Follow the Money:

Methods for Identifying Consumption and Investment Responses to a Liquidity Shock

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Motivation

- What are impacts of liquidity shocks on spending decisions of households and small businesses?
- Answers have implications for:
  - theory, practice and regulation of credit markets
  - modeling intertemporal choice more generally
- Related macro literature: leveraging and deleveraging in wake of credit supply shocks
  - Hall (2011 AER), Eggertsson & Krugman (2012 QJE), Mian and Sufi (2012 "… Aggregate Demand Channel")

Motivating Gaps

- Most work estimates medium- and long-term effects, by measuring spending patterns several months or years post liquidity shock
  - Macro work with regional and/or aggregate data
  - Micro evaluations of microcredit expansions
  - Micro evaluations of business grants, other cash transfers
- Useful for understanding an important subset of potential outcomes
- But leaves mechanisms underlying any change unidentified:
  - Each state of the world could be due to different paths from shock to outcome
  - Mechanism is important for understanding the welfare implications of different policies
- Two examples…

Motivating Example 1: Leveraging and Deleveraging

- Mian and Sufi (2011): borrowing against rising home values drove rise in household leverage 2002-2006, and increase in defaults from 2006-2008
- "The real effects of the home-equity based borrowing channel depends on what households do with the borrowing money…"
- So how did homeowners deploy borrowed funds? We don't know.
  - No evidence of effects on new home purchase
  - No evidence of effects on credit card balances
  - "suggests a high marginal private return to borrowed funds"
- What sort of spending generates this high marginal private return? Splurges? Investment in household goods? In small businesses?
  - Evidence on this would shed light on how to specifiy preferences, expectations, etc.

Motivating Example 2: Microcredit Expansions

Bulk of evidence: weak if any effects on microenterprise scale or profitability up to two years post-expansion (Banerjee ARE; forthcoming special issue in *AEJ-Applied*)

Three explanations:

1. Need longer time horizon to see impacts
2. Microentrepreneurs do not invest marginal liquidity in their business; instead invest in household consumption with higher returns
3. Microentrepreneurs do invest marginal liquidity in their business but the investments do not earn positive return

If #2 is true: need to understand credit constraints: causes, consequences, cures

If #3 is true: need to understand preferences, expectations of entrepreneurs

- Risk-loving? Non-pecuniary returns?
- Over-optimism?

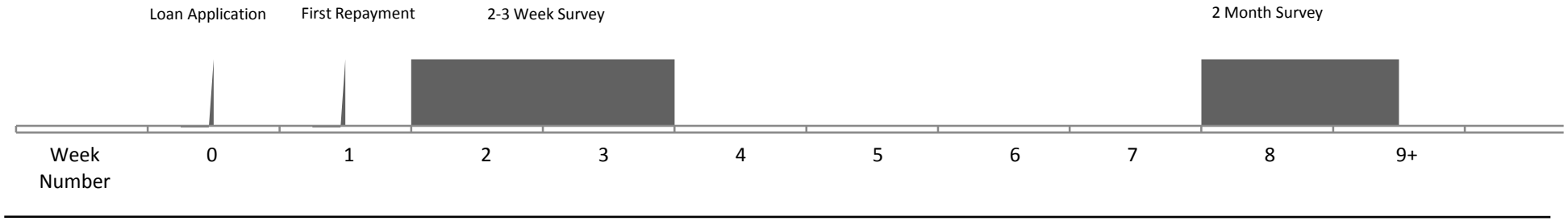
Motivating Measurement Challenge

- Upshot of our two examples: *tracking short-run consumption and investment responses would be useful.* But how?
- Relevant admin data rarely available
- Surveys may be plagued by noise, strategic reporting, etc.
  - Errors
    - Household balance sheets and income statements can be quite complex
    - Money is fungible
  - Biases
    - Perceived link between surveyor and tax authorities
    - Perceived link between surveyor and bank staff
    - Justification Bias
    - Social Stigma

What we do

- "Follow the money" injected by randomized supply shocks from 2 micro-lenders in the Philippines
- Loans are targeted to business investment
  - Underwritten accordingly
  - But not collateralized or restricted in disbursement
- Using 7 different methods: measurement techniques
- Comparing results across methods shows impacts of strategic reporting, fungibility, etc. on inferences
- Innovations:
  - Compare channel factors (who surveys)
  - Compare survey-only methods: direct elicitation (what did you spend loan on?) vs. less-direct elicitation (did you spend it on anything on this list?)
  - Compare survey-only methods to asking about spending broadly (no mention of loan), and use the randomization to identify the liquidity shock

