What does Debt Relief do for Development?

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Motivation

Debt relief as development policy?

- Large-scale debt relief programs are very common
- Effects on household finance, well-being poorly understood
- Controversial among economists and central bankers

Debt relief programs are good

- ease credit constraints
- address debt overhang
- enable productive investment

Debt relief programs are bad

- · bad for credit discipline
- ex-post financial exclusion
- behavioral effects

Program Summary

India's debt relief policy experiment

- Natural experiment offered by India's 2008 "Debt Waiver and Debt Relief Scheme for Small and Marginal Farmers"
- Among the largest debt relief programs in history: ~US\$ 16 bn, transfer to 40 million rural households
- Benefit to treatment group in sample around Rs 46,488 \sim one average annual income (India's 2010 pc income is Rs 44,345 = US\$1002)
- Eligibility based on land hypotheticated when loan was taken (typically several years before program)

Roadmap

1 Motivation

- Program and eligibility
- 3 Household survey
- 4 Identification

6 Results

6 Conclusion and policy implications

Program Eligibility

The debt relief program for small and marginal farmers

- Crop loans and agricultural investment loans from commercial, cooperative and regional rural banks
- Overdue or restructured as of December 31, 2007 and remaining overdue as of February 28, 2008
- Loans originated Dec 31, 1997 Dec 31, 2007
- Beneficiaries must be made eligible for new loan
- Banks must make beneficiary lists public
- Intention: program works like personal bankruptcy settlement, clears collateral and restores financial access. Does it?

Program Eligibility

- · Benefit status depends on land pledged (not amount overdue)
- Program eligibility criteria were unanticipated
- Program timing was unanticipated
- Discontinuity in *implemented* debt relief at 2 hectares

	Land < 2 ha	Land > 2 ha
Regular district	100%	25% if remaining
		75% settled
Drought affected district	100%	25% of Rs 20,000
		whichever is greater

This Paper Methodology

Survey-based regression discontinuity design (RDD)

- Survey of 2,897 households in 4 districts of central Gujarat, India
- Program beneficiaries within +/- .5 ha of discontinuity, identified from bank beneficiary lists
- Match bank data on indebtedness and landholdings with survey responses
- Program cutoff: quasi-random assignment of debt relief status
- Outcomes of interest: investment, productivity, subsequent debt, expectations about conditionality and reputational consequences of default

This Paper Contribution

- Question: What is the effect of debt relief on subsequent indebtedness, productivity and expectations?
- Can bailout cure debt overhang, is there a real effect of debt relief on output and productivity?
- How does debt relief affect expectations? What are the bahavioral effects of the bailout?
- Methodology: Survey-based regression discontinuity design (RDD) based on the program eligibility rules
- Survey of 2,897 households within +/-.5 ha of program cutoff, who received 100% unconditional relief or 25% conditional relief

This Paper Related Literature

- 1. Credit rationing and poverty traps
 - Banerjee Newman (1993), Banerjee (2000)
 - Ghosh, Mookherjee and Ray (2000)
- 2. Debt overhang and moral hazard
 - Myers (1977), Krugman (1988, 1990) but very little evidence at the household level
- 3. Social banking and political economy
 - Burgess and Pande (2005), Burgess Wong and Pande (2005), Cole (2009), Dinc (2005)

This Paper Preview of Results

Predictions

- · Relief alleviates debt overhang
- Increases in investment
- Decreases in risk-taking
- If windfall, consumption should increase

Results

- Decrease in overall level of debt
- Shift away from formal credit
- · Strong effect on composition of ex-post borrowing
- · Weak effect on investment and productivity
- Strong effect on opinions about seniority and reputation

Survey Setting



Survey household, Kheda district, Gujarat



Location of survey districts

Survey districts

- Households in 'non-drought affected' districts of central Gujarat, slightly wealthier than average district
- Gujarat state pc income 26% above national average (but concentrated in urban centers)
- Less industrialized than state average
- Less urbanized (~25-30%) than state average (39%)
- Bank coverage 1 branch per 14,220 inhabitants (all India: 1 branch per 15,601)
- Heavily indebted households 40% (all India: 48%)

Whom did we interview?

