'Less is More': Consumer Spending and the Size of Economic Stimulus Payments

Michele Andreolli[1] and Paolo Surico[1,2]

[1]London Business School

[2]CEPR

August 2022

Motivation

- Payments to households accounts for majority of fiscal stimuli.
- Most Economic Stimulus Payments (ESP) are untargeted.

- What ESP design maximizes impact on aggregate demand?
    1. Does it matter if it is targeted or not and to whom?
    2. Does it matter how much each household receives?

- Answer theoretically ambiguous (at least on the size)

Empirical Challenges

1. MPCs are typically unobserved and group-specific.

2. The size of ESPs is typically endogenous.
   - Only one shock per household is observed.
   - Unobserved heterogeneity.

Our Paper

Exploit unique set of hypothetical questions from the Italian Survey of Household Income and Wealth (SHIW) that ask the **same household** how much they would spend out of two unexpected and transitory income shocks of very different size:

1. small shock: one month of income
2. large shock: one year of income.

Pros and cons of our research design

Main pros:

1. Full distribution of MPCs across households;
2. No selection issue or unobserved heterogeneity;
3. Sizes expressed as % of each household income;
4. Sizes sufficiently different to elicit different behaviour.

Main cons

1. Would households behave the same in actual circumstances?

Main Empirical Findings
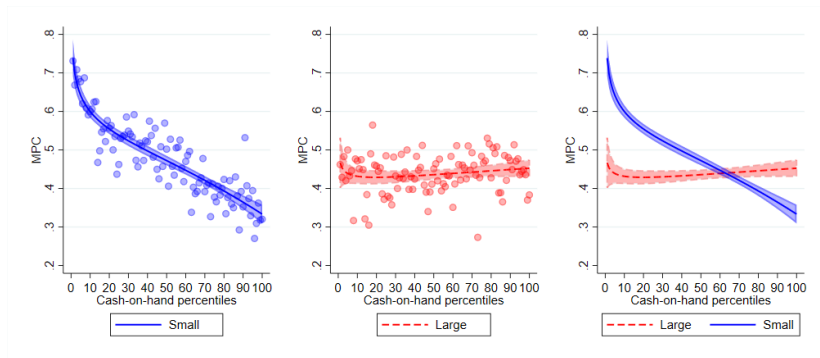
A puzzle and a possible resolution

Puzzle: affluent HHs have larger MPC out of larger shocks.

Our explanation: non-homothetic preferences on non-essentials.

In the data:

1. non-essentials are more expensive than essentials over time;
2. income elasticity is *much* higher for non-essentials.

In the model:

3. (1) $\Rightarrow$ MPC increases with income;
4. (2) $\Rightarrow$ MPC is convex along the income distribution;
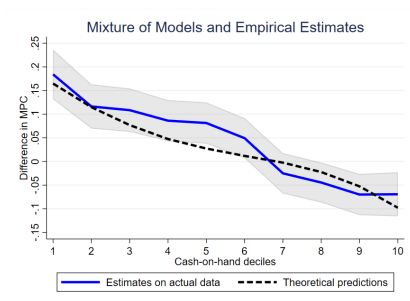
In both the data and the model:

- higher non-essential share predicts higher MPC.

Mixture of Models Fits our Evidence Well

- Mix Aiyagari (1994) and non-homothetic models.
- Give more weight to non-homothetic model for high cash-on-hand.

Findings:

- Replicate sign switch
- Close to empirical estimates

Mixture of Models and Empirical Estimates

Estimates on actual data ——— Theoretical predictions

Policy Implications

Consider two policies for a stimulus package of the same % GDP:

1. Small payments to a larger fraction of low cash-on-hand HHs
2. Large payments to a smaller fraction of low cash-on-hand HHs

Our findings:

Policy Implications

Consider two policies for a stimulus package of the same % GDP:

1. Small payments to a larger fraction of low cash-on-hand HHs
2. Large payments to a smaller fraction of low cash-on-hand HHs

Our findings:

- Impact on aggregate demand is much higher under policy (1).

- Revenue-neutral redistributions are expansionary. And the more so the smaller is the size of the transfer (and thus the larger the share of HHs) for a given % of GDP stimulus!

Related Literature

- Empirical MPC studies:
    - Estimation with quasi-natural experimental variation in the timing of tax rebate receipts, lottery wins or stock market gains (Johnson, Parker and Souleles, 2006, Parker et al., 2013, Agarwal and Qian, 2014, Misra and Surico, 2014, Kueng, 2018, Andersen, Johannesen and Sheridan, 2021, Fagereng, Holm and Natvik, 2021, Boutros, 2021).
    - Survey questions on how much of an hypothetical (actual) income windfall households would spend (have spent). Examples include Jappelli and Pistaferri (2014, 2020), Christelis et al. (2019), Sahm, Shapiro and Slemrod (2010) and Fuster, Kaplan and Zafar (2021) (Coibion, Gorodnichenko and Weber, 2020, Parker and Souleles, 2019).

- Theoretical literature on non-homothetic preferences in household expenditure behavior (Deaton, 1992, Browning and Crossley, 2000, Guvenen, 2006, Crossley and Low, 2011).

Outline

Data

Empirical Results

Models

Fiscal Experiments

Italian Survey of Household Income and Wealth - SHIW

- Biannual survey by the Bank of Italy.
- Detailed info on income, wealth, consumption, etc.

Italian Survey of Household Income and Wealth - SHIW

- Biannual survey by the Bank of Italy.
- Detailed info on income, wealth, consumption, etc.
- Ask households about how much they would spend if they unexpectedly received windfall equal to either a month or a year of their household disposable income. Questions Wording
- One month in 2010 wave, One year in 2012 wave.
- 8000 households per wave; 4500 appear in both waves.
- Quantitative question. MPC Distribution
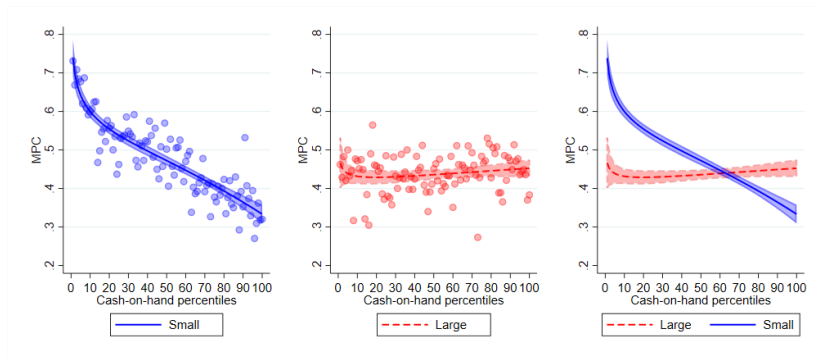- Cash on hand: disposable income plus financial assets.

Outline

Data

Empirical Results

Models

Fiscal Experiments

MPC heterogeneity by cash-on-hand and shock size

MPC heterogeneity by cash-on-hand and shock size

VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff
I cash-on-hand decile	0.745***	0.394***	0.229***	0.651***	0.368***	0.184***
	(0.027)	(0.025)	(0.023)	(0.030)	(0.028)	(0.027)
II cash-on-hand decile	0.589***	0.393***	0.130***	0.546***	0.375***	0.116***
	(0.026)	(0.024)	(0.023)	(0.027)	(0.025)	(0.024)
III cash-on-hand decile	0.534***	0.359***	0.115***	0.519***	0.357***	0.109***
	(0.027)	(0.025)	(0.023)	(0.026)	(0.025)	(0.023)
IV cash-on-hand decile	0.515***	0.390***	0.086***	0.506***	0.381***	0.086***
	(0.025)	(0.024)	(0.022)	(0.025)	(0.024)	(0.022)
V cash-on-hand decile	0.499***	0.381***	0.080***	0.500***	0.381***	0.081***
	(0.026)	(0.024)	(0.022)	(0.025)	(0.024)	(0.022)
VI cash-on-hand decile	0.437***	0.369***	0.050**	0.440***	0.375***	0.049**
	(0.025)	(0.023)	(0.022)	(0.024)	(0.023)	(0.022)
VII cash-on-hand decile	0.365***	0.427***	-0.037*	0.389***	0.432***	-0.025
	(0.025)	(0.023)	(0.022)	(0.025)	(0.023)	(0.022)
VIII cash-on-hand decile	0.322***	0.412***	-0.058***	0.356***	0.425***	-0.044**
	(0.025)	(0.023)	(0.021)	(0.024)	(0.023)	(0.022)
IX cash-on-hand decile	0.289***	0.423***	-0.087***	0.333***	0.438***	-0.070***
	(0.025)	(0.023)	(0.021)	(0.025)	(0.023)	(0.022)
X cash-on-hand decile	0.270***	0.406***	-0.082***	0.306***	0.415***	-0.069***
	(0.025)	(0.023)	(0.021)	(0.026)	(0.025)	(0.024)
Observations	4,524	4,524	4,524	4,524	4,524	4,524
Demographic controls	NO	NO	NO	YES	YES	YES

Summary of Evidence on MPC heterogeneity

1. Households with low cash-on-hand: $MPC_{1m} > MPC_{1y}$.
2. Households with high cash-on-hand: $MPC_{1m} < MPC_{1y}$.
3. MPC_{1m}: strongly decreasing in cash-on-hand.
4. MPC_{1y}: mildly increasing in cash-on-hand.

- Estimated with Tobit regression.
- Robust to demographic controls.
- Sensitivity Analsys

Summary of Evidence on MPC heterogeneity

1. Households with low cash-on-hand: $MPC_{1m} > MPC_{1y}$.
2. Households with high cash-on-hand: $MPC_{1m} < MPC_{1y}$.
   How can we explain this?
3. MPC_{1m}: strongly decreasing in cash-on-hand.
4. MPC_{1y}: mildly increasing in cash-on-hand.

- Estimated with Tobit regression.
- Robust to demographic controls.
- Sensitivity Analsys

MPC and non-necessity consumption

- Affluent households are less likely to be liquidity constraint.
- They spend a higher share of their budget in non-necessities.
- A higher share in non-necessities predicts a higher MPC, especially for large shocks.

MPC and non-necessity consumption

- Affluent households are less likely to be liquidity constraint.
- They spend a higher share of their budget in non-necessities.
- A higher share in non-necessities predicts a higher MPC,
  especially for large shocks.

VARIABLES	(1) Small	(2) Large
Eating outside share	0.116*	0.126**
	(0.061)	(0.058)
Observations	4,524	4,524
Cash-on-hand Deciles Controls	YES	YES
Demographic controls	YES	YES

All specifications   Figure

Outline

Data

Empirical Results

Models

Fiscal Experiments

Summary of Empirical Results

1. Households with low cash-on-hand: $MPC_{1m} > MPC_{1y}$.
2. Households with high cash-on-hand: $MPC_{1m} < MPC_{1y}$.
3. MPC_{1m}: strongly decreasing in cash-on-hand.
4. MPC_{1y}: mildly increasing in cash-on-hand.
5. Affluent households spend a higher budget share on non-necessity goods and services.
6. A higher share of non-necessity consumption is associated with a higher MPC, especially for large income gains.

Summary of Empirical Results

1. Households with low cash-on-hand: $MPC_{1m} > MPC_{1y}$.
2. Households with high cash-on-hand: $MPC_{1m} < MPC_{1y}$.
3. MPC_{1m}: strongly decreasing in cash-on-hand.
4. MPC_{1y}: mildly increasing in cash-on-hand.
5. Affluent households spend a higher budget share on non-necessity goods and services.
6. A higher share of non-necessity consumption is associated with a higher MPC, especially for large income gains.
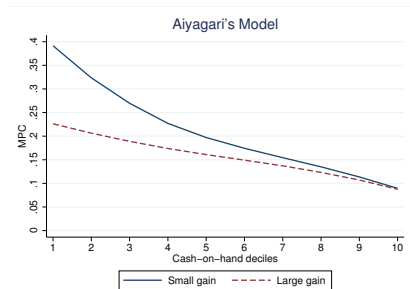
- 1 and 3 consistent with borrowing constraints.
- 2, 4, 5, and 6 consistent with non-homothetic preferences.

