Do Social Ties Trump Collateral in Determining Loan Performance?

Evidence Using Same Day Loan Repayments

Sumit Agarwal, Prasanna Tantri and Nitin Vishen

Research Question

Whether social ties (in group lending with joint liability) outperform traditional collateral (in individual-liability lending) in terms of containing loan default?

Why Is The Question Relevant?

- **Industry Trend**:
  Many Micorfinance Institutions (MFIs) are moving away from Joint Liability Group Lending towards Individual Lending
  .
- **Opposing Evidence in Literature**:
  - Carpena, Cole, Shapiro, and Zia (2012): Group lending does better than individual lending in terms of repayment rates
  - Gine and Karlan (2014): Joint-liability based group loans and individual loans have same repayment rates. Both loans are unsecured.
  - Attanasio et al (2015): Joint-liability based group loans and individual loans have same repayment rates. Both loans are collateralized.

The Best Way to Answer the Question?

The best test would involve a single lender who employs a range of contracts. ... The best evidence will come from well-designed, deliberate experiments in which loan contracts are varied but everything else is kept the same.

- Armendariz and Morduch
The Economics of Microfinance, Second Edition, 2010

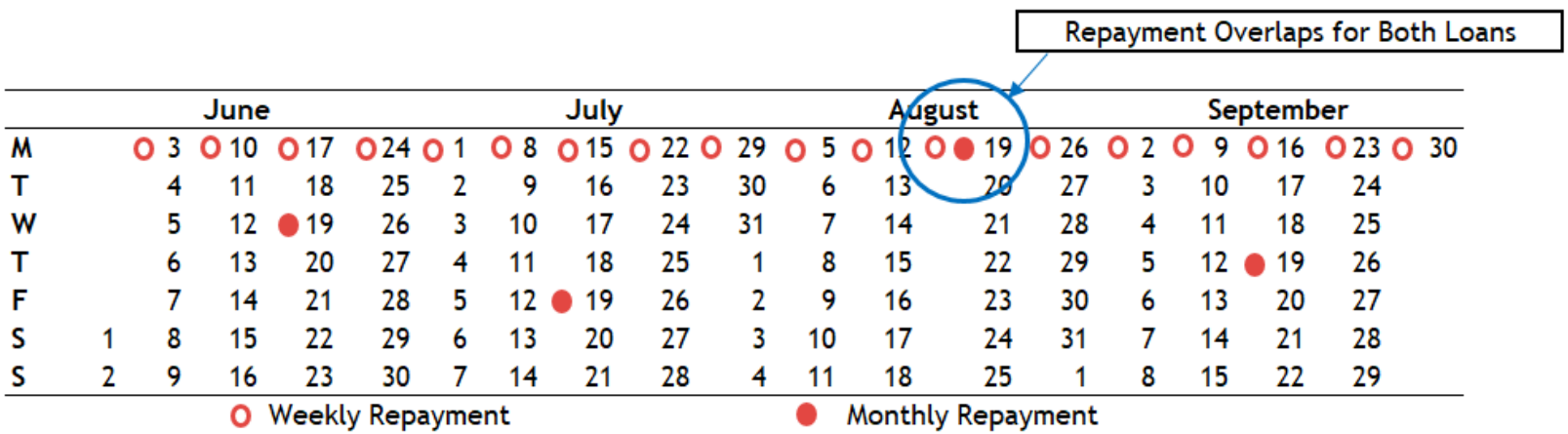
Empirical Setting

Institution:

- Loan transaction level data from a large Non-Banking Financial Company in India; operating in the states of Tamil Nadu, Odisha and Uttarakhand
- All transactions take place at branch offices