- 2,897 beneficiary households in 4 districts of central Gujarat (Anand, Gandhinagar, Kheda, Mehsana)
- All eligible accounts, 6 largest commercial banks and main cooperative bank in sample districts, (N=44,135)
- Restrict to households within +/- .5 ha of cutoff, exclude restructured loans, allied to ag and loans that were divided
- Total of 5,554 households
 - 53% commercial bank 47% coop borrowers
 - 76% crop loans 24% investment loans
- 2,897 households surveyed (52% of sample frame)

	Anand	Kheda	Gandhinagar	Mehsana	Total
Bank of Baroda	276	276	35	70	657
	14%	8%	7%	7%	9%
Bank of India	84	95	33	34	246
	10%	11%	10%	8%	10%
Central Bank of India	215	39	25	16	295
	16%	5%	10%	6%	11%
Dena Bank	84	47	122	144	397
	13%	13%	15%	18%	15%
State Bank of India	216	291	159	237	903
	6%	11%	17%	7%	9%
Union Bank of India	198	199	36	11	444
	20%	14%	12%	13%	16%
Kaira District Coop Bank	1,442 12	1,170 %	_	_	2,612 12%
Total	2,515	2,117	410	512	5,554
	12	%	13%	9%	11%

Summary of accounts in sample frame

Source: Gujarat State Level Banker's Committee.

Test for balanced attrition

	Treatment	Control	Differ	ence
	100% Relief	25% Relief	Coefficient	SE
Surveyed	55.10%	55.48%	-0.00375	[0.01360]
Deceased	11.86%	10.26%	0.0160*	[0.00859]
Migrated	7.23%	7.99%	-0.00755	[0.00720]
Refused	3.16%	3.67%	-0.00510	[0.00492]
Not located	0.000/	10.409/	0.0105	[0.00011]
Not located	9.38%	10.43%	-0.0105	[0.00811]
Failed to administer	5.00%	4.50%	0.00500	[0.00582]
Other	8.27%	7.68%	0.00592	[0.00741]

Discontinuity in implemented debt relief, sample frame (N=5,554)



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Discontinuity in implemented debt relief, surveyed households (N=2,897)



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Sharp regression discontinuity design

 $y_i = \alpha + \beta T_i + f(x_i) + \varepsilon_i$

where \bar{x} is the eligibility threshold, so that

$$T_i = \mathbf{1}\{x_i < \bar{x}\}$$
$$\forall x_i \in (\bar{x} - \delta, \bar{x} + \delta)$$

where $\delta = 1/2$ ha and $f(x_i)$ is a parametric control function.

Identification assumptions

- · Continuity of pre-program observables at cutoff
- No manipulation of assignment variable

Regression Discontinuity, First Stage

	Treatment Effect	SE	Ν
Relief			
All Banks	43,529.4***	(3,052)	2,459
Commercial Banks	53,142.5***	(5,171)	1,365
Cooperative Banks	34,992.8***	(2,877)	1,094
Eligible Amount Total			
All Banks	-2,939.7	(3,843)	2,442
Commercial Banks	-5,599.5	(5,603)	1,348
Cooperative Banks	4,186.5	(4,285)	1,094
Eligible Amount Principal			
All Banks	-4,517.2	(3,225)	2,443
Commercial Banks	-4,850.4	(4,996)	1,349
Cooperative Banks	1,432.4	(2,483)	1,094
Eligible Amount Interest			
All Banks	1,446.8	(1,442)	2,418
Commercial Banks	-1,414.8	(1,509)	1,325
Cooperative Banks	3,375.8	(2,403)	1,093

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Identification RDD

Continuity of pre-program variables at cutoff



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Identification RDD

Continuity of pre-program variables at cutoff



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Integrity of assignment variable, entire sample [N=5,554] PDF of land holding by bank type and survey status



Integrity of assignment variable, surveyed households [N=2,897] PDF of land holding by bank type and survey status



Identification RDD

Integrity of assignment variable CDF of land holding by audit result



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Identification RDD

Integrity of assignment variable CDF of land holding by source of land data



Commercial banks

Cooperative banks

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Identification RDD

Integrity of assignment variable CDF of land holding by audit result



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Identification RDD

Integrity of assignment variable CDF of land holding by source of land data



Commercial banks

Cooperative banks

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Results Specification

$$y_i = \alpha + \beta_1 T_i + \beta_2 (T_i \cdot lnBalance_i) + \gamma_1 (T_i \cdot x_i) + \gamma_2 (lnBalance_i) + \gamma_3 x_i + \phi_{bd} + \phi_j + \phi_t + \xi' \mathbf{X}_i + \varepsilon_i$$