Aiyagari (1994) Model

- Idiosyncratic income risk;
- Solve a standard intertemporal optimization problem with CRRA utility;
- Subject to a non-negative wealth constraint.

Findings:

Aiyagari's Model

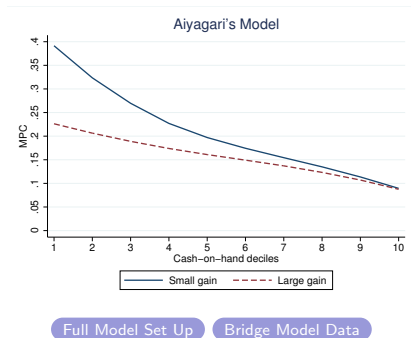Full Model Set Up   Bridge Model Data

Aiyagari (1994) Model

- Idiosyncratic income risk;
- Solve a standard intertemporal optimization problem with CRRA utility;
- Subject to a non-negative wealth constraint.

Findings:

1. $MPC_{1m} > MPC_{1y}$ for any cash-on-hand.
2. MPC is declining in cash-on-hand.

Aiyagari's Model

Small gain   Large gain

Full Model Set Up   Bridge Model Data

Non-Homothetic Model: Setting

- Power instantaneous felicity separable in two goods a (non-necessity) and b (necessity). $\gamma_a > \gamma_b$ wlog.
- $p_{i,t}$ price of good i in time t from the perspective of time 0.
- Y permanent income.
- X_t deflated expenditures in time t.
- $s_{i,t}^Y \equiv \frac{p_{i,t} c_{i,t}}{Y}$ and $s_{i,t}^X \equiv \frac{p_{i,t} c_{i,t}}{X_t}$.

$$\max_{\{c_{a,t}, c_{b,t}\}_{t=0}^{\infty}} U(\{c_{a,t}, c_{b,t}\}_{t=0}^{\infty}) = \sum_{t=0}^{\infty} \beta^t \left[\frac{c_{a,t}^{1-\frac{1}{\gamma_a}}}{1 - \frac{1}{\gamma_a}} + \frac{c_{b,t}^{1-\frac{1}{\gamma_b}}}{1 - \frac{1}{\gamma_b}} \right] \tag{1}$$

$$s.t. \quad Y = \sum_{t=0}^{\infty} \sum_{i=a,b} p_{i,t} c_{i,t} = \sum_{t=0}^{\infty} X_t$$

Non-Homothetic Model: Derivations

- One to one positive mapping between income elasticity and good specific IES. (Lemmata 1 and 2)
- Non-necessities are easier to shift intertemporally.
- MPC is fully characterized by income elasticities and spending shares. (Lemma 3)

Non-Homothetic Model: Derivations

- One to one positive mapping between income elasticity and good specific IES. Lemmata 1 and 2

- Non-necessities are easier to shift intertemporally.

- MPC is fully characterized by income elasticities and spending shares. Lemma 3

- MPC is increasing in income IF non-necessities prices grow faster than necessities prices with $\gamma_a > 1$. Proposition 1   Price Data

- MPC is convex in income if non-necessities are non necessities enough. Proposition 2   As in the Data

Non-Homothetic Model: Predictions

- $MPC_{1m} < MPC_{1y}$ for any cash-on-hand.
- MPC is increasing in cash-on-hand.
- MPC is increasing in share of non-essentials.
- Non-essential share is higher for affluent households.

Non–Homothetic Model
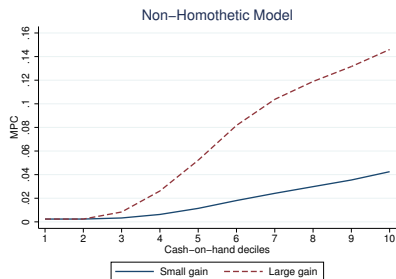
Calibration   Bridge Model Data

Models' Mix & Match

- Mix models across the resources distribution.
- Give more weight to non-homothetic model for high cash-on-hand HHs.
- Replicate sign switch
- Close to empirical estimates

Other Mechanisms
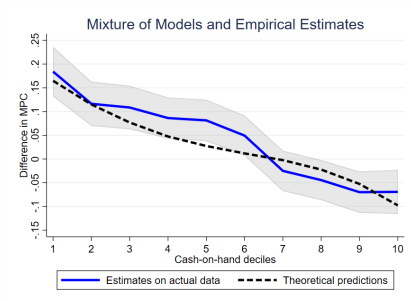
Mixture of Models and Empirical Estimates

In Level

Outline

Fiscal Experiments

PANEL A - STIMULUS PACKAGE EQUAL TO 0.5% OF GDP

POLICY EXPERIMENTS	Average Transfer		Average Taxes		Aggregate
	Value(€)	MPC	Value(€)	MPC	Consumption
i) One-month income to bottom 27% financed by debt	775	0.52	–	–	+ 0.43%

Fiscal Experiments

PANEL A - STIMULUS PACKAGE EQUAL TO 0.5% OF GDP

POLICY EXPERIMENTS	Average Transfer		Average Taxes		Aggregate
	Value(€)	MPC	Value(€)	MPC	Consumption
i) One-month income to bottom 27% financed by debt	775	0.52	–	–	+ 0.43%
ii) One-year income to bottom 7% financed by debt	3744	0.46	–	–	+ 0.37%

Fiscal Experiments

PANEL A - STIMULUS PACKAGE EQUAL TO 0.5% OF GDP

POLICY EXPERIMENTS	Average Transfer		Average Taxes		Aggregate Consumption
	Value(€)	MPC	Value(€)	MPC	
i) One-month income to bottom 27% financed by debt	775	0.52	–	–	+ 0.43%
ii) One-year income to bottom 7% financed by debt	3744	0.46	–	–	+ 0.37%
iii) One-month income to bottom 27% funded by top 4% one-month income	775	0.52	6058	0.31	+ 0.17%

Fiscal Experiments

PANEL B - STIMULUS PACKAGE EQUAL TO 1% OF GDP

POLICY EXPERIMENTS	Average Transfer		Average Taxes		Aggregate
	Value(€)	MPC	Value(€)	MPC	Consumption
i) One-month income to bottom 41% financed by debt	997	0.52	–	–	+ 0.85%
ii) One-year income to bottom 10% financed by debt	4891	0.41	–	–	+ 0.68%
iii) One-month income to bottom 41% funded by top 10% one-month income	997	0.52	4618	0.35	+ 0.27%

Fiscal Experiments

PANEL C - STIMULUS PACKAGE EQUAL TO 2% OF GDP

POLICY EXPERIMENTS	Average Transfer		Average Taxes		Aggregate
	Value(€)	MPC	Value(€)	MPC	Consumption
i) One-month income to bottom 64% *financed by debt*	1290	0.50	–	–	+ 1.63%
ii) One-year income to bottom 14% *financed by debt*	6284	0.44	–	–	+ 1.43%
iii) One-month income to bottom 64% *funded by top 26% one-month income*	1290	0.50	3385	0.37	+ 0.42%
iv) One-year income to bottom 14% *funded by top 0.7% one-year income*	6284	0.44	105422	0.45	- 0.01%

Fiscal Experiments - Taxation

PANEL A - AGGREGATE TAX INCREASE EQUAL TO 1% OF GDP

POLICY EXPERIMENTS	Average Taxes		Aggregate
	Value($\in$)	MPC	Consumption
i) One month income from top 10%	4618	0.35	-0.58%
ii) One year income from top 0.2%	121902	0.42	-0.66%

PANEL B - AGGREGATE TAX INCREASE EQUAL TO 2% OF GDP

POLICY EXPERIMENTS	Average Taxes		Aggregate
	Value($\in$)	MPC	Consumption
i) One month income from top 26%	3385	0.37	-1.21%
ii) One year income from top 0.7%	105422	0.45	-1.42%

PANEL C - AGGREGATE TAX INCREASE EQUAL TO 3% OF GDP

POLICY EXPERIMENTS	Average Taxes		Aggregate
	Value($\in$)	MPC	Consumption
i) One month income from top 45%	2821	0.39	-1.91%
ii) One year income from top 1.4%	92662	0.41	-1.97%

PANEL D - AGGREGATE TAX INCREASE EQUAL TO 4% OF GDP

POLICY EXPERIMENTS	Average Taxes		Aggregate
	Value($\in$)	MPC	Consumption
i) One month income from top 70%	2368	0.42	-2.73%
ii) One year income from top 2.0%	86713	0.37	-2.38%

Conclusions

- Should fiscal stimuli be targeted? To low cash-on-hand HHs.

- For an aggregate stimulus of a given share of GDP:
    - Small payment to a larger fraction of low cash-on-hand HHs
      $\rightarrow$ **higher aggregate stimulus than**
    - large payment to a smaller fraction of low cash-on-hand HHs

- Households with low cash-on-hand: $MPC_{1m} > MPC_{1y}$
  $\rightarrow$ behaviour consistent with **borrowing constraints**.

- Households with high cash-on-hand: $MPC_{1m} < MPC_{1y}$
  $\rightarrow$ behaviour consistent with **non-homothetic preferences**.

- Novel explanation for high MPC among high earners.

Thank You!

Agarwal, Sumit, and Wenlan Qian. 2014. "Consumption and Debt Response to Unanticipated Income Shocks: Evidence from a Natural Experiment in Singapore." *American Economic Review*, 104(12): 4205–30.

Aiyagari, S Rao. 1994. "Uninsured idiosyncratic risk and aggregate saving." *The Quarterly Journal of Economics*, 109(3): 659–684.

Andersen, Asger, Niels Johannesen, and Adam Sheridan. 2021. "Consumption Responses to Stock Market Gains." *Mimeographed*, University of Copenhagen.

Arnold, Martin, and James Politi. 2021. "Mind the economic gap: Europe and the US are drifting further apart." *Financial Times*.

Attanasio, Orazio, James Banks, and Sarah Tanner. 2002. "Asset holding and consumption volatility." *Journal of Political Economy*, 110: 771–792.

Blundell, Richard, Martin Browning, and Costas Meghir.
1994. "Consumer demand and the life-cycle allocation of
household expenditures." *The Review of Economic Studies*,
61(1): 57–80.

Boutros, Michael. 2021. "Bounded Intertemporal Rationality and
the Marginal Propensity to Consume." *Mimeographed*, Duke
University.

Browning, Martin, and Thomas F Crossley. 2000. "Luxuries are
easier to postpone: A proof." *Journal of political Economy*,
108(5): 1022–1026.

**Calvet, Laurent E, John Y Campbell, Francisco J Gomes,
and Paolo Sodini.** 2021. "The cross-section of household
preferences." *Mimeographed, Harvard University, London
Business School and Stockholm School of Economics*.

Christelis, Dimitris, Dimitris Georgarakos, Tullio Jappelli, Luigi Pistaferri, and Maarten van Rooij. 2019. "Asymmetric Consumption Effects of Transitory Income Shocks." *Economic Journal*, 129(622): 2322–41.

Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2020. "How Did US Consumers Use Their Stimulus Payments?" National Bureau of Economic Research.

Crossley, Thomas F, and Hamish W Low. 2011. "Is the elasticity of intertemporal substitution constant?" *Journal of the European Economic Association*, 9(1): 87–105.

Deaton, Angus. 1992. *Understanding consumption.* Oxford University Press.

Fagereng, Andreas, Martin Blomhoff Holm, and Gisle James James Natvik. 2021. "MPC heterogeneity and household balance sheets." *American Economic Journal: Macroeconomics*, Forthcoming.