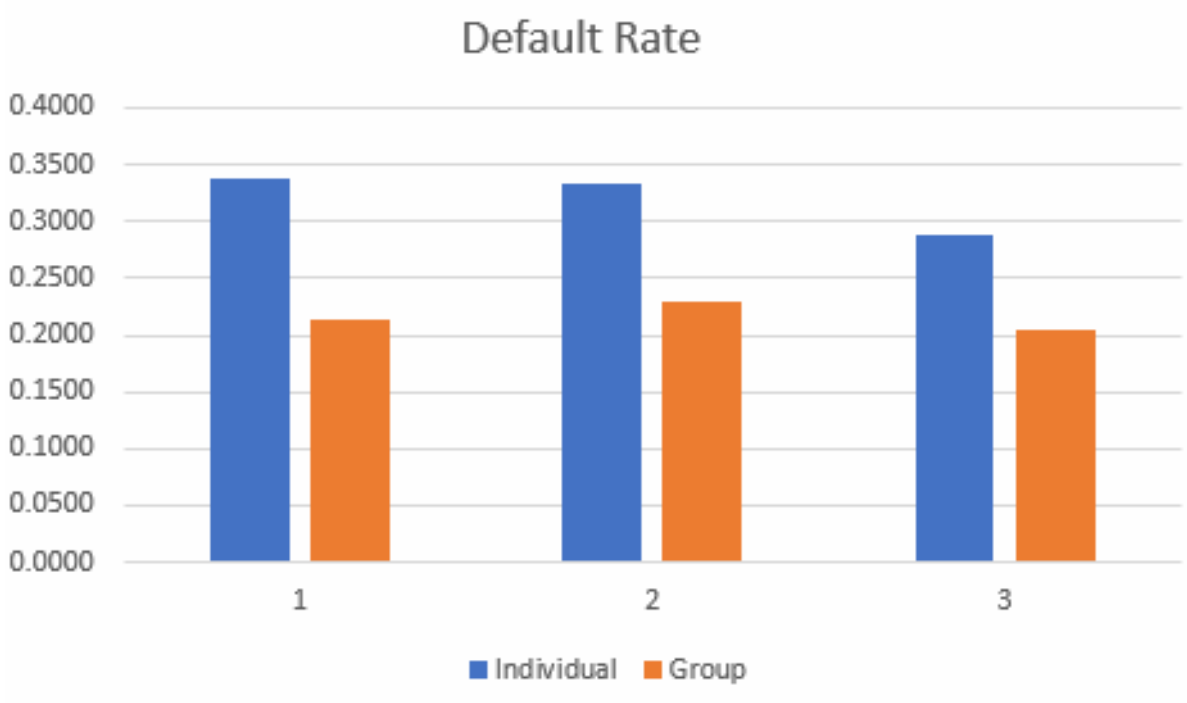
Borrowers in our sample:

- Borrowers who took out two loans:
  1. One Joint Liability Group Loan, and
  2. One Individual Loan
- Two loans have (partially or completely) overlapping repayment periods
  - Sometimes both the loans have to be repaid on the same day



Three Sub-samples

1. All the repayments in which group and individual loans are running simultaneously
2. The repayment instances where a borrower is required to repay a group loan and an individual loan on the same day
3. Subset of sample 2 where the two types of loans have different repayment frequencies



Sub-sample 1

Sample Period	Jun-09	to	Jul-15
	Group	Individual	Total
Number of Borrowers	14151	14151	14151
Number of Loans	20397	16083	36480
Number of Installment Repayments	825193	235360	1060553
Number of Simultaneous Installment Repayments	796916	234033	1030949

Sub-sample 2 and 3

Panel A: Group and Individual Loans have different repayment frequencies; one weekly and the other monthly			
Loan Type	Number of Borrowers	Number of Loans	Number of Installment Repayments
Group	8362	9984	13704
Individual	8362	8919	13596
Total	8362	18903	27300

Panel B: Group and Individual Loans both have weekly repayment frequencies			
Group	313	323	13104
Individual	313	316	13090
Total	313	639	26194

Panel C: Group and Individual Loans both have monthly repayment frequencies			
Group	1835	1988	23065
Individual	1835	1995	23121
Total	1835	3983	46186