T_i treatment status

- x_i hectares from cutoff [assignment variable]
- ϕ_{bd} bank-district fixed effects
- ϕ_j interviewer fixed effects
- ϕ_t week of interview fixed effects
- \mathbf{X}_i matrix of additional controls

T1 Total Debt

	Panel A		Pan	Panel B		nel C
	Discontinu	ity sample	Full s	ample	Robustness sample	
	Log Tot	al Debt	Log To	tal Debt	Log To	tal Debt
	Before	After	Before	After	Before	After
	(1)	(2)	(3)	(4)	(5)	(6)
[A] 100% Relief	0.078 (0.06)	-0.177** (0.07)	0.119 ⁺ (0.06)	-0.154** (0.06)	0.163** (0.07)	-0.251*** (0.08)
[B] 100% Relief \times Balance	0.259*** (0.08)	0.191** (0.08)	0.302*** (0.08)	0.037 (0.06)	0.319*** (0.07)	0.049 (0.09)
[C] Balance	0.475*** (0.08)	0.130** (0.06)	0.438*** (0.10)	0.233*** (0.06)	0.418*** (0.09)	0.248*** (0.09)
Control fctn			Linear	Linear	Linear	Linear
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Test B+C=0	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Outcome mean	3 99	2.63	3 99	2.63	3 99	2.63
LATE % of outcome mean	0.020	0.067	0.029	0.059	0.041	0.095
Bandwidth	+/- 25	+/- 25	+/- 5	+/- 5	+/- 5	+/- 5
Observations	716	714	1.515	1.512	1.002	1.001
R-Squared, Adj.	0.317	0.142	0.323	0.125	0.404	0.126

• Reduction in (self-reported) total debt

Small number of households use free collateral to draw new loans

T2 Sources of Credit

	Ba	anks	Informa	I Lenders
	Before	After	Before	After
	(1)	(2)	(3)	(4)
[A] 100% Relief	-1.460	-6.827***	0.439	4.840***
	(0.90)	(2.35)	(0.74)	(1.32)
[B] 100% Relief ×Balance	1.669	6.116***	-0.704+	-1.837***
	(1.34)	(2.10)	(0.41)	(0.60)
[C] Balance	-0.640	-3.808***	0.561+	1.364**
	(0.89)	(1.17)	(0.31)	(0.68)
Control fctn	Linear	Linear	Linear	Linear
Fixed Effects	Yes	Yes	Yes	Yes
Test B+C=0	[0.388]	[0.068]	[0.688]	[0.378]
Outcome mean	42.78	15.28	4.08	11.62
LATE, % outcome mean	0.034	0.447	0.108	0.417
Bandwidth	+/5	+/5	+/5	+/5
Observations	2,268	2,262	2,260	2,259
R-Squared, Adj.	0.492	0.229	0.835	0.264

· Shift away from banks towards informal credit

T3 Sources of Credit

	$\Delta \mathbf{Bank}$		Δ Money-	∆Family
	(4)	Bank	lender	& Friends
	(1)	(2)	(3)	(4)
[A] 100% Relief	1.057 (2.81)	-6.449** (2.89)	1.160 (1.55)	3.242+ (1.73)
$[B] \ 100\% \ Relief \times Balance$	1.584 (1.61)	3.029** (1.23)	0.019 (0.73)	-1.123 (0.83)
[C] Balance	-1.519 (1.09)	-1.656** (0.84)	0.136 (0.49)	0.668 (0.53)
Control fctn	Linear	Linear	Linear	Linear
Fixed Effects	Yes	Yes	Yes	Yes
Test B+C=0	0.36	1.34	0.80	0.00
Outcome mean	86.75	58.04	8.44	15.64
LATE, % outcome mean	0.016	0.118	0.052	0.309
Bandwidth	+/5	+/5	+/5	+/5
Observations	2,268	2,262	2,260	2,259
R-Squared, Adj.	0.214	0.211	0.014	0.134

- · Less borrowing from coop banks, more loans from family
- Effect differs between coop and commercial banks