Fuster, Andreas, Greg Kaplan, and Basit Zafar. 2021. "What Would You Do with $500? Spending Responses to Gains, Losses, News, and Loans." *Review of Economic Studies*, Forthcoming.

Guvenen, Fatih. 2006. "Reconciling conflicting evidence on the elasticity of intertemporal substitution: a macroeconomic perspective." *Journal of Monetary Economics*, 53(7): 1451–1472.

Jappelli, Tullio, and Luigi Pistaferri. 2014. "Fiscal Policy and MPC Heterogeneity." *American Economic Journal: Macroconomics*, 6(4): 107–36.

Jappelli, Tullio, and Luigi Pistaferri. 2020. "Reported MPC and Unobserved Heterogeneity." *American Economic Journal: Economic Policy*, 12(4): 275–97.

Johnson, David, Jonathan A Parker, and Nicholas Souleles. 2006. "Household Expenditure and the Income Tax Rebates of 2001." *American Economic Review*, 96: 1589–1610.

Kaplan, Greg, and Giovanni Luca Violante. 2014. "A Model of the Consumption Response to Fiscal Stimulus Payments." *Econometrica*, 82(4): 1199–1239.

Krueger, Dirk, and Fabrizio Perri. 2006. "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory." *The Review of Economic Studies*, 73(1): 163–193.

Kueng, Lorenz. 2018. "Excess sensitivity of high-income consumers." *The Quarterly Journal of Economics*, 133(4): 1693–1751.

Misra, Kanishka, and Paolo Surico. 2014. "Consumption, Income changes and Heterogeneity: Evidence from two fiscal stimulus programmes." *American Economic Journal: Macroconomics*, 6(4): 84–106.

Parker, Jonathan, and Nicholas Souleles. 2019. "Reported
Effects versus Revealed-Preference Estimates: Evidence from the
Propensity to Spend Tax Rebates." *American Economic Review
Insights*, 1(3): 273–90.

**Parker, Jonathan, Nicholas Souleles, David Johnson, and
Robert McClelland.** 2013. "Consumer Spending and the
Economic Stimulus Payments of 2008." *American Economic
Review*, 103(6): 2530–53.

Sahm, Claudia R, Matthew D Shapiro, and Joel Slemrod.
2010. "Household response to the 2008 tax rebate: Survey
evidence and aggregate implications." *Tax Policy and the
Economy*, 24(1): 69–110.

Fiscal Policy in the Pandemic

- Fiscal policy is at the center of the government policy response to the pandemic.

- Massive fiscal stimuli, in the US 13% of GDP, in the Euro Area 7%.

Fiscal support varies between countries

% points of GDP

Fiscal support announced since Dec 2020

Cumulative fiscal support as of Dec 2020
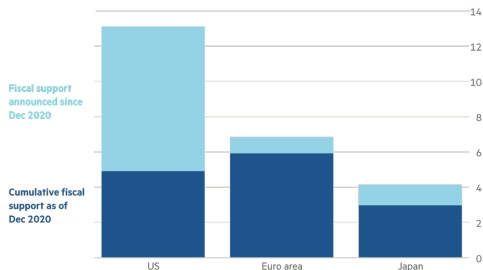
Source: OECD
© FT

Source: Arnold and Politi (2021) Back

External Validity in US Pandemic Stimulus Payments   Back

OPPORTUNITY INSIGHTS
ECONOMIC TRACKER

Effects of January 2021 Stimulus Payments on Consumer Spending

Raj Chetty, John Friedman & Michael Stepner

TOTAL MONTHLY SPENDING EFFECT OF FIRST AND SECOND STIMULUS PAYMENTS, BY HOUSEHOLD INCOME GROUP

Data Source: Affinity Solutions and ACS. Since the April stimulus payments were $1,200 for most families, we halve the values in this chart in order to make them comparable to the per-dollar effects of the recent $600 stimulus payments.

Based on these results, we estimate that **households earning more than $78,000 will spend only $105 of the $1400 stimulus check they receive** - implying that $200 billion of additional government expenditure will lead to only $15 billion of additional spending.[2] Targeting the next round of stimulus payments toward lower-income households would save substantial resources that could be used to support other programs, with minimal impact on economic activity.

A technical appendix for this analysis can be found on the Opportunity Insights website as well as more analysis on the economic effects of the COVID-19 pandemic.

1. Low- and high-income households are defined as those residing in zip codes with average household incomes below $46,000 and above $78,000 respectively.
2. This figure is calculated based on reduced spending among multi-person households with incomes greater than $78,000 and single-headed households with incomes greater than $50,000 respectively.

ABOUT OPPORTUNITY INSIGHTS

Opportunity Insights is a non-partisan, not-for-profit organization located at Harvard University that seeks to translate insights from rigorous, scientific research to policy change by harnessing the power of "big data" using an interdisciplinary approach.

Requests for additional information on the data or technical questions can be directed to info@opportunityinsights.org.   Updated as of February 4th, 2021

Survey Questions

The question asked for the one month temporary shock in the SHIW wave of 2010 is

- *Suppose you suddenly receive a reimbursement equal to how much your household earns in one month. Which part of this sum would you save and how much would you spend? Give the percentage that would be saved and the percentage what would be spent.*

The question asked for the one year temporary shock in the SHIW wave of 2012 is:

- *Suppose you receive an unexpected inheritance equal to how much your family earns in one year. In the next 12 months, how would you use this unexpected sum? Consider 100 to be the total, divide it in these three types of possible uses:*
  - *Amount saved for future expenses or to repay debts*
  - *Amount used within the year in goods or services that last in time (precious items, cars or other transport means, home renovation, furniture, dentist, et cetera) that otherwise you would not have bought or that you were waiting to buy*
  - *Amount used within the year in goods or services that do not last in time (food expenses, clothing, travel, vacations, etc) that usually you would not have bought*

Back

MPC
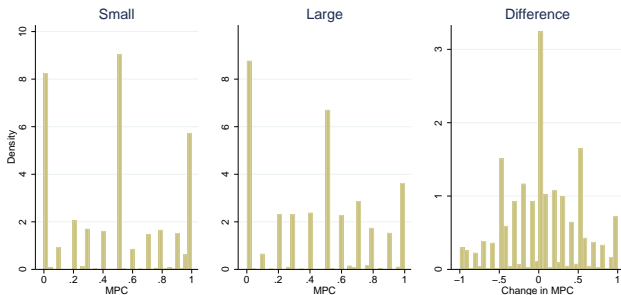
Notes: The small shock MPC (one month gain, in the first panel) comes from the 2010 SHIW wave and the large shock MPC (one year gain, in the second panel) from 2012. The difference is the small gain MPC less the large gain MPC. Only households who are present in both years are included.

Summary Statistics   Back

Summary statistics for households observed in both waves

	2010						2012			
	mean	p10	p25	p50	p75	p90	mean	p10	p25	p50
Cash-on-hand	53.72	10.00	17.80	30.82	56.55	104.00	52.62	9.00	16.16	27.41
Net disposable income	23.48	7.30	13.00	20.42	29.03	40.07	21.85	6.38	12.08	18.79
Financial assets	30.24	0.00	1.63	8.23	28.30	68.69	30.77	0.00	1.42	6.89
Male	0.57	0.00	0.00	1.00	1.00	1.00	0.54	0.00	0.00	1.00
Married	0.65	0.00	0.00	1.00	1.00	1.00	0.63	0.00	0.00	1.00
Years of education	9.35	5.00	5.00	8.00	13.00	17.00	9.52	5.00	5.00	8.00
Family size	2.53	1.00	2.00	2.00	3.00	4.00	2.47	1.00	1.00	2.00
Resident in the South	0.34	0.00	0.00	0.00	1.00	1.00	0.34	0.00	0.00	0.00
Unemployed	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
City size less then 20,000	0.28	0.00	0.00	0.00	1.00	1.00	0.28	0.00	0.00	0.00
City size 20.000-40,000	0.18	0.00	0.00	0.00	0.00	1.00	0.19	0.00	0.00	0.00
City size 40,000-500,000	0.47	0.00	0.00	0.00	1.00	1.00	0.46	0.00	0.00	0.00
City size larger than 500,000	0.07	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
Marginal Propensity to Consume	0.47	0.00	0.10	0.50	0.80	1.00	0.44	0.00	0.10	0.50
Change in MPC 2010 less 2012							0.03	-0.50	-0.30	0.00
Eating outside share							0.11	0.00	0.00	0.06
Observations	4524						4524			

Notes: The first 5 columns show 2010 data and the second 5 columns show 2012 data. Each variable is displayed with its me
25th, 75th, and 90th percentiles. The exact same households are present in both years. Cash-on-hand, net disposable income,
sets are expressed in 2010 thousands of Euros. Cash-on-hand is the sum of disposable income and financial assets. Eating ou
share of food budget spent on food away from home. Marginal Propensity to Consume in 2010 represents the MPC out of a o
transitory shock, in 2012 out of a one year income transitory shock. The change in MPC between 2010 less 2012 represents h
household would spend out of a one month shock rather than a one year shock. Back

Summary statistics for all households observed in any wave

	2010						2012			
	mean	p10	p25	p50	p75	p90	mean	p10	p25	p50
Cash-on-hand	52.85	9.51	16.98	29.16	53.80	100.96	49.94	8.51	15.14	25.6
Net disposable income	23.11	7.05	12.74	19.81	28.07	39.52	21.26	6.38	11.66	18.2
Financial assets	29.41	0.00	1.45	7.00	25.68	64.49	28.30	0.00	0.76	5.68
Male	0.55	0.00	0.00	1.00	1.00	1.00	0.55	0.00	0.00	1.00
Married	0.62	0.00	0.00	1.00	1.00	1.00	0.61	0.00	0.00	1.00
Years of education	9.28	5.00	5.00	8.00	13.00	17.00	9.39	5.00	5.00	8.00
Family size	2.49	1.00	1.00	2.00	3.00	4.00	2.46	1.00	1.00	2.00
Resident in the South	0.32	0.00	0.00	0.00	1.00	1.00	0.33	0.00	0.00	0.00
Unemployed	0.04	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
City size less then 20,000	0.26	0.00	0.00	0.00	1.00	1.00	0.25	0.00	0.00	0.00
City size 20.000-40,000	0.18	0.00	0.00	0.00	0.00	1.00	0.18	0.00	0.00	0.00
City size 40,000-500,000	0.47	0.00	0.00	0.00	1.00	1.00	0.48	0.00	0.00	0.00
City size larger than 500,000	0.09	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
Marginal Propensity to Consume	0.48	0.00	0.10	0.50	0.80	1.00	0.45	0.00	0.10	0.50
Eating outside share							0.11	0.00	0.00	0.05
Observations	7940						8138			

Notes: The first 5 columns show 2010 data and the second 5 columns show 2012 data. Each variable is displayed with its
25th, 75th, and 90th percentiles. All households in each wave are present, even if some are not observed in both waves
disposable income, and financial assets are expressed in 2010 thousands of Euros. Cash-on-hand is the sum of disposable
assets. Eating outside share is the share of food budget spent on food away from home. Marginal Propensity to Consum
the MPC out of a one month income transitory shock, in 2012 out of a one year income transitory shock. Back

