borrow more than this amount:

$$d_{t+1} \leq \phi.$$

In addition, both financial instruments must be weakly positive. Net wealth is defined as $w_t \equiv a_t - d_t$. When $\delta = 0$, the budget constraint collapses to that of the standard model in which only the net level of wealth is relevant.

3.2.3 Liquidity-in-Advance Constraint

The key ingredient in our model is the addition of a liquidity-in-advance constraint that requires certain consumption goods, c_2, can only be purchased using liquid assets:

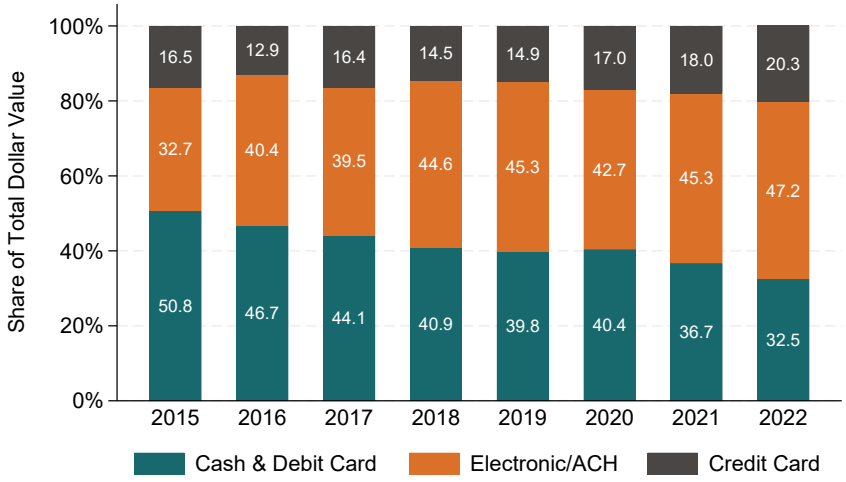
$$c_{2,t} \leq a_t.$$

This constraint ensures that households must have sufficient liquidity on hand before they can consume these goods. The logic is closely connected to the macroeconomic money demand literature, where cash is held because of its transactional role. Classic cash-in-advance models such as Lucas (1982) and Svensson (1985) explain why households are willing to hold zero-return money instead of only investing in higher-yield assets. In the same way, the liquidity-in-advance constraint explains why households de-

mand liquid assets in order to transact for a fraction of their goods, even while wishing to borrow from their future selves, which generates demand for liquid debt (Telyukova and Wright, 2008).

The liquidity-in-advance constraint is motivated by a wide range of empirical evidence. Telyukova (2013) use the Survey of Consumer Expenditures to provide compelling evidence of liquidity demand as a resolution to the so-called coholding "puzzle" studied in household finance. She finds that households that spend more on goods requiring liquid assets are those most likely to hold large amounts of cash and cohold credit card debt. More recently, direct qualitative survey evidence has confirmed that coholders explicitly prefer to hold a relatively expensive mix of cash and credit card debt for transactional purposes (Batista et al., 2024; Colarieti et al., 2025).

Figure 7: Value Share of Transactions by Payment Instrument



Notes: Cash & Debit Card includes cash, checks, money orders, and debit. Electronic/ACH includes bank account number payments, online banking bill payments, mobile payment apps, account-to-account transfers, and prepaid/gift/EBT. Credit Card includes credit or charge cards. Figure excludes payments categorized as "other" in original source. Source: Table 6 of 2022 SDCPC Tables.

Figure 7 illustrates the magnitude of this constraint by plotting the value share of transactions by payment instrument as reported in the 2015 to 2022 waves of the Survey and Diary of Consumer Payment Choice. In our analysis, liquid debt most closely corresponds to credit cards, while liquid assets encompasses cash & debit card and electronic/ACH payments. Together, liquid asset transactions compose about 85% of transactions over our sample, decreasing slightly over the last several years. Liquid asset transactions include mortgage payments, rent payments, vehicle payments, utility payments, and other such recurring expenses that form the bulk of household spending. Unsurprisingly, cash & debit transactions decreased by 18.3 pp over the survey sample period,

from 50.8% of all transacted dollars in 2015 to 32.5% in 2022. However, the majority of these cash & debit transactions shifted to electronic or automated clearing house (ACH) transactions, which increased by 14.5 pp over the same period. This mostly represents the transition from manually writing cheques to automated monthly payments. Credit card transactions increased by only 3.8 pp, from 16.5% to 20.3%. While there has been a marked shift from cash to digital payments, the majority of that transition has been to digital debit payments, not digital credit payments.

We note that this is an intertemporal "in-advance" constraint because the choice of consumption today, $c_{2,t}$, is subject to the liquid assets chosen in the previous period. This timing is consistent with Svensson (1985): the household chooses liquidity before it observes the state variables required to choose consumption. In contrast, the timing in Lucas (1982) is such that the household observes all state variables and then chooses liquidity and consumption. As Svensson (1985) argues, this form of the constraint generates more realistic demand for liquidity, as the household's choice is "in-advance" of the resolution of uncertainty.

3.2.4 Optimization

The household's problem can be expressed using recursive notation. The household chooses consumption, saving, and borrowing to maximize its value function,

$$V(a, d, y) = \max_{C, a', d'} u(C) + \beta E[V(a', d', y')|y]$$

subject to an exogenous income process, y', and each of the constraints described above:

1. Budget constraint:
$$y + a - d = c_1 + c_2 + \frac{a'}{R_a} - \frac{d'}{R_a + \delta}.$$

2. Borrowing constraint:
$$d' \leq \phi.$$

3. Liquidity-in-advance constraint:
$$c_2 \leq a.$$

This optimization problem generates rational coholding of liquid assets and liquid debt. Households hold liquid assets to satisfy the liquidity-in-advance constraint for future consumption, while simultaneously borrowing to smooth consumption over time. The desired level of net wealth arises from standard buffer-stock mechanisms, while the

desired level of liquid assets is driven by the expected level of consumption and the liquidity-in-advance constraint. Together, these generate a desired level of liquid debt, resulting in coholding behavior despite the interest rate wedge.

4 Coholding in the Model: A Simplified Framework

To build intuition for how our model generates coholding through the liquidity-in-advance constraint, we present a simplified three-period version with no income uncertainty that illustrates the key mechanisms generating coholding.[3] This simplified model captures the essential trade-offs that households face when making portfolio decisions between liquid assets and debt.

4.1 Setup

We assume that the cash and credit goods are perfect complements, $\eta = 0$, and $\alpha_2 = \theta$ is the fraction of total consumption that must be financed with liquid assets. The household maximizes lifetime utility,

$$\max_{(c_t, a_{t+1}, d_{t+1})_{t=1,2,3}} \log(c_1) + \beta \log(c_2) + \beta^2 \log(c_3),$$

subject to the following constraints for $t \in \{1, 2, 3\}$:

1. Budget constraint:

$$y_t + R_a a_t - (R_a + \delta) d_t = c_t + a_{t+1} - d_{t+1}.$$

2. Borrowing constraint:

$$d_{t+1} \leq \phi.$$

3. Liquidity-in-advance constraint:

$$\theta c_t \leq a_t.$$

For simplicity, we assume income is received only in period 2 ($y_2 > 0, y_1 = y_3 = 0$), and the borrowing constraint is non-binding. We further assume the liquidity-in-advance constraint binds in periods 2 and 3 but not in period 1. Since the household lives for only three periods, $a_4 = d_4 = 0$.

[3] We thank Andreas Tryphonides for suggesting this framework.

4.2 Optimal Portfolio Allocation

The household's optimal net wealth position, $w_3 \equiv a_3 - d_3$, is given by:

$$w_3 = \frac{\beta^2}{1+\beta+\beta^2}(R_a + \delta)x,$$

where $x \equiv \frac{y_2}{R_a+\delta} + R_a a_1 - (R_a + \delta)d_1$ denotes total resources available to the household. The key insight from this expression is that net wealth is independent of the liquidity-in-advance constraint governed by the parameter θ. Since $y_3 = 0$, the household is a net saver into the next period to smooth consumption, and the liquidity constraint does not impact the optimal level of savings.

Instead, liquidity-in-advance dictates the optimal allocation between liquid assets and liquid debt. The main contribution of our model is to further decompose net wealth into its gross positions:

$$a_3 = \frac{\theta(R_a + \delta)}{1 + \delta\theta} w_3,$$
$$d_3 = \frac{\theta R_a - 1}{1 + \delta\theta} w_3.$$

Unlike with net liquid wealth, these equations show that the coholding parameter, θ, features prominently in the optimal levels of liquid assets and liquid debt. Both of these functions are increasing in the coholding parameter. The stronger is the liquidity-in-advance constraint, the more the household must save with liquid assets to purchase consumption in the next period. At the same time, the household increases its debt holdings to maintain the same level of resources to finance consumption in the current period. These offsetting forces change the composition of net wealth without altering its total level.

4.3 The Marginal Propensity to Consume

Using the analytical expression for consumption, we can derive the marginal propensity to consume out of an income change in period 2:

$$MPC_2 \equiv \frac{dc_2}{dy_2} = \frac{\beta}{1+\beta+\beta^2} \frac{1}{1+\delta\theta}$$

With $\theta \to 0$, the propensity to consume becomes a function solely of time preferences, as in standard models. The presence of the liquidity-in-advance constraint dampens the marginal propensity to consume relative to the standard benchmark. The household in-

creases consumption in the current period, but to smooth consumption in the next period, must save a fraction of the shock into the liquid asset. As the strength of the constraint increases, the household consumes less of the shock today and saves more for the next period.

4.4 Summary and Connection to Full Model

There are two main takeaways from the simple model. First, the liquidity-in-advance constraint primarily affects the allocation between assets and debt rather than the level of wealth. Households hold liquid assets to satisfy their liquidity needs for future consumption, even while borrowing to smooth consumption over time. The stronger is the constraint, the more that households will cohold, that is, hold larger amounts of both liquid assets and liquid debt for a given level of liquid wealth. This insight transfers directly to the full model with income uncertainty. The optimal level of net liquid wealth is driven by the standard buffer-stock mechanism of balancing precautionary saving with borrowing against the future, while the liquidity-in-advance constraint dictates the optimal composition of liquid assets and liquid debt.

Second, the liquidity-in-advance constraint impacts the marginal propensity to consume. The stronger the constraint, the larger the degree of coholding, and the more the household optimally allocates a positive income shock into improving its balance sheet composition, which decreases the consumption response. The same mechanism is active in the full quantitative model where all households face the same liquidity-in-advance constraint but vary in their intensity of coholding due to the realization of idiosyncratic income shocks. Households with more liquid debt will allocate a larger fraction of a positive income shock to deleveraging, reducing the marginal propensity to consume. This dynamic is crucial for generating the patterns documented in our empirical analysis.

5 Calibration

This section presents the model's full baseline calibration. We calibrate external parameters to standard values in the literature and target the distributions of wealth and debt in the economy using the discount rate and liquidity-in-advance constraint. The calibrated model is also able to match untargeted empirical facts regarding the marginal propensity to consume and its relationship to the joint distributions of liquid assets and debt.