T4 Credit Supply

	New Loan Applications					
	Applied for	New loan	Interest	Log amount		
	new loan	approved	rate	approved		
	(1)	(2)	(3)	(4)		
100% Relief	0.090	0.267	0.547	-1.135		
100% Relief \times Balance	-0.003 (0.01)	0.058	0.212 (0.30)	0.018 (0.12)		
\times Hectares from cutoff	-0.119 (0.14)	-0.113 (0.17)	-0.655 (1.83)	0.294 (0.29)		
\times Pre-program wealth	0.037* (0.02)	0.033 (0.03)	-0.175 (0.17)	-0.106 (0.10)		
\times Pre-program total debt	-0.008 (0.02)	-0.023 (0.05)	-0.101 (0.28)	0.075 (0.09)		
Balance	0.029** (0.01)	-0.044 (0.03)	-0.092 (0.20)	-0.019 (0.08)		
Hectares from cutoff	0.094 (0.10)	0.118 (0.13)	-0.292 (1.45)	-0.610* (0.31)		
Pre-program wealth	0.013 (0.02)	0.005 (0.02)	0.118 (0.15)	0.288*** (0.05)		
Pre-program total debt	0.015 (0.02)	0.003 (0.04)	0.111 (0.27)	0.313*** (0.11)		
Fixed Effects Observations B-Squared Adi	Yes 2,830 0,102	Yes 663 0.130	Yes 492 0.179	Yes 554 0.301		

33/42

T5 Investment and Productivity

	Investment			Production			
	Ag	Hired	Fixed	Per-capita	Per-capita	Per-capita	
	Inputs	Labor	Investments	Income	Income, Kharif	Income, Rabih	
	(1)	(2)	(3)	(4)	(5)	(6)	
[A] 100% Relief	-0.110** (0.04)	0.022 (0.05)	0.166 (0.15)	-0.068 (0.09)	-0.018 (0.06)	-0.063 (0.08)	
[B] 100% Relief×Balance	-0.052 (0.04)	-0.023 (0.06)	0.077 (0.07)	-0.023 (0.06)	0.053 (0.05)	0.048 (0.04)	
[C] 100% Relief	0.009	0.175	-0.425	-0.223	-0.267	-0.329	
×Hectares from cutoff	(0.13)	(0.30)	(0.70)	(0.40)	(0.28)	(0.30)	
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	2,509	2,290	2,783	2,142	2,068	1,728	
R-Squared, Adj.	0.316	0.317	0.037	0.219	0.223	0.267	

- Decline in overall debt level
- Shift towards informal loans
- Surprisingly few new investment loans
- Reflected in decline in input spending (and productivity)

T6 Investment

	Agricultural Investment			Δ Agricultural Investment			
	Log	Log input	Log input	Increase	Increase	Increase	
	output	per capita	per acre	in input	in input	in input	
	(1)	(2)	(3)	(4)	per capita (5)	per acre (6)	
[A] 100% Relief	-0.146*** (0.05)	-0.167*** (0.05)	-0.063 (0.14)	-0.069** (0.03)	-0.069** (0.03)	-0.068** (0.03)	
[B] 100% Relief \times Balance	-0.086* (0.04)	-0.082* (0.05)	-0.084 (0.06)	-0.007 (0.02)	-0.007 (0.02)	-0.009 (0.02)	
[C] Balance	0.053 (0.04)	0.062 (0.0 4)	0.014 (0.06)	0.023* (0.01)	0.022* (0.01)	0.027** (0.01)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	2,460	2,460	2,501	2,723	2,723	2,723	
R-Squared, Adj.	0.176	0.168	0.132	0.103	0.102	0.103	

- Decline in agricultural investment
- Expectation of future financial constraints?

T7 Productivity

	Agric	ultural Proc	ductivity	Δ Agricultural Productivity			
	Log	Log output	Log output	Increase	Increase	Increase	
	output	per capita	per acre	in output	in output	in output	
					per capita	per acre	
	(1)	(2)	(3)	(4)	(5)	(6)	
[A] 100% Relief	-0.098 (0.07)	-0.129 (0.08)	-0.062 (0.07)	0.013 (0.04)	0.014 (0.04)	0.007 (0.04)	
[B] 100% Relief \times Balance	-0.013 (0.04)	-0.002 (0.04)	-0.038 (0.03)	-0.051*** (0.02)	-0.052*** (0.02)	-0.054*** (0.02)	
[C] Balance	0.003 (0.04)	-0.006 (0.05)	-0.006 (0.04)	0.020 (0.01)	0.020 (0.01)	0.020 (0.01)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	1,692	1,692	1,684	2,703	2,703	2,703	
R-Squared, Adj.	0.372	0.314	0.239	0.074	0.073	0.073	

- No evidence of debt overhang
- Productivity effect of debt relief zero (or negative)
- Due to change in debt structure?

