

The Liquid Hand-to-Mouth: Evidence from Personal Finance Management Software

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Motivation

- ▶ Payday effects: (some) people's spending increases the day they are paid



Relevant literature

- ▶ Empirical studies that document consumption responses to disposable income:
 - ▶ Micro level: Parker (1999), Souleles (1999), Shapiro and Slemrod (2003a), Shapiro and Slemrod (2003b), Shapiro and Slemrod (2009), Johnson et al. (2006), Parker et al. (2013), Broda and Parker (2014), and Gelman et al. (2014)
 - ▶ Macro level: Campbell and Mankiw (1989, 1990)
- ▶ Theoretical studies explaining spending responses with illiquid savings and liquidity constraints:
 - ▶ Laibson et al. (2012): hyperbolic discounting preferences induce agents to lock their wealth
 - ▶ Kaplan and Violante (2014): the “wealthy hand-to-mouth” hold plenty illiquid wealth but no liquid wealth

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2. We show that less than 3 percent of individuals have less than one day of spending left in cash or liquidity before their paychecks
3. We show that individuals' liquidity and cash holdings are at least three times larger than predicted by economic models
4. We then look at cash holding responses to income payments to detect insufficient cash cushions and future liquidity constraints inspired by the corporate finance literature

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 - ▶ App is marketed through banks and we have a fairly representative sample
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- ▶ We also observe overdraft and credit limits

The financial aggregation app: screenshots

Swisscom 17:44

Edit Profile



Gender	Year of birth
	1984
Adults	Children
	0
House	Size in m ²
	100
Bedrooms	Cars
	0

Life goals Budget Activity Offers More


Swisscom 17:49

Transactions


WEDNESDAY, SEPTEMBER 16

-  TAXI DAMIAN - 4,454 kr.
Taxis & Public Transportation
-  Metrostation Islands B - 713 kr.
Planes, Trains and Automobile...


TUESDAY, SEPTEMBER 15

-  Millifært: Tollstjóri 33,341 kr.
Taxes (+ and -)


MONDAY, SEPTEMBER 14

-  FOETEX FISKETORVET - 732 kr.
Groceries

SUNDAY, SEPTEMBER 13

-  NETTO AXEL HEIDESG - 78 kr.
Groceries


SATURDAY, SEPTEMBER 12





-  NETTO AXEL HEIDESG - 263 kr.
Groceries

Life goals Budget Activity Offers More




Swisscom 17:50

Feed

Search  [Refine](#)

-  Current 1,134,157 kr. >
-  Credit cards - 183,924 kr. >
-  Savings 9 kr. >
-  Show Only Transactions >

SUNDAY, SEPTEMBER 20

-  HOTEL TIROL S.A. - 54,809 kr.
Hotels & Accomodation
-  TAXI EDUARDO GAI... - 4,441 kr.
Taxis & Public Transportation
-  SCHWEIZ. BUNDES... - 1,162 kr.
Planes, Trains and Auto...

Life goals Budget Activity Offers More

The financial aggregation app: screenshots

The screenshot displays the MENIGA web application interface. At the top, the logo 'MENIGA' is visible on the left, and the user's email 'amevandar@gmail.com', a 'Logout' link, and a language dropdown set to 'English' are on the right. A dark teal navigation bar contains links for 'Home', 'Transactions', 'Budget', 'Reports', 'Life goals', 'Insights', 'Offers', and a 'Settings' button. Below this, a secondary navigation bar includes 'Your Profile', 'Users', 'Accounts', 'Categories', 'Notifications', 'Rules', 'Offers', and 'Terms & Conditions'. The main content area is titled 'Edit accounts' and contains a form for adding a new account or credit card. A modal window is open over this form, titled 'Add a new account or credit card'. The modal prompts the user to 'Select a bank/issuer:' and provides a grid of options: Arion banki, Íslandsbanki, a red stylized 'A' logo, AMERICAN EXPRESS, MasterCard, mpbanki, SPARISJÓÐURINN, and Other banks. The background interface is dimmed, showing a list of current accounts with details like 'abalskningur', 'Gullvild dtsk.ð.', and 'Námsvild', each with an 'Automatic update' date of 09/03/2016 and an 'Edit' button.