5.1 External Calibration

The model is calibrated to a monthly periodicity. Income, preferences, and interest rates are calibrated to standard values in the literature summarized in Table 2. We select a standard value of risk aversion, $\gamma = 2$. We set the elasticity of substitution between cash and credit goods to $\eta = 0.2976$, as estimated in Telyukova (2013). We take the interest rate on savings and the interest rate spread on credit card debt from Telyukova (2013) and set it to $r = 0.0033$ and $\delta = 0.0074$, respectively. This corresponds to an annual interest rate on saving of 4% and an annual interest rate on credit card debt of 14%.

Borrowing is allowed up to approximately two months of average monthly income, $\phi = 2.2$, in line with the analysis by Kaplan and Violante (2014) who find a limit of 74% of quarterly income.

We model monthly income following Gelman (2021), who estimates an AR(1) process with $\rho_y = 0.096$ and $\sigma_y^2 = 0.039$ using high-frequency data from a proprietary financial services provider. This data provides information on regular income, focusing on transitory income fluctuations and abstracting away from permanent heterogeneity across households.

Table 2: Baseline External Calibration

Parameter	Description	Value	Source
γ	Risk aversion	2	Standard
η	Elasticity in C aggregator	0.2976	Telyukova (2013)
r	Interest rate	0.0033	4.00% APR
δ	Credit card spread	0.0074	9.63% APR
ϕ	Borrowing limit	2.2	74% of quarterly income
ρ_y	Persistence of y_t	0.096	Gelman (2021)
σ_y^2	Variance of innovation in y_t	0.039	Gelman (2021)

5.2 Internal Calibration

We calibrate the discount rate and the liquidity-in-advance constraint to match the distributions of liquid wealth and debt observed in the data. As highlighted by the stylized model, total wealth holdings are driven primarily by the discount factor, as in standard models, while the degree of coholding, and thus the underlying joint distributions of gross wealth components, is driven by the liquidity-in-advance constraint.

Panel A of Table 3 reports our primary model targets: the median level of liquid wealth, normalized by income, is 0.31, and the 75^{th} percentile of normalized liquid debt

is 0.41. We measure the empirical targets using the SCF.[4] Using the parameters in Panel B and detailed in the next section, the model is successfully able to match these moments, as well as a number of untargeted moments in Panel C.

Table 3: Internal Calibration and Model Moments

Panel A: Targeted Moments

Moment	Data	Model
Liquid Wealth (Median)	0.31	0.31
Liquid Debt (75^{th} Pct.)	0.41	0.41

Panel B: Internally Calibrated Parameters

Description	Parameter	Value
Annual discount factor	β	0.900
Share of cash-good consumption	θ	0.475

Panel C: Untargeted Moments

Moment	Data	Model
Joint Distribution of Assets and Debt		
Liquid Assets (Median)	0.61	0.50
Liquid Debt-to-Asset ratio (75^{th} Pct.)	0.80	0.85
Marginal Propensities (Mean)		
Consume	17.1	18.6
Deleverage	38.4	57.2
Save	44.0	26.4

Notes: Liquid assets and debt are expressed relative to monthly income. Households are coholders if they hold more than 10% of monthly income in liquid assets and debt and, in the SCF, additionally report revolving credit card debt habitually. Balance sheet data are taken from the SCF 2016, while marginal propensities are taken from the SCE 2015–2019.

5.2.1 Discount Rate

The (annual) discount factor is set to 0.900. The model does not require an extremely low discount rate to induce borrowing. Households borrow not only to smooth consumption over time, which is driven by preferences, but also because within a given period,

[4]We normalize by monthly income to bring the scaling in line with our model. We choose to match the wealth distribution in the SCF as opposed to the SCE as it provides a more accurate picture of revolving credit card debt and explicitly asks respondents if they revolve credit card debt. Table A.1 compares household characteristics across SCE and SCF and shows that coholding shares are nevertheless similar.

they wish to both satisfy the future liquidity-in-advance constraint and finance current consumption. This generates demand for debt without the need for impatience.

5.2.2 Liquidity-in-Advance Constraint

The parameter θ, which dictates the fraction of consumption subject to the liquidity-in-advance constraint, is calibrated to 0.475. This value is in the lower range of empirical estimates of the percentage of consumption paid for using non-credit products. Greene and Stavins (2022) document that over 80% of households' regular consumption goods and services, such as shelter and utilities, are paid for using liquid assets directly from bank accounts, and that many households cohold exactly for this purpose. Telyukova (2013) finds cash payments accounted for 65% of the total value of all consumer transactions in the 2002 Survey of Consumer Expenditure. One explanation for why the value of θ in our calibration is lower than implied by survey data is that such data accounts for all spending, while our model captures only non-durable consumption.[5]

6 Coholding and Marginal Propensities in the Model

In this section, we evaluate the model's ability to match the empirical facts documented in Section 2. To provide a direct comparison, we simulate a one-time positive income shock for 100,000 households and re-generate the empirical figures from above on the simulated data instead of the SCF/SCE data. Along several dimensions, the model generates household behavior consistent with the observed empirical behavior.

6.1 Liquid Wealth, Liquid Assets, and Liquid Debt

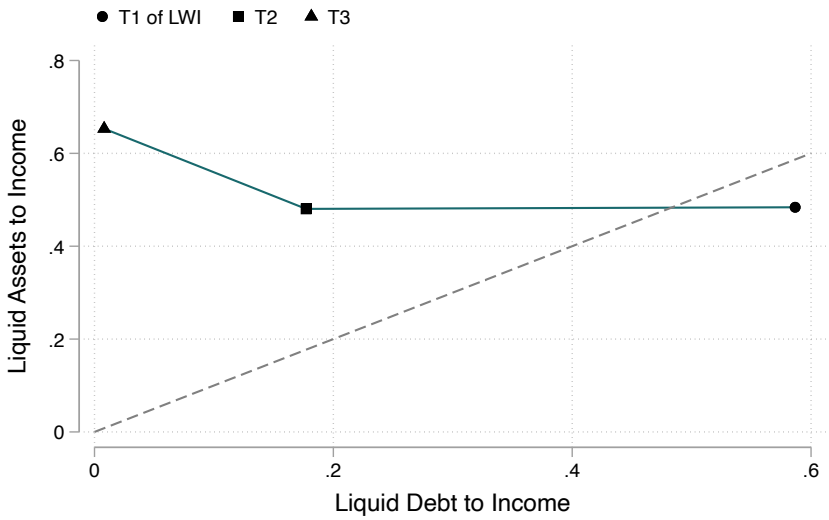
As our primary calibration targets, the model is successful in matching median liquid wealth and the 75^{th} percentile of liquid debt holdings. The former is identified primarily through the discount factor and the latter through the strength of the liquidity-in-advance constraint. Median liquid assets is 0.50 in the model, compared to 0.61 in the data.

The model also performs well in matching the untargeted joint distribution of liquid assets and debt. The 75^{th} percentile of the liquid debt-to-asset ratio is 0.80 in the data and 0.85 in the model. As in Figure 3, Figure 8 plots the joint distribution of liquid assets and debt over the distribution of liquid wealth. The model generates an L-shaped distribution that is qualitatively similar to the data. Households in the lowest tercile of liquid wealth

[5] Adding current income to the liquidity-in-advance constraint would also raise the value of θ.

have low cash holdings and high debt holdings, while households in the highest tercile of liquid wealth have high cash holdings and no debt. Households in the middle tercile hold less liquid debt than the lowest tercile and less liquid assets than households in the top tercile.

Figure 8: Joint Distribution of Liquid Assets and Debt (Model)



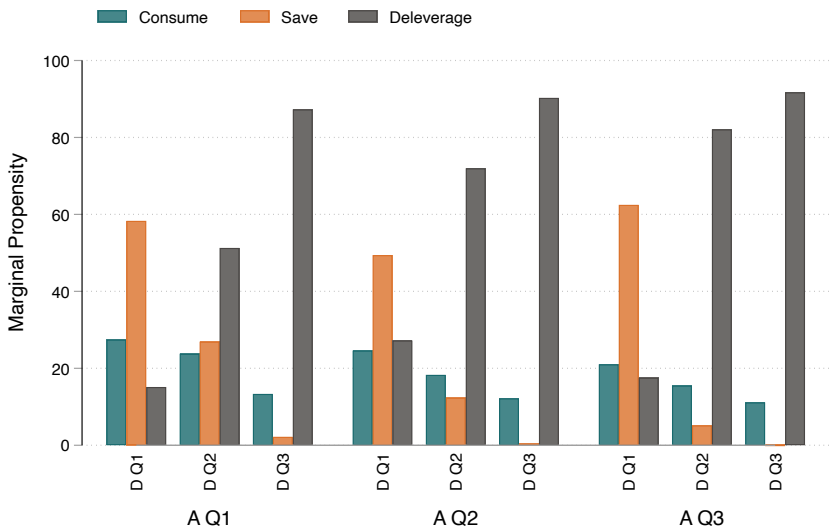
Notes: Joint distribution of liquid assets and debt for different net liquid wealth terciles in baseline model specification.

6.2 Coholding and Marginal Propensities

The model performs well in matching the untargeted propensities to consume, save, and deleverage. We compute quarterly marginal propensities to consume, save, and deleverage by comparing the model's policy functions with and without the shock, dividing the difference by the shock size. The income shock is implemented as an exogenous increase in assets equivalent to 10 percent of average monthly income. In the data, the average household consumes around 17% of an unexpected income windfall, uses 38% to deleverage, and saves the remainder. The average model household consumes roughly 19% of the income shock, uses roughly 57% to deleverage, and saves the remainder.

More importantly, the model successfully reproduces the relationship between these propensities and the joint distribution of liquid assets and debt. Figure 9 presents the model counterpart to Figure 4. The model captures the key empirical pattern that even after controlling for liquid assets, increasing liquid debt consistently dampens the marginal propensity to consume while increasing the propensity to deleverage. This pattern holds

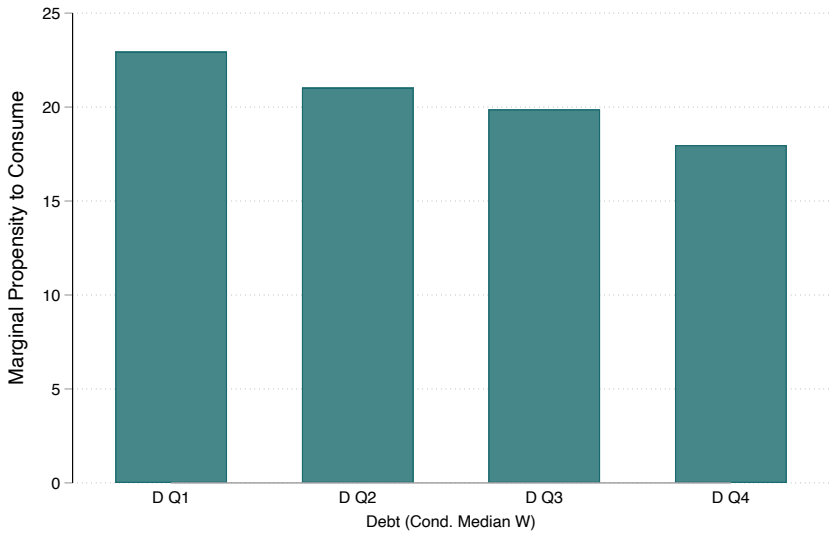
Figure 9: Marginal Propensities Across the Joint Distribution of Assets and Debt (Model)



Notes: The figure reports average propensities by tercile of liquid assets and liquid debt, relative to income, in the model. Top and bottom percent of marginal propensities are winsorized to avoid outliers caused by numerical error.

across all terciles of liquid assets, mirroring what we observe in the data.