Study Timeline



Loan Activity & Data Collection

Week 0:	*Week 1:*	*Weeks 2&3:*	*Week 8:*	*Weeks 9-24:*
Loan Activity: Applies for Loan Credit Score Calculated Loan Randomization *1. Data Collection (Bank Employee):* Loan Use Questions Intended Use Listing	*Loan Activity:* First Repayment (For Treatment) *2. Data Collection (Bank Employee):* Loan Use Questions Main Use of Funds	*Loan Activity:* Continued Repayment (For Treatment) *Data Collection (Independent Surveyor):* 3. Loan Use Questions 5. List Randomization 6. Spending Outflows	*Loan Activity:* Continued Repayment (For Treatment) *Data Collection (Independent Surveyor):* 4. Loan Use Questions 7. Spending Outflows	*Loan Activity:* Continued Repayment (For Treatment)

Survey-Only Methods (1-4): Direct Questions About Loan Uses

- Direct Elicitation:
  - Will/did you spend 5,000 pesos or more of your loan on any single transaction for your household?
  - Will/did you spend 2,500 pesos or more of your loan to pay down debt?
- Loan Use Listing:
  - What will/did you spend your loan on?

Method 1. Asked by bank, on loan application

Method 2. Asked by loan officer, after loan disbursement, at first repayment

Methods 3 and 4. Asked by independent surveyor, 2-3 weeks and 2 months after disbursement

Survey-Only Methods: List Randomizations

- Independent surveyor asks in first follow-up survey (2-3 weeks after loan disbursement)
- Randomized whether respondent is given a four-question or five-question list
- The fifth question is the potentially sensitive one:
  - I used 5,000 pesos or more of my loan on any single transaction for my household
  - I used 2,500 pesos or more of my loan to pay down other debt.
- Respondent report *how many statements are true* out of 4 or 5: *but not which ones*
- We infer proportion saying yes to sensitive question by comparing means across the "long-list" vs. "short-list" groups.

Survey-Only:
Method 5a. List Randomization re: Household Use

- "I will now read five statements. I would like you to tell me how many are true for you, but do not tell me which ones are true."

1. I have a washing machine in my home.
2. I am originally from this city.
3. I have completed one year or more of formal education post-high school.
4. My household owns a computer.
5. I used 5,000 pesos or more of my loan on any single transaction for my household.

Survey-Only:
Method 5b. List Randomization re: Debt Use

- "I will now read five statements. I would like you to tell me how many are true for you, but do not tell me which ones are true"

1. I have visited a hospital or clinic in the last six months.
2. I have more than three siblings.
3. I have purchased some type of insurance in the past five years.
4. My household owns an air conditioner.
5. I used 2,500 pesos or more of my loan to pay down other debt.

Survey+Randomization (Methods 6 & 7)

- List of all spending outflows, in each follow-up survey:
  - Please list all transactions of 1,000 pesos or more that you have made in the last two weeks/two months List each item with the amount that you spent.
  - Difference across treatment vs. control groups to identify impact of marginal loan on spending decisions

Key Finding 1: Respondents Report Strategically

Almost no non-business uses of loan proceeds to the bank (methods 1 and 2)

Significantly more to independent surveyors in the two surveys (methods 3 and 4)

Yet significantly more, in the same surveys, with list randomization (methods 5a and 5b)

Key Finding 2: "Truthful" Survey Responses do not Identify Counterfactual Spending

I.e.,: "What did you spend your loan on?" ≠ "What did you spend your loan on that you would not have purchased otherwise"?

List randomization suggests that 12% of treatment group spent loan on a household expense

Survey + randomization suggests *household expenditures are the same* in the treatment and control groups (13% of each report an expense > 1,000 pesos).

Key Finding 3: Liquidity Goes to Business Inventory

Survey + randomization:

- 2-week treatment effect on inventory accounts for entire loan amount
- 2-month treatment effect is even larger, but more noisily estimated
- No effects on other types of business investment

Any lack of downstream impacts on business growth will not be for lack of borrowers' trying

- We are doing another follow-up to identify longer-run impacts, or lack thereof

First-Stage (Did they borrow more?)

Table 1: Did they borrow more? (2-3 Weeks After Loan Application)

Dependent variables	(1)	(2)	(3)
Has Loan from Experimenting Lender (Admin Data)	0.329***	0.329***	0.329***
	(0.042)	(0.042)	(0.042)
Any Outstanding Formal Loan (Survey Data)	0.159***	0.159***	0.159***
	(0.045)	(0.045)	(0.045)
Number of Outstanding Formal Loans (Survey Data)	0.181***	0.166***	0.166***
	(0.061)	(0.061)	(0.061)
Total Outstanding Formal Loans (Survey Data)	1,535	1,725	2,644***
	(1,919)	(1,119)	(788)
Winsorized (1%)	N	Y	N
Trimmed (1%)	N	N	Y
Observations	1,388	1,388	1,374

Household Spending

Table 2a: Self-Reported Loan Use: Will/Did you use 5,000 pesos or more of your loan on any single transaction for your household?