Summary Statistics

			Percentiles				
	Mean	Std Dev	1%	25%	50%	75%	99%
Borrower Characteristics							
Age (Years)	39.96	8.55	23	33	40	46	58
Higest Household Education (Years)	8.38	5.43	0	5	10	12	17
Monthly Household Income (INR)	13516.53	26807.27	1458	6000	10000	16145	62500
Monthly Household Expense (INR)	4025.78	2621.56	524	2391	3549	4866	8506
Land Area (sq km)	4.00	55.05	0	0	0	0	122.08
Loan Statistics							
Default	0.2355	0.4243	0	0	0	1	1
Loan Aount (INR)	18064.61	7386.40	1000	15000	20000	24000	35000
Interest Rate	0.2254	0.1160	0.0000	0.2194	0.2397	0.2519	0.3507
Tenure (Years)	1.02	0.20	0.87	0.96	0.96	1	2
Group Loans							
Default	.2045	.4033	0	0	0	0	1
Loan Amount (INR)	18663.17	5471.41	5000	15000	20000	20000	35000
Interest Rate	.2170	.0946	0	.2194	.2397	.2397	.2593
Tenure (years)	.9867	.0736	.9615	.9615	.9615	.9615	1.1923
Individual Loans							
Default	.3442	.4751	0	0	0	1	1
Loan Amount (INR)	15965.99	11628.73	1000	2000	20000	25000	45000
Interest Rate	.2605	.1752	0	.2490	.2605	.2696	1.0359
Tenure (years)	1.14	.38	.5	1	1	1	2

What do we find?

$$Y_{itj} = \alpha + \nu_i + \gamma_j + \beta_1 * \text{Group}_{ij} + \beta_2 * \text{Borrower Characteristics}_{itj} + \varepsilon_{itj}$$

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Group	-0.1257***	-0.1024***	-0.0832***	-0.1432***	-0.1139***	-0.1097***
	(-35.24)	(-13.39)	(-12.08)	(-31.16)	(-12.16)	(-9.38)
Household Size				-0.0033	-0.0493***	-0.0028
				(-0.51)	(-3.42)	(-0.11)
log (Land Area)				0.0001	-0.0002	0.0002
				(0.08)	(-0.08)	(0.05)
log (Household Income)				0.0372***	0.0440***	0.0392***
				(9.85)	(5.84)	(3.81)
log (Household Expense)				-0.0049	-0.0426***	-0.0167
				(-0.85)	(-3.30)	(-1.09)
Age				0.0048***	0.0062**	0.0067**
				(3.30)	(2.55)	(2.48)
Constant	0.5626***	-0.0247	0.0716	0.1339	-0.1908	-0.3323
	(4.38)	(-0.16)	(0.37)	(0.89)	(-0.95)	(-1.35)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1030949	99619	27300	1012199	94984	27277
R^2	0.394	0.540	0.442	0.403	0.554	0.444

What do we find?

Robustness: Non-performing Assets (NPA) = Payment delayed > 90 days

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
				NPA		
Group	-0.0475***	-0.0811***	-0.0355***	-0.0651***	-0.0963***	-0.0533***
	(-24.04)	(-14.69)	(-8.77)	(-27.56)	(-14.32)	(-8.58)
Household Size				-0.0080**	-0.0428***	0.0308*
				(-2.29)	(-3.29)	(1.91)
log (Land Area)				-0.0006	-0.0015	-0.0002
				(-0.80)	(-1.05)	(-0.13)
log (Household Income)				0.0321***	0.0540***	0.0252***
				(16.33)	(10.77)	(4.86)
log (Household Expense)				0.0024	-0.0396***	0.0017
				(0.76)	(-3.86)	(0.21)
Age				0.0016*	0.0015	0.0036*
				(1.85)	(0.93)	(1.96)
Constant	0.4434***	-0.1023	-0.0868	0.1209	-0.2160*	-0.4558***
	(3.38)	(-1.60)	(-1.00)	(0.86)	(-1.76)	(-3.17)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1030949	99619	27300	1012199	94984	27277
R^2	0.162	0.316	0.364	0.167	0.325	0.366

What do we find?

