

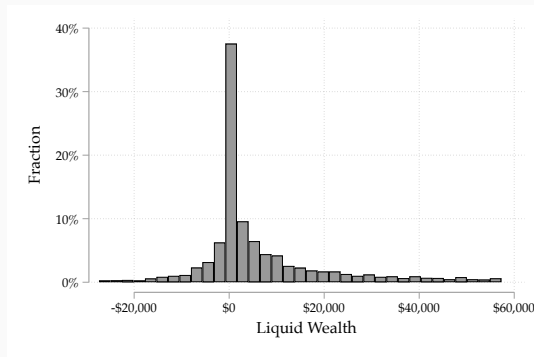
THE MACROECONOMIC IMPLICATIONS OF COHOLDING

Michael Boutros (University of Toronto) Andrej Mijakovic (University of Mannheim)

Bank of Chile Workshop on “The Micro and Macro of Financial Intermediation”

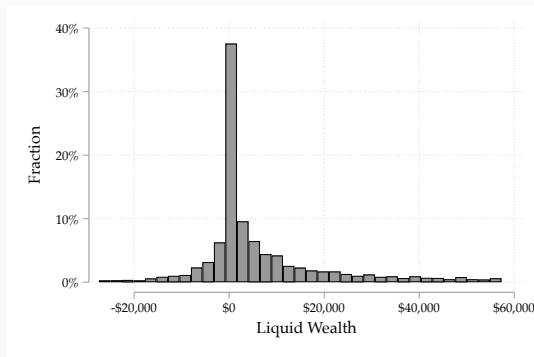
October 6, 2025

MOTIVATION



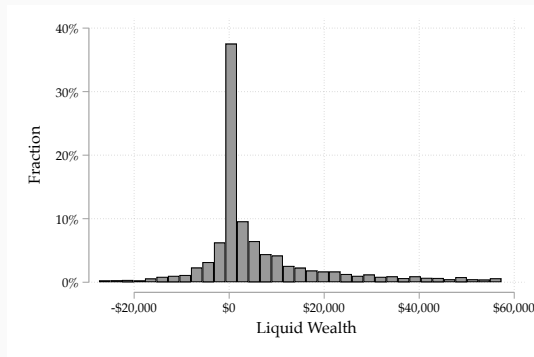
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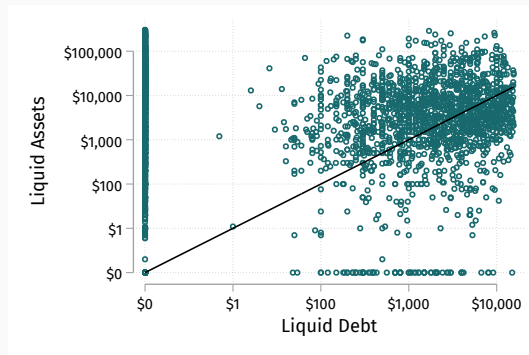


1. **Liquid wealth distribution** is key determinant of **policy transmission**.

- Tight link between **liquidity** and marginal propensity to consume (**MPC**)
- Canonical models consider **net**, not **gross** liquid wealth position:

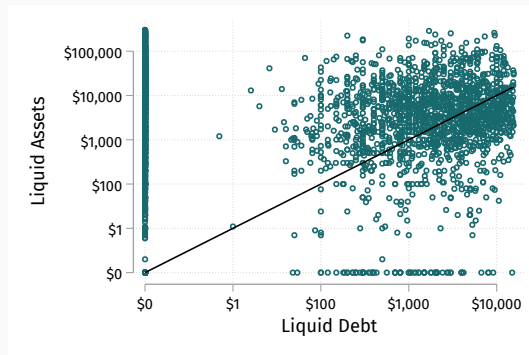
$$MPC(a - d) \text{ vs } MPC(a, d)$$

MOTIVATION



2. **Coholding liquid assets and liquid debt** is common in the US.

MOTIVATION



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- 1/3 of Americans regularly **borrow** on their credit card
- Vast majority **simultaneously** holds liquid assets

What are the implications of coholding for fiscal and monetary policy?

1. Empirical Analysis

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- For given level of liquid wealth, more credit card debt implies a smaller marginal propensity to consume. **Gross liquid wealth positions** matter!

Fact: Significant overlap between coholders and hand-to-mouth households.

- Roughly 30% of hand-to-mouth are coholders (mostly wealthy HtM).
- Distinction is crucial for understanding short- and long-term behavior.

What are the implications of coholding for fiscal and monetary policy?

2. Model

- Consumption-savings model w/ **coholding via liquidity-in-advance constraint**
- **Matches levels and slopes of MPC/MPS/MPRD** across asset/debt distribution

What are the implications of coholding for fiscal and monetary policy?

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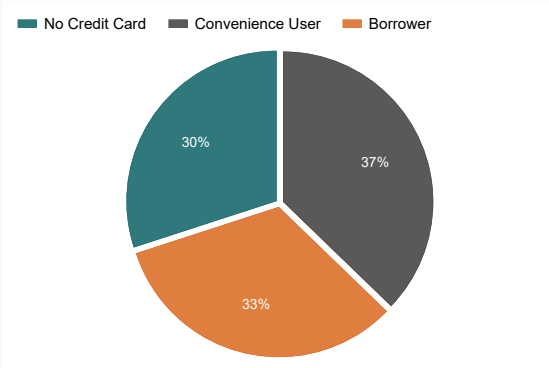
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- **Matches levels and slopes of MPC/MPS/MPRD** across asset/debt distribution

3. Implications for fiscal and monetary policy

- More coholding over time leads to lower **aggregate MPC**
- **Targeting transfers** is complicated – consumption/deleveraging trade-off
- Coholding changes **cross-sectional** consumption response to monetary policy

CREDIT CARD DEBT AND THE MARGINAL PROPENSITY TO CONSUME

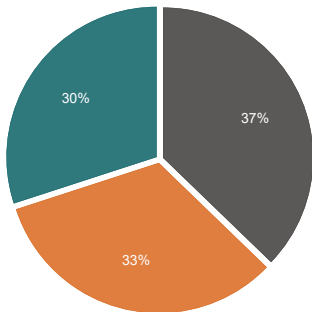
COHOLDING OF LIQUID ASSETS AND DEBT IN THE US



(a) Credit Card User Types (SCF 2016)

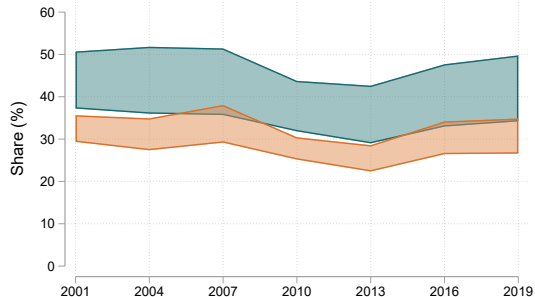
COHOLDING OF LIQUID ASSETS AND DEBT IN THE US

■ No Credit Card ■ Convenience User ■ Borrower



(a) Credit Card User Types (SCF 2016)