MPC heterogeneity by cash-on-hand and shock size

VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff
I cash-on-hand decile	0.745***	0.394***	0.229***	0.651***	0.368***	0.184***
	(0.027)	(0.025)	(0.023)	(0.030)	(0.028)	(0.027)
II cash-on-hand decile	0.589***	0.393***	0.130***	0.546***	0.375***	0.116***
	(0.026)	(0.024)	(0.023)	(0.027)	(0.025)	(0.024)
III cash-on-hand decile	0.534***	0.359***	0.115***	0.519***	0.357***	0.109***
	(0.027)	(0.025)	(0.023)	(0.026)	(0.025)	(0.023)
IV cash-on-hand decile	0.515***	0.390***	0.086***	0.506***	0.381***	0.086***
	(0.025)	(0.024)	(0.022)	(0.025)	(0.024)	(0.022)
V cash-on-hand decile	0.499***	0.381***	0.080***	0.500***	0.381***	0.081***
	(0.026)	(0.024)	(0.022)	(0.025)	(0.024)	(0.022)
VI cash-on-hand decile	0.437***	0.369***	0.050**	0.440***	0.375***	0.049**
	(0.025)	(0.023)	(0.022)	(0.024)	(0.023)	(0.022)
VII cash-on-hand decile	0.365***	0.427***	-0.037*	0.389***	0.432***	-0.025
	(0.025)	(0.023)	(0.022)	(0.025)	(0.023)	(0.022)
VIII cash-on-hand decile	0.322***	0.412***	-0.058***	0.356***	0.425***	-0.044**
	(0.025)	(0.023)	(0.021)	(0.024)	(0.023)	(0.022)
IX cash-on-hand decile	0.289***	0.423***	-0.087***	0.333***	0.438***	-0.070***
	(0.025)	(0.023)	(0.021)	(0.025)	(0.023)	(0.022)
X cash-on-hand decile	0.270***	0.406***	-0.082***	0.306***	0.415***	-0.069***
	(0.025)	(0.023)	(0.021)	(0.026)	(0.025)	(0.024)
Age in[18,30]				-0.003	0.003	0.002
				(0.056)	(0.053)	(0.050)
Age in[30,45]				0.023	-0.018	0.032
				(0.025)	(0.024)	(0.022)
Age in[45,60]				0.067***	-0.019	0.057***
				(0.021)	(0.019)	(0.018)
Male				0.000	-0.016	0.009
				(0.018)	(0.017)	(0.016)
Married				-0.010	-0.016	0.009
				(0.022)	(0.021)	(0.019)
Years of education				0.005**	0.009***	-0.002
				(0.002)	(0.002)	(0.002)
Family size				0.003	-0.003	0.005
				(0.009)	(0.008)	(0.008)
Resident in the South				0.249***	0.137***	0.079***
				(0.018)	(0.017)	(0.016)
Unemployed				0.036	-0.008	0.025
				(0.048)	(0.045)	(0.043)
City size less than 20,000				-0.161***	0.122***	-0.188***
				(0.034)	(0.032)	(0.030)
City size 20.000-40,000				-0.162***	0.132***	-0.196***
				(0.035)	(0.033)	(0.031)
City size 40,000-500,000				-0.098***	0.091***	-0.128***
				(0.032)	(0.030)	(0.028)
Observations	4,524	4,524	4,524	4,524	4,524	4,524

Back

Notes: Tobit regression. Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. The last column also adds the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. The left hand side in columns 1 and 4 is the MPC out of a small (one month) shock, measured in the 2010 survey; in column 2 and 5 is the MPC out of large (one year) shock, measured in the 2012 survey; in columns 3 and 6 is the difference in MPCs, the MPC out of a small shock less the MPC out of a large shock. The sample consists of households present in both surveys.

MPC and non-necessity consumption

VARIABLES	(1) Small	(2) Large	(3) Small	(4) Large	(5) Small	(6) Large
Eating outside share	-0.002	0.186***	0.228***	0.173***	0.116*	0.126**
	(0.060)	(0.054)	(0.060)	(0.055)	(0.061)	(0.058)
I cash-on-hand decile			0.755***	0.402***	0.675***	0.376***
			(0.027)	(0.025)	(0.031)	(0.029)
II cash-on-hand decile			0.597***	0.399***	0.556***	0.380***
			(0.026)	(0.024)	(0.027)	(0.026)
III cash-on-hand decile			0.542***	0.366***	0.527***	0.362***
			(0.027)	(0.025)	(0.027)	(0.025)
IV cash-on-hand decile			0.521***	0.395***	0.505***	0.387***
			(0.025)	(0.024)	(0.025)	(0.024)
V cash-on-hand decile			0.502***	0.383***	0.503***	0.384***
			(0.026)	(0.024)	(0.025)	(0.024)
VI cash-on-hand decile			0.437***	0.370***	0.444***	0.374***
			(0.025)	(0.023)	(0.024)	(0.023)
VII cash-on-hand decile			0.361***	0.424***	0.380***	0.433***
			(0.025)	(0.023)	(0.025)	(0.023)
VIII cash-on-hand decile			0.315***	0.407***	0.347***	0.421***
			(0.025)	(0.023)	(0.025)	(0.023)
IX cash-on-hand decile			0.281***	0.417***	0.322***	0.431***
			(0.025)	(0.023)	(0.025)	(0.024)
X cash-on-hand decile			0.258***	0.396***	0.292***	0.401***
			(0.025)	(0.023)	(0.027)	(0.026)
Observations	4,524	4,524	4,524	4,524	4,524	4,524
Demographic Controls	NO	NO	NO	NO	YES	YES

Back

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included in columns 3 to 6. Demographic controls are: age in[18,30], age in(30,45], age in(45,60], male, married, years of education, family size, resident in the South, unemployed, and the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. The left hand side in columns 1, 3, and 5 is the MPC out of a small (one month) shock, measured in the 2010 survey; in columns 2, 4, and 6 is the MPC out of large (one year) shock, measured in the 2012 survey. The sample consists of households present in both surveys.

MPC and non-necessity consumption [Back]
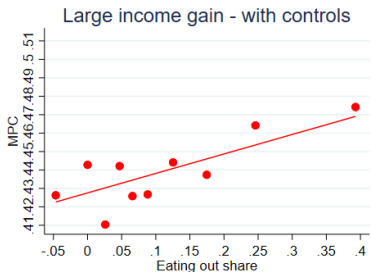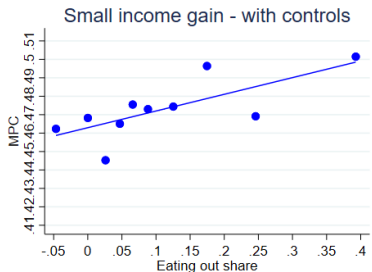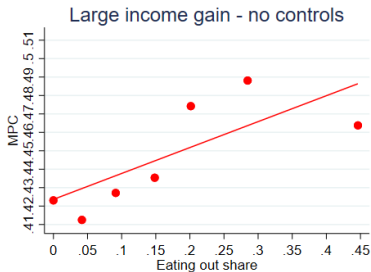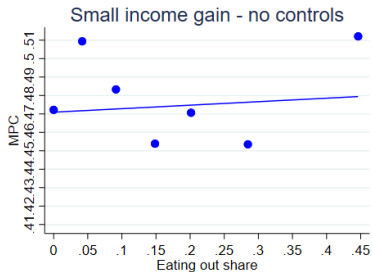
Further empirical results and sensitivity Back

- Results are even stronger for the North of Italy. Regional Heterogeneity
- Results hold both at the extensive margin $P(MPC > 0)$ and at the intensive margin $\mathbb{E}(MPC|MPC > 0)$. Extensive-Intensive Margin
- MPC on durables and non-durables exhibit a similar behavior as overall MPC. Durables and Non-Durables MPC
- Restrict the sample to those who received a score no lower than 8 (on a scale from 1 to 10) by the interviewer about their understanding of the questions. Understanding the questions
- Focus on households who answered correctly at least two of the three questions that they were asked about basic understanding of finance. Financial literacy
- Exclude debtors. Household debt
- Run OLS with a standard errors correction for heteroskedasticity. Errors non-normality
- Extend sample to all households present in each wave (2010 and 2012). Selection 1
- Run with 2016 data for small shock. Selection 2

Regional heterogeneity
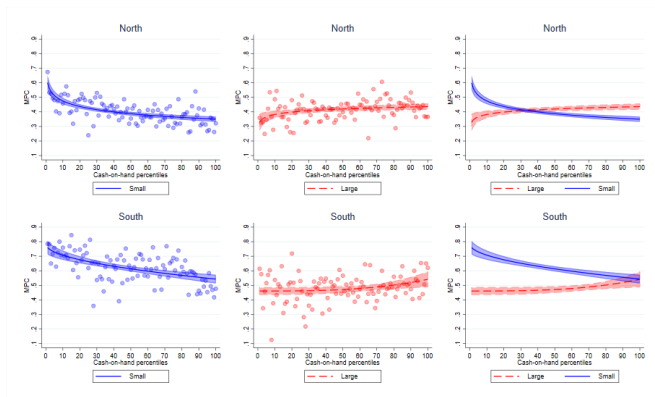
Notes: The plot shows the MPC by each regional cash-on-hand percentile in 2010 and fit a fractional polynomial with 95% confidence bands based on the percentile bins. Cash-on-hand is the sum of disposable income and financial assets. The first column plots the MPC out of a small gain, the second one out of a large gain, the third one plots both fractional polynomials together. The first row plots the results for the northern part of the country and the second row for the southern one. Back   Regression Results