Figure 10: Marginal Propensity to Consume Conditional on Liquid Wealth (Model)



Notes: Marginal propensities to consume for households with median liquid wealth further divided into four groups (zero liquid debt and terciles of liquid debt). Median liquid wealth denotes the middle quintile of the liquid wealth distribution.

Furthermore, Figure 10 shows how the MPC varies with liquid debt for households with the same level of net liquid wealth in the model. The pattern closely resembles

Figure 5 from the data. Focusing on households at the median of the liquid wealth distribution, we observe a clear negative relationship between liquid debt and the MPC. This confirms our model's ability to generate the empirical fact that liquid debt dampens the marginal propensity to consume, independent of its effect on net wealth positions. To verify these visual findings quantitatively, we estimate the same regression specifications as in Table 1 using the model-generated data and confirm that the model successfully reproduces the key empirical relationships. In particular, the model generates a negative coefficient on liquid debt in the MPC regression, confirming that liquid debt dampens the consumption response in the model, just as it does in the data.

Overall, the model's success in matching both the distribution of liquid assets and debt and the relationship between these variables and household responses to income shocks provides confidence in using the model to study the macroeconomic implications of coholding. The model captures the essential mechanisms through which gross positions affect household behavior, allowing us to explore counterfactual policies and scenarios.

7 Fiscal Policy

With the calibrated model in hand, we turn to the analysis of fiscal policy in the presence of coholders.

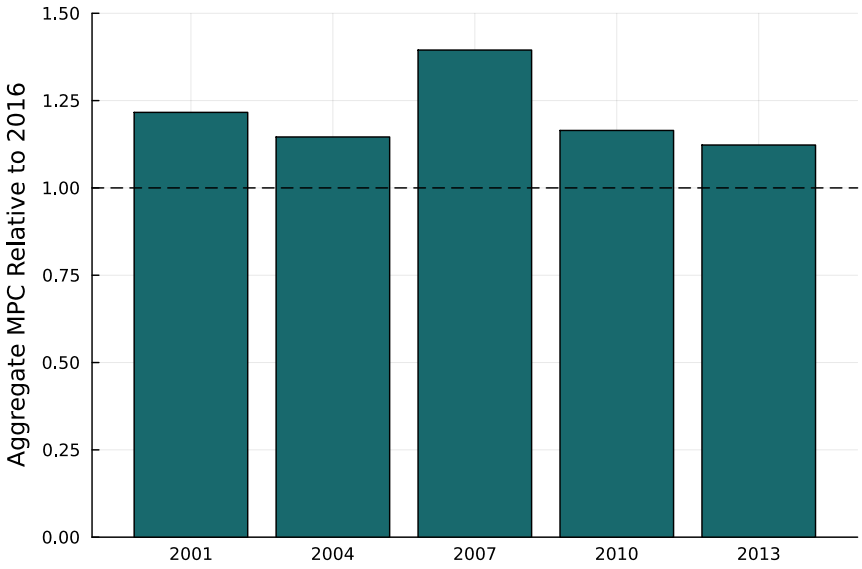
7.1 Direct Stimulus Payments

Stimulative fiscal transfers are an important policy tool employed to increase aggregate demand in times of economic downturn. These policies have been popular in the United States in the last 25 years in different forms, from rebates to stimulate specific sectors (e.g., automobile rebates) to direct cash transfers in 2001, 2008, and 2020–2021.

7.1.1 Untargeted Fiscal Transfers

The starting point for our analysis is an untargeted fiscal stimulus program in which all households receive an identical and unexpected one-time income shock. We use the model to construct an aggregate consumption response over the distribution of liquid assets and debt from the 2001–2016 vintages of the Survey of Consumer Finance. For each year, we divide the data into quintiles of liquid wealth and calculate the average level of liquid assets and debt in each group. We then calculate the propensity to consume for each quintile using the model's consumption policy function, and combine each quintile's consumption response to arrive at the aggregate marginal propensity to consume.

Figure 11: Relative Model-Based Aggregate Marginal Propensity to Consume (2001–2016)



Notes: This figure plots the aggregate consumption response to an untargeted fiscal transfer. The consumption response in 2016 is normalized to one, and each bar represents the relative response using the distribution of households from each vintage of the Survey of Consumer Finances between 2001 and 2013.

Figure 11 plots the aggregate consumption response in each year relative to the baseline calibration in 2016. The aggregate propensity to consume is larger in every year prior to 2016. This striking result arises from the fact that coholding has increased over time and, based on our previous analysis, coholding households typically have smaller consumption responses and larger debt repayment responses. For example, in 2010, the aggregate consumption response to an untargeted fiscal transfer program is 16.5% larger than in 2016, while in 2013, the aggregate response is 12.2% larger than in 2016. The patterns in this figure largely follow aggregate patterns in coholding shown in Figure 2b. The model captures that households with more liquid debt have smaller consumption responses, and thus as household indebtedness grows, the aggregate consumption response decreases.

7.1.2 Targeted Fiscal Transfers

We next study direct stimulus payment programs that target specific groups of households. For each program, Table 4 reports the aggregate marginal propensities to consume and deleverage across versions of each program that target the bottom 10%, bottom 30%, and bottom 50% of each characteristic, holding fixed the aggregate transfer size.

Income & Net Liquidity The first program we consider targets households based on their income. This characteristic is typically observable to the fiscal authority and most

stimulus cheque programs in the U.S. have had income-related thresholds. From the first two columns of Table 4, targeting the bottom 10% of the income distribution generates an aggregate MPC of 16.2% and an aggregate MPD of 71.7%. Surprisingly, as the program expands and targets households with higher income, the aggregate consumption response increases.

To understand this, we analyze a second stimulus program that targets households based on net liquidity. Targeting the bottom 10% of the net liquid wealth distribution generates an aggregate MPC of 10.4% and an aggregate MPD of 92.6%. Increasing the group of households that receives the transfer to the bottom 50% of the distribution significantly increases the consumption response to 14.1% and decreases the deleveraging response to 84.8%.

Counterintuitively, targeting households with *more* net liquidity leads to a *larger* consumption response. Our model highlights that this is because households with the lowest net liquid wealth have the most credit card debt and therefore a smaller consumption response. This is echoed in the first set of results on a targeted income program since lower income households are heavy users of credit card debt. In both programs, targeting marginally higher income or wealthier households that are still in the lower half of the distribution increases the consumption response because escaping the very bottom of the distribution shifts away from coholders to true hand-to-mouth households.

Table 4: Consumption and Debt Response to Fiscal Transfers

	Income		Net Liquidity		Gross Liquidity	
	MPC	MPD	MPC	MPD	MPC	MPD
Bottom 10%	16.2	-71.7	10.4	-92.6	24.6	-30.5
Bottom 30%	16.4	-71.6	12.2	-89.8	24.9	-41.0
Bottom 50%	17.0	-68.9	14.1	-84.8	23.4	-45.5

Notes: This table reports the aggregate consumption and deleveraging responses to targeted fiscal transfers as a percentage of the aggregate transfer size. The aggregate transfer size is held fixed across scenarios. Transfers are lump-sum and amount to 10% of average monthly income for the scenario in which the bottom half of the distribution is targeted. In the benchmark untargeted transfer, the changes are 18.6% for consumption and -57.2% for debt.

Gross Liquidity Building on this insight, we construct a new measure, "gross liquidity," as the *sum* of liquid assets and liquid debt. By construction, low gross liquid wealth households must have low net wealth positions, which helps in targeting true hand-to-mouth households. This is reflected in the final two columns of Table 4: targeting gross wealth generates both the largest consumption response and smallest debt response of

all programs we consider. Specifically, targeting the bottom 10% of households based on gross wealth generates an aggregate MPC of 24.6% and an aggregate MPD of -30.5%. Increasing the scope of the program to target the bottom 30% of households only marginally affects the aggregate responses, indicating the program is successfully targeting hand-to-mouth households even as the inclusion criteria grows. Eventually, when the program grows to include the entire bottom half of the distribution, more coholder households receive the stimulus cheque, and thus the aggregate consumption response decreases to 23.4% and aggregate deleveraging response increases to 45.5%.

7.1.3 Targeted vs. Untargeted Transfers

Overall, these results show the importance of targeting true hand-to-mouth households. The gross wealth targeting program is successful in generating the largest aggregate consumption response since it specifically targets hand-to-mouth households, who are not necessarily those with low net wealth or low income. In fact, our analysis suggests that targeting those two groups of households may be less effective than no targeting at all. To test this, Figure 12 plots the change in aggregate consumption when targeting the bottom 30% of each group relative to an equally-sized program that distributes a transfer to every household in the economy.

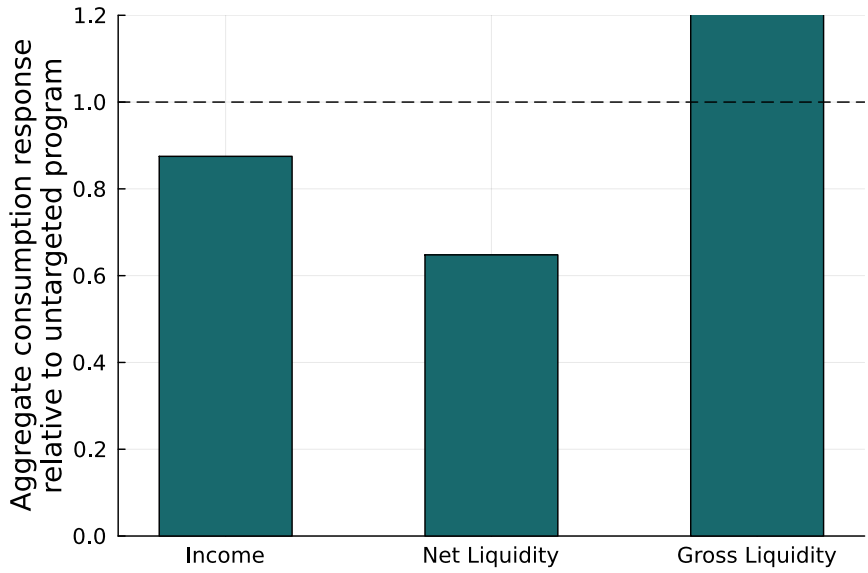
Relative to the untargeted plan, both the income and net wealth programs are less effective. Only the plan that explicitly targets true hand-to-mouth households by measuring gross wealth is able to generate a larger aggregate consumption response than the generic transfer program. Altogether, our analysis highlights that targeting can be effective if it is successful in finding true hand-to-mouth households, but programs that attempt to do so but confound with coholders may be even less effective than untargeted programs.

7.1.4 The Dynamics of Direct Stimulus Payments

All of the analysis in the previous section focuses on the immediate impact of fiscal transfers. The model we develop also allows us to study the dynamics of consumption over time. In this class of models, since households ultimately only value consumption, the cumulative consumption response to any income shock eventually reaches 100%, and can surpass this if the non-consumed portion of the shock is invested into a financial instrument with positive returns.

