

Group versus Individual Liability: A Field Experiment in the Philippines

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Basic Idea

- Problem: difficult to compare individual contracts with group contract
 - ↳ most lenders use one or the other
 - ↳ borrower characteristics may vary between contract types
- Green Bank of Caraga randomly converted some of its group-lending centers to individual liability (August 2004-May 2005)
 - ↳ allows a randomized control trial to evaluate the impact of group vs. individual liability on repayment and profitability

Table 1: Summary Statistics

	All	Control	Treatment				T-stat Control vs Treatment
			All Waves	Wave 1	Wave 2	Wave 3	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Center Performance, pre-intervention							
Total number of accounts	20.500 (0.924)	20.253 (1.261)	20.253 (1.367)	23.600 (4.017)	18.333 (2.653)	21.218 (1.742)	0.774
Average Loan size	6079.383 (159.788)	6139.096 (227.945)	6009.355 (223.152)	4758.583 (348.283)	5997.003 (413.538)	6300.813 (303.584)	0.689
Proportion of missed weeks over cycle (May-Aug 2004)	0.079 (0.011)	0.078 (0.015)	0.083 (0.019)	0.059 (0.034)	0.067 (0.022)	0.079 (0.017)	0.926
Retention (May-Aug 2004)	0.904 (0.011)	0.901 (0.016)	0.906 (0.015)	0.933 (0.020)	0.930 (0.022)	0.892 (0.022)	0.758
Observations	169	89	80	11	24	45	
B. Individual-level Performance, pre-intervention							
Proportion of missed weeks over cycle	0.953 (0.002)	0.058 (0.004)	0.066 (0.005)	0.090 (0.020)	0.065 (0.008)	0.059 (0.005)	0.241
Loan amount in August 2004	6082.074 (64.944)	6123.237 (90.359)	6036.125 (93.072)	5165.354 (180.301)	5778.497 (193.300)	6399.568 (125.040)	0.503
Number of active clients, August 2004	3,308	1,744	1564	231	399	972	

Standard errors in parentheses. 52 pesos = US\$1. t-statistics reported in column (7) is the probability of (column (2) - column (3)) being zero.

Group Liability program: BULAK

- Each center consists of 15-30 individuals. Groups of 5 with *joint liability*
- 12,000 clients in 400 centers
- Study focuses on 169 centers from the island of Leyte
- Borrowers are female entrepreneurs
- Progressive lending (up to \$450)
- Interest rate = 2.5% per month. Weekly repayments.
- Mandatory savings deposits each week, plus a fee.

Random switch to individual liability

- New loans could be issues even if other are in default
- Group savings switched to individual accounts
- All other aspects of program remained the same
- First wave of conversion: 11 centers in August 2004
- Second wave of conversion: 24 centers in November 2004
- Third wave wave of conversion: 45 centers in May 2005

Primary Results (Table 2)

- Uses a difference-in-differences model estimated by OLS:

$$y_{igt} = \alpha + \beta T_{gt} + \delta_t + \theta_g + \varepsilon_{igt}$$

where

$$y_{igt} = \left\{ \begin{array}{l} \text{repayment} \\ \text{savings} \\ \text{loan size} \end{array} \right\} \text{ of individual } i \text{ from group } g \text{ at date } t$$

- and

$$T_{igt} = \left\{ \begin{array}{ll} 1 & \text{if individual liability} \\ 0 & \text{if group liability} \end{array} \right.$$

$$\delta_t = \text{time "fixed effects"}$$

$$\theta_g = \text{centre fixed effects}$$

Table 2: Cycle-level Impact on Default, Savings, and Loan Size by Conversion Waves