Regional heterogeneity Tobit regression results

| VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff	(7) Small	(8) Large	(9) Diff	(10) Small	(11) Large	(12) Diff
I Regional cash-on-hand decile	0.486***	0.273***	0.134***	0.495***	0.287***	0.136***	0.839***	0.490***	0.239***	0.821***	0.515***	0.202***
	(0.035)	(0.032)	(0.030)	(0.037)	(0.034)	(0.033)	(0.040)	(0.040)	(0.037)	(0.044)	(0.044)	(0.042)
II Regional cash-on-hand decile	0.429***	0.329***	0.063**	0.456***	0.341***	0.076**	0.780***	0.472***	0.210***	0.776***	0.489***	0.196***
	(0.036)	(0.033)	(0.030)	(0.036)	(0.034)	(0.031)	(0.040)	(0.040)	(0.038)	(0.042)	(0.041)	(0.039)
III Regional cash-on-hand decile	0.404***	0.323***	0.051*	0.425***	0.332***	0.061**	0.711***	0.358***	0.249***	0.718***	0.370***	0.248***
	(0.034)	(0.031)	(0.029)	(0.034)	(0.031)	(0.029)	(0.038)	(0.038)	(0.036)	(0.039)	(0.039)	(0.037)
IV Regional cash-on-hand decile	0.391***	0.348***	0.027	0.409***	0.351***	0.037	0.639***	0.460***	0.128***	0.658***	0.463***	0.140***
	(0.034)	(0.031)	(0.029)	(0.033)	(0.031)	(0.029)	(0.037)	(0.037)	(0.035)	(0.037)	(0.037)	(0.035)
V Regional cash-on-hand decile	0.315***	0.325***	-0.001	0.319***	0.333***	-0.003	0.657***	0.450***	0.146***	0.665***	0.456***	0.148***
	(0.033)	(0.030)	(0.028)	(0.032)	(0.030)	(0.028)	(0.039)	(0.039)	(0.037)	(0.038)	(0.038)	(0.036)
VI Regional cash-on-hand decile	0.291***	0.378***	-0.052*	0.295***	0.379***	-0.050*	0.674***	0.444***	0.168***	0.684***	0.434***	0.182***
	(0.033)	(0.029)	(0.028)	(0.032)	(0.029)	(0.027)	(0.039)	(0.036)	(0.034)	(0.035)	(0.036)	(0.034)
VII Regional cash-on-hand decile	0.283***	0.387***	-0.062**	0.281***	0.386***	-0.063**	0.646***	0.456***	0.139***	0.645***	0.463***	0.131***
	(0.032)	(0.029)	(0.027)	(0.031)	(0.029)	(0.027)	(0.037)	(0.038)	(0.035)	(0.037)	(0.038)	(0.035)
VIII Regional cash-on-hand decile	0.275***	0.428***	-0.101***	0.259***	0.423***	-0.110***	0.693***	0.482***	0.163***	0.691***	0.472***	0.169***
	(0.032)	(0.028)	(0.027)	(0.032)	(0.029)	(0.027)	(0.037)	(0.037)	(0.035)	(0.037)	(0.037)	(0.035)
IX Regional cash-on-hand decile	0.305***	0.422***	-0.072***	0.298***	0.413***	-0.074***	0.554***	0.484***	0.052	0.548***	0.465***	0.061*
	(0.031)	(0.028)	(0.026)	(0.031)	(0.029)	(0.027)	(0.035)	(0.035)	(0.033)	(0.035)	(0.036)	(0.034)
X Regional cash-on-hand decile	0.183***	0.351***	-0.096***	0.141***	0.328***	-0.111***	0.474***	0.534***	-0.042	0.463***	0.513***	-0.033
	(0.033)	(0.029)	(0.027)	(0.035)	(0.031)	(0.029)	(0.036)	(0.037)	(0.035)	(0.038)	(0.039)	(0.038)
Age in [18,30]				0.012	0.047	-0.023				0.002	-0.083	0.077
				(0.073)	(0.066)	(0.063)				(0.086)	(0.087)	(0.081)
Age in [30,45]				0.041	-0.003	0.037				-0.028	-0.067*	0.028
				(0.032)	(0.030)	(0.028)				(0.039)	(0.040)	(0.037)
Age in [45,60]				0.065**	0.002	0.042*				0.070**	-0.067**	0.092***
				(0.027)	(0.025)	(0.023)				(0.031)	(0.032)	(0.030)
Male				-0.016	-0.012	-0.005				0.020	-0.014	0.023
				(0.023)	(0.021)	(0.020)				(0.027)	(0.027)	(0.026)
Married				0.034	-0.006	0.032				-0.080**	-0.039	-0.028
				(0.029)	(0.026)	(0.024)				(0.033)	(0.033)	(0.031)
Years of education				0.008***	0.010***	-0.001				0.001	0.008**	-0.005
				(0.003)	(0.003)	(0.003)				(0.003)	(0.003)	(0.003)
Family size				-0.020*	-0.020*	0.002				0.033***	0.023*	0.010
				(0.012)	(0.011)	(0.010)				(0.012)	(0.012)	(0.012)
Unemployed				0.042	-0.007	0.017				0.065	-0.019	0.059
				(0.076)	(0.069)	(0.065)				(0.058)	(0.057)	(0.054)
City size less then 20,000				-0.240***	0.039	-0.182***				-0.046	0.272***	-0.213***
				(0.045)	(0.041)	(0.038)				(0.049)	(0.051)	(0.047)
City size 20,000-40,000				-0.285***	0.081*	-0.242***				0.060	0.209***	-0.087*
				(0.046)	(0.042)	(0.040)				(0.053)	(0.054)	(0.050)
City size 40,000-500,000				-0.198***	0.013	-0.134***				0.058	0.227***	-0.121***
				(0.043)	(0.039)	(0.037)				(0.046)	(0.048)	(0.044)
Observations	2,983	2,983	2,983	2,983	2,983	2,983	1,541	1,541	1,541	1,541	1,541	1,541
Area	North	North	North	North	North	North	South	South	South	South	South	South

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. The columns 6 and 12 also add the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. Columns 1 to 6 pertain to household living in northern regions; column 7 to 12 pertain to household living in southern regions. The left hand side in columns 1, 4, 7, and 10 is the MPC out of a small (one month) shock, measured in the 2010 survey; in column 2, 5, 8, and 11 is the MPC out of large (one year) shock, measured in the 2012 survey; in columns 3, 6, 9, and 12 is the difference in MPCs, the MPC out of a small shock less the MPC out of a large shock. The sample consists of households present in both surveys. Back

Regional heterogeneity non-necessity Tobit regression results

VARIABLES	(1) Small	(2) Large	(3) Small	(4) Large	(5) Small	(6) Large	(7) Small	(8) Large	(9) Small	(10) Large	(11) Small	(12) Large
Eating outside share	0.168**	0.373***	0.344***	0.335***	0.285***	0.301***	-0.225***	-0.127	-0.121	-0.160*	-0.183**	-0.159*
	(0.076)	(0.068)	(0.078)	(0.070)	(0.082)	(0.074)	(0.086)	(0.086)	(0.085)	(0.087)	(0.090)	(0.092)
I Regional cash-on-hand decile			0.505***	0.291***	0.524***	0.302***			0.837***	0.486***	0.836***	0.523***
			(0.035)	(0.032)	(0.038)	(0.035)			(0.040)	(0.040)	(0.045)	(0.045)
II Regional cash-on-hand decile			0.449***	0.349***	0.477***	0.359***			0.775***	0.466***	0.777***	0.487***
			(0.036)	(0.033)	(0.037)	(0.034)			(0.041)	(0.040)	(0.042)	(0.042)
III Regional cash-on-hand decile			0.418***	0.337***	0.439***	0.344***			0.710***	0.356***	0.728***	0.374***
			(0.034)	(0.031)	(0.034)	(0.031)			(0.038)	(0.038)	(0.039)	(0.040)
IV Regional cash-on-hand decile			0.400***	0.355***	0.414***	0.360***			0.634***	0.454***	0.653***	0.465***
			(0.033)	(0.031)	(0.034)	(0.031)			(0.037)	(0.037)	(0.037)	(0.038)
V Regional cash-on-hand decile			0.317***	0.328***	0.326***	0.333***			0.658***	0.451***	0.666***	0.464***
			(0.032)	(0.029)	(0.033)	(0.030)			(0.039)	(0.039)	(0.038)	(0.039)
VI Regional cash-on-hand decile			0.287***	0.375***	0.288***	0.378***			0.674***	0.444***	0.675***	0.438***
			(0.032)	(0.029)	(0.032)	(0.029)			(0.035)	(0.036)	(0.035)	(0.036)
VII Regional cash-on-hand decile			0.276***	0.380***	0.271***	0.381***			0.647***	0.458***	0.645***	0.452***
			(0.032)	(0.029)	(0.032)	(0.029)			(0.037)	(0.038)	(0.037)	(0.038)
VIII Regional cash-on-hand decile			0.266***	0.419***	0.253***	0.413***			0.693***	0.483***	0.683***	0.468***
			(0.032)	(0.028)	(0.032)	(0.029)			(0.036)	(0.037)	(0.037)	(0.038)
IX Regional cash-on-hand decile			0.294***	0.410***	0.276***	0.403***			0.557***	0.488***	0.542***	0.467***
			(0.031)	(0.028)	(0.032)	(0.029)			(0.035)	(0.035)	(0.036)	(0.036)
X Regional cash-on-hand decile			0.164***	0.331***	0.125***	0.311***			0.480***	0.543***	0.464***	0.502***
			(0.033)	(0.029)	(0.036)	(0.032)			(0.036)	(0.037)	(0.039)	(0.041)
Observations	2,983	2,983	2,983	2,983	2,983	2,983	1,541	1,541	1,541	1,541	1,541	1,541
Demographic Controls	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	YES	YES
Area	North	North	North	North	North	North	South	South	South	South	South	South

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. Demographic controls are: age in[18,30], age in[30,45], age in[45,60], male, married, years of education, family size, unemployed, and the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. Columns 1 to 6 pertain to household living in northern regions; column 7 to 12 pertain to household living in southern regions. The left hand side in odd columns is the MPC out of a small (one month) shock, measured in the 2010 survey; in even columns is the MPC out of large (one year) shock, measured in the 2012 survey. The sample consists of households present in both surveys. Back
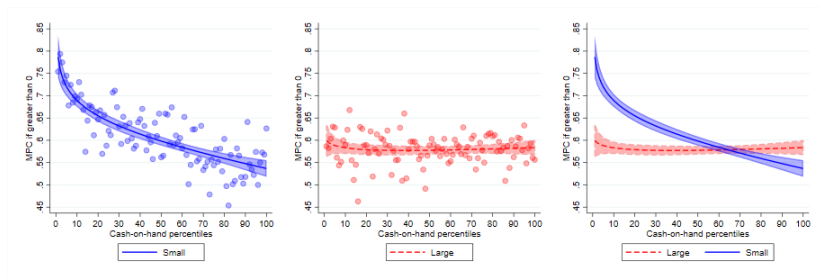
Extensive Margins
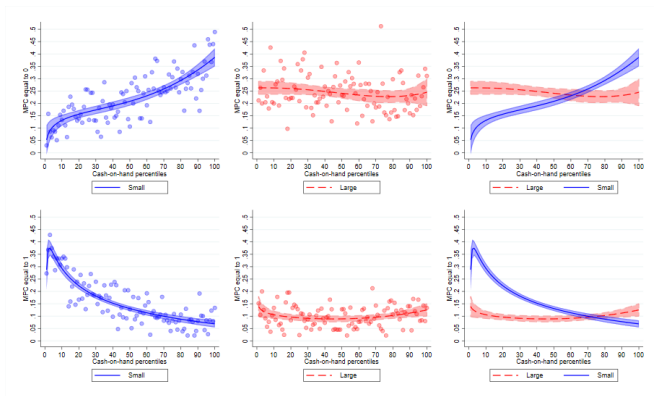
Notes: The plot shows the proportion of MPC equal to 0 and 1 by each cash-on-hand percentile in 2010 and fit a fractional polynomial with 95% confidence bands based on the percentile bins. Cash-on-hand is the sum of disposable income and financial assets. The first column plots the MPC out of a small gain, the second one out of a large gain, the third one plots both fractional polynomials together. The first row plots the results for the fraction of MPCs being equal to 0 and the second row for being equal to 1. The sample consists of households present in both surveys. Back

Intensive Margin

Notes: The plot shows the average MPC conditioned on the MPC being strictly greater than 0 by each cash-on-hand percentile in 2010 and fit a fractional polynomial with 95% confidence bands based on the percentile bins. Cash-on-hand is the sum of disposable income and financial assets. The first column plots the MPC out of a small gain, the second one out of a large gain, the third one plots both fractional polynomials together. The sample consists of households present in both surveys. Back

Durables and Non-Durables MPC
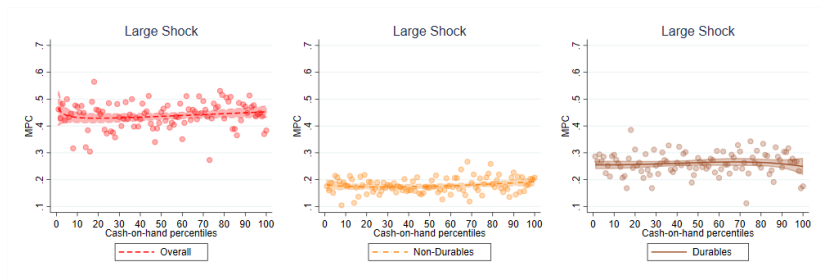
Notes: The figure shows the MPCs out of a large gain along the cash-on-hand distribution in 2010. Cash-on-hand is the sum of disposable income and financial assets. We fit a fractional polynomial with 95% confidence bands based on the percentile bins. The first panel plots the MPC for total expenditure, the second chart displays the MPC for non-durable consumption only, the third column reports the MPC for durable expenditure only. The sample consists of households present in both surveys. Back

Durables and Non-Durables MPC

Figure: Probability of spending on durables and cash-on-hand
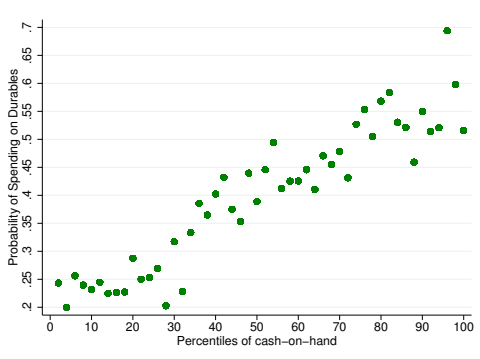
Notes: The plot shows 50 equal sized bins of cash-on-hand in 2010 and presents the probability for any durable
consumption spending share for each bin. Each bin corresponds to 2 percentiles. The probability of spending on
durables is the probability that we observe a positive spending on durable goods and services, measured in 2010.
Cash-on-hand is the sum of disposable income and financial assets.