Land or Gold as Collateral

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
				Default		
Group	-0.1921***	-0.1265***	-0.1893***	-0.2015***	-0.1235***	-0.2457***
	(-27.12)	(-11.63)	(-14.06)	(-22.76)	(-8.50)	(-10.69)
Household Size				-0.0000	0.0072	-0.0138
				(-0.00)	(0.31)	(-0.37)
log (Land Area)				-0.0071***	-0.0089***	-0.0139***
				(-4.52)	(-3.08)	(-4.21)
log (Household Income)				0.0114*	-0.0155	0.0470***
				(1.90)	(-1.18)	(2.62)
log (Household Expense)				0.0073	0.0111	0.0149
				(0.84)	(0.63)	(0.59)
Age				0.0091***	0.0153***	0.0096**
				(3.57)	(3.72)	(2.12)
Constant	0.4175***	0.0667	0.2643	-0.0303	-0.4481	-0.5207
	(4.72)	(0.30)	(1.23)	(-0.20)	(-1.41)	(-1.47)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	309606	21789	8548	304484	20721	8542
R^2	0.355	0.506	0.452	0.362	0.517	0.459

What do we find?

Gold as Collateral

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Group	-0.9293***	-0.9353***	-0.9361***	-0.9300***	-0.9583***	-0.9612***
	(-112.36)	(-63.63)	(-63.06)	(-81.75)	(-38.93)	(-38.40)
Household Size				0.0079	0.0054	0.0055
				(0.96)	(0.19)	(0.20)
log (Land Area)				0.0010	-0.0008	-0.0010
				(0.35)	(-0.17)	(-0.20)
log (Household Income)				-0.0034	0.0191	0.0215
				(-0.46)	(0.82)	(0.92)
log (Household Expense)				-0.0157	-0.0377	-0.0361
				(-1.07)	(-0.57)	(-0.54)
Age				-0.0014	-0.0031	-0.0032
				(-0.38)	(-0.51)	(-0.53)
Constant	0.9363***	0.9794***	0.9773***	1.1310***	1.2336**	1.2026**
	(98.72)	(60.17)	(58.92)	(6.06)	(2.15)	(2.11)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	50258	1568	1549	50182	1565	1546
R^2	0.842	0.928	0.929	0.841	0.928	0.930

Plausible Channel

Economic Shock: 20% Decline in Month-on-Month Night Lights in the District

$$Y_{itj} = \alpha + \nu_i + \gamma_j + \beta_1 * \text{Shock}_{itj} + \beta_2 * \text{Borrower Characteristics}_{itj} + \varepsilon_{itj}$$

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Shock	0.0720***	0.0575***	0.0951***	0.0715***	0.0577***	0.0964***
	(31.49)	(3.51)	(4.81)	(31.05)	(3.45)	(4.81)
Household Size				0.0162***	0.0111	0.0585**
				(2.62)	(0.63)	(1.99)
log (Land Area)				0.0115***	0.0076**	0.0075**
				(6.40)	(2.21)	(2.02)
log (Household Income)				-0.0812***	-0.0971***	-0.1044***
				(-21.47)	(-9.90)	(-11.95)
log (Household Expense)				0.0525***	0.0535**	0.0720***
				(9.63)	(2.27)	(4.02)
Age				0.0209***	0.0127***	0.0121***
				(9.88)	(4.06)	(3.68)
Constant	0.0603	0.0588	0.0218	-0.4201***	-0.0272	-0.1963
	(1.52)	(0.34)	(0.11)	(-3.97)	(-0.10)	(-0.65)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	548015	20531	14773	547780	20504	14758
R^2	0.344	0.476	0.478	0.361	0.500	0.508

Plausible Channel

Mutual Insurance

$$Y_{itj} = \alpha + \nu_i + \gamma_j + \beta_1 * \text{Group}_{itj} + \beta_2 * \text{Shock}_{itj} + \beta_3 * \text{Group}_{itj} * Shock_{itj} + \beta_4 * \text{Borrower Characteristics}_{itj} + \varepsilon_{itj}$$

