9. Credit and Saving Frictions

MD/Desenvolvimento Econômico II – 2024

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Today

1. Observing unobservables (Karlan and Zinman, Ecma 2009)

2. The miracle of microfinance? (Banerjee et al., AEJ Applied 2015)
   Evidence from Bayesian Hierarchical Analysis

3. Financial Inclusion

1/ Observing unobservables (Karlan and Zinman, Ecma 2009)

Asymmetric information

- Information asymmetries in credit market are important in theory.
- Empirical work typically has examined this issue indirectly, either through accounting exercises, or by inferring credit constraints from an agent's ability to smooth consumption.
- Karlan and Zinman (Ecma 2009) provide a microfoundation for studying the effects of credit constraints by identifying the presence (or absence) *and magnitudes* of two specific credit market failures:
  - adverse selection, and
  - moral hazard.

Experimental design (Karlan and Zinman, Ecma 2009)

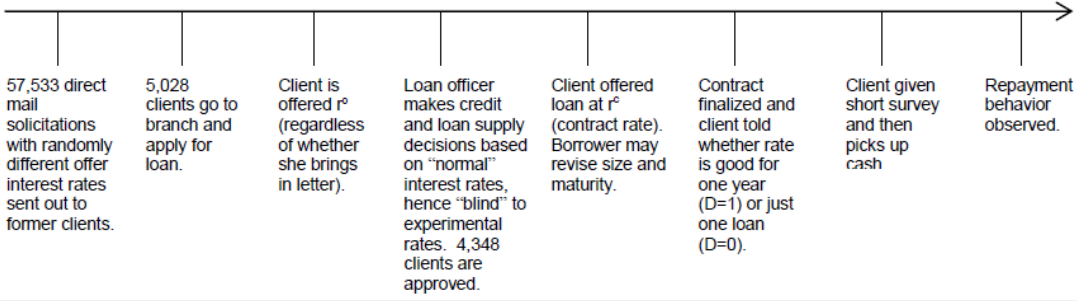
- The Lender sent direct mail solicitations with pre-qualified, limited- time offers to 57,533 former clients with *good repayment histories*.

- The experiment identifies information asymmetries by randomizing loan pricing along three dimensions:

    1. the interest rate offered on a direct mail solicitation (r^o),
    2. the contracted interest rate on the loan contract (r^c),
    3. the interest rate offered on future loans ($D = 1$).

Experimental Design

Figure 2: Operational Steps of Experiment



Experimental Design

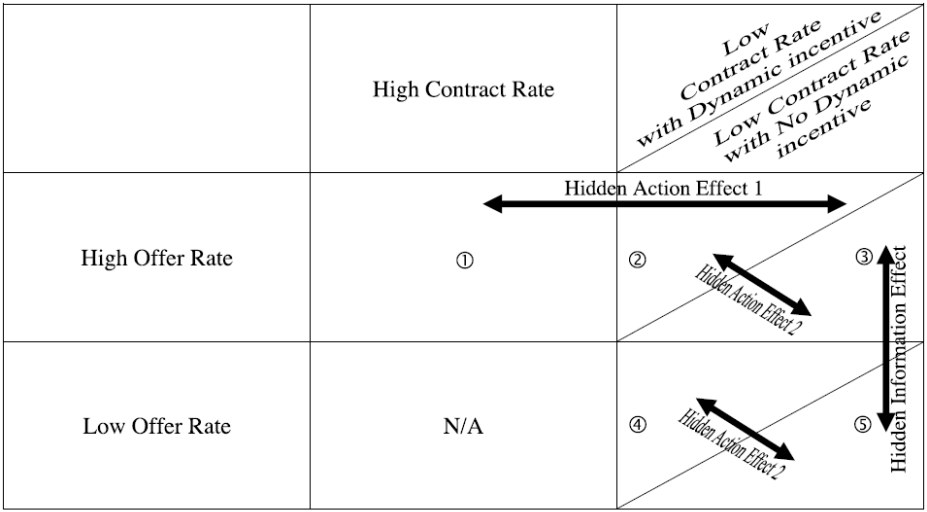


FIGURE 1.—Some basic intuition for our identification strategy.