Tobit regression results split by durable and non-durables

VARIABLES	(1) Total	(2) Non-Dur	(3) Dur	(4) DiffDND	(5) Total	(6) Non-Dur	(7) Dur	(8) DiffDND
Spending on durables	0.055***	0.025**	0.046***	0.018*	0.058***	0.022*	0.046***	0.019*
	(0.015)	(0.011)	(0.012)	(0.011)	(0.016)	(0.011)	(0.012)	(0.011)
I cash-on-hand decile					0.379***	0.055***	0.173***	0.087***
					(0.029)	(0.021)	(0.022)	(0.021)
II cash-on-hand decile					0.383***	0.059***	0.180***	0.078***
					(0.026)	(0.019)	(0.020)	(0.018)
III cash-on-hand decile					0.366***	0.069***	0.161***	0.068***
					(0.025)	(0.019)	(0.020)	(0.018)
IV cash-on-hand decile					0.387***	0.068***	0.195***	0.093***
					(0.024)	(0.017)	(0.018)	(0.017)
V cash-on-hand decile					0.383***	0.065***	0.198***	0.095***
					(0.024)	(0.018)	(0.018)	(0.017)
VI cash-on-hand decile					0.372***	0.074***	0.183***	0.080***
					(0.023)	(0.017)	(0.018)	(0.017)
VII cash-on-hand decile					0.432***	0.108***	0.216***	0.088***
					(0.023)	(0.017)	(0.018)	(0.017)
VIII cash-on-hand decile					0.419***	0.117***	0.195***	0.060***
					(0.023)	(0.017)	(0.018)	(0.017)
IX cash-on-hand decile					0.430***	0.106***	0.221***	0.094***
					(0.024)	(0.017)	(0.018)	(0.017)
X cash-on-hand decile					0.400***	0.096***	0.197***	0.087***
					(0.025)	(0.018)	(0.020)	(0.018)
Observations	4,524	4,524	4,524	4,524	4,524	4,524	4,524	4,524
Demographic Controls	NO	NO	NO	NO	YES	YES	YES	YES

Notes: Standard errors in parentheses. P-values correspond to: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included in columns 5 to 8. Demographic controls are: age in[18,30], age in(30,45], age in(45,60], male, married, years of education, family size, resident in the South, unemployed, and the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. The left hand side variables all pertain to the MPC out of a large (one year) shock. For columns 1 and 5 the MPC is for total expenditures; in columns 2 and 6 is the MPC for non-durable expenditures; in columns 3 and 7 is the MPC for durables expenditures; and finally, in columns 4 and 8 the LHS is the difference in MPC for durable less the MPC for non-durable expenditures. The sample consists of households present in both surveys. Back

Understanding the Question, Financial Literacy, No Debtors

VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff	(7) Small	(8) Large	(9) Diff
I cash-on-hand decile	0.612***	0.342***	0.172***	0.665***	0.375***	0.195***	0.663***	0.362***	0.195***
	(0.042)	(0.038)	(0.037)	(0.040)	(0.038)	(0.036)	(0.033)	(0.033)	(0.031)
II cash-on-hand decile	0.567***	0.326***	0.157***	0.572***	0.350***	0.152***	0.566***	0.386***	0.120***
	(0.039)	(0.036)	(0.034)	(0.038)	(0.036)	(0.034)	(0.029)	(0.029)	(0.027)
III cash-on-hand decile	0.497***	0.330***	0.113***	0.470***	0.334***	0.089***	0.562***	0.367***	0.127***
	(0.036)	(0.033)	(0.032)	(0.034)	(0.032)	(0.029)	(0.029)	(0.030)	(0.027)
IV cash-on-hand decile	0.497***	0.379***	0.085***	0.476***	0.407***	0.048*	0.542***	0.386***	0.100***
	(0.032)	(0.029)	(0.028)	(0.031)	(0.029)	(0.028)	(0.028)	(0.029)	(0.026)
V cash-on-hand decile	0.482***	0.385***	0.067**	0.473***	0.347***	0.091***	0.525***	0.450***	0.048*
	(0.030)	(0.028)	(0.027)	(0.030)	(0.029)	(0.027)	(0.029)	(0.029)	(0.027)
VI cash-on-hand decile	0.401***	0.371***	0.027	0.418***	0.373***	0.036	0.465***	0.397***	0.051*
	(0.029)	(0.027)	(0.025)	(0.028)	(0.027)	(0.025)	(0.028)	(0.028)	(0.026)
VII cash-on-hand decile	0.401***	0.415***	-0.000	0.392***	0.398***	-0.003	0.416***	0.435***	-0.010
	(0.028)	(0.026)	(0.025)	(0.028)	(0.026)	(0.025)	(0.028)	(0.028)	(0.026)
VIII cash-on-hand decile	0.348***	0.433***	-0.053**	0.345***	0.421***	-0.048**	0.359***	0.412***	-0.043*
	(0.027)	(0.025)	(0.024)	(0.027)	(0.025)	(0.024)	(0.027)	(0.027)	(0.025)
IX cash-on-hand decile	0.311***	0.444***	-0.085***	0.344***	0.418***	-0.050**	0.347***	0.469***	-0.089***
	(0.027)	(0.025)	(0.024)	(0.027)	(0.025)	(0.024)	(0.028)	(0.028)	(0.026)
X cash-on-hand decile	0.295***	0.415***	-0.072***	0.302***	0.405***	-0.066***	0.319***	0.399***	-0.054*
	(0.029)	(0.026)	(0.025)	(0.028)	(0.026)	(0.025)	(0.029)	(0.029)	(0.028)
Age in[18,30]	0.003	0.031	-0.018	-0.001	0.014	-0.001	0.092	-0.016	0.069
	(0.068)	(0.062)	(0.059)	(0.067)	(0.063)	(0.060)	(0.070)	(0.072)	(0.066)
Age in[30,45]	0.020	-0.017	0.031	0.026	-0.030	0.042	0.084***	0.026	0.042
	(0.030)	(0.027)	(0.026)	(0.029)	(0.028)	(0.026)	(0.030)	(0.030)	(0.028)
Age in[45,60]	0.059**	-0.015	0.050**	0.061**	-0.028	0.060***	0.104***	0.008	0.063***
	(0.025)	(0.022)	(0.021)	(0.024)	(0.023)	(0.021)	(0.023)	(0.023)	(0.021)
Male	-0.011	-0.024	0.004	-0.007	-0.014	0.002	-0.012	-0.015	0.001
	(0.021)	(0.020)	(0.019)	(0.021)	(0.020)	(0.019)	(0.020)	(0.020)	(0.018)
Married	-0.005	-0.023	0.017	0.020	-0.023	0.032	0.006	0.000	0.008
	(0.027)	(0.024)	(0.023)	(0.026)	(0.025)	(0.023)	(0.025)	(0.025)	(0.023)
Years of education	0.005*	0.008***	-0.002	0.002	0.008***	-0.003	0.007***	0.010***	-0.001
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Family size	-0.006	-0.006	0.002	-0.011	-0.009	0.001	-0.002	-0.009	0.006
	(0.011)	(0.010)	(0.009)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.010)
Resident in the South	0.265***	0.146***	0.078***	0.271***	0.131***	0.098***	0.249***	0.142***	0.081***
	(0.023)	(0.021)	(0.020)	(0.022)	(0.021)	(0.020)	(0.020)	(0.021)	(0.019)
Unemployed	0.010	0.015	-0.025	-0.028	-0.036	0.004	-0.033	-0.002	-0.033
	(0.065)	(0.058)	(0.056)	(0.057)	(0.051)	(0.051)	(0.058)	(0.057)	(0.053)
City size less then 20,000	-0.137***	0.149***	-0.191***	-0.155***	0.104***	-0.167***	-0.161***	0.156***	-0.212***
	(0.039)	(0.036)	(0.034)	(0.039)	(0.037)	(0.035)	(0.038)	(0.039)	(0.035)
City size 20,000-40,000	-0.146***	0.151***	-0.191***	-0.137***	0.138***	-0.180***	-0.158***	0.169***	-0.224***
	(0.041)	(0.038)	(0.036)	(0.041)	(0.039)	(0.037)	(0.040)	(0.040)	(0.037)
City size 40,000-500,000	-0.101***	0.090***	-0.129***	-0.115***	0.051	-0.107***	-0.092**	0.117***	-0.146***
	(0.037)	(0.034)	(0.032)	(0.037)	(0.035)	(0.033)	(0.036)	(0.037)	(0.034)
Observations	3,266	3,266	3,266	3,151	3,151	3,151	3,351	3,351	3,351
Conditioning on Understanding Questions	YES	YES	YES	NO	NO	NO	NO	NO	NO
Conditioning on High Financial Literacy	NO	NO	NO	YES	YES	YES	NO	NO	NO
Conditioning on No Debt	NO	NO	NO	NO	NO	NO	YES	YES	YES

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. Columns 3, 6, and 9 also adds the real log change in household cash-on-hand between 2012 and 2010. All other controls are measured in 2010. The left hand side in columns 1, 4, and 7 is the MPC out of a small (one month) shock, measured in the 2010 survey; in column 2, 5, and 8 is the MPC out of large (one year) shock; in columns 3, 6, and 9 is the difference in MPCs. The MPC out of a small shock less the MPC out of a large shock. The sample consists of households present in both surveys. Columns 1 to 3 condition only on households who the interviewer deemed that understood very well the survey overall (grade 8 or higher in a scale that goes from 1 to 10). Columns 4 to 6 condition only on households who are financially literate (answered correctly at least 2 of the 3 questions asked to gauge it). Columns 7 to 9 condition on household who do not have any debt. Back

OLS Robust Results

VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff
I cash-on-hand decile	0.655***	0.439***	0.215***	0.591***	0.423***	0.172***
	(0.017)	(0.017)	(0.021)	(0.019)	(0.019)	(0.026)
II cash-on-hand decile	0.559***	0.436***	0.123***	0.530***	0.423***	0.109***
	(0.017)	(0.016)	(0.021)	(0.017)	(0.017)	(0.022)
III cash-on-hand decile	0.524***	0.418***	0.106***	0.514***	0.416***	0.099***
	(0.018)	(0.017)	(0.023)	(0.017)	(0.017)	(0.023)
IV cash-on-hand decile	0.514***	0.435***	0.079***	0.508***	0.428***	0.080***
	(0.016)	(0.015)	(0.021)	(0.016)	(0.015)	(0.021)
V cash-on-hand decile	0.506***	0.429***	0.077***	0.507***	0.429***	0.079***
	(0.016)	(0.016)	(0.021)	(0.016)	(0.015)	(0.021)
VI cash-on-hand decile	0.471***	0.425***	0.046**	0.474***	0.429***	0.045**
	(0.016)	(0.015)	(0.020)	(0.015)	(0.015)	(0.020)
VII cash-on-hand decile	0.421***	0.458***	-0.037*	0.437***	0.462***	-0.026
	(0.016)	(0.015)	(0.020)	(0.016)	(0.015)	(0.020)
VIII cash-on-hand decile	0.393***	0.452***	-0.058***	0.417***	0.461***	-0.045**
	(0.015)	(0.015)	(0.021)	(0.015)	(0.015)	(0.021)
IX cash-on-hand decile	0.369***	0.453***	-0.083***	0.399***	0.463***	-0.066***
	(0.015)	(0.015)	(0.020)	(0.015)	(0.016)	(0.021)
X cash-on-hand decile	0.365***	0.444***	-0.080***	0.387***	0.451***	-0.067***
	(0.016)	(0.015)	(0.021)	(0.017)	(0.017)	(0.023)
Age in[18,30]				0.003	0.005	-0.003
				(0.034)	(0.034)	(0.048)
Age in[30,45]				0.017	-0.014	0.030
				(0.016)	(0.016)	(0.021)
Age in[45,60]				0.042***	-0.013	0.054***
				(0.013)	(0.013)	(0.017)
Male				-0.003	-0.010	0.007
				(0.011)	(0.011)	(0.015)
Married				-0.003	-0.011	0.008
				(0.014)	(0.014)	(0.018)
Years of education				0.004***	0.006***	-0.002
				(0.001)	(0.001)	(0.002)
Family size				0.003	-0.003	0.006
				(0.005)	(0.005)	(0.007)
Resident in the South				0.170***	0.092***	0.078***
				(0.012)	(0.011)	(0.015)
Unemployed				0.020	-0.008	0.028
				(0.029)	(0.028)	(0.038)
City size less then 20,000				-0.096***	0.083***	-0.178***
				(0.021)	(0.020)	(0.029)
City size 20.000-40,000				-0.098***	0.086***	-0.183***
				(0.022)	(0.021)	(0.030)
City size 40,000-500,000				-0.059***	0.061***	-0.120***
				(0.020)	(0.019)	(0.027)
Change in Cash on Hand						-0.000
						(0.000)
Observations	4,524	4,524	4,524	4,524	4,524	4,524
R-squared	0.662	0.635	0.048	0.684	0.643	0.070