Summary statistics

	Mean	Standard Deviation	Statistics Iceland
Monthly total income	3256.1	3530.5	4316
Monthly regular income	3038.2	3184.3	3227
Monthly salary	2703.5	2992.5	2456
Monthly irregular income	217.82	1414.8	1089
Monthly spending:			
Total	1315.1	1224.3	
Groceries	468.29	389.29	490
Fuel	235.88	258.77	(359)
Alcohol	61.75	121.43	85
Ready Made Food	170.19	172.64	(252)
Home Improvement	150.16	464.94	(229)
Transportations	58.33	700.06	66
Clothing and Accessories	86.62	181.27	96
Sports and Activities	44.29	148.41	(36)
Pharmacies	39.62	62.08	42
Age	40.6	11.5	37.2
Female	0.45	0.50	0.48
Unemployed	0.08	0.27	0.06
Parent	0.23	0.42	0.33
Pensioner	0.15	0.36	0.12

All numbers are in US dollars. Parentheses indicate that data categories do not match perfectly.

Looking at payday effects on spending

We run the following regression

$$x_{it} = \sum_{k=-7}^7 \beta_k I_i(\text{Paid}_{t-k}) + \text{fixed effects} + \varepsilon_{it}$$



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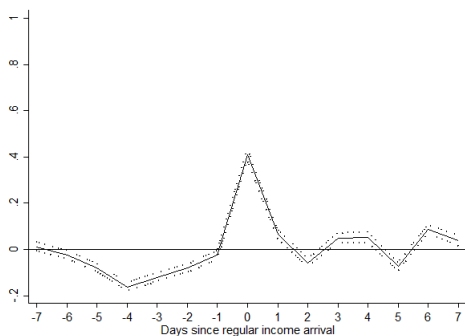
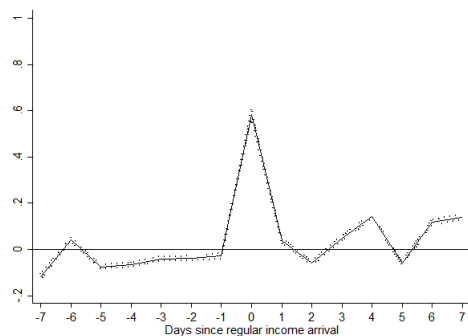
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- ▶ individual fixed effects, day-of-week fixed effects, day-of-month fixed effects, year-month fixed effects, and holiday dummies

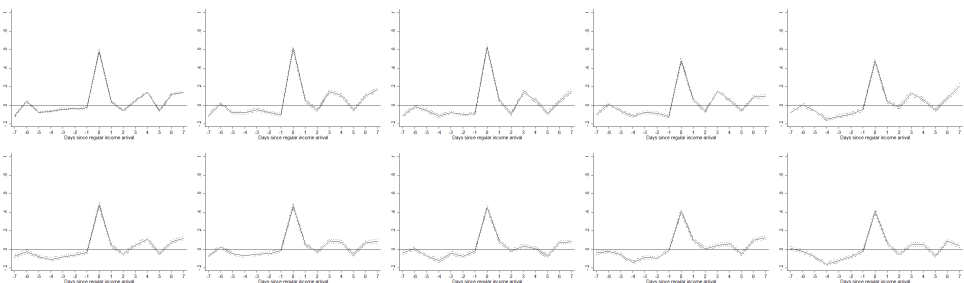
Looking at payday effects on spending



The effects of regular income arrival on spending for the bottom and top deciles of the salary distribution

- ▶ Individuals in the bottom decile spend 60% more than their average spending on paydays
- ▶ Individuals in the top decile spend 40% more than their average spending on paydays

Looking at payday effects on spending



The effects of regular income arrival on spending by ten deciles of the salary distribution

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- ▶ Response to firm pricing: firms increase prices on common paydays but only marginally