■ Credit Card Borrowers ■ Coholders



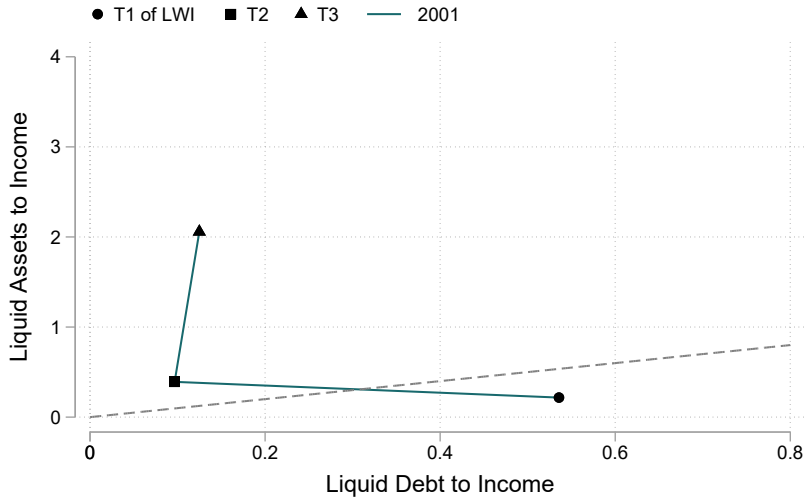
(b) Credit Card Borrowers & Coholders (SCF)

Detail

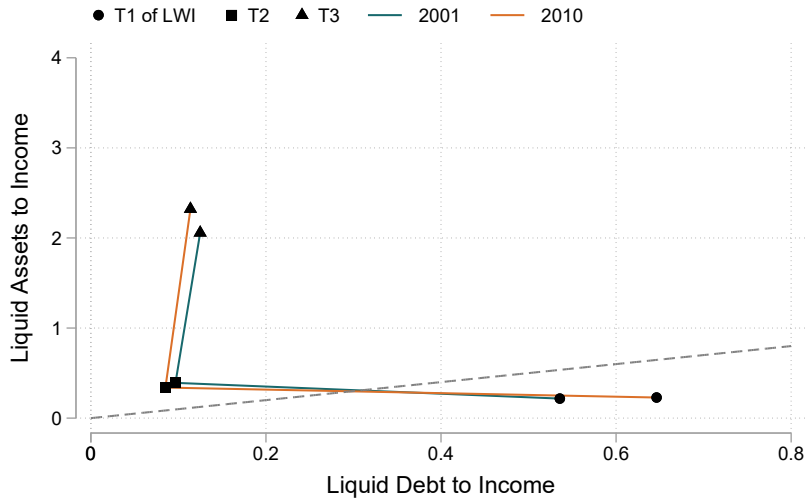
Over time

Share of credit

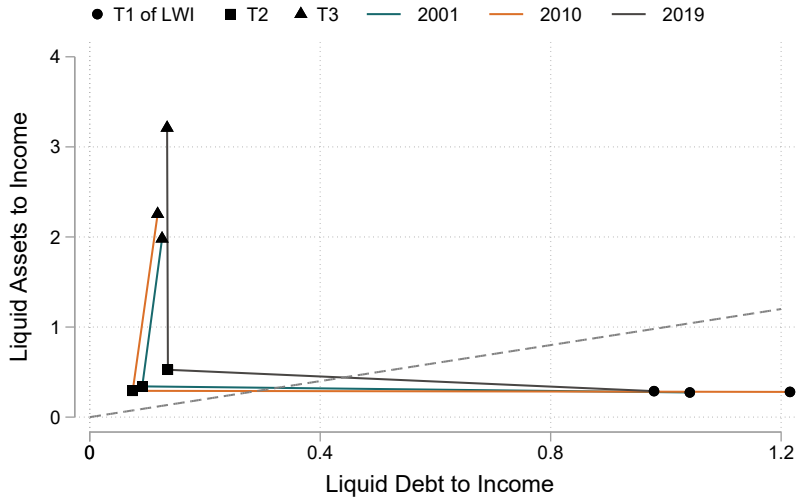
JOINT DISTRIBUTION OF LIQUID ASSETS AND DEBT OVER TIME (SCF)



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MPCs AND LIQUID DEBT

- Credit card debt **dampens** the marginal propensity to consume.

$Y = MPC^+$	(1)
Liquid Debt	-0.205*** (0.037)
Liquid Wealth	
Demographics	X
Illiquid Assets/Debt	
Other Financial Variables	
N	2,742

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

MPCs AND LIQUID DEBT

- Credit card debt **dampens** the marginal propensity to consume.

$Y = MPC^+$	(1)	(2)
Liquid Debt	-0.205*** (0.037)	-0.197*** (0.043)
Liquid Wealth		0.007 (0.016)
Demographics	X	X
Illiquid Assets/Debt		
Other Financial Variables		
N	2,742	2,742

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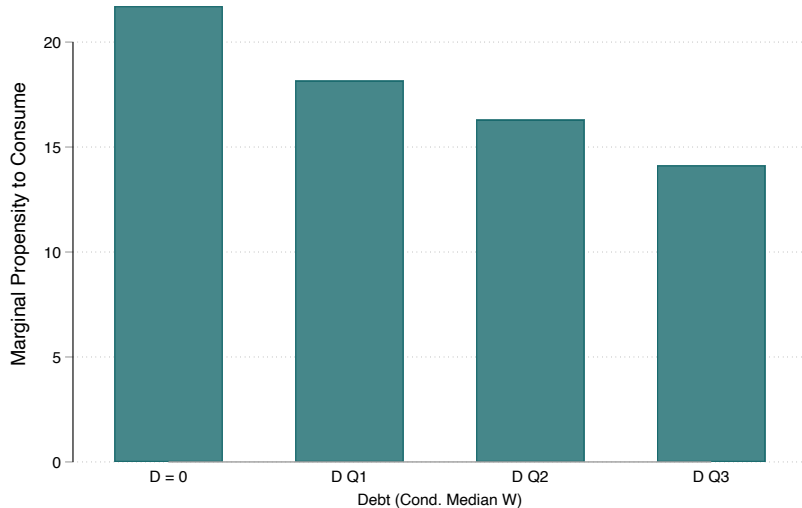
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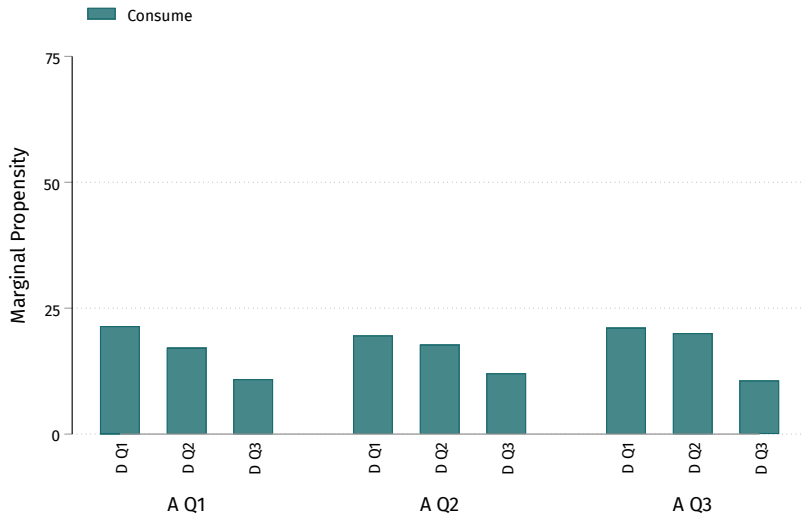
$Y = MPC^+$	(1)	(2)	(3)
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Demographics	X	X	X
Illiquid Assets/Debt			X
Other Financial Variables			X
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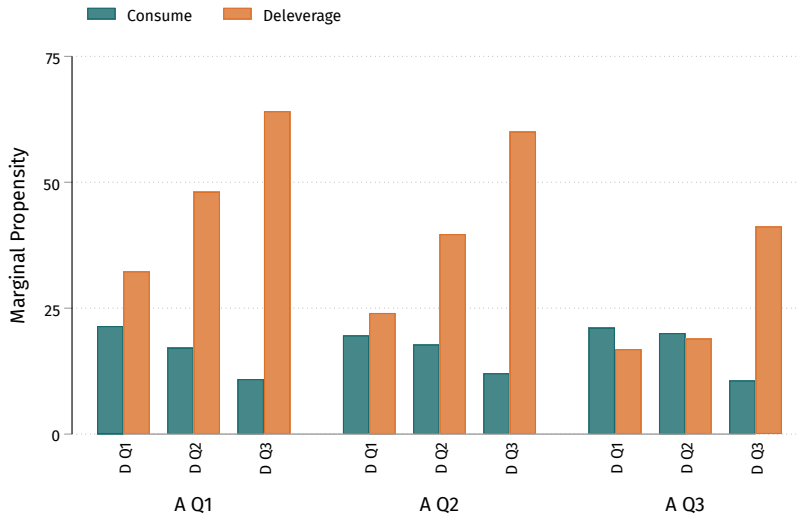
MPCs BY LIQUID DEBT FOR MEDIAN LIQUID WEALTH