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Group	-0.1932***	-0.1089***	-0.1434***	-0.1870***	-0.0872***	-0.1650***
	(-36.74)	(-8.65)	(-9.70)	(-29.52)	(-5.15)	(-8.80)
Shock	0.0792***	0.0720***	0.1109***	0.0796***	0.0717***	0.1125***
	(22.19)	(4.11)	(5.11)	(22.34)	(4.05)	(5.19)
Shock x Group	-0.0065**	-0.0292**	-0.0322**	-0.0074**	-0.0276**	-0.0339**
	(-2.01)	(-2.52)	(-2.02)	(-2.29)	(-2.39)	(-2.12)
Household Size				0.0038	0.0070	0.0397
				(0.63)	(0.41)	(1.40)
log (Land Area)				0.0039**	0.0038	0.0011
				(2.24)	(1.12)	(0.29)
log (Household Income)				0.0072*	-0.0225	0.0338***
				(1.90)	(-1.61)	(2.70)
log (Household Expense)				0.0327***	0.0387*	0.0398**
				(6.37)	(1.86)	(2.33)
Age				0.0075***	0.0077**	0.0041
				(3.92)	(2.57)	(1.29)
Constant	0.2856***	0.1129	0.0930	-0.3218***	-0.3059	-0.6758**
	(7.56)	(0.65)	(0.46)	(-3.42)	(-1.20)	(-2.57)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	548015	20531	14773	547780	20504	14758
R^2	0.377	0.509	0.524	0.378	0.512	0.526

Addressing Selection Bias

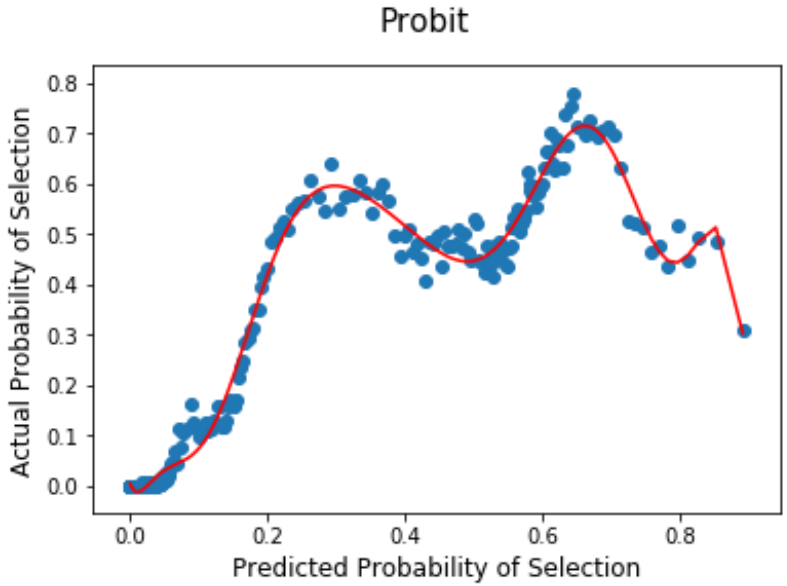
Heckman Two Step Correction

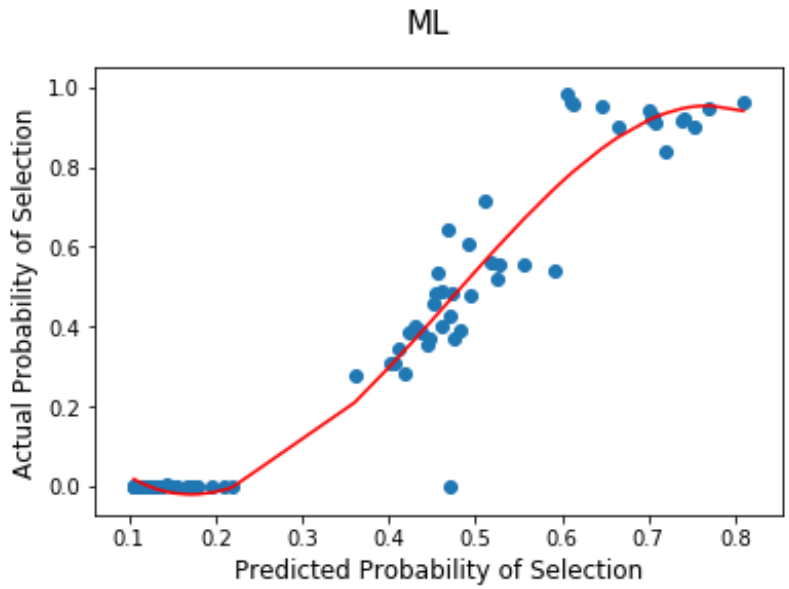
$$Y_{itj} = \alpha + \nu_i + \gamma_j + \beta_1 \text{Group}_{ij} + \beta_2 \text{Borrower Characteristics}_{itj} + \beta_3 IMR_{ij} + \varepsilon_{itj}$$