Untargeted Fiscal Transfers Panel (a) of Figure 13 plots the cumulative consumption and debt repayment responses of the same untargeted fiscal transfer studied in previous

Figure 12: Consumption Response to Targeted Relative to Untargeted Fiscal Transfers



Notes: This figure reports the response of aggregate consumption to fiscal transfers targeting the bottom 30% of the distribution relative to untargeted transfers holding the aggregate transfer size fixed. Transfers are lump-sum and amount to 10% of average monthly income for the targeted scenario.

sections. As above, the aggregate MPC of the untargeted program is 18.6% and the aggregate MPD is 58.5%. After one year, the cumulative consumption response is only 55.5%, implying that in quarters two to four, a significant amount of the fiscal transfer remains in the form of wealth. Finally, after three years, the cumulative consumption response reaches 100% of the initial cash transfer.

Over that time, the non-consumed wealth portion of the transfer accumulates returns, both directly through saving in the liquid asset and indirectly through the savings from smaller debt service payments. Cumulative debt repayment and saving eventually become zero, implying that average household balance sheets return to their pre-transfer levels. However, because of the large front-loading of wealth increases, the cumulative consumption response grows beyond 100%, ultimately reaching 116.3% of the initial cash transfer. We note that this number must be interpreted with caution because our analysis is undertaken in partial equilibrium, and the effects of general equilibrium will be especially important over time.

Targeted Fiscal Transfers We perform a similar dynamic analysis for each of the targeted fiscal transfers studied in the previous section. Panel (b) of Figure 13 plots the cumulative response for each program relative to the untargeted program in Panel (a). Consistent with the analysis above, the immediate consumption response in the income and net wealth programs is well below the untargeted program, while only the gross

wealth targeting program has a larger immediate consumption response than the untargeted program.

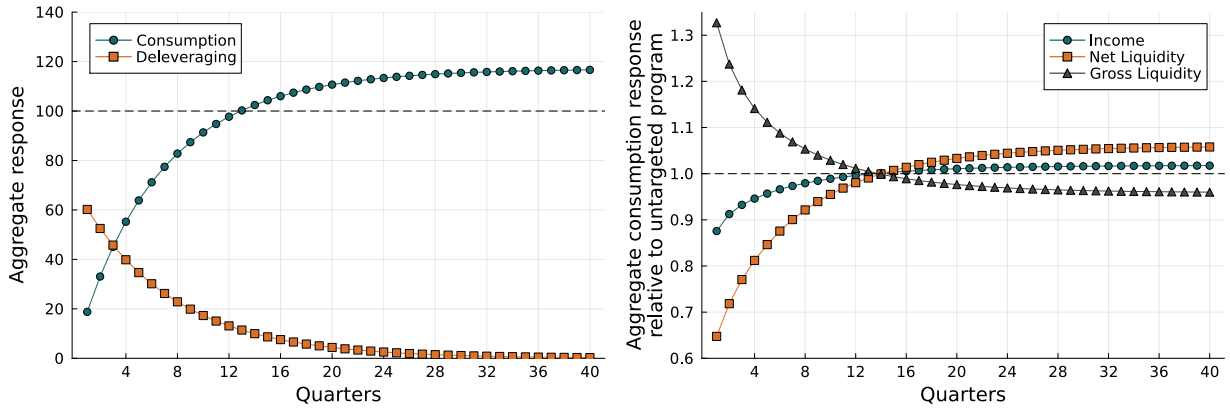
Over time, however, both the income and gross wealth targeting programs converge to roughly the same long-run cumulative response as the untargeted program. With gross wealth targeting, the primary beneficiaries are true hand-to-mouth households, which have the largest spending responses and smallest saving responses. As such, the response is completely front-loaded relative to the untargeted program. Since more of the transfers are immediately spent rather than saved, there are less cumulative returns to the non-consumed wealth, and thus the cumulative response in the long run is slightly less than in the untargeted case.

On the other hand, the income targeting program directs a significant sum of fiscal transfers to coholders, who pay down debt and have a smaller initial consumption response. Eventually, the savings from having less debt become increased consumption, and most of the response is back-loaded until the cumulative responses eventually equalize after four years. In the long run, the cumulative response from the income targeting program is slightly greater than the untargeted program.

Since the net wealth program almost directly targets coholders with the largest levels of credit card debt, this program has an even smaller immediate consumption response than the income targeting program in every period. As with the other programs, the net wealth program equalizes with the untargeted program after roughly four years. However, instead of remaining roughly in line with the untargeted program, the cumulative response in the net wealth program continues increasing, ultimately growing roughly 5% more than any other program. This occurs because coholders immediately pay down their credit card debt instead of increasing consumption, and the cumulative wealth returns from avoiding high-cost debt payments yields increased consumption in the long run.

Discussion and Implications Our analysis highlights that each fiscal transfer program generates unique short- and long-run dynamics for aggregate household consumption. Depending on the policymaker's objectives, each program may be optimal and thus comparison across programs necessitates specifying both the desired outcome and horizon. If the goal is to immediately stimulate demand, our analysis suggests targeting away from coholders. If the goal is to increase consumption over the medium- or long-term, then targeting coholders may be optimal since these households immediately increase wealth through decreased debt, which eventually translates into higher consumption. Again, although the analysis in this section is in partial equilibrium, we believe that the main insights still apply.

Figure 13: Dynamic Aggregate Responses to Fiscal Transfers



(a) Untargeted Transfers

(b) Relative Consumption Responses of Targeted Transfers

Notes: The left panel reports the dynamic response of aggregate consumption and debt repayment to untargeted fiscal transfers as a percentage of the transfer size. The right panel reports the dynamic response of aggregate consumption to targeted fiscal transfers relative to the untargeted scenario. In each scenario, the bottom 30% of the respective distribution (income, net wealth or gross wealth) are targeted. The aggregate transfer size is held fixed across scenarios. Transfers are lump-sum and amount to ten percent of average monthly income for the targeted scenario.

The idea that the level of debt affects aggregate demand is related to the theory of indebted demand developed in Mian, Straub and Sufi (2021). In our partial-equilibrium framework, debt depresses the short-term consumption response to transitory changes in income. Repaying debt is beneficial over the long-term because it increases aggregate resources through the reduction in interest payments. In the general-equilibrium model of Mian et al. (2021), debt repayment also increases overall demand by shifting resources from savers to borrowers. This demand effect is induced by differences in MPCs out of *permanent* income between savers and borrowers, a feature that is not captured in our model. Our channel operates through differences in MPCs out of *transitory* income instead.

7.2 Debt Relief as Fiscal Policy

In addition to stimulative cash transfers, fiscal authorities have also experimented with various debt-relief policies during economic downturns. In the United States, the federal government has implemented debt relief for both mortgages in 2008 and student debt in 2020 (Ganong and Noel, 2020; Dinerstein, Yannelis and Chen, Forthcoming), which researchers have argued may be too broad or expensive relative to other alternatives (Catherine and Yannelis, 2023; Boutros, Clara and Gomes, 2023). In Canada, the federal

government has implemented debt relief for credit cards in the form of payment pauses (Allen, Clark, Li and Vincent, 2022). These recent advances into consumer credit markets demonstrate a willingness for governments to implicitly target borrowers instead of the broad population.

Our model allows us to study and compare debt relief policies relative to direct cash transfers. Panel (a) of Figure 14 plots the aggregate consumption and debt responses to a debt relief program that forgives outstanding credit card debt up to 10% of monthly income. Households with no outstanding credit card debt are completely unaffected by the program, while households with debt equal to less than 10% of monthly income see their entire balance forgiven. On impact, the aggregate marginal propensity to consume out of the debt relief program is 15.2%. It takes just over three years for the aggregate consumption response to reach 100%, and then reaches 120% in the long run. On the other hand, the aggregate deleveraging response on impact is 77.1%. This is less than 100% because in response to debt forgiveness, many households optimally choose to re-borrow a fraction of that debt in the next period. As with the direct fiscal transfer program, the cumulative aggregate debt response is zero and long-run balance sheets return to their pre-program levels.

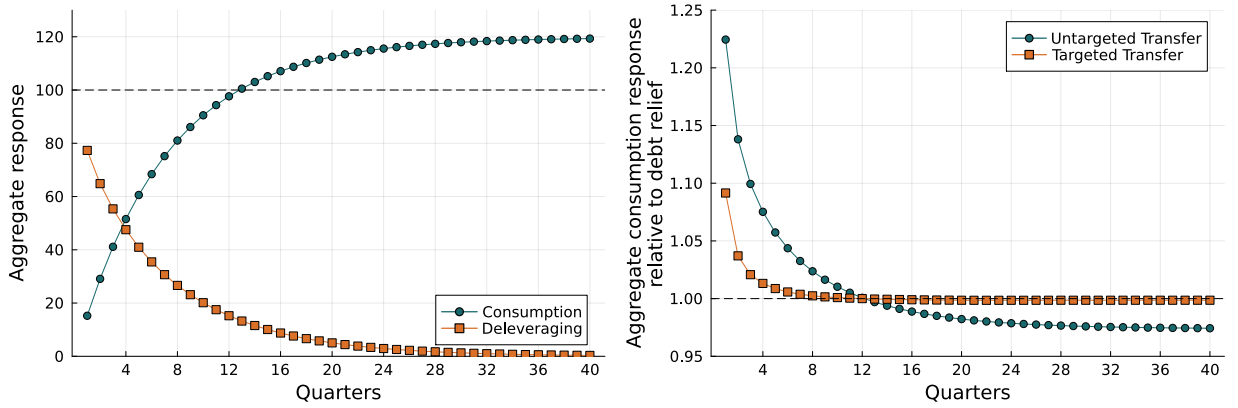
7.2.1 Comparison to Fiscal Transfers

Despite a smaller initial response, the long-run aggregate consumption response to debt relief is 3.1 pp greater than the aggregate response from the direct transfer program. This difference arises for two reasons that our model can help us understand. First, the MPC out of income is different than the MPC out of debt relief; and second, debt relief implicitly targets only households that hold debt, which are a subset of the total population.

Panel (b) of Figure 14 plots two alternative fiscal programs that shed light on how each of these reasons contributes to the difference between direct cash transfers and debt relief. First, we consider an alternative "Targeted Fiscal Transfer" program that targets each household that receives debt relief and, instead of forgiving debt up to 10% of income, gives them the same amount as cash. This allows us to isolate the difference between the type of positive shock and the corresponding consumption response. On impact, the aggregate MPC of the targeted transfer program is almost 10% larger than the debt-relief program, but after four years, the cumulative consumption response for both programs is roughly equal. When debt is outright forgiven, households primarily respond by further decreasing debt, not by increasing consumption, but this ultimately leads to the same long-run increase in consumption.