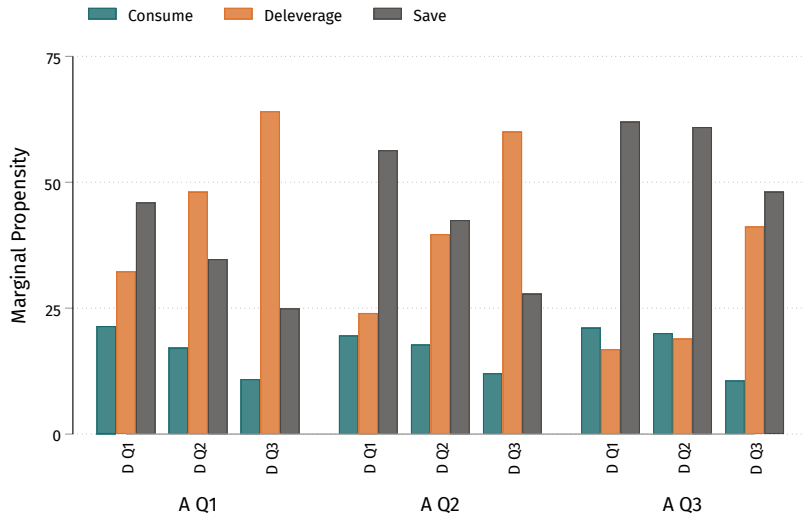
MPs ACROSS JOINT DISTRIBUTION OF LIQUID ASSETS AND DEBT



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MODEL

Environment

- Infinite horizon consumption-saving model, period is one month.
- Endowment income with idiosyncratic income shocks.

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Financial Markets

- Liquid one-period instruments for assets, a , and debt, d
- Wedge on interest rate between saving and borrowing:

$$R_a = 1 + r, \quad R_d = R_a + \delta$$

Utility

$$u(C) = \frac{C^{1-\sigma}}{1-\sigma}, \quad C = \left[(1-\theta)c_1^{\frac{\eta-1}{\eta}} + \theta c_2^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

- Goods differ in means of payment: c_1 can be financed with credit card debt, c_2 is cash-only.

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Constraints

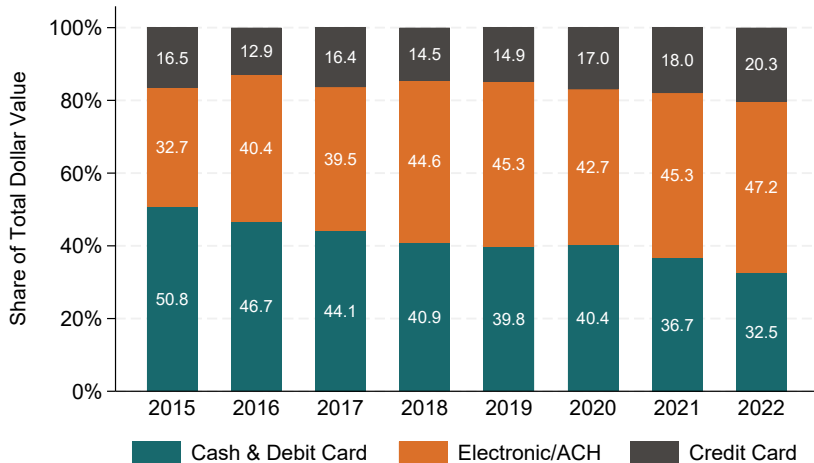
1. Budget:

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

2. Borrowing:

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

MOTIVATION: LIQUIDITY-IN-ADVANCE CONSTRAINT



Source: FRBA Survey and Diary of Consumer Payment Choice

Liquidity-in-Advance Constraint

- The cash good, $c_{2,t}$, must be paid for using liquid assets:

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

- This is an **intertemporal constraint**: consumption chosen in current period subject to liquidity chosen in previous period (Svensson, 1985; Lucas, 1982).

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Notes

1. Mechanism for coholding motivated by **rate of return dominance puzzle** in monetary macroeconomics (Telyukova and Wright, 2008; Telyukova, 2013).

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Notes

1. Mechanism for coholding motivated by **rate of return dominance puzzle** in monetary macroeconomics (Telyukova and Wright, 2008; Telyukova, 2013).
2. Consistent with **reported motivations** of coholders from survey data (Batista et al., 2024; Colarieti et al., 2025).

SIMPLIFIED MODEL (CLOSED FORM ANALYSIS)

Assumptions

- Three periods, consumption goods are perfect complements ($\eta = 0$).
- No income risk, $y_2 > 0, y_1 = y_3 = 0$.
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Key Insights

1. Liquidity-in-advance constraint dictates **composition**, not level, of liquidity.
2. Liquidity-in-advance constraint **dampens** marginal propensity to consume.