	(1) Selected	(2) Default	(3) Default	(4) Default	(5) Default
Household Size	-0.2117***		-0.0008		-0.0020
	(-63.11)		(-0.11)		(-0.24)
log (Household Income)	-0.0263***		0.0373***		0.0373***
	(-23.83)		(9.69)		(9.62)
log (Household Expense)	0.2000***		-0.0056		-0.0067
	(133.02)		(-0.89)		(-0.97)
Land (sq km)	0.0015***		-0.0000		-0.0000*
	(41.01)		(-1.63)		(-1.87)
Age	0.0069***		0.0050***		0.0051***
	(74.23)		(3.36)		(3.34)
Profession1	-0.0042***				
	(-1351.16)				
Profession2	-0.0021***				
	(-626.25)				
District	-0.1406***				
	(-721.27)				
Group		-0.1236***	-0.1429***	-0.1233***	-0.1422***
		(-33.04)	(-30.64)	(-32.73)	(-30.24)
IMR		-0.0134	-0.0170		
		(-0.98)	(-1.15)		
IMR_ML				-0.0229	-0.0277
				(-0.45)	(-0.42)
Constant	0.2157***	0.2291***	-0.2190***	0.2302***	-0.2116*
	(14.83)	(12.33)	(-2.64)	(5.28)	(-1.96)
Borrower Fixed Effect	No	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	No	Yes	Yes	Yes	Yes
Observations	11520510	981584	981584	955368	955368
R^2		0.403	0.404	0.405	0.406
Pseudo R^2	0.551				

Heckman Correction: First Stage

Probit vs Machine Learning





Purposes of Loan

ID	Purpose
0	miscellaneous
1	animal
2	business
3	repayment
4	vehicle
5	agri
6	house
7	insurance
8	social
9	household
10	jewel
11	education
12	travel
13	liquidity
14	medical
15	Fishery
16	land

Purpose of Loan

Both Loans Have Same Purpose

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Group	-0.1271***	-0.0815***	-0.0904***	-0.1494***	-0.0866***	-0.1437***
	(-18.26)	(-6.78)	(-6.04)	(-17.30)	(-6.46)	(-5.88)
Household Size				-0.0052	-0.0449*	0.0436
				(-0.43)	(-1.91)	(0.88)
log (Land Area)				-0.0048	-0.0042	-0.0042
				(-1.45)	(-0.70)	(-0.60)
log (Household Income)				0.0475***	0.0399***	0.0696***
				(6.04)	(3.15)	(3.17)
log (Household Expense)				-0.0061	-0.0571***	0.0119
				(-0.51)	(-2.65)	(0.37)
Age				0.0031	0.0058	0.0055
				(1.13)	(1.16)	(0.93)
Constant	0.3013***	-0.0596	0.0471	-0.1184	-0.0840	-0.7953*
	(2.87)	(-0.39)	(0.23)	(-0.58)	(-0.28)	(-1.95)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	244384	45364	6511	238659	43010	6504
R^2	0.443	0.584	0.496	0.453	0.598	0.501