Since debt relief only reaches households that hold debt, the total fiscal cost of the

Figure 14: Dynamic Aggregate Responses to Debt Relief



(a) Debt Relief

(b) Relative Consumption Responses of Alternative Programs

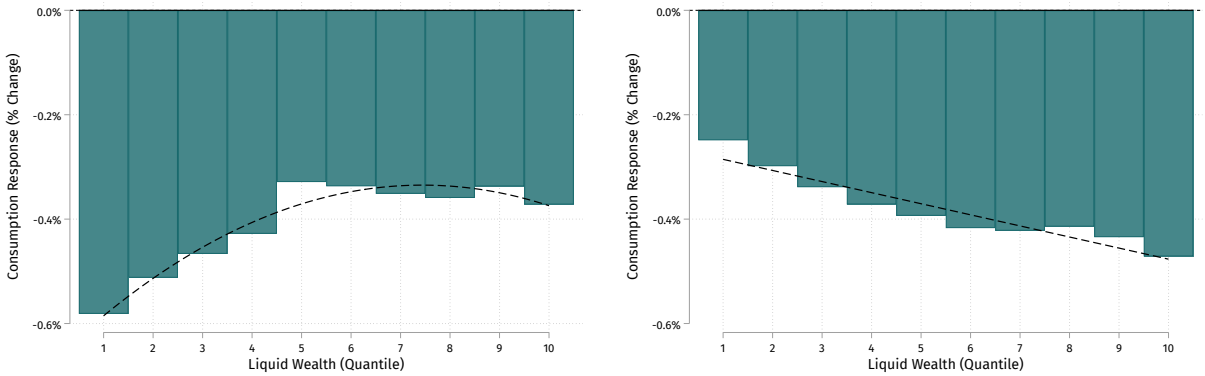
Notes: The left panel reports the dynamic response of aggregate consumption to an untargeted debt relief of 10% of average monthly income as a percentage of the total debt relief. The right panel reports the response relative to a uniform transfer (untargeted transfers to all households) and a transfer replicating debt relief (targeted cash transfer equal in magnitude to debt relief).

program studied in Panel (a) is far less than the untargeted transfer studied in the previous section. We therefore consider an alternative "Untargeted Fiscal Transfer" program in which all households receive a cash transfer, but the aggregate size of this program is equal to the size of the debt-relief program. The immediate consumption response of this program is almost 25% greater than the debt-relief program, but the long-run cumulative consumption response of the untargeted program is roughly 2.5% less than the debt-relief program. In the debt-relief program, heavily leveraged households see larger increases in wealth that they convert into larger increases in long-run consumption. This effect is washed out when debt forgiveness is replaced by uniform transfers for all households.

8 Monetary Policy with Coholding

The model also allows us to study the implications of coholding on monetary policy. We consider the consumption response to a persistent 1% contractionary monetary policy shock. Auclert (2019) decomposes monetary policy shocks into distinct channels and studies the impact of household heterogeneity for each of them in a setting with net wealth. Our framework allows us to extend this analysis to incorporate rich heterogeneity in the joint distribution of liquid assets and debt. This is particularly important for two channels: the substitution channel of monetary policy and (unhedged) interest rate exposure.

Figure 15: Consumption Response to Contractionary Monetary Policy Shock



(a) Benchmark Coholding Model (b) One-Asset Model

Notes: Contemporaneous consumption response in the model by decile of liquid wealth to a persistent ($\rho = 0.97$) increase in both the savings and borrowing rates by 1%. The left panel plots the responses in the benchmark coholding model used throughout our analysis. The right panel plots the responses in a standard one-asset model without an interest rate wedge.

8.1 Substitution Channel of Monetary Policy

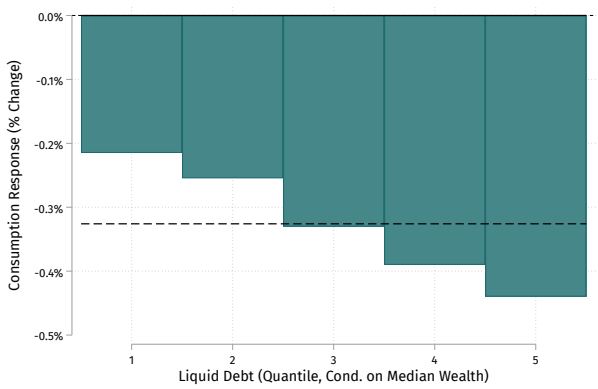
The substitution channel of monetary policy captures how much households shift consumption across time in response to changes in the interest rate. All else equal, a higher interest rate increases substitution towards future consumption. Panel (a) of Figure 15 plots the contemporaneous consumption response across the distribution of net wealth to a persistent 1% contractionary monetary policy shock. In line with standard economic theory, households respond to a contractionary monetary policy shock by decreasing consumption.[6]

The consumption response is stronger for the smallest and largest levels of net wealth, generating a mild inverse-U-shape. This is qualitatively consistent with the empirical evidence in Holm, Paul and Tischbirek (2021) on the household-level consumption responses to monetary policy shocks and a contribution of our model relative to existing one-asset models. Specifically, the upper deciles of net wealth feature households with large liquid asset holdings and no liquid debt. These "net savers" respond to the increase in interest rates by increasing saving and further substituting consumption into the future. At the bottom of the net wealth distribution, net borrowers respond to the large increase in borrowing costs by cutting back on consumption. The middle of the net wealth distribution features both coholders with large gross positions *and* households with low gross positions. The size of gross positions is directly related to the consumption responses of these

[6]Since the timing of our model is such that interest rates affect the return of saving and cost of borrowing today, there is no contemporaneous cashflow effect from monetary policy shocks.

households, as households with low gross positions are less sensitive to changes in interest rates. The presence of the latter therefore reduces the overall consumption response to monetary policy.

Figure 16: Consumption Response by Liquid Debt Conditional on Median Wealth



Notes: Consumption response in the model for households with median net liquid wealth sorted into five quantiles of liquid debt. The dashed line is the average consumption response for all households with median net liquid wealth.

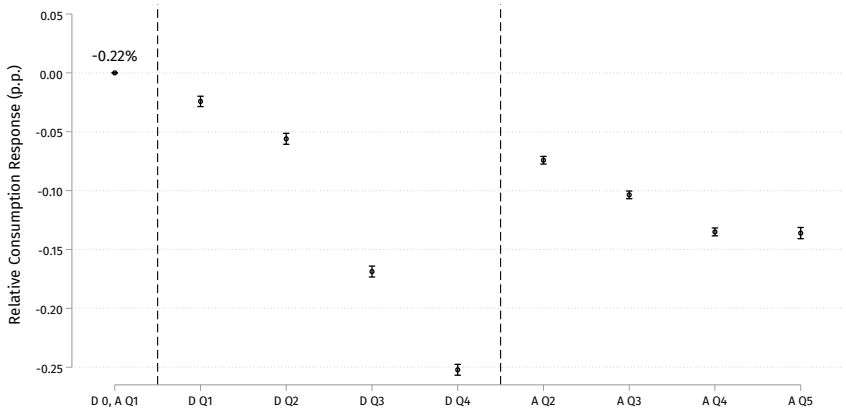
However, focusing exclusively on net wealth masks important heterogeneity in the consumption response depending on underlying gross wealth positions. Figure 16 plots the consumption response for median net wealth households further sorted by liquid debt. Holding fixed liquid wealth to the median decile, the consumption response is decreasing in liquid debt. Households with median net wealth and in the first quintile of liquid debt decrease consumption by 0.22% in response to a contractionary monetary policy shock. Holding fixed liquid wealth to its median level but increasing to the final quintile of liquid debt doubles the response of consumption to a decrease of 0.44%. Naturally, households with more debt must cut consumption by more in response to an increase in the borrowing rate.

To demonstrate the implications of coholding more concretely, we estimate the following equation using the simulated model data:

$$\frac{c_{i,t+1} - c_{i,t}}{c_{i,t}} = \beta_0 + \sum_{n=2}^{5} \beta_{A,n} \mathbb{1}[Q(a_{i,t}) = n] + \sum_{i=2}^{5} \beta_{D,n} \mathbb{1}[Q(d_{i,t}) = n] + u_{i,t},$$

where $\mathbb{1}[\cdot]$ are indicator functions that sort households into quantiles of liquid assets and liquid debt. We divide households into quintiles of liquid assets. For liquid debt, since a large mass of households are non-borrowers, we sort households into a first group with zero debt and, conditional on borrowing, into quartiles of liquid debt. Figure 17 plots

Figure 17: Regression Coefficients for Consumption Response by Gross Wealth



Notes: Coefficients and 95% CIs from regression of consumption response in the model to a contractionary monetary policy shock on indicators for quintiles of liquid assets and liquid debt. The omitted group, represented by the first point on the left, is zero liquid debt and the first quintile of liquid assets. See text for exact specification.

the estimated coefficients from the regression. The omitted group, zero liquid debt and first quintile of liquid assets, has an average consumption response of -0.22%. Holding fixed liquid assets, increasing liquid debt decreases the consumption response, and the same is true when holding fixed liquid debt and increasing liquid assets. Consistent with our earlier analysis, the gradient is much larger when varying liquid debt, although even holding fixed liquid debt and varying liquid assets provides meaningful variation in the consumption response to a contractionary monetary policy shock.

The strong connection between these results and the correlations evident in Figure 9 represents two sides of the same coin. As Auclert (2019) notes, the strength of the substitution effect across the distribution of liquid wealth depends crucially on the covariance between MPCs and liquid wealth, which extends in our setting to the covariance between MPCs and gross wealth positions. In our model, true hand-to-mouth households with high MPCs have low gross wealth, which coincides with median net wealth. This generates the inverse U-shape in our model which is consistent with the empirical evidence.

On the other hand, as Holm et al. (2021) discuss extensively, standard one-asset models cannot generate the inverse-U-shape. This is illustrated in Panel (b) of Figure 15, which plots the consumption response across the distribution of wealth to the same contractionary shock in a standard one-asset model.[7] With only net wealth, all high MPC households must have low net wealth, and the substitution effect is purely monotonic:

[7]Compared to the baseline model, we remove the liquidity-in-advance constraint and the interest rate wedge, i.e., we set $\theta = 0$ and $\delta = 0$. For comparability, we also recalibrate the discount factor to match the same average level of net wealth as in the baseline model.

as net wealth increases, households substitute more towards the future, and the negative consumption response is larger.

8.2 Interest Rate Exposure Channel of Monetary Policy

The interest rate exposure channel measures the extent to which households are exposed to monetary policy shocks due to the composition of their balance sheets: households with large negative or positive levels of wealth (i.e., further from zero net wealth) have more exposure to monetary policy. Now, with coholding, interest rate exposure at a given level of net wealth increases as households hold both more liquid assets and liquid debt. Even households with zero net wealth may be significantly exposed to monetary policy due to high gross holdings, and therefore measures of exposure focusing solely on net positions will miss the interest rate exposure dynamics we discuss below.

Our model of coholding allows us to separately study interest rate exposure to liquid assets and liquid debt. For example, from Table 3, the median level of net wealth in the model is slightly positive, and these slight net savers (represented in the middle deciles of Figure 15) have a slightly negative consumption response to a contractionary monetary policy shock. In all of the analysis above, we assumed equal and complete pass-through of monetary policy to both rates, approximately holding fixed the interest rate channel. In Figure 18, we run the same analysis as before for two scenarios corresponding to two extremes: pass-through only to the saving rate and pass-through only to the borrowing rate.

Panel A of Figure 18 recreates Figure 15 and plots the consumption response for households sorted by decile of liquid wealth. When the monetary policy shock affects only the saving rate, the consumption response is flat over the first several deciles of liquid wealth and then monotonically increasing in decile of liquid wealth. Households with higher liquid wealth have either more liquid assets or less liquid debt. As liquid wealth generally increases, more of the contribution (mechanically) comes from more liquid assets, and only liquid assets are directly exposed to the saving rate and therefore the monetary policy shock. This is why the response is relatively flat over the first five deciles of liquid wealth, where most of the increase in liquid wealth comes from a reduction in liquid debt, and then the response increases more starkly for the upper half of the liquid wealth distribution.