Data Source:	Reported to Bank		Reported in Survey 2-3 Week Following Randomization			Reported in Survey 2 Months Following Randomization	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Proportion reporting "yes" on loan application	Proportion reporting "yes" to account officer, after loan disbursal	Proportion reporting "yes" in direct self-report to independent surveyor	Implicit proportion reporting "yes" from list randomization.	Proportion reporting "yes" for household (Panel A) or debt (Panel B) outflows	Proportion reporting "yes" in direct self-report to independent surveyor	Proportion reporting "yes" for household (Panel A) or debt (Panel B) outflows
Treatment	0.018***	0.008	0.055***	0.115**	0.133	0.216***	0.227
	(0.003)	(0.006)	(0.006)	(0.056)	(0.009)	(0.013)	(0.013)
Control					0.133		0.180
					(0.028)		(0.035)
Treatment - Control					0.000		0.046
					(0.030)		(0.037)
Observations from Treatment	1493	238	1245	1245	1245	973	973
Observations from Control	0	0	0	0	143	0	122

Debt Repayment

Table 2b: Self-Reported Loan Use: Will/Did you use 2,500 pesos or more of your loan to pay down other debt?

Data Source:	Reported to Bank		Reported in Survey 2-3 Week Following Randomization			Reported in Survey 2 Months Following Randomization	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Proportion reporting "yes" on loan application	Proportion reporting "yes" to account officer, after loan disbursal	Proportion reporting "yes" in direct self-report to independent surveyor	Implicit proportion reporting "yes" from list randomization.	Proportion reporting "yes" for household (Panel A) or debt (Panel B) outflows	Proportion reporting "yes" in direct self-report to independent surveyor	Proportion reporting "yes" for household (Panel A) or debt (Panel B) outflows
Treatment	0.023***	0.029***	0.077***	0.191***	0.142	0.325***	0.237
	(0.004)	(0.011)	(0.008)	(0.049)	(0.010)	(0.015)	(0.014)
Control					0.126		0.197
					(0.028)		(0.036)
Treatment - Control					0.016		0.041
					(0.029)		(0.039)
Observations from Treatment	1493	238	1245	1245	1245	973	973
Observations from Control	0	0	0	0	143	0	122

2-3 Week Spending Changes

Table 3: Self-Reported Loan Use: Where did the extra money go?			
Dependent variables	(1)	(2)	(3)
Total Spending	5,696*	5,374**	4,996**
	(3,010)	(2,588)	(2,136)
Business Expenditures	7,031***	6,280***	4,523**
	(2,268)	(2,104)	(1,985)
Assets for Business	356*	137	-93
	(187)	(121)	(94)
Merchandise for Business	6,045***	5,328***	3,738*
	(2,173)	(2,013)	(1,914)
Business Renovations	120	-3	2
	(203)	(30)	(2)
Utilities for Business	303	92	63
	(252)	(119)	(98)
Salaries for Employees	159	102	0
	(135)	(126)	(111)
Other Business Expenses	48	-16	109
	(271)	(228)	(146)
Household Expenditures	-1,676	-3	320
	(1,934)	(413)	(317)
Debt Repayment	371	98	-59
	(284)	(223)	(206)
Winsorized (1%)	N	Y	N
Trimmed (1%)	N	N	Y
Observations	1,388	1,388	1,374

2 Month Spending Changes

Table 4: Self-Reported Loan Use: Where did the extra money go?				
Dependent variables		(1)	(2)	(3)
Total Spending		23,577	13,849	22,209**
		(17,046)	(13,643)	(8,868)
Business Expenditures		20,826	11,092	18,774**
		(16,518)	(13,295)	(8,363)
	Assets for Business	28	15	-45
		(229)	(154)	(94)
	Merchandise for Business	19,726	9,748	17,978**
		(16,075)	(13,094)	(8,018)
	Business Renovations	-561	-241	-83
		(828)	(168)	(71)
	Utilities for Business	237	26	117
		(382)	(235)	(174)
	Salaries for Employees	584	195	-172
		(500)	(374)	(316)
	Other Business Expenses	813	46	-160
		(525)	(274)	(252)
Household Expenditure		699	-63	457
		(1,746)	(1,204)	(901)
Debt Repayment		1,719	622	387
		(1,618)	(1,087)	(775)
Winsorized (1%)		N	Y	N
Trimmed (1%)		N	N	Y
Observations		1095	1095	1084

Implications

Short-run, high-frequency data can be useful in tracing and interpreting household responses to liquidity shocks:

- Over-borrowing?
- Why? On what?

Portable methods:

- May be yet others worth testing; e.g., Perhaps asking “what did you spend your loan on that you would not have bought if you had not gotten a loan?” would produce the same inferences, at less expense, than a randomized experiment followed by elicitation of all major household and business outflows.