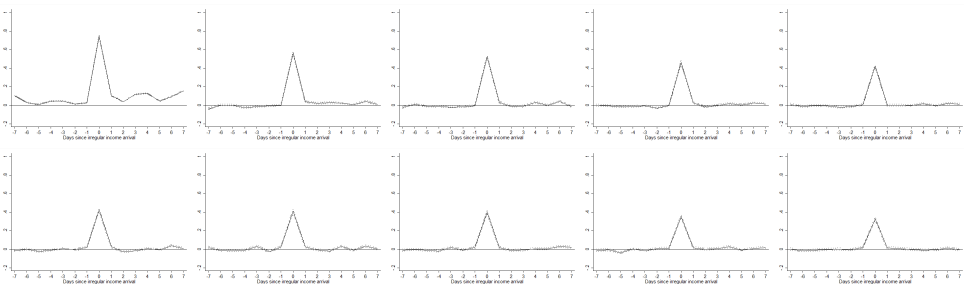
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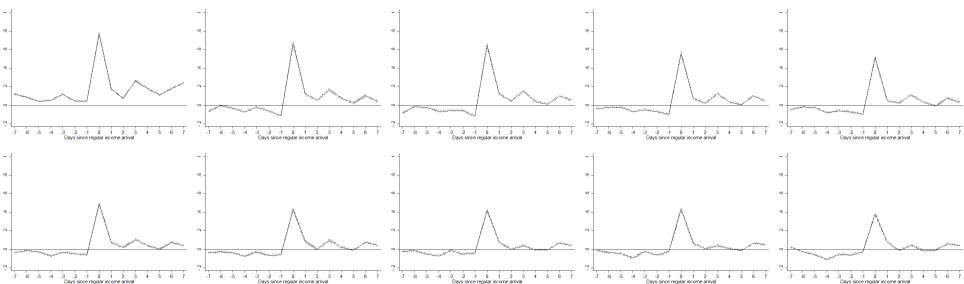
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- ▶ Response to firm pricing: firms increase prices on common paydays but only marginally
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- ▶ App usage: we do not observe a relation between payday responses and frequency of logging in

Looking at payday effects on spending



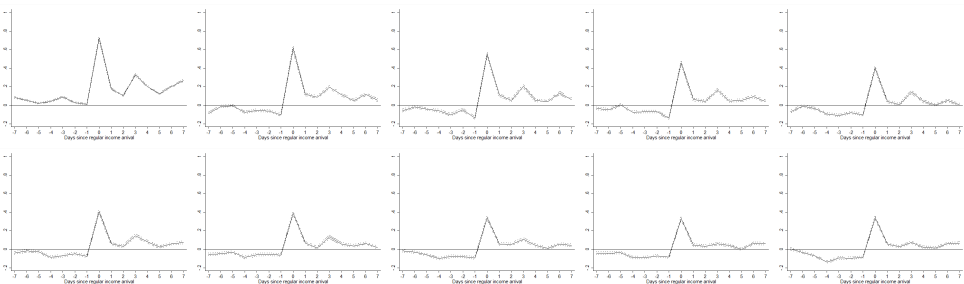
The effects of irregular income arrival on spending by ten deciles of the salary distribution

Are individuals spending on necessities?



The effects of income arrival on necessary spending by ten deciles of the salary distribution

Are individuals spending on necessities?



The effects of income arrival on unnecessary spending by ten deciles of the salary distribution

Gelman, Kariv, Shapiro, Silverman, and Tadelis (Science, 2014) payday responses

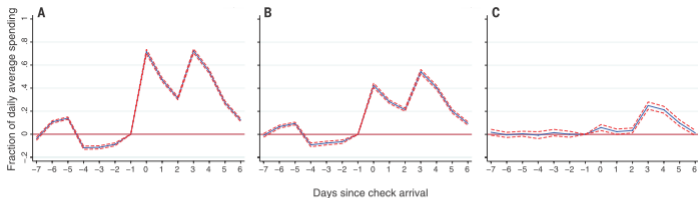


Fig. 2. Response of spending to income: Alternative components of spending. (A) Total spending. (B) Nonrecurring spending. (C) Fast food and coffee shop spending. The solid line represents regression coefficients from Eq. 1. The dashed lines are 95% confidence intervals. Estimates are based on 5,371,244, 5,371,244, and 5,173,594 total observations from 23,985, 23,985, and 23,021 users for panels (A), (B), and (C), respectively.