- Liquidity-in-advance constraint, measured with θ , governs gross positions:

$$a_3 = M(\beta, R_a, \delta)(R_a + \delta)^1 \frac{\theta}{1 + \delta\theta} w_3,$$

LIA AND COMPOSITION OF WEALTH

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CALIBRATION AND MODEL PERFORMANCE

Internally Calibrated Parameters

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

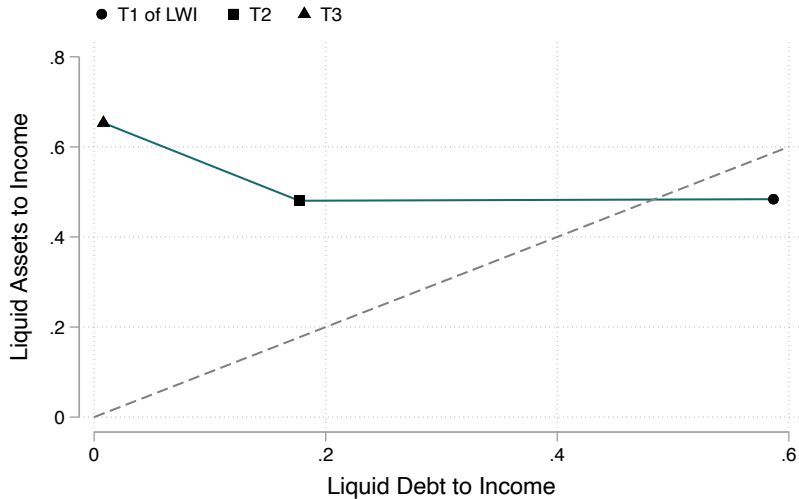
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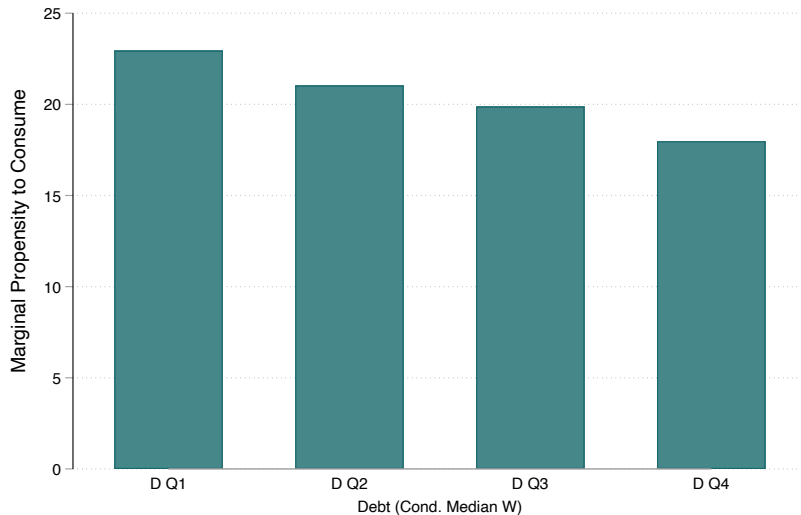
Targeted Moments

	Data	Model
Liquid Wealth (Median)	0.31	0.31
Liquid Debt (75 th Pct.)	0.41	0.41

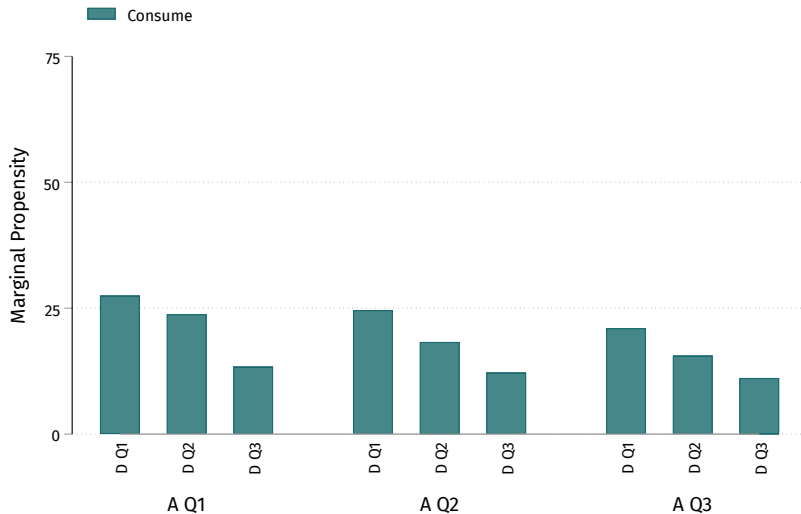
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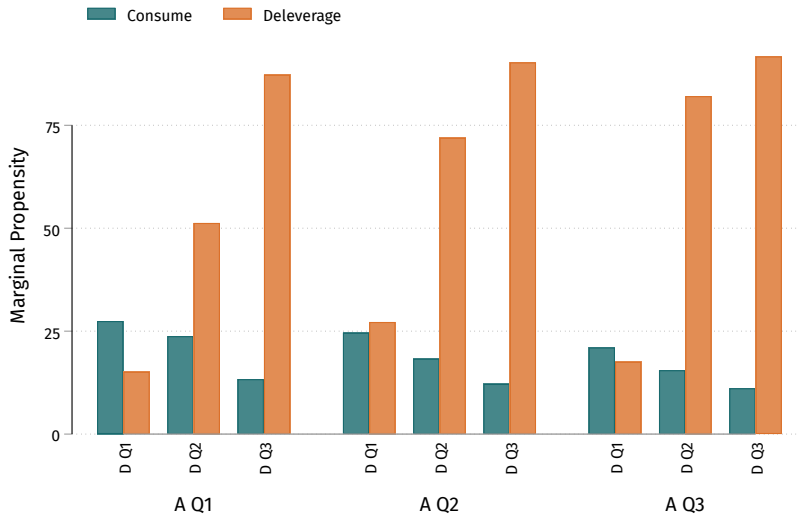
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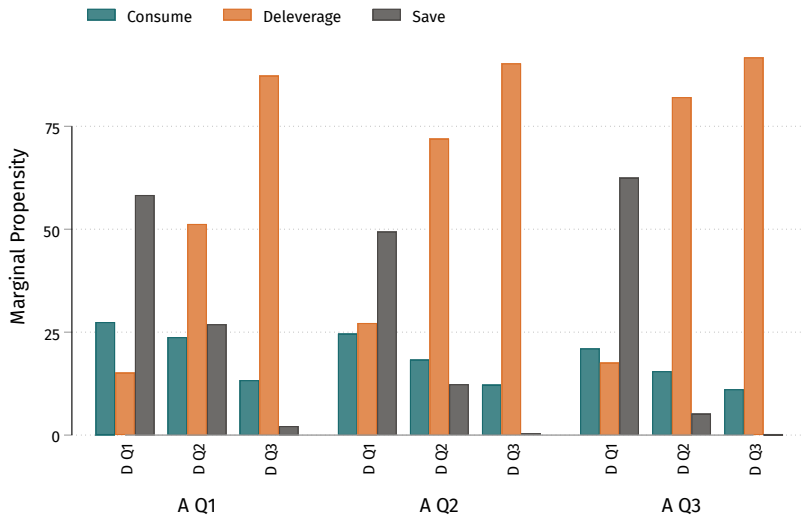
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THE MACROECONOMIC IMPLICATIONS OF COHOLDING

TARGETED FISCAL POLICY

Experiment: stimulus payment to subgroups of households (constant cost).

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	Income		Net Liquidity	Gross Liquidity
	Cons.	Debt		
Bottom 10%	14.8	-54.8		
Bottom 30%	15.0	-54.3		
Bottom 50%	15.3	-51.9		

Experiment: stimulus payment to subgroups of households (constant cost).