Purpose of Loan

The Two Loans Have Different Purpose

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Default		
Group	-0.1239***	-0.1184***	-0.0817***	-0.1368***	-0.1402***	-0.0954***
	(-31.52)	(-12.32)	(-10.63)	(-26.38)	(-10.89)	(-7.43)
Household Size				0.0013	-0.0481***	-0.0098
				(0.18)	(-2.63)	(-0.34)
log (Land Area)				0.0009	-0.0007	0.0009
				(0.56)	(-0.22)	(0.27)
log (Household Income)				0.0300***	0.0571***	0.0244**
				(7.18)	(5.75)	(2.20)
log (Household Expense)				-0.0013	-0.0388**	-0.0207
				(-0.19)	(-2.44)	(-1.20)
Age				0.0055***	0.0053*	0.0067**
				(3.53)	(1.96)	(2.27)
Constant	0.7329***	0.2332	0.3330	0.2869**	-0.0521	0.0595
	(6.12)	(0.61)	(0.69)	(1.97)	(-0.13)	(0.12)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	818111	58704	22853	804530	56164	22833
R^2	0.392	0.517	0.452	0.399	0.529	0.453

Repayment Frequency

Group And Individual Loans For All Simultaneously Running Loans

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
				Default		
Group	-0.1118***	-0.2334***	-0.0954***	-0.1222***	-0.2327***	-0.0940***
	(-27.08)	(-12.77)	(-23.50)	(-20.37)	(-12.71)	(-21.47)
Household Size				0.0052	-0.0697***	-0.0454***
				(0.73)	(-3.17)	(-2.92)
log (Land Area)				0.0012	0.0078	-0.0006
				(0.85)	(0.72)	(-0.08)
log (Household Income)				0.0204***	0.0754***	0.0269***
				(4.64)	(3.46)	(3.52)
log (Household Expense)				0.0008	-0.0863**	0.0194**
				(0.13)	(-2.31)	(2.02)
Age				0.0055***	0.0887***	0.2080***
				(3.67)	(3.49)	(28.35)
Constant	0.7143***	0.3490***	0.3149	0.3546*	-2.7530**	-8.4150***
	(3.65)	(2.64)	(0.64)	(1.80)	(-2.58)	(-28.42)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	858557	61400	133245	858340	61400	114712
R^2	0.395	0.586	0.334	0.395	0.588	0.384

Repayment Frequency

Group And Individual Loans When Repayment Dates Coincide

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
				Default		
Group	-0.0832***	-0.2000***	-0.0583***	-0.1097***	-0.2000***	-0.0586***
	(-12.08)	(-7.62)	(-20.79)	(-9.38)	(-7.62)	(-19.94)
Household Size				-0.0028	-0.0502**	-0.0693***
				(-0.11)	(-2.10)	(-3.21)
log (Land Area)				0.0002	0.0005	0.0121
				(0.05)	(0.03)	(0.94)
log (Household Income)				0.0392***	0.0219	0.0522***
				(3.81)	(0.69)	(3.49)
log (Household Expense)				-0.0167	-0.1973***	-0.0035
				(-1.09)	(-3.29)	(-0.18)
Age				0.0067**	0.0850***	0.4431***
				(2.48)	(3.69)	(15.14)
Constant	0.0716	0.3039**	0.1904***	-0.3323	-1.3349*	-18.1168***
	(0.37)	(2.52)	(8.10)	(-1.35)	(-1.76)	(-15.13)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27300	26194	46186	27277	26194	41574
R^2	0.442	0.605	0.524	0.444	0.607	0.560

Loan Terms

Interest Rates

$$Y_{itj} = \alpha + \nu_i + \gamma_j + \beta_1 LoanTerms_{itj} + \beta_2 BorrowerCharacteristics_{itj} + \varepsilon_{itj}$$