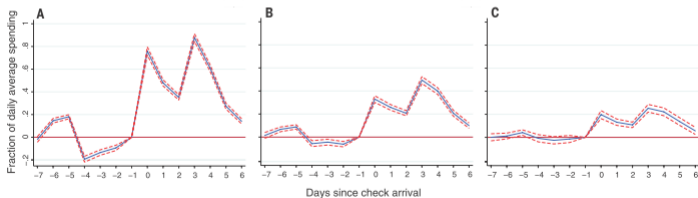


Fig. 3. Response of nonrecurring spending to income: Liquidity ratio. (A) Low liquidity. (B) Medium liquidity. (C) High liquidity. The solid line represents regression coefficients from Eq. 1. The dashed lines are 95% confidence intervals. Estimates are based on 1,784,460, 1,809,839, and 1,769,968 total observations from 7956, 7956, and 7955 users for panels (A), (B), and (C), respectively. The liquidity ratio is defined as the average daily balance of checking and savings accounts normalized by daily average spending.

The only day better than Friday is payday!

- ▶ Why is (some) people's spending or consumption not independent of their income?
 - ▶ Liquidity-constrained hand-to-mouth consumers (poor and rich)?



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 - ▶ Balance sheet liquidity: cash plus saving plus credit balance plus overdraft limit plus credit limit



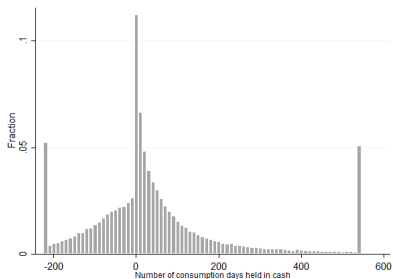
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- * What are liquidity UNconstraints and how can we measure them?
 - ▶ Spending prior to income payments?
 - ▶ Spending on unnecessary goods and services?

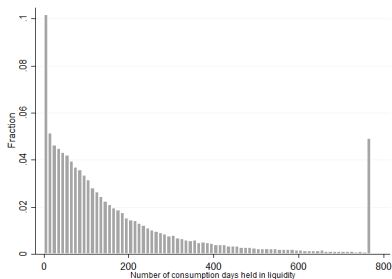


How many individuals are liquidity constrained on their paydays?

- ▶ Only 12% of individuals have less than ten days of spending left in cash on their paydays
- ▶ Only 10% of individuals have less than ten days of spending left in liquidity on their paydays



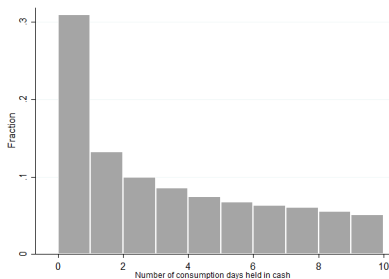
Cash holding (checking/saving balances)



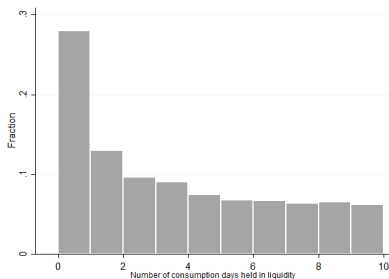
Liquidity (credit/debit limits
plus checking/saving balances)

How many individuals are liquidity constrained on their paydays?

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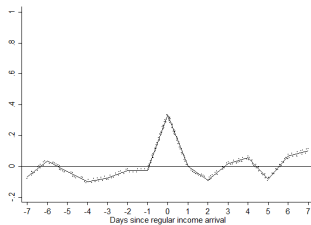
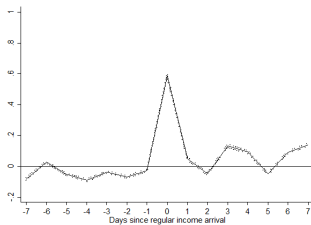
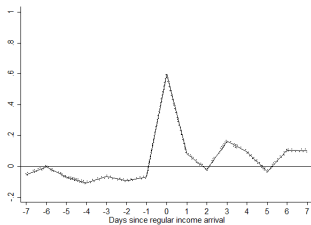