Experimental Design

- Identify any **selection effect** by considering the sample that received the low contract rate, and comparing high with low offer interest rate.
  - Condition on r^c
- Identify any effect of **repayment burden** by considering the sample that responded to the high offer interest rate, and comparing high with low contract interest rate.
  - Condition on $r^o = high$.
- Any correlation between future option and default must be driven by choices, not repayment burden; i.e., by **"pure" moral hazard**.
  - Condition on r^o and $r^c = low$.

Validating the randomization

Table 2. Experimental Integrity Checks and Observable Selection

OLS

Dependent variable:	Contract Rate (1)	Offer Rate (2)	Rate Valid for One Year (versus One Loan) (3)	Applied=1 (4)	Sample Restricted to Applied = 1 Rejected = 1 (5)
Female	0.009	0.028	-0.002		
	(0.022)	(0.021)	(0.004)		
Married	0.017	0.022	0.004		
	(0.022)	(0.021)	(0.004)		
External credit score	-0.000	-0.000	0.000		
	(0.000)	(0.000)	(0.000)		
No External credit score	-0.017	-0.006	0.016		
	(0.093)	(0.091)	(0.016)		
Internal credit score	-0.001	-0.002	0.000		
	(0.001)	(0.001)	(0.000)		
Log (Size of last loan prior to project)	-0.017	-0.003	-0.004		
	(0.017)	(0.017)	(0.003)		
Maturity of last loan prior to project	-0.010	-0.011	-0.001		
	(0.011)	(0.010)	(0.002)		
# of prior loans with the lender	0.003	0.003	0.001**		
	(0.003)	(0.003)	(0.001)		
Gross income	-0.001	-0.000	0.000		
	(0.001)	(0.000)	(0.000)		
Years at Employer	0.000	0.001	-0.000		
	(0.002)	(0.002)	(0.000)		
Mean education	0.002	-0.002	-0.000		
	(0.003)	(0.003)	(0.001)		
# of dependants	0.002	-0.005	0.000		
	(0.007)	(0.006)	(0.001)		
Age	-0.000	-0.001	-0.000*		
	(0.001)	(0.001)	(0.000)		
Home bond	0.053	0.028	0.011		
	(0.041)	(0.040)	(0.007)		
# of months since last loan	-0.001	-0.001	-0.001***		
	(0.002)	(0.002)	(0.000)		
Offer Interest Rate				-0.003***	
				(0.001)	
Contract Interest Rate				0.000	-0.001
				(0.001)	(0.002)
Dynamic Repayment Incentive					-0.014
					(0.012)
Constant	7.700***	8.369***	0.228***	0.081***	0.334***
	(0.297)	(0.292)	(0.051)	(0.005)	(0.075)
Observations	57339	57339	57339	57533	5028
Joint F-Test	0.87	0.96	0.01		
R-squared	0.10	0.14	0.37	0.04	0.09

* significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Columns 1 through 3 test whether the randomized variables are correlated with information observable before the experiment launch. For column 3, if the dormancy variable is omitted the F-test is 0.21. Column 4 shows that the decision to borrow by the client was affected by the

Regression equation

- Regress

$$Y_i = \alpha + \beta_o r_i^o + \beta_c r_i^c + \beta_w D_i + \gamma X_i + \varepsilon_{ib}$$

  where X_i includes the Lender's measure of observable risk, month and branch fixed effects.

- Errors ε_{ib} are clustered at the branch level.