T8 Repayment

Would default	on a bank loan first in the futu	re?
	Commercial Bank (1)	Cooperative Bank (2)
[A] 100% Relief	0.006 (0.03)	0.018 (0.02)
[B] 100% Relief ×Balance	-0.028** (0.01)	0.035*** (0.01)
[C] Balance	0.016 (0.02)	-0.006 (0.01)
Control fctn Fixed effects Test B+C=0	Linear Yes [0.058]	Linear Yes [0.006]
Bandwidth Observations R-Squared, Adj.	+/5 2,271 0.09	+/5 2,271 0.09

- Moral hazard (self-reported seniority of claims) differs by bank type
- ...and by size of loan that was written off

T9 Reputation

Would non-repayment of a loan from lender x tarnish your reputation?					
	Bank	Coop Bank	Money- lender	Family & Friends	
	(1)	(2)	(3)	(4)	
[A] 100% Relief	-0.180**	-0.137 ⁺	0.191	0.212**	
	(0.07)	(0.07)	(0.14)	(0.09)	
$[B] \ 100\% \ Relief \times Balance$	0.068	0.052	0.146	0.012	
	(0.04)	(0.05)	(0.10)	(0.05)	
[C] Balance	-0.054	-0.016	-0.063	-0.028	
	(0.04)	(0.04)	(0.08)	(0.05)	
Control fctn	Linear	Linear	Linear	Linear	
Fixed effects	Yes	Yes	Yes	Yes	
Test B+C=0	[0.269]	[0.578]	[0.335]	[0.738]	
Bandwidth	+/5	+/5	+/5	+/5	
Observations	2,264	2,260	2,247	2,255	
R-Squared, Adj.	0.434	0.369	0.299	0.273	

Beneficiaries worry less about reputational effect of default!

T10 Future Credit

How worried are you about future access to credit from lender x?						
	Bank	Coop Bank	Money- lender	Family & Friends		
	(1)	(2)	(3)	(4)		
[A] 100% Relief	0.310 ⁺	0.358**	0.082	0.152		
	(0.17)	(0.15)	(0.20)	(0.16)		
$[B] \ 100\% \ Relief \times Balance$	0.113	0.141	-0.174	-0.123		
	(0.15)	(0.13)	(0.17)	(0.09)		
[C] Balance	0.081	-0.023	0.139	0.051		
	(0.09)	(0.09)	(0.15)	(0.07)		
Control fctn	Linear	Linear	Linear	Linear		
Fixed effects	Yes	Yes	Yes	Yes		
Test B+C=0	[0.037]	[0.259]	[0.591]	[0.361]		
Bandwidth	+/5	+/5	+/5	+/5		
Observations	2,243	2,243	2,208	2,233		
R-Squared, Adj.	0.391	0.355	0.352	0.253		

· Beneficiaries worry more about future access to credit

Conclusion Results

- Debt relief does not improve access to bank credit
- 2 But: strong and persistent shift in composition of debt
- 3 No evidence that debt relief cures debt overhang
- 4 Strong effects on behavior and expectations
 - Debt relief beneficiaries more likely to default on formal sector loans in the future
 - · Less concerned about reputational effects of default
 - More concerned about consequences of default on future access to formal credit
 - · Borrowers distinguish between formal sector lenders

Conclusion Implications

1 Debt relief leads to less new borrowing than expected

- Incentivize banks to lend after debt relief?
- Incentivize borrowers to apply for new credit?
- 2 Welfare implications depend on whether we think of household as a producer or consumer:
 - · Minimal (or adverse) productivity effects
 - · Decrease in overall debt may be welfare-improving
 - But don't observe details of informal sector debt contracts
- 3 Expectations and post-program behavior
 - Design induces moral hazard (benefit only for defaulters!)
 - · Need to incentivize repayment, reward non-defaulters

Conclusion Future Research

1 The political economy of debt relief

- What were the political returns to debt relief?
- 2 Debt relief and credit supply
 - Did banks change the (geographical) allocation of credit in response to the program?
 - Did credit supply response help or hurt financial access in the long run?

...in progress!