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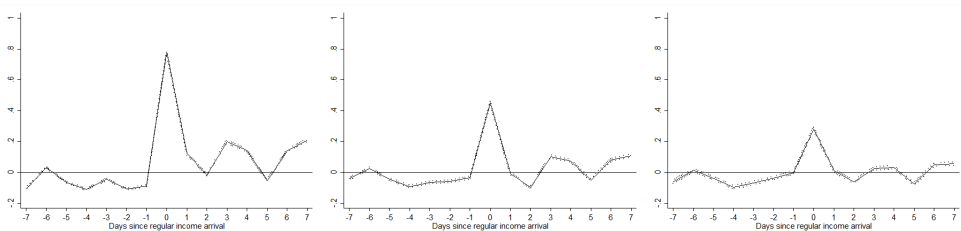
Liquidity (credit/debit limits plus checking/saving balances)

Payday effects on spending by liquidity terciles



The effects of regular income on spending by liquidity (measured by the median number of consumption days held in cash)

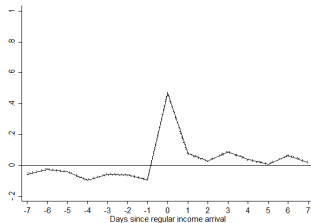
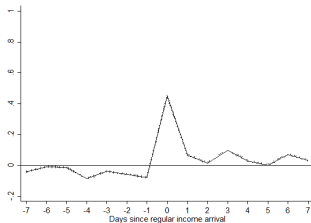
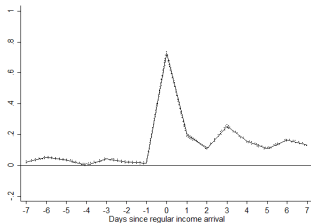
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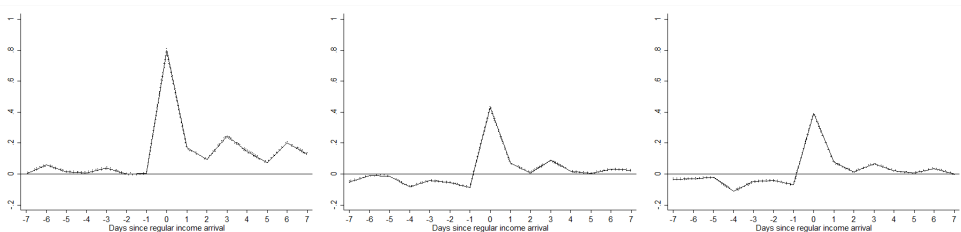
► What about liquidity UNconstraints?



The effects of regular income on spending by prior spending (how much people spend compared to average daily spending in the last 4 days prior to income arrival)

Payday effects on spending by liquidity terciles

► What about liquidity UNconstraints?



The effects of regular income on spending by unnecessary spending (how much people spend on unnecessary consumption compared to average daily spending in the last 4 days prior to income arrival)

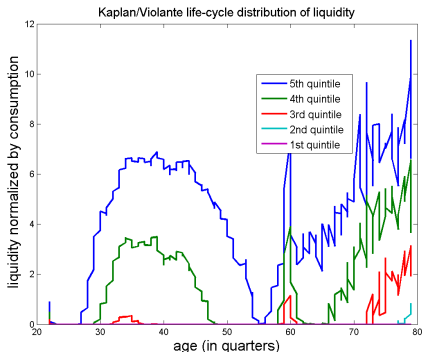
Summary statistics by liquidity terciles

- ▶ Are people liquidity constrained by standard measures?