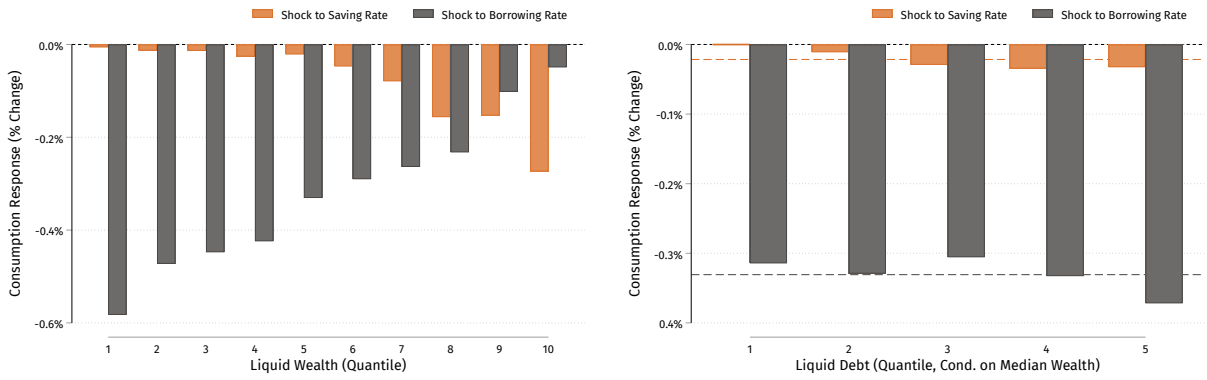
The same patterns hold in reverse for a monetary policy shock that affects only the borrowing rate. The consumption response is largest for households in the lowest deciles of liquid wealth, who (again, mechanically) hold more liquid debt and are therefore di-

rectly exposed to the monetary policy shock. As liquid wealth increases, the prevalence of liquid debt decreases, and the response becomes smaller and flatter in liquid wealth.

Panel B of Figure 18 further illustrates the impact of coholding when monetary policy has heterogeneous pass-through. This panel recreates Figure 16 and plots the consumption response for households with median net liquid wealth sorted by quintile of liquid debt. In both extreme cases of complete pass-through to either the saving or borrowing rate, the consumption response for the median level of net liquid wealth varies depending on the underlying gross positions in liquid assets and liquid debt. Jointly increasing liquid assets and liquid debt increases the consumption response in both cases since, as discussed above, one of these gross positions will be exposed to the monetary policy shock. This figure again demonstrates that the consumption response is more sensitive to levels of liquid debt: the response to the saving rate shock increases less than the response to the borrowing rate shock as liquid debt increases.

Altogether, interest rate exposure that focuses only on net wealth positions misses important heterogeneity in underlying gross positions. Even in one-asset models with different interest rates for net savers and net borrowers, our results show that the interaction of liquid assets and liquid debt in the case of partial pass-through is an important determinant of the overall consumption response. Both the distinct gross positions and ability for heterogeneous pass-through allow our model to generate a consumption re-

Figure 18: Consumption Response with Heterogeneous Pass-Through of Monetary Policy



(a) Consumption Response by Liquid Wealth

(b) Consumption Response by Liquid Debt for Median Net Wealth

Notes: Panels A and B recreate Figures 15 and 16, respectively, for a contractionary monetary policy shock with heterogeneous pass-through of monetary policy. In each panel, the first set of bars is in response to a contractionary monetary policy that affects only the saving rate and leaves the borrowing rate unchanged, and the second set is the same for a shock that affects only the borrowing rate. Panel A plots the consumption response in the model by quantile of liquid wealth. Panel B plots the consumption response in the model by quantile of liquid debt for households with median net wealth.

sponse more in line with the empirical evidence.

9 Conclusion

We build a quantitative model of household consumption, saving, and borrowing built on insights from the household finance literature on the coholding of credit card debt and liquid assets. We use the model to understand the empirical evidence on the marginal propensities to consume, save, and deleverage, which is infeasible in standard models that only consider net wealth positions instead of the joint distribution of liquid assets and debt. We adapt the standard model by adding a parsimonious liquidity-in-advance constraint and, without explicitly targeting them, generate relationships between the marginal propensities to consume, save, and deleverage and the joint distribution of liquid assets and debt that largely resemble the data.

For the study of fiscal policy, the model's key insight is that there are two groups of households with low liquid wealth: the true hand-to-mouth, who have low net wealth and low liquid assets, and the coholders, who have low net wealth and high liquid assets. These households appear identical if considering only net wealth, but behave very differently in response to transitory income shocks; the former have a large MPC and the second have a low MPC. Coholders have a low MPC because it is optimal for them to deleverage instead of increase consumption. This has important implications for fiscal stimulus policy, especially as household indebtedness grows.

Relatedly, coholding impacts monetary policy by enriching the substitution and interest rate exposure channels to account for heterogeneity in underlying gross positions. Across the distribution of wealth, extreme net borrowers and net savers have the largest consumption response due to large substitution effects, in line with the empirical evidence. For a given level of wealth, the composition of underlying gross positions determines the interest rate exposure, especially when monetary policy shocks have heterogeneous pass-through to saving and borrowing rates.

Future work will continue to study the implications of coholding for optimal fiscal and monetary policy, especially in a general equilibrium environment with aggregate shocks and endogenous supplies of assets and debt.

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A Appendix

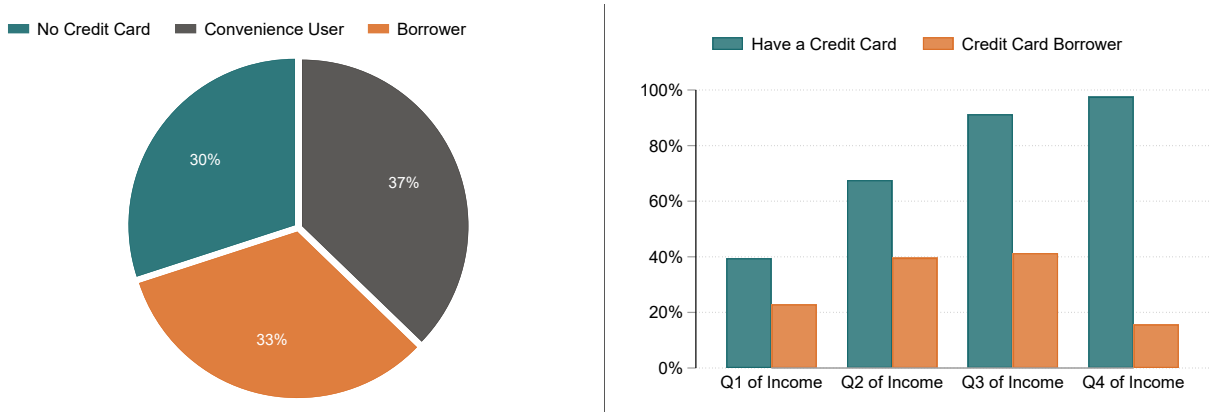
A.1 Coholding of Liquid Assets and Credit Card Debt in the SCF

The coholding of low-return liquid assets and high-cost credit card debt has been thoroughly documented in the household finance literature. To establish a baseline set of facts regarding coholding in the United States, we use the Survey of Consumer Finances (SCF), a nationally representative sample of US households fielded roughly every three years. We restrict our sample to households aged 25-65 with annual income above 1,000 USD.

The SCF questionnaire design enables us to distinguish between households that use credit cards for convenience and those that revolve debt. Specifically, respondents report their total credit card balance after the most recent payment, which allows us to infer revolving behavior. The survey also includes a direct question about whether the household typically carries a balance from month to month. We define liquid assets as funds held in checking and savings accounts.

Figure A.1a plots the distribution of credit card holders in the SCF. According to the survey, roughly 70% of households have credit cards, but 37% of households are convenience users that report paying their entire balance in full and therefore never borrow on their credit cards. Almost one-third of all households report having at least one credit card and paying less than the full statement balance each month.

Figure A.1: Extensive Margin of Credit Card Holding and Borrowing in the United States



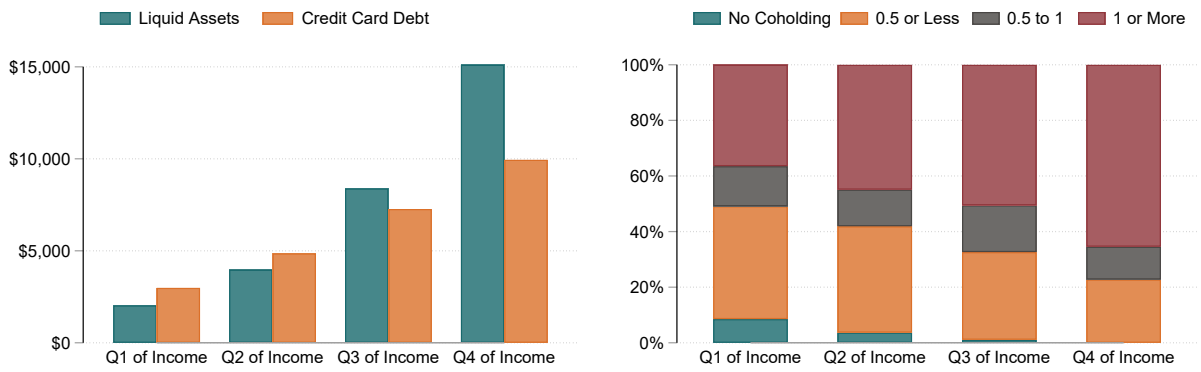
(a) Fraction of Credit Card Holders

(b) Credit Card Holders by Income Quartile

Notes: Data from the 2016 SCF.

Figure A.1b shows that credit card holders and borrowers are found across the entire distribution of income. In fact, higher income households are both more likely to have credit cards and, except for the last quartile, to revolve debt on their credit cards.

Figure A.2: Intensive Margin of Coholding for Credit Card Borrowers



(a) Average Liquid Assets and Debt (b) Ratio of Liquid Assets to Liquid Debt

Notes: Data from the 2016 SCF. In the left panel, we additionally restrict the sample to households between the 1st and 95th percentile of the liquid asset, debt, and wealth distribution.

We next focus on the subset of credit card users who are borrowers and study the composition of their balance sheets on the intensive margin. Figure A.2a plots the average level of liquid assets and debt for coholders in each quartile of income. In the lowest quartile of income, households hold roughly $3,000 in liquid debt and $2,000 in liquid assets, yielding a negative net liquid wealth. Liquid assets and debt both increase by $2,000 in the second quartile, yielding again a negative net liquid wealth. For those in the third quartile of income, net liquid wealth is only slightly higher by a few hundred dollars, but liquid assets and debt both increase to around $8,000 and $7,000, respectively. In the top quartile of income, liquid assets increase to $15,000, while liquid debt increases to only $10,000, yielding a positive net liquid wealth of just over $5,000.

Figure A.2b provides additional detail for the degree of coholding for each income quartile. In the lowest income quartile, only 10% of households report no coholding, and just under 40% report holding enough liquid assets to completely pay off their credit card debt. As income increases, the fraction of coholding increases; for the top income quartile, over 60% of households report enough liquid assets to completely pay off their credit card debt, while under 2% report no coholding.