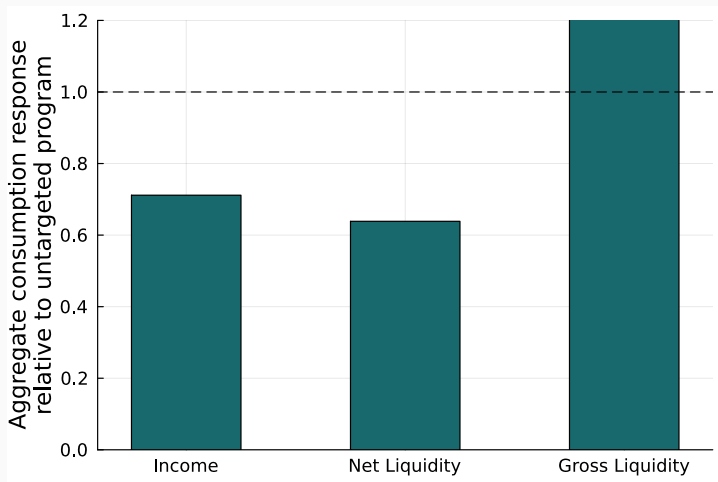
	Income		Net Liquidity		Gross Liquidity
	Cons.	Debt	Cons.	Debt	
Bottom 10%	14.8	-54.8	11.7	-88.3	
Bottom 30%	15.0	-54.3	13.3	-81.7	
Bottom 50%	15.3	-51.9	16.9	-70.8	

Experiment: stimulus payment to subgroups of households (constant cost).

	Income		Net Liquidity		Gross Liquidity	
	Cons.	Debt	Cons.	Debt	Cons.	Debt
Bottom 10%	14.8	-54.8	11.7	-88.3	19.2	-29.1
Bottom 30%	15.0	-54.3	13.3	-81.7	19.7	-37.2
Bottom 50%	15.3	-51.9	16.9	-70.8	19.9	-39.4

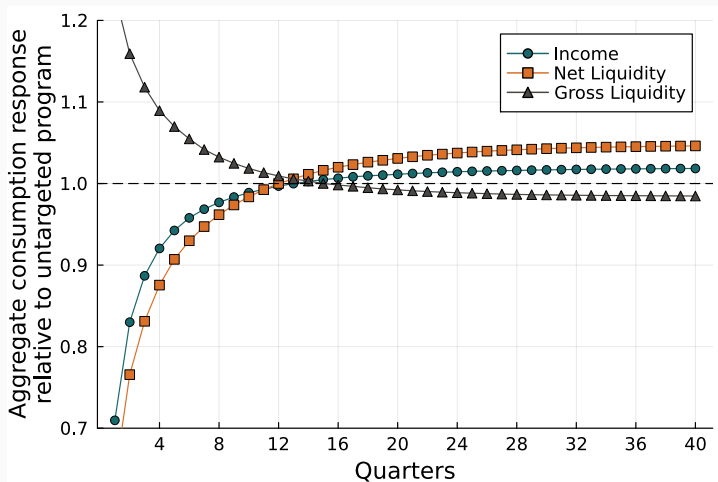
COMPARISON OF TARGETED AND UNTARGETED FISCAL POLICY PROGRAMS

Experiment: stimulus payment to subgroups of households (constant cost).



DYNAMIC EFFECTS OF TARGETED AND UNTARGETED FISCAL POLICY PROGRAMS

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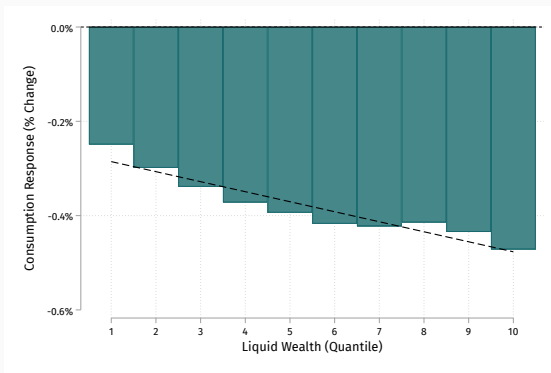


CONSUMPTION RESPONSE FOLLOWING AN INTEREST RATE HIKE

Experiment 3: persistent increase in interest rate by 1 pp.

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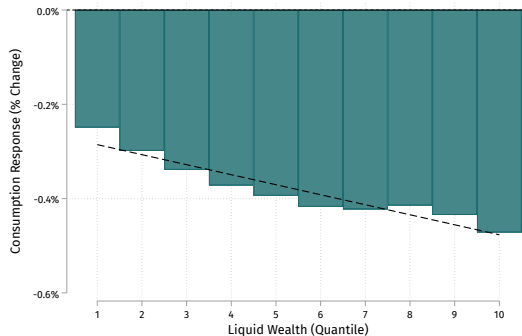
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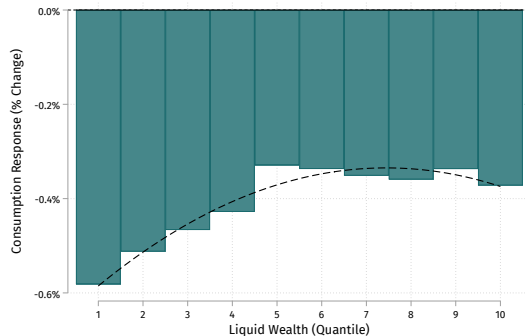
(a) One-asset model

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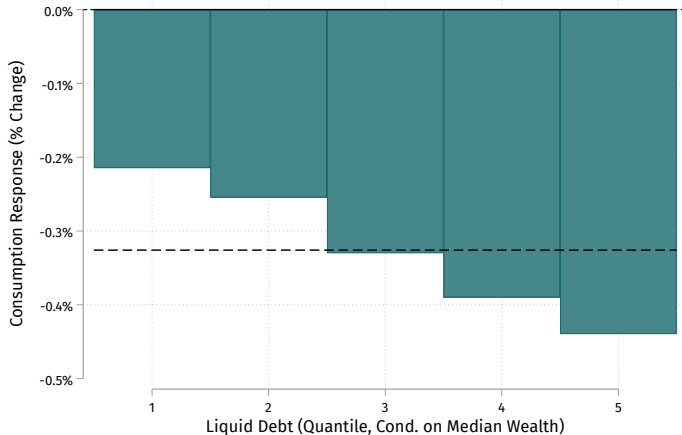


(b) Coholding model

- (b) is consistent with empirical evidence in Holm, Paul, and Tischbirek (2021).

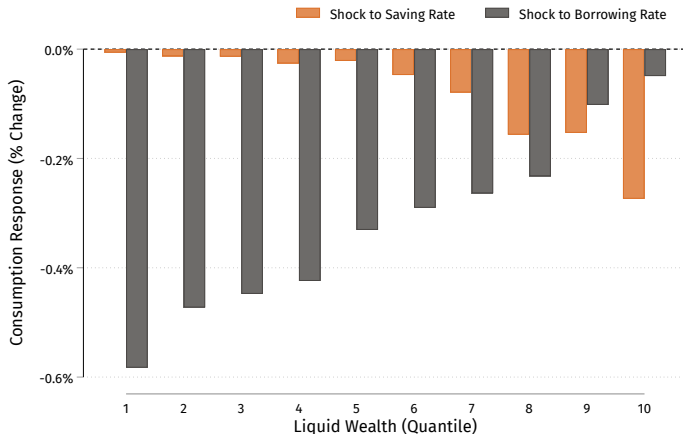
CONSUMPTION RESPONSE FOLLOWING AN INTEREST RATE HIKE

Experiment 3: persistent increase in interest rate by 1 pp.