	Liquidity in 1st tercile	Liquidity in 2nd tercile	Liquidity in 3rd tercile
Monthly total income	3119.34	4268.01	5158.81
Saving account balance	175.98	665.85	9655.23
Checking account balance	-1898.77	-1288.35	2850.07
Credit-card balance	-1137.87	-1866.11	-1911.71
Checking account limit	2677.27	3730.05	3784.48
Credit-card limit	2073.12	5385.96	8833.03
Cash	-1722.78	-622.51	12505.29
Liquidity	1889.75	6627.39	23211.08
Credit utilization	0.52	0.35	0.26
Checking account utilization	0.37	0.30	0.14
Number of days held in cash	-38.00	-14.00	214.00
Number of days held in liquidity	38.00	123.00	546.00
Age	36	41	45
Gender	0.53	0.46	0.39

Do households hold too much cash?

- ▶ Standard model: households hold life-time savings in cash and marginal propensities to consume out of transitory income shocks are small
- ▶ State-of-the-art model for high marginal propensities to consume: Kaplan and Violante (Econometrica, 2014) with liquid and illiquid assets



whereas in the data, we obtain

- 1st tercile holds 0.42
- 2nd tercile holds 1.37
- 3rd tercile holds 6.1

quarters of consumption in liquidity

Intermediate conclusion

- ▶ Few people are liquidity constrained, but we may not measure liquidity constraints correctly: individuals may hold cash cushions for unforeseen events or “term save” for foreseeable expenses

Intermediate conclusion

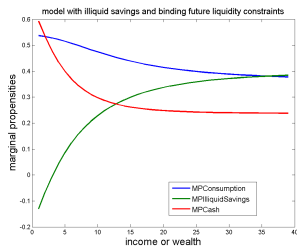
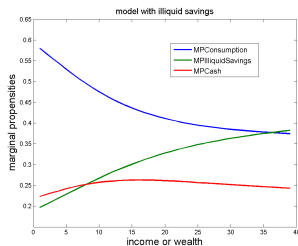
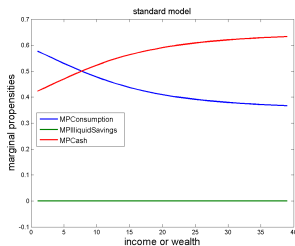
- ▶ Few people are liquidity constrained, but we may not measure liquidity constraints correctly: individuals may hold cash cushions for unforeseen events or “term save” for foreseeable expenses
- ▶ Impossible to measure? Let's turn to a different literature/methodology:

Intermediate conclusion

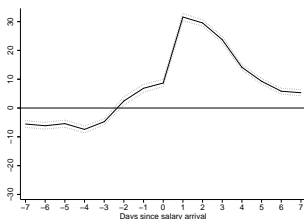
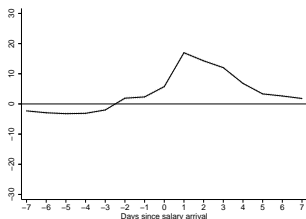
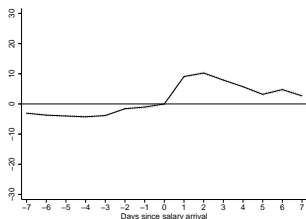
- ▶ Few people are liquidity constrained, but we may not measure liquidity constraints correctly: individuals may hold cash cushions for unforeseen events or “term save” for foreseeable expenses
- ▶ Impossible to measure? Let's turn to a different literature/methodology:
 - ▶ the corporate finance literature dealt with this problem by looking not at spending (i.e., investment) responses but at cash holding responses (Almeida, Campello, and Weisbach (2004))
 - ▶ potentially binding future liquidity constraints (insufficient cash cushions) can be measured by looking at individuals' propensity to hold on to incoming cash

The marginal propensity to hold on to cash

- ▶ Standard life-cycle model: the MPCash is always increasing in income/liquidity: $MPCash = 1 - MPCConsumption$
- ▶ Model with liquid and illiquid assets: the MPCash may be increasing or decreasing: $MPCash = 1 - MPCIlliquidSaving - MPCConsumption$
- ▶ Model with liquid and illiquid assets and binding future liquidity constraints: the MPCash is decreasing