Results

TABLE I

EMPIRICAL TESTS OF HIDDEN INFORMATION AND HIDDEN ACTION: FULL SAMPLE

	OLS							
Dependent Variable:	*Monthly Average Proportion Past Due*		*Proportion of Months in Arrears*		*Account in Collection Status*		*Standardized Index of Three Default Measures*	
Mean of Dependent Variable:	0.09	0.09	0.22	0.22	0.12	0.12	0	0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Contract rate (Hidden Action Effect 1)	0.005	0.002	0.006*	0.002	0.001	−0.001	0.014	0.004
	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.011)	(0.013)
Dynamic repayment incentive dummy (Hidden Action Effect 2)	−0.019*	−0.000	−0.028**	0.004	−0.025**	−0.004	−0.080**	−0.000
	(0.010)	(0.017)	(0.011)	(0.021)	(0.012)	(0.020)	(0.032)	(0.057)
Dynamic repayment incentive size		−0.005		−0.009**		−0.006		−0.023*
		(0.004)		(0.004)		(0.005)		(0.013)
Offer rate (Hidden Information Effect)	0.005	0.004	0.002	0.002	0.007	0.007	0.015	0.015
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.011)	(0.012)
Observations	4348	4348	4348	4348	4348	4348	4348	4348
Adjusted *R*-squared	0.08	0.08	0.14	0.15	0.06	0.06	0.10	0.11
Probability(both dynamic incentive variables = 0)		0.06		0.00		0.06		0.01
Probability(all 3 or 4 interest rate variables = 0)	0.0004	0.0005	0.0003	0.0012	0.0006	0.0016	0.0000	0.0001

*significant at 10%; **significant at 5%; ***significant at 1%. Each column presents results from a single OLS model with the RHS variables shown and controls for the randomization condtions: observable risk, month of offer letter, and branch. Adding loan size and maturity as additional controls does not change the results. Robust standard errors in parentheses are corrected for clustering at the branch level. "Offer rate" and "Contract rate" are in monthly percentage point units (7.00% interest per month is coded as 7.00). "Dynamic repayment incentive" is an indicator variable equal to one if the contract interest rate is valid for one year (rather than just one loan) before reverting back to the normal (higher) interest rates. "Dynamic repayment incentive size" interacts the above indicator variable with the difference between the lender's normal rate for that individual's risk category and the experimentally assigned contract interest rate. A positive coefficient on the Offer Rate variable indicates hidden information, a positive coefficient on the Contract Rate or Dynamic Repayment Incentive variables indicates hidden action (moral hazard).

The dependent variable in columns (7) and (8) is a summary index of the three dependent variables used in columns (1)–(6). The summary index is the mean of the standardized value for each of the three measures of default.

Conclusion

- Relatively strong evidence of economically significant moral hazard in a South African consumer credit market.
  - Moral hazard explains 13% to 21% of default in the sample.
- Weaker evidence of repayment burden and adverse selection effect.
  - Why?

2/ The miracle of microfinance? (Banerjee et al., AEJ Applied 2015)

The miracle of microfinance?

- Microcredit has generated considerable enthusiasm and hope for fast poverty alleviation.
- In 2006, Mohammad Yunus and the Grameen Bank were awarded the Nobel *Peace* Prize, for their contribution to the reduction in world poverty.
- In 2009, the Consultative Group to Assist the Poor (CGAP), an international organization housed at the World Bank and dedicated to accelerating financial inclusion, cited the following as contributions of microfinance:
  - eradication of poverty and hunger, universal primary education, the promotion of gender equality and empowerment of women, reduction in child mortality, and improvement in maternal health.
  - CGAP was far from alone in its enthusiasm.

The miracle of microfinance?

- In 2011, according to the Microcredit Summit, there were 195 million microcredit borrowers. (Banerjee, 2013)
- Polemic in the policy world:
  - “hyperprofits off the poor”
  - bankruptcy (e.g., “no pago” in Nicaragua)
  - violence/suicides
  - Mixed empirical evidence

The miracle of microfinance? (Banerjee et al, AEJ AP 2015)

- What are the effects of microcredit on development outcomes?
- *Challenge*: self-selection.
- This paper reports the first randomized evaluation of the effect of microcredit which target women.
- "It also follows the households over the longest period of any other study"
  - I.e., 3.5 years...

Experimental Design

1. Baseline survey (non-representative, used as controls and stratification only)
2. In 2005, 52 of 104 poor neighborhoods in Hyderabad (India) were randomly selected for opening an MFI branch (Spandana).
3. 18 months later, performed a comprehensive household survey (65hh in each area).
    - Spandana and other MFI (potentially) start operating in the control areas.
4. 2 years later, new survey.