CONSUMPTION RESPONSE WITH ASYMMETRIC PASS-THROUGH

Experiment 4: persistent increase in either saving or borrowing rate by 1 pp.



- **Joint distribution** of liquid assets/debt matters **beyond** liquid wealth for determining consumption, saving, and borrowing behavior
 - Hand-to-mouth behaviour not as straightforward as often modelled
- **Parsimonious model** with **liquidity-in-advance** constraint generates:
 - Coholding of liquid assets and debt
 - Empirically observed marginal propensities to consume, save and repay debt
- **Novel implications** for fiscal and monetary policy:
 - Aggregate propensity to consume decreasing as coholding increasing
 - Targeting away from coholders has larger impact on aggregate demand
 - Cross-sectional response to monetary policy changes with coholding

THE MACROECONOMIC IMPLICATIONS OF COHOLDING

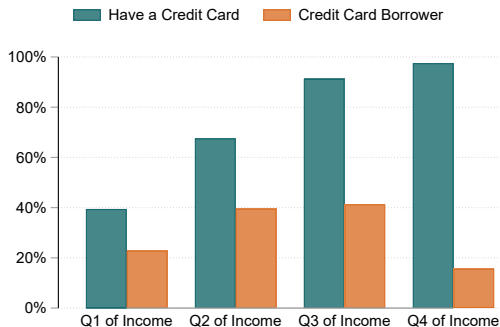
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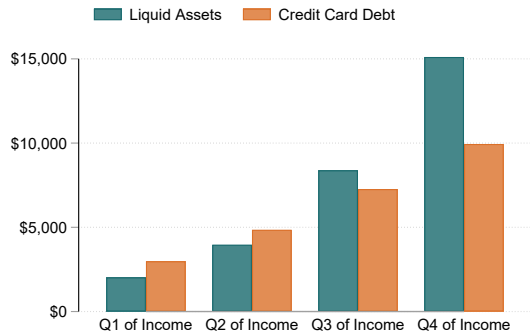
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1. Coholding puzzle [Gross-Souleles-2002, Bertaut-et-al-2009, Telyukova-Wright-2008, Telyukova-2013, Fulford-2015, Druedahl-Jørgensen- 2018, Gorbachev-Luengo-Prado-2019]
→ **Focus on macroeconomic implications** of coholding
2. Marginal propensities to consume and policy transmission [...]
→ **Highlight role of joint distribution** of liquid assets and debt
→ Potential **resolution to conflicting evidence** on slope of MPC
→ Investigate **marginal propensity to repay debt**
3. Debt-dependent fiscal multipliers [Dynan-et al-2013, Mian-et-al-2013, Klein- 2017, Baker-2018, Bernardini-Peersman-2018, Demyanyk-et-al-2019, Bernardini-et-al-2020]
→ Focus on **liquid debt** instead of total debt

COHOLDING OF LIQUID ASSETS AND DEBT IN THE US (SCF 2016)

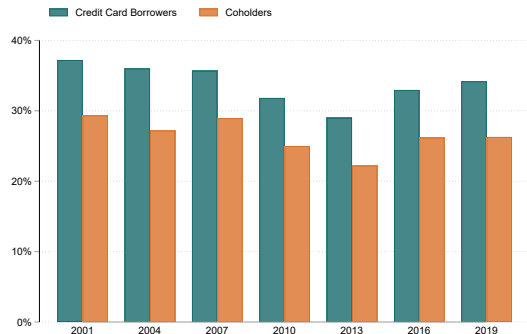


(a) Credit Card Holders by Income Quartile

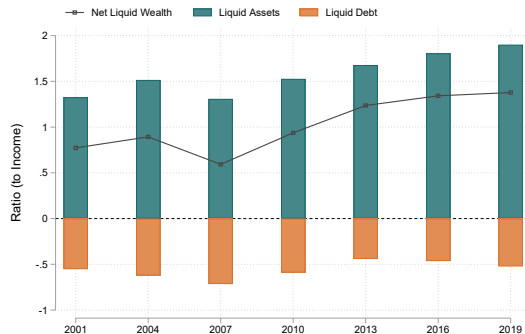


(b) Average liquid assets and debt

COHOLDING AND COMPOSITION OF LIQUID WEALTH OVER TIME (SCF)



(a) Share of Coholders and Credit Card Borrowers

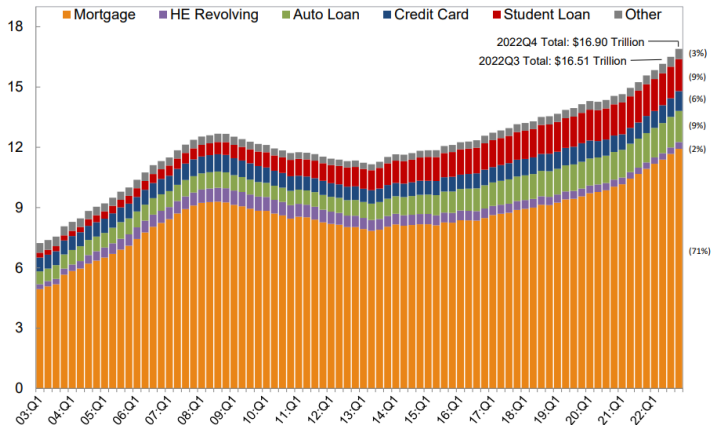


(b) Composition of Liquid Wealth

THE COMPOSITION OF DEBT IN THE US

Total Debt Balance and its Composition

Trillions of Dollars



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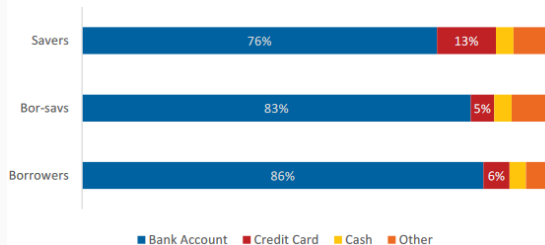
COHOLDING BALANCE CHECKS

Comparison of coholders and non-coholders 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			