Payday effects on cash holding by liquidity terciles

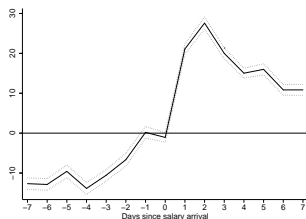
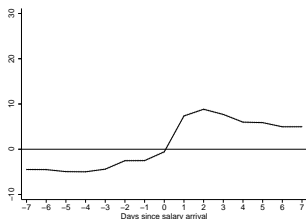
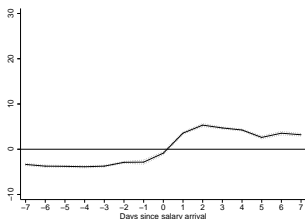


The effects of regular income on cash holding by liquidity (measured by the median number of consumption days held in cash or lines of credit)

- ▶ We find that cash holding are increasing in liquidity which is consistent with the standard model (without illiquid saving or future liquidity binding constraints)

Present and future liquidity constraints do not seem to play a role in explaining payday effects

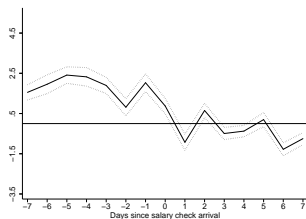
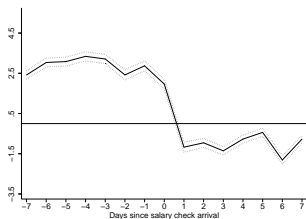
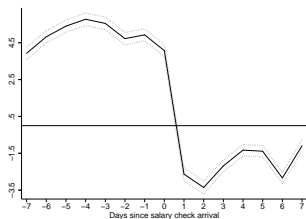
Payday effects on cash holding by liquidity terciles



The effects of regular income on liquidity by liquidity (measured by the median number of consumption days held in cash or lines of credit)

- ▶ We find that cash holding is increasing in liquidity which is consistent with the standard model (without illiquid saving or future liquidity binding constraints)
- ▶ What about changes in overdraft limits?

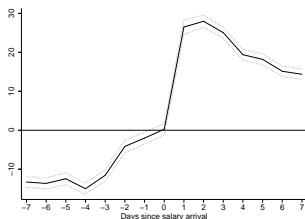
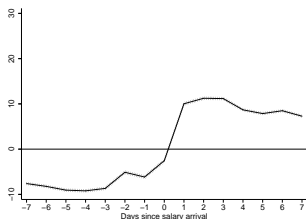
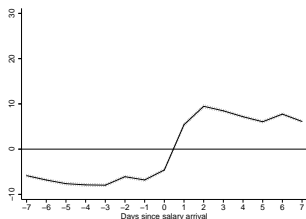
Payday effects on cash holding by liquidity terciles



The effects of regular income on overdraft limits by liquidity (measured by the median number of consumption days held in cash or lines of credit)

- ▶ We find that liquidity-constrained individuals reduce their overdraft limits in response to regular income payments
- ▶ We also look at checking, savings, and credit-card balances

Payday effects on cash holding by liquidity terciles



The effects of regular income on balances by liquidity (measured by the median number of consumption days held in cash or lines of credit)

- ▶ We find that balances are increasing in liquidity which is consistent with the standard model (without illiquid saving or future liquidity binding constraints)

Conclusion

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- ▶ It is important to understand the mechanism of fiscal stimulus responses (Kaplan and Violante (2014))
- ▶ How can we measure soft liquidity constraints?
- ▶ How much of the payday response is driven by liquidity constraints as opposed to a license to spend?