OLS

Sample frame: Baseline clients only

Dependent Variable:	Proportion of missed weeks	Percentage of past due balance, at maturity date	Past due balance,		Loan Size
			30 days past maturity date (binary)	Total excess savings	
	(1)	(2)	(3)	(4)	(5)
Panel A: Wave 1 Conversion (Aug 2004)					
Treatment	-0.017 (0.040)	0.051 (0.077)	0.004 (0.003)	9.679 (69.493)	-853.041 (726.291)
Constant	0.916*** (0.006)	0.131*** (0.021)	0.000 (0.000)	44.712*** (16.487)	2,490.513*** (84.169)
Mean of dependent variable	0.078	0.133	0.001	1.000	6395.923
Observations	9027	9027	9027	8097	9027
Number of group(branch center)	97	97	97	97	97
R-squared	0.07	0.01	0.01	0.01	0.17
Panel B: Wave 2 Conversion (Nov 2004)					
Treatment	0.017 (0.014)	0.070 (0.113)	0.002 (0.003)	-32.080 (29.751)	-962.557** (418.074)
Constant	0.831*** (0.016)	0.188*** (0.042)	0.002*** (0.001)	111.848*** (12.333)	354.202* (206.981)
Mean of dependent variable	0.075	0.179	0.002	2.000	6314.152
Observations	10557	10557	10557	9434	10557
Number of group(branch center)	112	112	112	112	112
R-squared	0.08	0.01	0.01	0.01	0.14
Panel C: Wave 3 Conversion (May 2005)					
Treatment	-0.029 (0.022)	0.029 (0.091)	0.003 (0.003)		-407.574 (343.917)
Constant	0.008 (0.007)	0.094* (0.051)	0.002*** (0.000)		2,724.253*** (88.509)
Mean of dependent variable	0.076	0.131	0.001		6345.303
Observations	14189	14189	14189		14189
Number of group(branch center)	134	134	134		134
R-squared	0.08	0.01	0.01		0.12

Robust standard errors clustered by lending centers in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions use fixed effect for lending centers and time. Proportion of missed weeks is calculated by the number of weeks in which the client did not make the full installment divided by the number of installments. Savings data are only analyzed up to September 2005 because systematic savings policy changes for control centers occurred in September 2005 which effectively required higher savings in control centers than treatment centers. Treatment variable is one if the loan cycle ends after the conversion in treatment centers; zero otherwise.

Table 3: Cycle-level Impact on Default, Savings, and Loan Size, All waves combined

Sample frame: All clients (both baseline and new clients)

Dependent Variable:	Proportion of missed weeks	Past due balance,		Total excess savings (pesos)	Loan Size (pesos)
		Percentage of past due balance, at maturity date	30 days past maturity date (binary)		
	(1)	(2)	(3)	(4)	(5)
Treatment	-0.009 (0.016)	-0.146 (0.106)	-0.001 (0.002)	-19.397 (22.184)	-620.800** (264.535)
New member after Aug 04	-0.016 (0.010)	-0.067 (0.095)	-0.001 (0.001)	-23.194 (21.267)	-3,405.221*** (257.466)
New member after Nov 04	-0.008 (0.014)	-0.057 (0.202)	-0.001 (0.003)	23.726 (28.997)	-964.930*** (321.448)
New member after May 05	-0.049** (0.019)	0.135 (0.470)	-0.001 (0.009)	-67.756 (44.004)	-1,542.772*** (381.606)
Treatment x New member after Aug 04	0.003 (0.018)	0.788 (0.527)	0.011 (0.008)	41.056 (37.712)	975.684*** (334.453)
Treatment x New member after Nov 04	-0.004 (0.023)	-0.792 (0.513)	-0.013 (0.008)	57.082 (47.004)	-775.486* (422.484)
Treatment x New member after May 05	0.051 (0.038)	0.194 (0.624)	0.009 (0.016)	-4.612 (71.083)	518.325 (473.306)
Constant	0.624*** (0.218)	0.124*** (0.027)	0.001*** (0.001)	167.416*** (60.982)	1,176.215** (476.488)
Mean of dependent variable	0.080	0.184	0.002	253.021	6154.993
Observations	18217	18217	18217	18122	18217
R-squared	0.06	0.01	0.01	0.01	0.18

Robust standard errors clustered by lending center in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions use fixed effect for centers and time. Proportion of missed weeks is calculated by the number of weeks in which the client did not make the full installment divided by the number of installments. Savings data only analyzed up to September 2005 because systematic savings policy changes for control centers occurred in September 2005 which effectively required higher savings in control centers than treatment centers. Treatment variable is one if the loan cycle ends after the conversion in treatment centers; zero otherwise.