Experimental Design

Table 1: Baseline Characteristics

	Treatment	Control	Difference	Obs
	(1)	(2)	(3)	(4)
PANEL A: Demographics				
Household size	5.13	5.04	0.095	2,440
	[1.78]	[1.67]	(0.092)	
Household expenditure (Rs/mo)	5,405	5,208	277	2,440
	[4,820]	[4,224]	(232)	
Household owns home	0.676	0.674	0.002	2,455
			(0.040)	
Household rents home	0.288	0.272	0.016	2,455
			(0.034)	
School attendance (7-11 yrs old)	0.981	0.974	0.007	1,290
			(0.010)	
School attendance (12-15 yrs old)	0.853	0.856	-0.002	1,135
			(0.023)	
Working for a wage (Wage Labor /Job Work)	0.410	0.407	0.003	4,660
			(0.034)	
Business income (business owners only, Rs/mo)	3,265	3,393	-128	650
	[3,982]	[7,469]	(541)	
Total household income (Rs/mo)	4,921	4,825	96	2,440
	[4,818]	[5,861]	(295)	
PANEL B: Household savings/insurance/shocks				
Household with at least 1 outstanding loan	0.684	0.682	0.002	2,440
			(0.029)	
Average loan outstanding (Rs)	20,228	25,779	-5,551	4,279
	[39,131]	[145,791]	(3087)	
Average interest rate (monthly)	4.017	3.771	0.245	3,727
	[10.18]	[2.50]	(0.441)	
Loans taken from moneylender	0.498	0.512	-0.014	4,249
			(0.040)	
Loans taken from friends or neighbors	0.252	0.255	-0.003	4,249
			(0.039)	
Loans taken from family members	0.137	0.129	0.007	4,249
			(0.018)	
Loans taken from commercial banks	0.028	0.03	-0.002	4,249
			(0.007)	
Household with a savings account	0.322	0.34	-0.019	2,439
			(0.028)	
Household with life insurance	0.23	0.237	-0.007	2,440
			(0.023)	
Household with health insurance	0.003	0.003	0	2,440
			(0.002)	
Household spent Rs. 500 on health shock, previous year	0.425	0.38	0.045	2,439
			(0.033)	
Household w/ sick member had to borrow	0.5	0.581	-0.081	774
			(0.04)	
PANEL C: Business				
Number of businesses per household	0.301	0.32	-0.019	2,440
	[0.62]	[0.68]	(0.034)	
Households with at least one business	0.233	0.242	-0.009	2,440
			(0.023)	
Business with any employees (%)	0.094	0.056	0.038	735
			(0.028)	
Business without any assets (%)	0.15	0.157	-0.007	747
			(0.044)	
Average revenues (Rs/mo)	9,396	10,051	-655	695
	[13,945]	[15,592]	(1242)	

Note: Standard deviations of nonbinary variables in brackets (cols 1 and 2). Standard errors of differences, clustered at the area level, in parentheses (col 3). all monetary amounts in 2005 Rs. Rs. 1 equals 0.7 household's daily wage.

Model

- Two periods, two goods:
  - Non-durables c_n
  - Durables c_d lasts for two periods and yields services, ac_d, in both periods, $a \in (0, 1)$.
- Utility in the first period:

$$u(c) = \begin{cases} c_n & \text{if not buy durables} \\ c_n + ac_d & \text{if buy durables} \end{cases}$$

Model

1. Compare two people, one of whom has higher access to credit. More likely to buy durable, her second-period non-durable consumption will be lower.
2. Increased access to credit increases the likelihood that the consumer makes a fixed investment but reduce the average product of the projects that get implemented.
3. Increased access to credit can lead to an increase in labor supply in the first period.
4. If durables and non-durables are not perfect substitutes, increased access to credit may raise labor supply in both periods.