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Interest Rate					
Group	-0.0426***	-0.0590***	-0.0476***	-0.0326***	-0.0603***	-0.0339***
	(-20.72)	(-10.25)	(-14.59)	(-12.94)	(-8.68)	(-7.29)
Household Size				0.0011	0.0020	0.0073**
				(0.50)	(1.40)	(2.05)
log (Land Area)				0.0025***	0.0027**	0.0036**
				(3.58)	(2.00)	(2.25)
log (Household Income)				-0.0134***	0.0034	-0.0124***
				(-8.30)	(0.83)	(-2.90)
log (Household Expense)				0.0044**	-0.0036	-0.0004
				(1.96)	(-1.45)	(-0.07)
Age				0.0018**	-0.0005	0.0005
				(2.43)	(-0.47)	(0.44)
Constant	0.1247***	0.2005***	0.1668***	0.1279***	0.2166***	0.2289***
	(7.51)	(19.74)	(15.06)	(3.47)	(4.87)	(3.58)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	979791	90000	24297	964557	86032	24278
R^2	0.494	0.548	0.499	0.502	0.560	0.501

Loan Terms

Loan Amount

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable				Loan Amount		
Group	3479.92***	13436.58***	1409.56***	4654.48***	15379.08***	2439.51***
	(31.31)	(70.73)	(8.24)	(33.59)	(72.53)	(9.10)
Household Size				130.26	627.03**	-266.80
				(1.12)	(2.34)	(-0.56)
log (Land Area)				15.15	369.24***	-148.01**
				(0.45)	(6.08)	(-2.31)
log (Household Income)				-2049.82***	-8233.02***	-1783.64***
				(-21.35)	(-30.38)	(-7.97)
log (Household Expense)				589.16***	2663.46***	761.73**
				(4.92)	(7.05)	(2.41)
Age				-173.47***	293.84***	-388.30***
				(-4.59)	(4.52)	(-6.13)
Constant	8307.84***	657.22	10636.77***	25806.90***	33545.10***	32679.21***
	(6.80)	(0.80)	(7.83)	(11.89)	(7.03)	(8.34)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1030949	99619	27300	1012199	94984	27277
R^2	0.426	0.635	0.447	0.450	0.699	0.455

Loan Terms

Both Loans Have Same Loan Amount

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
				Default		
Group	-0.1152***	-0.0932***	-0.0859***	-0.1577***	-0.1450***	-0.1783***
	(-10.65)	(-5.03)	(-4.21)	(-10.54)	(-4.80)	(-4.98)
Household Size				-0.0199	0.0246	0.0531
				(-1.45)	(0.49)	(0.57)
log (Land Area)				-0.0060*	-0.0005	-0.0008
				(-1.76)	(-0.05)	(-0.08)
log (Household Income)				0.0574***	0.0855***	0.1051***
				(5.94)	(3.49)	(3.69)
log (Household Expense)				-0.0037	0.0141	-0.0075
				(-0.27)	(0.44)	(-0.22)
Age				-0.0023	0.0041	0.0021
				(-1.06)	(0.55)	(0.26)
Constant	-0.2074	-0.3654***	-0.6088***	-0.5655*	-1.3135***	-1.4179***
	(-0.86)	(-3.91)	(-4.20)	(-1.81)	(-2.97)	(-2.84)
Borrower Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	91883	3953	2864	90657	3921	2862
R^2	0.419	0.550	0.493	0.427	0.559	0.504

Loan Terms

Two Simultaneous Individual Loans

Dependent Variable	Default		
Interest Rate	0.031580	0.106594	0.156632
	(0.82)	(0.63)	(0.80)
Loan Amount	-0.000001*	-0.000004*	-0.000006
	(-1.78)	(-1.75)	(-1.45)
Tenure (years)	-0.050401*	-0.076109	-0.349148***
	(-1.85)	(-0.81)	(-3.51)
Constant	0.530759***	-0.053412	-0.100196
	(5.78)	(-0.23)	(-0.51)
Borrower Fixed Effect	Yes	Yes	Yes
Month x Year Fixed Effect	Yes	Yes	Yes
Observations	53234	6365	1939
R^2	0.364	0.364	0.349

Conclusion

- We compare repayment rates of collateral based individual lending and joint-liability based group lending
- We find a set of borrowers who have both the loan contracts running simultaneously
- Group loans out-perform in terms of default rates
- The strength of social ties trumps enforceability of collateral in its impact on loan performance
- Group loans out-perform even more during times of economic distress