A.2 Household Balance Sheets in the SCE

The New York FED Survey of Consumer Expectations (SCE) is a monthly online survey of a rotating panel of around 1,300 households. It collects information on household expectations and decisions on a variety of topics and provides detailed accounts of household income, balance sheets, and demographics.

We combine the monthly SCE core survey with two additional modules at lower frequency, the Spending Survey and the Household Finance Survey, which contain information on marginal propensities and household balance sheets. Our merged dataset covers the period 2015-2019 at annual frequency. We restrict the analysis to households aged 25-65 with income above 1000 USD. We drop households for which we do not observe income, marginal propensities, or liquid assets and debt. For the regression analysis and figures, we also jointly trim the top 1% of the liquid asset and debt distribution, and the top 1% and bottom 1% of the liquid wealth distribution. Liquid assets are defined as the current value of savings in checking or savings accounts. Liquid debt is defined as outstanding debt on credit cards.

Table A.1 compares household balance sheets in the SCE and the SCF. On average, households in the SCE hold fewer liquid assets but carry more liquid debt compared to those in the SCF. They also report lower total assets and higher total debt. At the median, however, liquid and total wealth levels are broadly similar across the two surveys. Household income distributions are also closely aligned. Coholding behavior appears somewhat more prevalent in the SCF.

Table A.1: Comparison of SCE and SCF

	SCE				SCF			
	Mean	p25	p50	p75	Mean	p25	p50	p75
Liquid assets	17.68	0.00	1.60	13.11	22.19	0.50	3.20	12.50
Liquid debt	9.07	0.00	1.30	7.50	2.88	0.00	0.00	2.20
Liquid wealth	8.61	-4.20	0.00	10.00	19.31	0.00	1.20	10.16
Total assets	445.74	15.00	185.90	472.00	718.63	26.10	176.70	457.00
Total debt	134.96	5.20	37.00	143.00	114.79	3.00	44.95	153.60
Total wealth	309.05	-1.20	91.00	317.00	603.83	8.25	81.44	307.08
Income	103.51	33.00	64.00	109.00	111.05	31.39	60.76	105.31
Coholder share	0.32	0.00	0.00	1.00	0.34	0.00	0.00	1.00
Observations	3558				4580			

Notes: This table compares the distribution of household balance sheets and income (in thousands of USD) between the SCE and SCF. All statistics are weighted using survey weights. Liquid assets include funds held in checking and savings accounts, while liquid debt refers to credit card debt. Households are classified as coholders if they hold more than 10% of their monthly income in both liquid assets and liquid debt. The SCE data cover the period 2015–2019; the SCF data refer to the year 2016.

Table A.2 compares observable characteristics of households that cohold liquid assets and credit card debt with those that do not, using data from the SCE. Coholders are similar in age to non-coholders but are more likely to be male and college-educated. They also exhibit slightly higher levels of financial literacy. These patterns challenge the no-

tion that coholding arises primarily from limited financial literacy or lower educational attainment. Coholders have lower average but higher median income and tend to hold more in both liquid assets and debt. They are also more likely to own a home and carry a mortgage.

Table A.2: Comparison of coholders and non co-holders in the SCE

	Coholders				Non-coholders			
	Mean	p25	p50	p75	Mean	p25	p50	p75
Age	46.25	37.00	47.00	56.00	46.36	36.00	47.00	57.00
Female	0.46	0.00	0.00	1.00	0.50	0.00	0.00	1.00
College degree	0.40	0.00	0.00	1.00	0.34	0.00	0.00	1.00
Financial literacy	5.50	5.00	6.00	7.00	5.24	4.00	5.00	7.00
Income	90.61	45.00	74.00	110.00	109.46	30.00	58.00	100.00
Liquid assets	22.23	2.00	7.00	21.60	15.58	0.00	0.00	9.00
Liquid debt	12.29	2.00	5.00	12.00	7.58	0.00	0.00	4.00
Liquid wealth	9.94	-4.72	1.00	15.20	8.00	-4.00	0.00	9.00
Total assets	433.49	93.00	265.00	565.00	451.43	5.00	160.00	414.00
Total debt	118.42	14.00	60.00	175.00	142.60	2.70	30.00	120.00
Total wealth	315.45	16.00	133.00	405.00	306.08	-4.60	68.25	283.00
Homeowner	0.77	1.00	1.00	1.00	0.66	0.00	1.00	1.00
Mortgage	0.49	0.00	0.00	1.00	0.38	0.00	0.00	1.00
Observations	1195				2363			

Notes: This table compares households that cohold liquid assets and debt with those that do not in the SCE. All statistics are weighted using survey weights. Balance sheet variables and income are expressed in thousands of USD. Liquid assets include funds held in checking and savings accounts; liquid debt refers to credit card debt. Households are defined as coholders if they hold more than 10% of their monthly income in both liquid assets and liquid debt. The data cover the period 2015–2019.

A.3 Additional Evidence on Marginal Propensities and Household Characteristics

This section presents additional evidence on marginal propensities to consume, save, and deleverage, as well as their relationship with household characteristics.

Robustness. Columns 1–2 of Table A.3 report additional coefficients of the regressions estimated in Table 1. Columns 3–6 display results for the marginal propensity to save (MPS) and the marginal propensity to deleverage (MPD). Columns 7–12 present regressions in which liquid debt and wealth are included in quartiles rather than levels. These results indicate that the marginal propensity to consume (MPC) decreases monotonically with debt, even when estimated non-parametrically.

Table A.3: Regressions of Marginal Propensities on Household Characteristics

	in '000 USD						Quartiles					
	(1) Spend	(2) Spend	(3) Save	(4) Save	(5) Deleverage	(6) Deleverage	(7) Spend	(8) Spend	(9) Save	(10) Save	(11) Deleverage	(12) Deleverage
Liquid debt	-0.209***	-0.194***	-0.486***	-0.531***	0.697***	0.726***						
	(0.039)	(0.032)	(0.066)	(0.058)	(0.080)	(0.064)						
Liquid wealth	0.005	0.010	0.240***	0.140***	-0.244***	-0.149***						
	(0.014)	(0.015)	(0.024)	(0.022)	(0.021)	(0.019)						
Liquid debt Q2							-0.774	-0.446	-5.058*	-4.805*	5.908*	5.323*
							(1.738)	(1.746)	(2.335)	(2.361)	(2.303)	(2.322)
Liquid debt Q3							-4.829***	-4.116**	-8.534***	-7.653***	13.442***	11.831***
							(1.273)	(1.251)	(2.059)	(2.105)	(2.074)	(2.088)
Liquid debt Q4							-6.766***	-5.838***	-14.774***	-14.255***	21.589***	20.117***
							(1.577)	(1.642)	(2.912)	(3.088)	(3.000)	(3.172)
Liquid wealth Q2							2.945	2.019	7.710**	7.150*	-10.723***	-9.256**
							(1.615)	(1.682)	(2.854)	(2.968)	(3.024)	(3.175)
Liquid wealth Q3							2.994	3.554*	17.931***	15.927***	-20.895***	-19.473***
							(1.683)	(1.734)	(2.946)	(3.101)	(3.092)	(3.240)
Liquid wealth Q4							2.124	2.691	29.352***	24.128***	-31.447***	-26.824***
							(1.524)	(1.588)	(2.934)	(3.233)	(2.958)	(3.272)
Iliquid assets Q2		0.327		6.697**		-6.876**		1.954		4.969		-6.585*
		(1.521)		(2.448)		(2.451)		(1.904)		(3.095)		(3.240)
Iliquid assets Q3		2.016		8.213**		-10.066***		1.991		7.282		-8.885*
		(1.766)		(2.841)		(2.881)		(2.108)		(3.742)		(3.940)
Iliquid assets Q4		2.869		13.432***		-16.106***		1.875		13.185**		-14.614***
		(1.995)		(3.227)		(3.252)		(2.334)		(4.061)		(4.207)
Iliquid debt Q2		-1.550		-13.640***		15.241***		-1.557		-9.078***		10.748***
		(1.232)		(1.808)		(1.795)		(1.474)		(2.301)		(2.381)
Iliquid debt Q3		-2.821*		-14.762***		17.627***		-1.382		-13.224***		14.718***
		(1.419)		(2.225)		(2.303)		(1.647)		(2.613)		(2.865)
Iliquid debt Q4		-1.344		-15.947***		17.323***		0.376		-13.975***		13.677***
		(1.651)		(2.640)		(2.689)		(1.854)		(3.155)		(3.272)
Log income		-2.238***		3.921***		-1.718		-1.911**		2.105		-0.281
		(0.616)		(0.937)		(0.917)		(0.710)		(1.324)		(1.296)
Mortgager		-2.407		0.300		1.981		-5.346**		0.500		4.530
		(1.711)		(2.865)		(2.896)		(2.069)		(3.605)		(3.863)
Homeowner		-2.070		0.138		1.798		-2.648		-0.939		3.276
		(1.550)		(2.478)		(2.454)		(1.878)		(3.123)		(3.315)
Moderate financial literacy		0.325		-0.357		0.138		0.302		4.340		-4.429
		(1.359)		(2.201)		(2.292)		(1.747)		(2.745)		(2.927)
High financial literacy		2.864		-1.302		-1.449		2.842		1.919		-4.532
		(1.567)		(2.458)		(2.552)		(1.942)		(3.058)		(3.280)
Constant	6.400	15.818**	16.273	16.017	77.473**	68.226*	5.717	14.401*	7.312	3.456	87.113***	82.355***
	(5.697)	(6.049)	(25.409)	(28.489)	(24.044)	(27.383)	(5.971)	(6.474)	(25.189)	(24.822)	(23.097)	(23.707)
N	3388	3236	3388	3236	3388	3236	3388	3236	3388	3236	3388	3236
R2	0.053	0.066	0.147	0.182	0.177	0.232	0.068	0.084	0.194	0.220	0.248	0.276

Notes: Heteroskedasticity-robust standard errors in parentheses. $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$. Additional controls include age, gender, race, marital status, education, geography, and survey date. Balance sheet variables enter the regression either in thousand USD or in quartiles. Mortgager refers to households with a mortgage; Homeowner refers to households that own a home without having a mortgage. Households are classified as moderately (highly) financially literate if more than half (all) of the questions on financial literacy were answered correctly.

Home Equity Lines of Credit. Next, we analyze the role of home equity lines of credit (HELOCs) in the determination of marginal propensities. We retrieve information on HELOCs from the housing module of the SCE, which is fielded once a year for a subset of the core sample. This analysis is subject to several caveats. First, the availability of HELOC data restricts the sample to roughly one-fifth of the baseline. Second, HELOCs may not be measured at the same point in the year as other balance sheet items. Third, we are unable to distinguish between home equity loans and HELOCs; for simplicity, we

refer to both as HELOCs.

Table A.4 presents baseline regression results for the subsample of households with observed HELOCs, both with and without HELOCs included as a control. The inclusion of HELOCs has little impact on the results, as the estimated coefficients remain nearly identical across specifications. As with credit card debt, higher HELOC balances are associated with a lower marginal propensity to consume (MPC). However, the effect is more modest: an additional $1,000 in HELOC debt reduces the MPC by only 0.07 percentage points, compared to 0.26 percentage points for credit card debt. This difference likely reflects the substantially lower interest rates typically associated with HELOCs.