Other Effects

- No statistically significant differences in time allocation of credit officers (Table 6)
- Prior members are more likely to know new members well under individual than group liability (Table 7)
- ↳ goes against idea that group lending encourages peer monitoring
- ↳ hypothesis: family members don't like to punish each other
- Less monitoring: individual became less informed about each other

Table 6: Activity-Based Costing Analysis: Time Spent on Different Activities by Center

OLS

	Total Time (1)	Time on repayment activities (2)	Time on center meeting (3)	Time on loan monitoring (4)	Time on loan enforcement (5)	Time on following up with delinquent clients (6)	Time on reloan (7)
Treatment	0.019 (0.268)	0.029 (0.157)	-0.033 (0.086)	-0.085 (0.066)	-0.145 (0.087)	-0.086 (0.071)	0.211 (0.143)
Constant	1.640** (0.267)	1.333** (0.164)	0.487** (0.089)	0.108 (0.074)	0.139 (0.097)	0.090 (0.070)	-0.020 (0.120)
Observations	146	146	146	146	146	146	146
R-squared	0.32	0.22	0.09	0.06	0.06	0.05	0.15

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Each cell reports the average time spent on indicated activity per center in a given week in January 2006. Repayment includes preparing for center meetings, travel time, and handling the collection; center meeting indicates the time spent on the actual meeting. Monitoring involves making reports, answering clients' questions; enforcement includes loan utilization check and following up with delinquent clients. Reloan includes conducting credit evaluation, filling/reviewing of loan forms, and releasing the loan.

Table 7: Knowledge About Other Members of the Center

Clients were asked about (a) how well they knew incoming members who joined the center, and
(b) other members' performances over three months prior to the survey

Sample Frame: Clients who were present at the survey which took place during a center meeting in November 2005

Sample Frame:	Knowledge about new members only				Knowledge about all other members							
	Baseline Clients	New Clients	Baseline Clients	New Clients	Baseline Clients	New Clients	Baseline Clients	New Clients	Baseline Clients	New Clients	Baseline Clients	New Clients
Dependent Variable:	Knew the new member well when they entered the center		Knew Business		Accuracy in reporting amount of installment		Accuracy in reporting number of defaults		Knew whether or not the client defaulted		Predicted default	
	Ordered probit (1)	Ordered probit (2)	Probit (3)	Probit (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)	Probit (9)	Probit (10)	Probit (11)	Probit (12)
Treatment	0.310*** (0.104)	-0.272*** (0.023)	-0.000 (0.019)	0.018 (0.025)	-4.585 (5.582)	-1.970 (6.363)	-0.091* (0.048)	-0.259** (0.100)	-0.018 (0.019)	-0.019 (0.026)	-0.018 (0.024)	-0.059** (0.029)
Constant			0.524*** (0.071)	0.323*** (0.086)	101.385*** (11.602)	81.935*** (12.856)	-0.933*** (0.123)	-0.787*** (0.184)	0.716*** (0.075)	0.285** (0.128)	0.897*** (0.026)	0.888*** (0.031)
Observations	1693	971	4015	1908	2902	1376	4128	2178	4161	2194	3684	1926
R-squared			0.06	0.08	0.03	0.06	0.29	0.19	0.12	0.15	0.11	0.09

Robust standard errors clustered by respondents in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Marginal coefficients reported for the probit specifications. All regressions use fixed effect for credit officers. Dependent variable for regressions in columns (1) and (2) is a categorical variable for how well the respondent knew the new member before she joined the program; 0 if did not know at all, 1 if knew a little, 2 if knew well, 3 if knew very well. Columns (5) through (8) are equal to the negative of the absolute value of the difference between the reported figure (installment amount for 5 and 6, number of defaults for 7 and 8) and the actual figure.

Heterogeneous Treatment Effects (Table 9)

- How did the effects differ across groups with different "social capital"?
 - ↳ measures of social capital from survey conducted in November 2004
- Shift to individual liability reduces fraction of missed weeks more for those with strong social networks
- But those with weaker social networks prior to conversion were more likely to default after conversion
 - ↳ hypothesis: those with weaker social networks have less to lose

Table 9: Impact of Social Network on Default

OLS

Sample Frame: Clients who were present at the meeting during the baseline social network baseline survey