The miracle of microfinance? Results

- Estimates the impact of microfinance becoming available in an area: intent to treat (ITT);
  - that is, simple comparisons of averages in treatment and comparison areas, averaged over borrowers and non-borrowers.

- Main specification

$$y_{ia} = \alpha + \beta \times Treat_{ia} + X_a^{'} \gamma + \varepsilon_i$$

- Standard errors clustered at the area level and all regressions are weighted to correct for oversampling of Spandana borrowers.

Results – Take up

Table 3: Borrowing

	Borrows from:				Amount borrowed from:					
	Any MFI	Spandana	Informal lender	A bank	Any MFI	Any MFI (borrowers only)	Spandana	Informal lender	A bank	Number of cycles borrowed from an MFI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: endine 1										
Treatment	0.088***	0.13***	-0.052**	0.0026	1355***	1030	1391***	-1072	49	0.11***
	(0.027)	(0.021)	(0.021)	(0.012)	(447)	(785)	(239)	(2519)	(2157)	(0.041)
Mean in control	0.18	0.052	0.76	0.079	2374	12976	597	41045	8422	0.32
Stdev in control	0.39	0.22	0.43	0.27	6652	10216	2907	78033	101953	0.67
Nobs	6811	6811	6811	6811	6811	1616	6811	6811	6811	6816
Panel B: endine 2										
Treatment	0.0058	0.067***	0.0024	0.00042	869	2344**	1046***	137	-1187	0.133*
	(0.030)	(0.020)	(0.018)	(0.0085)	(690)	(1052)	(306)	(2922)	(1081)	(0.068)
Mean in control	0.33	0.11	0.6	0.073	5544	16752	1567	32356	6127	0.72
Stdev in control	0.47	0.31	0.49	0.26	11348	14192	5618	76704	40308	1.09
Obs	6142	6142	6142	6142	6142	2094	6142	6142	6142	5926

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.

(2) "Informal lender" includes moneylenders, loans from friends/family, and buying goods/services on credit. Number of loan cycles from an MFI (col 10) is the maximum number of loan cycles borrowed with a single MFI, including the current loan (if any); number of cycles is zero for MFI never-borrowers.

(3) All monetary amounts in 2007 Rs.

(4) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Results – Consumption

Table 4: Consumption

	Monthly (per capita)			Yearly (total)						
	Total	Non durable	Tempt-ation goods	Durable (total)	Festivals	Home repairs (any>Rs 500)	Home repairs (mean if any>Rs 500)	Health	Education: total	Education: Fees
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: endine 1										
Treatment	10.1	-6.6	-8.73*	1154*	-763*	-0.03	-1613	-10	-6.93	8.37
	(37.2)	(31.8)	(4.88)	(682)	(454)	(0.020)	(3588)	(53)	(48.0)	(31.5)
Mean in control	1419.2	1304.8	83.9	6609	3732	0.51	18313	630	777	346
Stdev in control	978.3	852.4	130.2	19481	5851	0.5	65428	1916	1179	679
Nobs	6827	6781	6863	6781	6827	6834	2198	6827	5415	5404
PANEL B: endline 2										
	-48.3	-44.9	-9.99	62	205	0.004	584	-130*	70	88**
	(51.4)	(46.9)	(6.64)	(524)	(205)	(0.017)	(7039)	(75)	(69)	(42)
	0.0054	0.0065	0.007			0.0028				
Mean in control	1914.3	1755.2	117.7	8639	5994	0.57	28876	1022	1142	513
Stdev in control	1354.9	1209.5	182.4	18438	6901	0.5	192246	2655	1691	1211
Obs	6142	6142	6142	6140	6103	6141	3439	6141	4910	4910

Notes:
(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.
(2) See Appendix 2 for description of the construction of the profits, sales, and inputs variables.
(3) All monetary amounts in 2007 Rs.