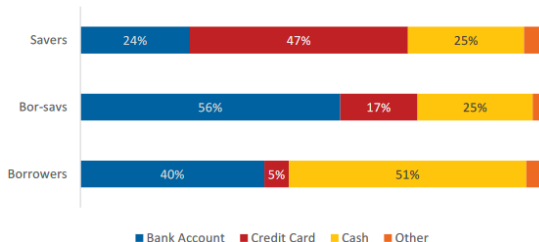
EXPENDITURE BY PAYMENT METHOD

Shares of bills by payment instrument, value,
2019



(a) Bills

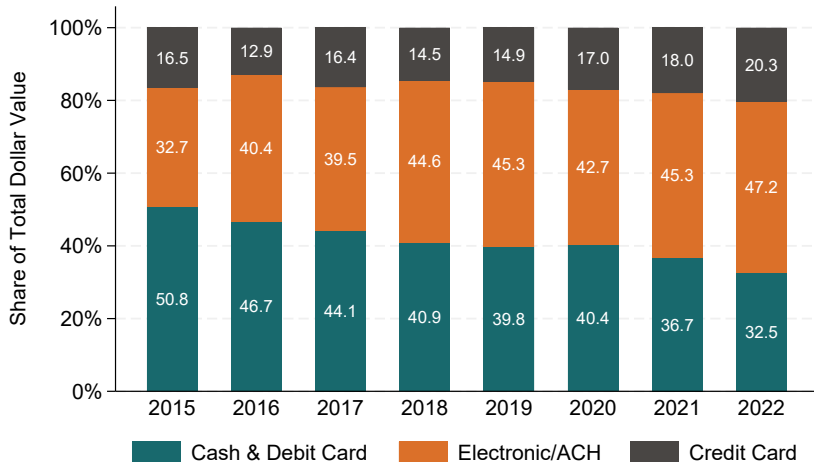
Shares of purchases by payment instrument,
value, 2019



(b) Purchases

Source: Greene-Stavings-2022, SCPC/DCPC.

VALUE SHARE OF TRANSACTIONS BY PAYMENT INSTRUMENT

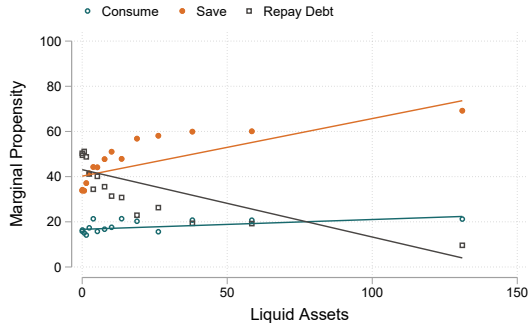


SCE VERSUS SCF

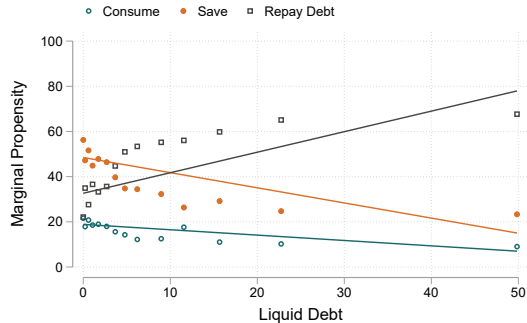
Distribution of assets, debt and income in the SCE and SCF

Variable	SCE				SCF			
	Mean	p25	p50	p75	Mean	p25	p50	p75
Liquid assets	18.15	0.00	2.00	13.50	22.19	0.50	3.20	12.50
Liquid debt	9.62	0.00	1.40	7.50	2.88	0.00	0.00	2.20
Liquid wealth	8.53	-4.70	0.00	10.50	19.31	0.00	1.20	10.16
Total assets	454.16	22.00	197.00	475.00	718.63	26.10	176.70	457.00
Total debt	148.08	6.00	40.00	150.00	114.79	3.00	44.95	153.60
Total wealth	304.16	-1.00	99.00	317.00	603.83	8.25	81.44	307.08
Income	109.01	35.00	66.00	110.00	111.05	31.39	60.76	105.31
Share of co-holders	0.32				0.34			
Observations	2774				4580			

MPs ACROSS MARGINAL DISTRIBUTIONS OF GROSS LIQUID WEALTH



(a) Liquid Assets



(b) Liquid Debt

HOUSEHOLD LIQUID BALANCE SHEET AND MARGINAL PROPENSITIES

$$MP_i = \beta_0 + \beta_1 A_i + \beta_2 D_i + \gamma X_i + u_i$$

	(1) Spend	(2) Save	(3) Repay Debt
Liquid Assets	0.0346 (0.0219)	0.231*** (0.0308)	-0.265*** (0.0296)
Liquid Debt	-0.243*** (0.0523)	-0.674*** (0.0818)	0.918*** (0.111)
N	2,578	2,578	2,578
R ²	0.069	0.119	0.174

Thought experiment:

- +1\$ A, +1\$ D, $\Delta W = 0$
- Gross wealth $\uparrow$, net wealth constant

→ Lower MPC! $+0.03 - 0.24 = -0.21$

Notes: Regressions control additionally for age, gender, race, marital status, education, geography, and survey date. Survey weights used. Liquid assets include money in checking/savings accounts. Liquid debt is credit card debt.

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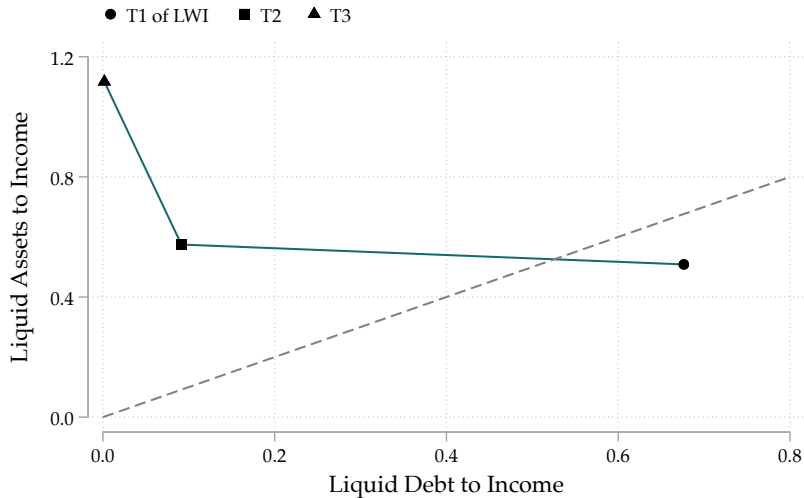
EXTERNAL VALIDITY

- What about **external validity**?
 - **Revisit empirical evidence** in:
 1. Japelli-Pistaferri-2014 (Italy)
 - MPC decreasing in debt
 2. Christelis-Georgarakos-Jappelli-Pistaferri-Van Rooij-2019 (Netherlands)
 - MPC decreasing in debt
 - MPRD increasing in debt
 3. Parker-Souleles-Johnson-McClelland-2013 (CEX)
 - Low power, weak evidence for non-monotonic decrease of MPC in debt
- **Robust evidence** for role of (liquid) debt in consumption response

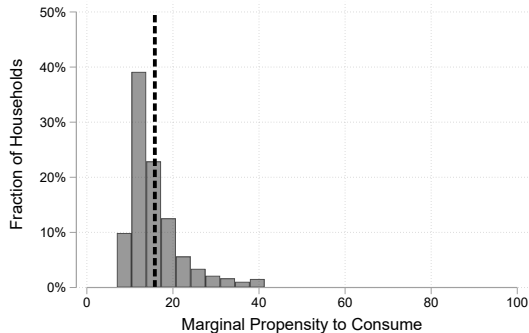
Externally Calibrated Parameters

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

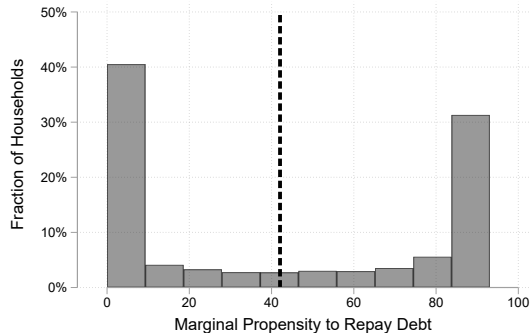
THE JOINT DISTRIBUTION OF LIQUID ASSETS AND DEBT (MODEL)