	Knowledge					Trust				
	Family (1)	Friends (2)	Buy products (3)	Visit once a week (4)	Knowledge index (5)	Given loan (6)	Voluntary help (7)	Go for advice (8)	Trust index (9)	All (10)
Mean of social network out-degree measure	0.110 (0.003)	0.045 (0.002)	0.291 (0.005)	0.131 (0.004)	0.410 (0.005)	0.036 (0.002)	0.015 (0.001)	0.071 (0.003)	0.092 (0.003)	0.418 (0.005)
Panel A: Dependent variable is proportion of missed weeks										
Treatment	-0.036 (0.023)	-0.033 (0.021)	0.003 (0.024)	-0.029 (0.022)	0.000 (0.024)	-0.028 (0.021)	-0.035 (0.021)	-0.041* (0.024)	-0.019 (0.022)	0.005 (0.024)
Social network out-degree	-0.001 (0.036)	0.028 (0.038)	0.102*** (0.036)	0.067** (0.034)	0.077*** (0.027)	0.128*** (0.049)	0.103 (0.078)	0.008 (0.038)	0.108** (0.043)	0.082*** (0.027)
Treatment x Social network out-degree	-0.023 (0.047)	-0.073 (0.061)	-0.114** (0.055)	-0.064 (0.054)	-0.080** (0.040)	-0.155* (0.081)	-0.162 (0.127)	0.046 (0.137)	-0.145** (0.060)	-0.087** (0.038)
Constant	0.085*** (0.026)	0.083*** (0.027)	0.038 (0.029)	0.072*** (0.027)	0.044 (0.029)	0.071*** (0.024)	0.080*** (0.025)	0.084*** (0.027)	0.066** (0.027)	0.040 (0.028)
Observations	2688	2688	2688	2688	2688	2688	2688	2688	2688	2688
Number of center fixed effects	157	157	157	157	157	157	157	157	157	157
R-squared	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Panel B: Dependent variable is percentage of past due balance at the maturity date										
Treatment	0.419 (0.285)	0.194 (0.321)	0.488 (0.431)	0.493* (0.297)	0.728 (0.562)	0.466* (0.272)	0.279 (0.262)	0.038 (0.505)	0.509* (0.283)	0.765 (0.574)
Social network out-degree	-0.550 (0.395)	-0.179 (0.466)	0.543 (0.357)	-0.043 (0.340)	0.046 (0.220)	0.160 (0.436)	0.342 (0.906)	-0.042 (0.280)	0.238 (0.370)	0.118 (0.260)
Treatment x Social network out-degree	-1.617 (1.227)	0.913 (1.768)	-0.642 (0.848)	-1.908 (1.678)	-1.006 (1.007)	-3.703 (2.412)	-1.359 (1.480)	3.256 (5.341)	-2.312** (1.094)	-1.050 (0.987)
Constant	0.549*** (0.143)	0.459*** (0.127)	0.203 (0.174)	0.439*** (0.125)	0.348*** (0.133)	0.310** (0.134)	0.432*** (0.121)	0.538** (0.207)	0.362*** (0.115)	0.309** (0.148)
Observations	2688	2688	2688	2688	2688	2688	2688	2688	2688	2688
Number of center fixed effects	157	157	157	157	157	157	157	157	157	157
R-squared	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Robust standard errors clustered by lending centers in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions use fixed effect for time and centers. Panel A reports the regressions on indegree over maximum number of links possible. This measure reports how prestigious is the member in relation to the group size from a degree perspective (the member has more prestige if he/she receives many links); Panel B reports the regressions on outdegree over maximum number of links possible. This measure reports how central is the member in relation to the group size from a degree perspective (the member is more central if he/she sends many links). See below for the definition of social network indices

Social network variables are defined as below:

- 1 Family: Have known this person since either one was a child (grandparents, parents, siblings, spouses, children, grandchildren, and cousins).
- 2 Friends: Have known this person since either one was a child (non-family members/relative)
- 3 Bought products: Have bought products or services from this person
- 4 Visit once a week: Visit this person house for social purposes at least once a week.
- 5 Knowledge index: Aggregate of 1 through 4
- 6 Given loan: Have given this person a loan outside of Bulak.
- 7 Voluntarily helped: Have voluntarily helped this person repay loans in Bulak.
- 8 Go for advise: Turn to this person for advise or help for any type of life problem; health, financial, or emotional.
- 9 Trust: Aggregate of 6 through 8
- 10 All: Aggregate of 1 through 4, and 6 through 8.

Main Conclusions

- Less monitoring of each other's loan performance
- But no change in repayment rate
- Increased growth in clientele
- New borrowers had *closer* social ties to prior members
- Those with weaker social networks prior to conversion were more likely to default after conversion