Results – Entrepreneurship

Table 5: Business Creation and outcomes (entire sample)

	in the last year					currently			in the last month		
	Started a business	Num. business started	Num. female business started	Closed a business	Value of business assets acquired	Value of business assets	Has at least a business	Num. business owned	Business revenue	Business inputs	Business profits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: endine 1											
Treatment	0.0093	0.016**	0.015***	0.002	389*	606	0.01	0.022	920	244	357
	(0.0061)	(0.0075)	(0.0054)	(0.0076)	(212)	(383)	(0.022)	(0.033)	(1181)	(1052)	(313)
Mean in control	0.047	0.053	0.026	0.037	280	2498	0.34	0.44	4856	4055	745
Stdev in control	0.21	0.25	0.17	0.19	4038	10802	0.47	0.72	33108	30446	10695
Nobs	6757	6757	6762	2352	6800	6800	6805	6805	6608	6685	6239
Panel B: endine 2											
Treatment	-0.00049	0.0023	-0.005	-0.00042	-134	1288**	0.023	0.047	267	-540	557
	(0.010)	(0.013)	(0.0062)	(0.0064)	(208)	(531)	(0.023)	(0.040)	(527)	(543)	(371)
Mean in control	0.083	0.093	0.047	0.053	1007	5003	0.42	0.56	5847	5225	953
Stdev in control	0.28	0.33	0.23	0.23	9623	14423	0.49	0.79	16784	20603	11280
Obs	6142	6142	6142	6142	6142	6142	6142	6142	6116	6116	6090

Notes:

Results – Labor Supply

Table 8: Labor supply

	Hours worked by head and spouse, total	Hours worked by head and spouse for wage	Hours worked by head and spouse, own business	Hours worked by children aged 9-17
	(1)	(2)	(3)	(4)
Panel A: endline 1				
Treatment	3.22**	0.44	2.78*	0.19
	(1.42)	(1.42)	(1.48)	(0.38)
Mean in control	57.8	32	25.8	3
Stdev in control	35.9	34.4	34.6	10.9
Nobs	6827	6827	6827	3880
Panel B: endline 2				
Treatment	1.07	-0.7	1.77	-0.12
	(1.18)	(1.48)	(1.58)	(0.30)
Mean in control	51.3	25.9	25.4	2.76
Stdev in control	35.4	31.4	33.4	9.83
Obs	6142	6142	6142	3570

Notes:
(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.
(2) Column 4 includes only households with children aged 9-17.

The miracle of microfinance?

Conclusion

- In the short run, microfinance plays a role in helping households make different intertemporal consumption choices.
  - More durables, less “temptation” goods and increase in labor supply.
- 18 months after gaining access to MFI’s credit, households are no more likely to own a business, but are more likely to start business (> 1), and invest more in existing business (with positive effects on profits).
- *The median marginal new business is both less profitable and less likely to have even one employee in treatment than in control areas.*

The miracle of microfinance?

Conclusion

- After 3 years, **no differences** on
  - tiny effects on business outcomes (no effects on profits),
  - average consumption,
  - woman's empowerment, or
  - human development outcomes (e.g., education, health etc)
- Almost 70% of eligible households do not have an MFI loan, preferring alternative sources.
- Miracle?

Evidence from Bayesian Hierarchical Analysis

Rachel Meager (AEJ Ap 2019)

- Bayesian hierarchical models serve as a methodology for aggregation of data from different studies
- Analyses evidence from 7 RCTs of expanding access to microcredit

Understanding the Average Impact of Microcredit Expansions

- "I find the impact on household business and consumption variables is unlikely to be transformative and may be negligible."
  - Zero effects on hh profits within the 95% posterior credible interval

Aggregating Distributional Treatment Effects

- Generalizable evidence that microcredit has negligible impact on the distribution of various household outcomes below the 75th percentile
  - ...but above this point there is no generalizable prediction
- Households with previous business experience have larger but more heterogeneous effects.

3/ Financial Inclusion

Financial inclusion, economic development, and inequality: Evidence from Brazil

by Julia Fonseca and Adrien Matray (JFE, 2024)

Thiago Ribeiro

Próxima aula

General Equilibrium – Muralidharan, K., Niehaus, P., Sukhtankar, S. (2023). General equilibrium effects of (improving) public employment programs: Experimental evidence from India. *Econometrica*