Table A.4: Regressions of Marginal Propensities on HELOCs

	(1) Spend	(2) Save	(3) Deleverage	(4) Spend	(5) Save	(6) Deleverage
Liquid Debt	-0.269***	-0.519***	0.793***	-0.261***	-0.521***	0.788***
	(0.065)	(0.127)	(0.139)	(0.064)	(0.127)	(0.139)
Liquid Wealth	-0.031	0.189***	-0.159**	-0.032	0.190***	-0.158**
	(0.025)	(0.051)	(0.050)	(0.025)	(0.051)	(0.050)
HELOC				-0.072***	0.023	0.049
				(0.021)	(0.037)	(0.043)
N	664	664	664	664	664	664
R^2	0.171	0.249	0.280	0.177	0.249	0.281

Notes: Heteroskedasticity-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Additional controls include age, gender, race, marital status, education, geography, and survey date. Balance sheet variables enter the regression in thousand USD.

Repaying credit card versus mortgage debt. The SCE question on marginal propensities to deleverage does not specify which type of debt households intend to repay. In our main analysis, we interpret the MPD as the marginal propensity to repay credit card debt. However, respondents may also have mortgage debt in mind. Although the survey design does not allow us to definitively distinguish between these possibilities, this section provides suggestive evidence that households are primarily thinking about credit card debt.

We proceed in two steps. First, we extend the main analysis from Table 1 by conditioning on mortgage status to assess whether households with mortgages respond differently to income changes than those without. Second, we conduct a placebo-style test by reversing the roles of credit card and mortgage debt: we include mortgage debt in the baseline regression and add a dummy for credit card debt. Table A.5 reports the results.

Column 2 shows that the coefficient on liquid debt is largely unchanged when controlling for mortgage status. Having a mortgage is associated with a 4.8 percentage point higher MPD. Somewhat unexpectedly, Column 3 indicates that, conditional on having a mortgage, higher mortgage balances are associated with a lower MPD.

Columns 4–6 report the results of the placebo test. Mortgage debt has no significant effect on the MPD, while having credit card debt is associated with a 19.0 percentage point increase. Conditional on holding credit card debt, the MPD rises with the amount owed. Taken together, the evidence supports the interpretation that credit card debt, rather than mortgage debt, is the primary reference point for repayment behavior.

Table A.5: Marginal Propensities to Deleverage Across Types of Debt

	(1) Deleverage	(2) Deleverage	(3) Deleverage	(4) Deleverage	(5) Deleverage	(6) Deleverage
Liquid Wealth	-0.244***	-0.245***	-0.243***	-0.361***	-0.294***	-0.225***
	(0.021)	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)
Liquid Debt	0.697***	0.680***	0.684***			0.479***
	(0.080)	(0.080)	(0.079)			(0.077)
Has housing debt		4.813**	6.747***			
		(1.641)	(1.885)			
Housing debt			-0.013**	0.001	-0.000	-0.003
			(0.005)	(0.004)	(0.004)	(0.004)
Has liquid debt					19.024***	15.520***
					(1.663)	(1.754)
N	3388	3388	3377	3377	3377	3377
R^2	0.177	0.180	0.182	0.142	0.192	0.207

Notes: Heteroskedasticity-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Additional controls include age, gender, race, marital status, education, geography, and survey date. Balance sheet variables enter the regression in thousand USD. 'Has housing debt' and 'Has liquid debt' are dummy variables that take on value 1 if the households has positive housing or liquid debt and zero otherwise.

A.4 Empirical Evidence from Other Datasets

This section explores to what extent our empirical results on the relation between marginal propensities and household liquid balance sheets are generalizable to other settings. For this purpose, we repeat our analysis using two alternative datasets, one for Italy (Jappelli and Pistaferri, 2014) and one for the Netherlands (Christelis et al., 2019).

A.4.1 Italian Survey of Household Income and Wealth

We first revisit the empirical evidence in Jappelli and Pistaferri (2014) (JP14). The authors find a negative gradient between the MPC and cash-on-hand, defined as financial assets plus income. They also provide suggestive evidence for indebted households having lower MPCs. We will explore this aspect in more detail.

The authors use the following question from the 2010 wave of the Italian Survey of Household Income and Wealth (SHIW) to elicit MPCs:

Imagine you unexpectedly receive a reimbursement equal to the amount your household earns in a month. How much of it would you save and how much would you spend? Please give the percentage you would save and the percentage you would spend.

The question is broadly comparable to the one posed in the SCE, but does not distinguish between saving and repaying debt. For this reason, we only analyze the MPC. Empirically, we closely follow the strategy in JP14. We estimate a cross-sectional Tobit regression of the MPC on quantiles of liquid wealth, liquid debt, and a set of covariates that includes age, gender, marital status, education, location, and family size. Different from JP14, we focus on liquid wealth and financial debt instead of cash-on-hand to be closer to the specification estimated in Table 1. However, our results are similar when we use cash-on-hand instead of liquid wealth.

Liquid, or financial wealth, is composed of financial assets and debt. Financial assets include deposits, government securities, trade credit, and other securities. Financial debt includes liabilities to banks and financial companies, trade debt, and liabilities to other households. Most liquid debt consists of bank liabilities, as credit cards are much less common in Italy than in the United States.

Table A.6 reports the results of this exercise. Column 1 shows that the MPC is decreasing in liquid wealth, in line with the findings in JP14. The higher the quintile of the liquid wealth distribution, the lower the MPC compared to the first quintile that serves as the comparison group. Once we additionally control for the composition of liquid wealth by including terciles of the liquid debt distribution, we observe that for a given quantile of wealth, the MPC is again decreasing in the amount of debt that is held. This effect becomes stronger for higher quantiles of debt. Note that here, the comparison group consists of households without liquid debt and terciles are constructed conditional on holding positive amounts of liquid debt. In Column 3, we control for gross instead of net financial wealth, defined as the sum of financial assets and debt. We find that, similarly to the results in the SCE, the MPC decreases in the amount of gross wealth held.

Table A.6: Regressions of MPC on Household Liquid Balance Sheet in SHIW

	(1) MPC	(2) MPC	(3) MPC
II net financial wealth quintile	-0.025	-0.093***	
	(0.022)	(0.023)	
III net financial wealth quintile	-0.066***	-0.144***	
	(0.018)	(0.019)	
IV net financial wealth quintile	-0.131***	-0.208***	
	(0.018)	(0.020)	
V net financial wealth quintile	-0.175***	-0.262***	
	(0.019)	(0.021)	
I financial debt tercile given pos. debt		-0.153***	
		(0.022)	
II financial debt tercile given pos. debt		-0.138***	
		(0.024)	
III financial debt tercile given pos. debt		-0.224***	
		(0.026)	
II gross financial wealth quintile			-0.093***
			(0.019)
III gross financial wealth quintile			-0.153***
			(0.020)
IV gross financial wealth quintile			-0.228***
			(0.020)
V gross financial wealth quintile			-0.243***
			(0.022)
N	7950	7950	7950
R^2	0.071	0.078	0.075

Notes: This table reports results from a Tobit regression of the MPC on household balance sheets and a set of covariates that includes age, gender, marital status, education, location, and family size. For net and gross financial wealth quantiles, the first (lowest) quantile serves as the comparison group. For financial debt terciles, households without financial debt form the comparison group. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A.4.2 CentER Internet Panel

We next revisit the evidence in Christelis et al. (2019) that uses the Dutch CentER Internet panel maintained by CentERdata at Tilburg University. The authors find a negative gradient between the MPC and cash-on-hand, defined as financial assets plus income. MPCs

are elicited through the following question:

Imagine you unexpectedly receive a one-time bonus from the government equal to the amount of net income your household earns in three-months. In the next 12 months, how would you use this unexpected income transfer?

The survey allows households to choose between savings, repaying debt, durable consumption, and non-durable consumption. We focus on non-durable consumption as our measure of the MPC. Compared to the SCE, the income change is larger and the question explicitly mentions the horizon over which the money would be spent.

For the regression analysis, we closely follow the empirical strategy in Christelis et al. (2019). In particular, we estimate a cross-sectional OLS regression of the MPC on quantiles of financial wealth, financial debt, and a set of covariates that includes age, gender, and household size. Different from Christelis et al. (2019), we focus on financial wealth and financial debt instead of cash-on-hand to be closer to the specification estimated in Table 1. However, our results also hold when we use cash-on-hand instead of liquid wealth. Note that financial debt excludes mortgage debt.

Table A.7: Regressions of Marginal Propensities on Household Balance Sheets in CentER

	(1) MPC	(2) MPC	(3) MPC	(4) MPS	(5) MPS	(6) MPS	(7) MPD	(8) MPD	(9) MPD
II net financial wealth quartile	-0.010	-0.024		0.088***	0.055*		-0.106***	-0.052*	
	(0.013)	(0.014)		(0.023)	(0.024)		(0.022)	(0.021)	
III net financial wealth quartile	-0.038**	-0.054***		0.097***	0.058*		-0.102***	-0.038	
	(0.013)	(0.014)		(0.023)	(0.025)		(0.022)	(0.023)	
IV net financial wealth quartile	-0.014	-0.030		0.143***	0.105***		-0.170***	-0.109***	
	(0.014)	(0.015)		(0.025)	(0.026)		(0.022)	(0.022)	
Low financial debt given pos. debt		-0.039**			-0.080**			0.142***	
		(0.015)			(0.029)			(0.029)	
High financial debt given pos. debt		-0.044**			-0.108***			0.171***	
		(0.016)			(0.029)			(0.031)	
II gross financial wealth quartile			-0.039**			0.009			-0.004
			(0.013)			(0.023)			(0.021)
III gross financial wealth quartile			-0.041**			0.023			0.014
			(0.013)			(0.024)			(0.022)
IV gross financial wealth quartile			-0.026			0.080**			-0.082***
			(0.014)			(0.025)			(0.019)
N	1332	1332	1332	1326	1326	1326	1332	1332	1332
R^2	0.025	0.034	0.028	0.028	0.040	0.010	0.071	0.118	0.040

Notes: This table reports results from an OLS regression of the MPC, MPS, and MPD on household balance sheets and a set of covariates that includes age, gender, and household size. For net and gross financial wealth quartiles, the first (lowest) quartile serves as the comparison group. For financial debt, households without financial debt form the comparison group. Low financial debt includes households with debt below median conditional on positive debt; high financial debt includes households with debt above median conditional on positive debt. Heteroskedasticity-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.7 reports the results of this exercise. Column 1 shows that the MPC is decreas-

ing in financial wealth, in line with the findings in Christelis et al. (2019). Households in higher quartiles of the financial wealth distribution have higher MPCs on average compared to the lowest quartile, which serves as the comparison group. Once we additionally control for the composition of financial wealth by including measures of financial debt, we observe that for a given quartile of wealth, the MPC is again decreasing in the amount of debt. Due to the relatively small sample, we split households into three groups: no financial debt (around 80%), low financial debt holdings (below median conditional on positive debt), and high financial debt holdings (above median conditional on positive debt). The comparison group consists of households without financial debt. In Column 3, we control for gross instead of net financial wealth, defined as the sum of financial assets and debt. We find that, similar to the results in the SCE, the MPC is decreasing in the amount of gross wealth held. With respect to the MPS and MPD, we observe similar patterns as in our baseline regression. The MPS is increasing in net wealth, but decreasing in debt. The MPD instead is decreasing in net wealth but increasing in debt.