Directions for future research

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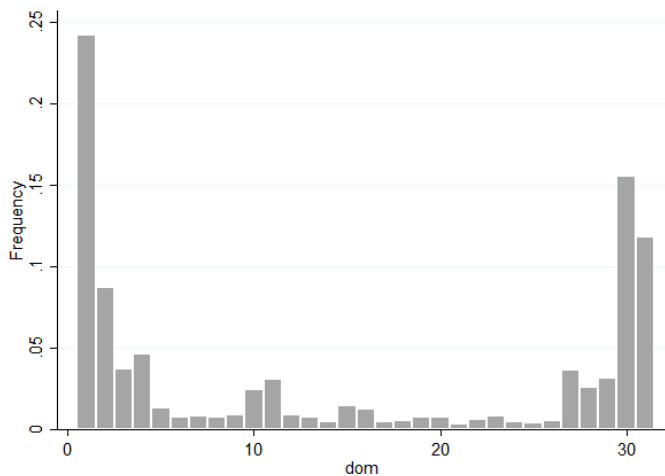
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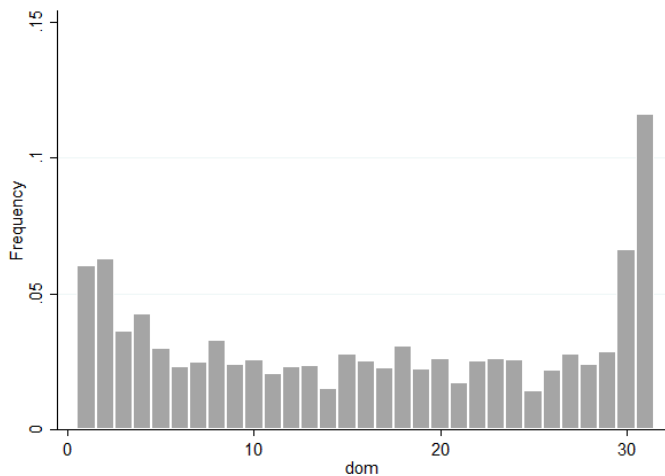
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- ▶ Running surveys and experiments

The distribution of regular income over the month

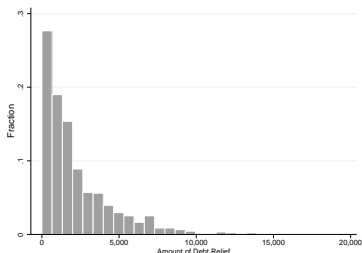
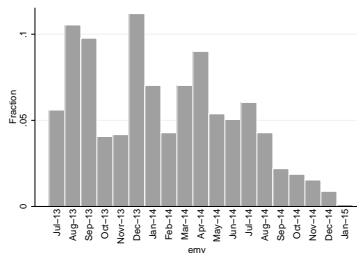


The distribution of irregular income over the month



Exogenous wealth shocks from a car-loan court case

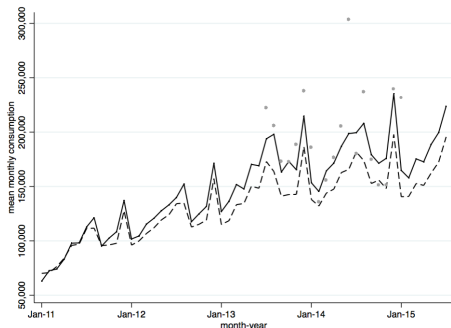
- ▶ May 30th 2013: the Supreme Court of Iceland ruled vehicle loans with exchange rate indexation concluded in 2007 illegal
- ▶ After the announcement banks recalculated affected loans, and some customers received cash transfers starting in early July to January 2015



Fraction of transfers by month and amounts transferred

The estimated windfall elasticity

- ▶ Diff-in-diff regression with variable treatment intensities: common trends in expenditures of individuals in the control and treatment groups in the sixteen months before the court ruling

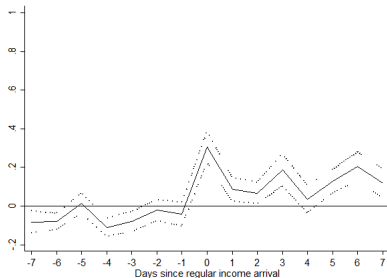
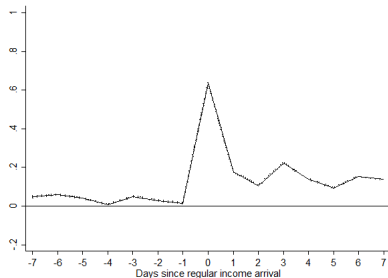


Estimated first-month windfall elasticity is 20%

Results are not affected by including linear treatment-specific time trends in the regressions and we estimate placebo experiments

Payday effects on spending by exogenous liquidity

- ▶ What about an exogenous liquidity inflow?



The effects of regular income on spending by exogenous liquidity

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