DISTRIBUTIONS OF MARGINAL PROPENSITIES TO CONSUME AND REPAY DEBT

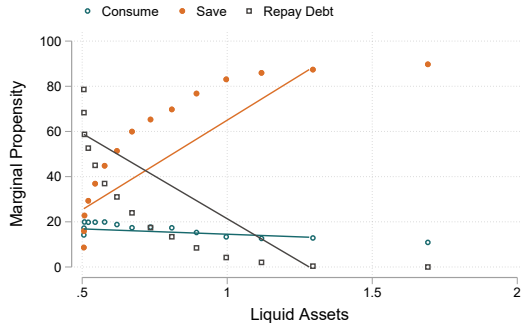


(a) Marginal Propensity to Consume

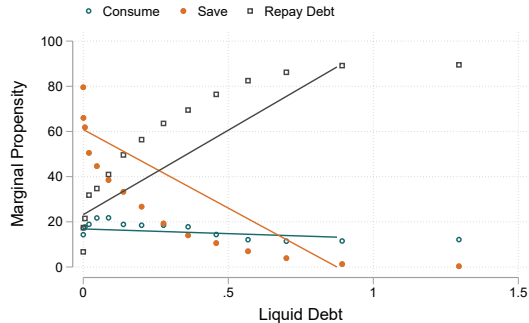


(b) Marginal Propensity to Repay Debt

MPs ACROSS MARGINAL DISTRIBUTIONS OF GROSS LIQUID WEALTH



(a) Liquid Assets



(b) Liquid Debt

THEORETICAL EXPLANATIONS OF COHOLDING

Large **empirical literature** documenting coholding [Gross-Souleles-2002, Gathergood-Weber-2014, Vihriala-2020, Gathergood-Olafsson-2022, Greene-Stavins-2022]

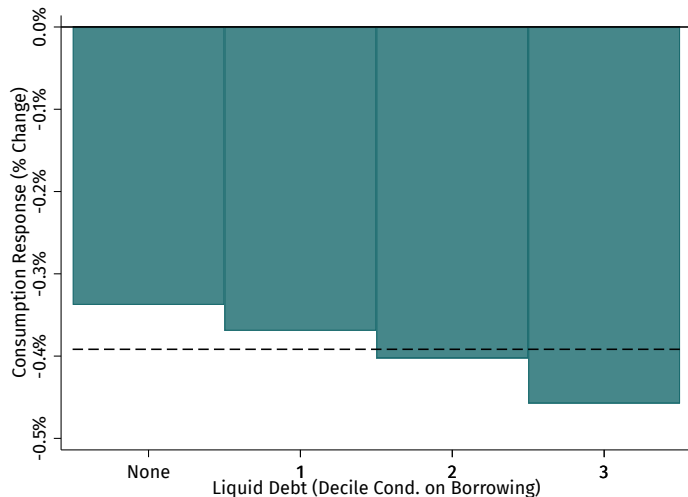
Proposed **theoretical** explanations:

1. Liquidity [Telyukova-Wright-2008, Telyukova-2013]
2. Credit access risk [Fulford-2015, Druedahl-Jørgensen-2018, Gorbachev-Luengo-Prado-2019]
3. Accountant-shopper models [Bertaut-et-al-2009]
4. Behavioral biases [Choi-Laschever-2018, Medina-Pagel-2023, Batista-Mao-Sussman-2023]

[Go back](#)

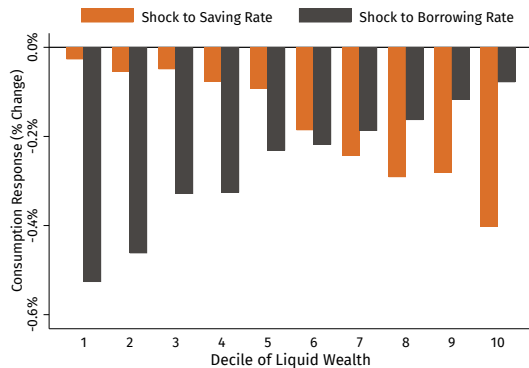
CONSUMPTION RESPONSE BY LIQUID DEBT CONDITIONAL ON MEDIAN WEALTH

Experiment 3: persistent increase in interest rate by 1pp

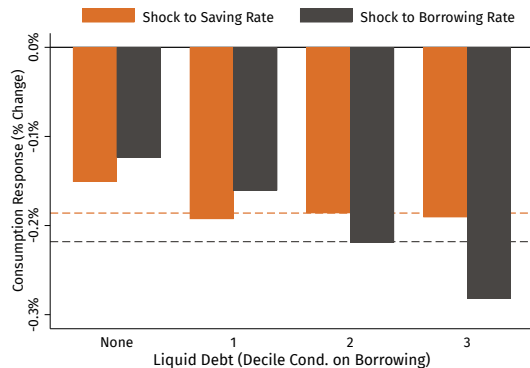


CONSUMPTION RESPONSE WITH HETEROGENEOUS PASS-THROUGH

Experiment 4: persistent increase in saving or borrowing rate by 1pp



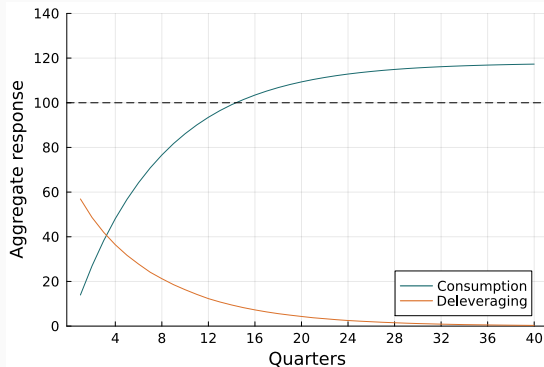
(a) Consumption Response by Liquid Wealth



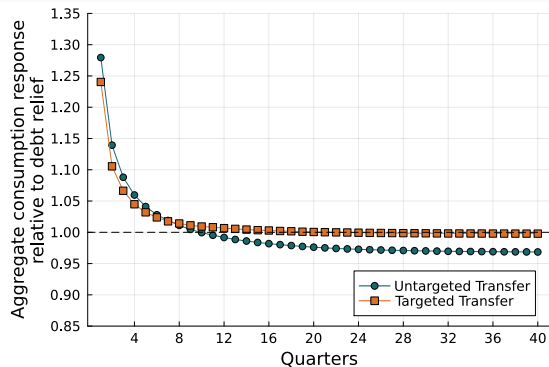
(b) Consumption Response by Liquid Debt for Median Net Wealth

DYNAMIC AGGREGATE RESPONSES TO DEBT RELIEF

Experiment 5: untargeted debt relief of 10% of avg. monthly income



(a) Debt Relief



(b) Relative Consumption Responses of Alternative Programs