Notes: Robust standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All regressions are run with OLS. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. All controls are measured in 2010 except Change in Cash on Hand, which is the real log change in household cash-on-hand between 2012 and 2010. The left hand side in columns 1 and 4 is the MPC out of a small (one month) shock, measured in the 2010 survey; in columns 2 and 5 is the MPC out of large (one year) shock, measured in the 2012 survey; in columns 3 and 6 is the difference in MPCs, the MPC out of a small shock less the MPC out of a large shock. The sample consists of households present in both surveys. Back

Extended Sample

VARIABLES	(1) Small	(2) Large	(3) Small	(4) Large
I cash-on-hand decile	0.742***	0.423***	0.648***	0.412***
	(0.020)	(0.018)	(0.022)	(0.020)
II cash-on-hand decile	0.580***	0.396***	0.544***	0.391***
	(0.020)	(0.018)	(0.020)	(0.019)
III cash-on-hand decile	0.523***	0.408***	0.514***	0.413***
	(0.020)	(0.018)	(0.019)	(0.018)
IV cash-on-hand decile	0.484***	0.409***	0.480***	0.410***
	(0.019)	(0.018)	(0.019)	(0.018)
V cash-on-hand decile	0.489***	0.410***	0.489***	0.413***
	(0.019)	(0.018)	(0.019)	(0.018)
VI cash-on-hand decile	0.432***	0.408***	0.440***	0.411***
	(0.020)	(0.018)	(0.019)	(0.018)
VII cash-on-hand decile	0.366***	0.413***	0.393***	0.415***
	(0.020)	(0.018)	(0.019)	(0.018)
VIII cash-on-hand decile	0.320***	0.396***	0.364***	0.405***
	(0.020)	(0.018)	(0.019)	(0.018)
IX cash-on-hand decile	0.279***	0.431***	0.326***	0.432***
	(0.020)	(0.018)	(0.020)	(0.019)
X cash-on-hand decile	0.276***	0.393***	0.311***	0.390***
	(0.020)	(0.018)	(0.021)	(0.020)
Age in[18,30]			0.011	0.023
			(0.036)	(0.038)
Age in(30,45]			0.036*	-0.025
			(0.019)	(0.018)
Age in(45,60]			0.044***	-0.030**
			(0.016)	(0.015)
Male			0.015	-0.001
			(0.013)	(0.013)
Married			-0.037**	-0.026*
			(0.016)	(0.015)
Years of education			0.006***	0.010***
			(0.002)	(0.002)
Family size			0.008	-0.006
			(0.007)	(0.006)
Resident in the South			0.271***	0.129***
			(0.014)	(0.013)
Unemployed			0.021	-0.009
			(0.036)	(0.030)
City size less then 20,000			-0.188***	0.039*
			(0.023)	(0.023)
City size 20,000-40,000			-0.170***	0.022
			(0.024)	(0.024)
City size 40,000-500,000			-0.119***	0.025
			(0.022)	(0.021)
Observations	7,853	8,031	7,853	8,031

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, **
p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-
hand is the sum of disposable income and financial assets. No constant is included.
Controls are measured in 2010 in columns 1 and 3 and in 2012 in columns 2 and 5.
The left hand side in columns 1 and 3 is the MPC out of a small (one month) shock,
measured in the 2010 survey; in column 2 and 4 is the MPC out of large (one year)
shock, measured in the 2012 survey. The sample consists of all households present in
either survey for whom there is data, it does not condition to households present in
both surveys as in the baseline results. Back

2016 Baseline Results

VARIABLES	(1) Small	(2) Large	(3) Diff	(4) Small	(5) Large	(6) Diff
I cash-on-hand decile	0.626***	0.451***	0.109***	0.553***	0.414***	0.090***
	(0.035)	(0.029)	(0.028)	(0.038)	(0.032)	(0.032)
II cash-on-hand decile	0.600***	0.425***	0.110***	0.577***	0.382***	0.129***
	(0.034)	(0.028)	(0.027)	(0.035)	(0.029)	(0.029)
III cash-on-hand decile	0.493***	0.361***	0.092***	0.495***	0.347***	0.106***
	(0.033)	(0.029)	(0.028)	(0.034)	(0.029)	(0.028)
IV cash-on-hand decile	0.482***	0.449***	0.014	0.482***	0.437***	0.024
	(0.035)	(0.030)	(0.029)	(0.035)	(0.030)	(0.029)
V cash-on-hand decile	0.445***	0.440***	-0.001	0.453***	0.440***	0.005
	(0.035)	(0.029)	(0.028)	(0.034)	(0.029)	(0.028)
VI cash-on-hand decile	0.428***	0.411***	0.009	0.420***	0.412***	0.001
	(0.035)	(0.029)	(0.028)	(0.034)	(0.029)	(0.028)
VII cash-on-hand decile	0.427***	0.448***	-0.017	0.435***	0.460***	-0.021
	(0.034)	(0.029)	(0.028)	(0.034)	(0.029)	(0.028)
VIII cash-on-hand decile	0.367***	0.433***	-0.047*	0.400***	0.454***	-0.042
	(0.033)	(0.028)	(0.027)	(0.033)	(0.028)	(0.027)
IX cash-on-hand decile	0.327***	0.407***	-0.043	0.350***	0.442***	-0.056**
	(0.032)	(0.027)	(0.026)	(0.033)	(0.028)	(0.028)
X cash-on-hand decile	0.281***	0.412***	-0.079***	0.299***	0.438***	-0.086***
	(0.031)	(0.026)	(0.025)	(0.034)	(0.028)	(0.029)
Age in[18,30]				0.089	0.052	0.013
				(0.111)	(0.094)	(0.093)
Age in[30,45]				0.090**	-0.013	0.068**
				(0.039)	(0.033)	(0.032)
Age in[45,60]				0.062**	-0.003	0.042*
				(0.027)	(0.023)	(0.023)
Male				0.005	-0.018	0.019
				(0.023)	(0.019)	(0.019)
Married				-0.039	-0.031	-0.006
				(0.028)	(0.023)	(0.023)
Years of education				0.003	0.007***	-0.002
				(0.003)	(0.003)	(0.002)
Family size				0.030***	-0.014	0.031***
				(0.012)	(0.010)	(0.010)
Resident in the South				0.112***	0.171***	-0.055***
				(0.024)	(0.020)	(0.020)
Unemployed				0.073	-0.003	0.041
				(0.055)	(0.047)	(0.045)
City size less then 20,000				-0.205***	0.037	-0.166***
				(0.045)	(0.039)	(0.038)
City size 20,000-40,000				-0.144***	0.050	-0.133***
				(0.047)	(0.040)	(0.039)
City size 40,000-500,000				-0.118***	0.048	-0.122***
				(0.042)	(0.036)	(0.035)
Observations	2,978	2,978	2,978	2,978	2,978	2,978

Notes: Standard errors in parentheses. P-values correspond to: *** p<0.01, ** p<0.05, * p<0.1. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. The last column also adds the real log change in household cash-on-hand between 2016 and 2012. All other controls are measured in 2016. The left hand side in columns 1 and 4 is the MPC out of a small (one month) shock, measured in the 2016 survey; in column 2 and 5 is the MPC out of large (one year) shock, measured in the 2012 survey; in columns 3 and 6 is the difference in MPCs, the MPC out of a small shock less the MPC out of a large shock. The sample consists of households present in both surveys. Back

2016 Non-Necessity Results

VARIABLES	(1) Small	(2) Large	(3) Small	(4) Large	(5) Small	(6) Large
Eating outside share	0.052	0.224***	0.306***	0.253***	0.181**	0.218***
	(0.074)	(0.062)	(0.077)	(0.065)	(0.081)	(0.068)
I cash-on-hand decile			0.647***	0.470***	0.574***	0.439***
			(0.035)	(0.029)	(0.040)	(0.033)
II cash-on-hand decile			0.617***	0.440***	0.589***	0.397***
			(0.034)	(0.028)	(0.035)	(0.030)
III cash-on-hand decile			0.509***	0.373***	0.508***	0.356***
			(0.034)	(0.029)	(0.034)	(0.029)
IV cash-on-hand decile			0.489***	0.455***	0.487***	0.444***
			(0.035)	(0.030)	(0.035)	(0.030)
V cash-on-hand decile			0.444***	0.440***	0.452***	0.439***
			(0.034)	(0.029)	(0.034)	(0.029)
VI cash-on-hand decile			0.419***	0.404***	0.422***	0.408***
			(0.035)	(0.029)	(0.034)	(0.029)
VII cash-on-hand decile			0.419***	0.442***	0.429***	0.453***
			(0.034)	(0.029)	(0.034)	(0.029)
VIII cash-on-hand decile			0.358***	0.426***	0.385***	0.449***
			(0.033)	(0.028)	(0.033)	(0.028)
IX cash-on-hand decile			0.311***	0.395***	0.340***	0.429***
			(0.033)	(0.027)	(0.034)	(0.028)
X cash-on-hand decile			0.261***	0.396***	0.283***	0.419***
			(0.032)	(0.026)	(0.036)	(0.030)
Observations	2,978	2,978	2,978	2,978	2,978	2,978
Demographic Controls	NO	NO	NO	NO	YES	YES

Notes: Standard errors in parentheses. P-values correspond to: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All variables except cash-on-hand deciles are demeaned. Cash-on-hand is the sum of disposable income and financial assets. No constant is included. Demographic controls are: age in[18,30], age in(30,45], age in(45,60], male, married, years of education, family size, resident in the South, unemployed, and the real log change in household cash-on-hand between 2016 and 2012. All other controls are measured in 2016. The left hand side in columns 1, 3, and 5 is the MPC out of a small (one month) shock, measured in the 2016 survey; in columns 2, 4, and 6 is the MPC out of large (one year) shock, measured in the 2012 survey. The sample consists of households present in both surveys. Back

Aiyagari Model Set Up

$$\max_{\{c_t, a_{t+1}\}_{t=0}^{\infty}} \mathbb{E}_0 \left[\sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\frac{1}{\gamma}} - 1}{1 - \frac{1}{\gamma}} \right]$$

$$s.t.$$

$$a_{t+1} + c_t \leq y_t + R a_t$$

$$a_{t+1} \geq 0$$

$$y_t = \exp(\eta_t + \varepsilon_{2,t})$$

$$\eta_t = \rho \eta_{t-1} + \varepsilon_{1,t}$$

- Solve the a partial equilibrium version of the model by Aiyagari (1994).
- Households maximize a standard CRRA utility, with $EIS = \gamma$.
- Invest in a riskless asset a_t with gross rate R, cannot have negative wealth $a_{t+1} \geq 0$
- Income y_t has two components, a persistent one η_t and a transitory one $\varepsilon_{2,t}$. Back

Aiyagari Model Calibration

- Standard calibration that is as comparable as possible with the non-homothetic model.

- EIS $\gamma = 0.9709$, which is equal to the IES for the non-homothetic model for a household with an average income.

- Match the discount factor $\beta = 0.95$ and the real interest rate on saving $R = 1.01$ (agents cannot borrow in this model).

- $\rho = 0.8$, $\sigma_1 = 0.01$, and $\sigma_2 = 0.03$.

Back

Aiyagari Model Solution

- Solve for the policy functions $c(a, \eta, \varepsilon_2)$ and $a'(a, \eta, \varepsilon_2)$

- Comparison: $\exp(\varepsilon_2) = 1 + 1$ for the one year shock,
  $\exp(\varepsilon_2) = 1 + 1/12$ for the one month shock, and
  $\exp(\varepsilon_2) = 1 + 0$ for the comparison under no shock.

- For any wealth and persistent income state pair (a, η), we
  compute cash-on-hand as $cash(a, \eta) = \exp(\eta) + Ra$ under no
  shock and the corresponding MPCs numerically with these
  two shocks plugged in the policy functions:

$$MPC_{1y}(a, \eta) = \frac{c(a, \eta, \ln(1+1)) - c(a, \eta, \ln(1))}{\exp(\eta)}$$

$$MPC_{1m}(a, \eta) = \frac{c(a, \eta, \ln(1+1/12)) - c(a, \eta, \ln(1))}{\exp(\eta)1/12}$$

Back

Bridge Aiyagari Model to Data

1. For each level of cash-on-hand in the model, we compute the MPCs out of positive shocks equal to one month and one year of income

2. To match the model scale, normalize empirical distribution of per-capita cash-on-hand by the average per-capita income in the sample.

3. For each shock size, compute the average MPCs within each decile of the empirical distribution of normalized per-capita cash-on-hand.

4. Consistent with the analysis on actual data, run a smoother across the average MPCs implied by the model.

Back

Non-Homothetic Model (Back)

- $\gamma_a > \gamma_b$ wlog.

- γ_i is the EIS for good i: $EIS_i \equiv -\dfrac{\partial \ln\left(\frac{c_{i,t+1}}{c_{i,t}}\right)}{\partial \ln\left(\frac{p_{i,t+1}}{p_{i,t}}\right)} = \gamma_i$

- γ_i is related to the income elasticity as well!

Lemma 1
In the problem defined in (1), *the income elasticity of demand for good i,* e_i^Y, *is given by*

$$e_i^Y \equiv \frac{\partial c_{i,t}}{\partial Y}\frac{Y}{c_{i,t}} = \frac{\gamma_i}{\gamma_a\left(\sum_{\tau=0}^{\infty} s_{a,\tau}^Y\right) + \gamma_b\left(\sum_{\tau=0}^{\infty} s_{b,\tau}^Y\right)} \tag{2}$$

Lemma 2
In the problem defined in (1), *good a is a non-necessity and good b is a necessity iff* $\gamma_a > \gamma_b$.

Non-Homothetic Model (Back)

- MPC in period t is the derivative of expenditures in period t with respect to the permanent income: $MPC_t \equiv \frac{\partial X_t}{\partial Y}$

Lemma 3
In the problem defined in (1), the MPC is fully characterized by the income elasticities of the two goods and the current budget shares according to the formula:

$$MPC_t = s_{a,t}^Y e_a^Y + s_{b,t}^Y e_b^Y \tag{3}$$

- In homothetic case $e_a^Y = e_b^Y = 1$: $MPC_t = \frac{X_t}{Y}$.
- In non-homothetic case $s_{i,t}^Y$ and e_i^Y depend on income levels: heterogeneity in Y.

Non-Homothetic Model Increasing MPC (Back)

Proposition 1
In the problem defined in (1), with $\gamma_a > \gamma_b$, the derivative of the MPC in period t with respect to income is positive if

$$\frac{\beta^{t\gamma_a} p_{a,t}^{1-\gamma_a}}{\beta^{t\gamma_b} p_{b,t}^{1-\gamma_b}} > \frac{\left(\sum_{\tau=0}^{\infty} \beta^{\tau\gamma_a} p_{a,\tau}^{1-\gamma_a}\right)}{\left(\sum_{\tau=0}^{\infty} \beta^{\tau\gamma_b} p_{b,\tau}^{1-\gamma_b}\right)} \tag{4}$$

Furthermore, the sign does not depend on the income level, but only on prices and preference parameters.

Non-Homothetic Model Increasing MPC [Back]

- Build intuition with simplified model.
- Prices grow at g_a, g_b after being discounted at rate R.
- If $\gamma_a > 1$,
- $g_a > g_b > 1$ is sufficient for increasing MPC in income.
  [As in the data] [Full Characterization]

Non-Homothetic Model Increasing MPC Back

- Build intuition with simplified model.
- Prices grow at g_a, g_b after being discounted at rate R.
- If $\gamma_a > 1$,
- $g_a > g_b > 1$ is sufficient for increasing MPC in income.
  As in the data   Full Characterization
- Non-necessities will be more expensive.
- Want to anticipate non-necessities.
- Rich consume more non-necessities.

Non-Homothetic Model Simplified

- Prices grow at g_a, g_b after being discounted at rate R.
  $p_{a,t} = (R^{-1}g_a)^t p_{a,0}$ and $p_{b,t} = (R^{-1}g_b)^t p_{b,0}$
- Condition in Proposition 1:

$$g_b^{(1-\gamma_b)} > g_a^{(1-\gamma_a)}(R\beta)^{\gamma_a - \gamma_b}$$

- If $g_b = 1$ and $R\beta = 1$, need $g_a > 1$.
- If $g_b > 1$ and $R\beta = 1$, the condition weakens, a lower trend growth g_a is enough with a threshold < 1. With $\gamma_b < 1$ income effects are stronger than substitution effects for good b, so households would tilt consumption expenditures away from where it is cheaper, that is today with $g_b > 1$.
- For any γ_b, having $R\beta < 1$ also allows for a lower threshold for g_a. The present becomes relatively more beneficial, so agents would tilt consumption relatively more to commodities which are easier to shift intertemporally: the non-necessities. This can be seen from the exponent to $R\beta$ having $\gamma_a - \gamma_b$.

Consumer Price Indexes proxying essential and non-essential consumption in Italy and the United States
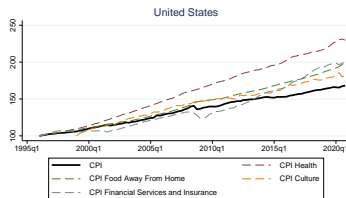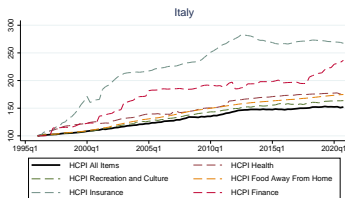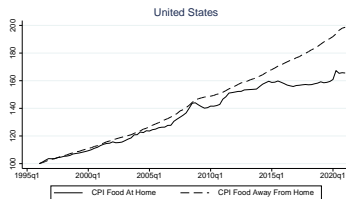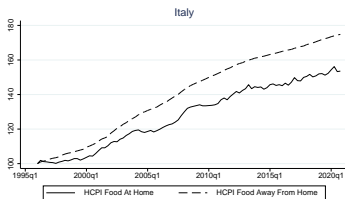
Notes: All data comes from FRED. Monthly series are converted to quarterly ones with end of quarter values. CPI Culture starts in 1999Q1, all other in 1996Q1. All series are normalized at 100 on their starting period. (Back)

Non-Homothetic Model Convex MPC Back

Proposition 2

In the problem defined in (1), *with condition* (4) *met as in Proposition 1, the MPC is convex in income* $\forall$ *income* $Y < \bar{Y} < \infty$, *if*

$$\gamma_a > 2\gamma_b \tag{5}$$

- Income elasticity for luxury goods be sufficiently higher than for essential consumption.
- Income elasticity $\iff$ EIS
    1. Blundell, Browning and Meghir (1994) data on income elasticity by good.
    2. Crossley and Low (2011) data on EIS by good.
    3. Attanasio, Banks and Tanner (2002) data on EIS by wealth (stock market participants vs not participants).
    4. Calvet et al. (2021) data on EIS by wealth-to-income.

Non-Homothetic Model Calibration

- The first two parameters are standard and match the Aiyagari (1994) model calibration.

- The two power elasticity parameters are calibrated by matching the average IES for poor and rich households estimated by Attanasio, Banks and Tanner (2002).

- The inflation parameters come from the inflation on food at home and away from home in Italy.

Table: Non-homothetic model calibration

Param	Value	Description
β	0.95	Discount Factor
R	1.01	Interest Rate
γ_a	10	Non-Necessities IES
γ_b	0.125	Necessities IES
g_a	1.03	Non-Necessities Inflation
g_b	1.015	Necessities Inflation

Back

Non-Homothetic Model to Data

- Non-homothetic model is not scale invariant.
- Use the fraction of food spending that goes to eating out (eating at home) as a proxy for the share of current expenditures on non-necessities, $s_{a,t}^X$ (on necessities, $s_{b,t}^X$).
- Approximate the shares of non-essential spending by the median values of the eating out shares in each decile of the empirical distribution of cash-on-hand.
- Compute the income implied by the model and, through that, obtain the theoretical MPCs for small and large shocks
- run a smoother across the average MPCs implied by the non-homothetic preference model within each decile of the cash-on-hand distribution.

Back

MPC levels across shock size by cash-on-hand deciles — models and estimates.
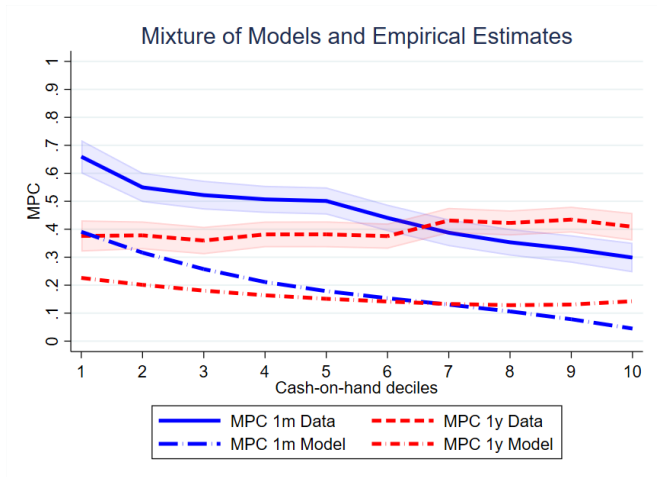
Back

Other Mechanisms

- Permanent income hypothesis: no heterogeneity.

- Liquidity constraints as Krueger and Perri (2006): MPC out of small gains is higher than out of large gains.

- Portfolio adjustment costs as Kaplan and Violante (2014): MPC out of small shocks is higher than out of large shocks for the wealthy hand-to-mouth.

- Inattention (e.g. lumpy consumption adjustment costs) as Fuster, Kaplan and Zafar (2021): conditional to a positive spending response, the MPC decreases with the shock size. We find that affluent households exhibit a higher $MPC|MPC > 0$ for large income gains.

- Non-homothetic preferences on bequests: MPC out of small gains is higher than out of large gains.

Back