Public Information and Coordination:
Evidence from a Credit Registry Expansion

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Motivation

- Do creditors to a firm close to distress have incentives to coordinate lending decisions?
  - Mechanism behind creditor runs (more broadly, bank runs, currency crises)
  - Bankruptcy code designed to alleviate creditor coordination problems
- Empirical problem
  - Coordination motive or arrival of bad news about the firm?
  - i.e.: Bear Sterns, Northern Rock (Brunnermeier 2009, Shin 2009)

This Paper

- Evidence of lender coordination motives
- Natural experiment that resembles an ideal laboratory setting:
  - Two banks lend to same firm
  - Bank A has bad news about the firm that B does not have
  - Exogenously make A's private bad news public
  - Any lending change by bank A is due to coordination motives
- Publicity multiplier of information
  - Credit outcomes more sensitive to ***same piece of information*** about borrower creditworthiness when it is public

Natural Experiment

- Setting: Public Credit Registry in Argentina
  - Database of credit information on borrowers
  - Government operated, mandatory information sharing
  - Common policy: exist in 71 countries (Djankov, McLiesh, Shleifer (2007))
- Experiment: technological shock
  - In early registries, small borrowers excluded to reduce information distribution costs
  - In Argentina, small borrower: total debt < $200,000
  - CD-ROM adoption reduced distribution costs
  - Credit information privately held by banks became public (540,000 borrowers)

Information Reporting and Sharing Timeline

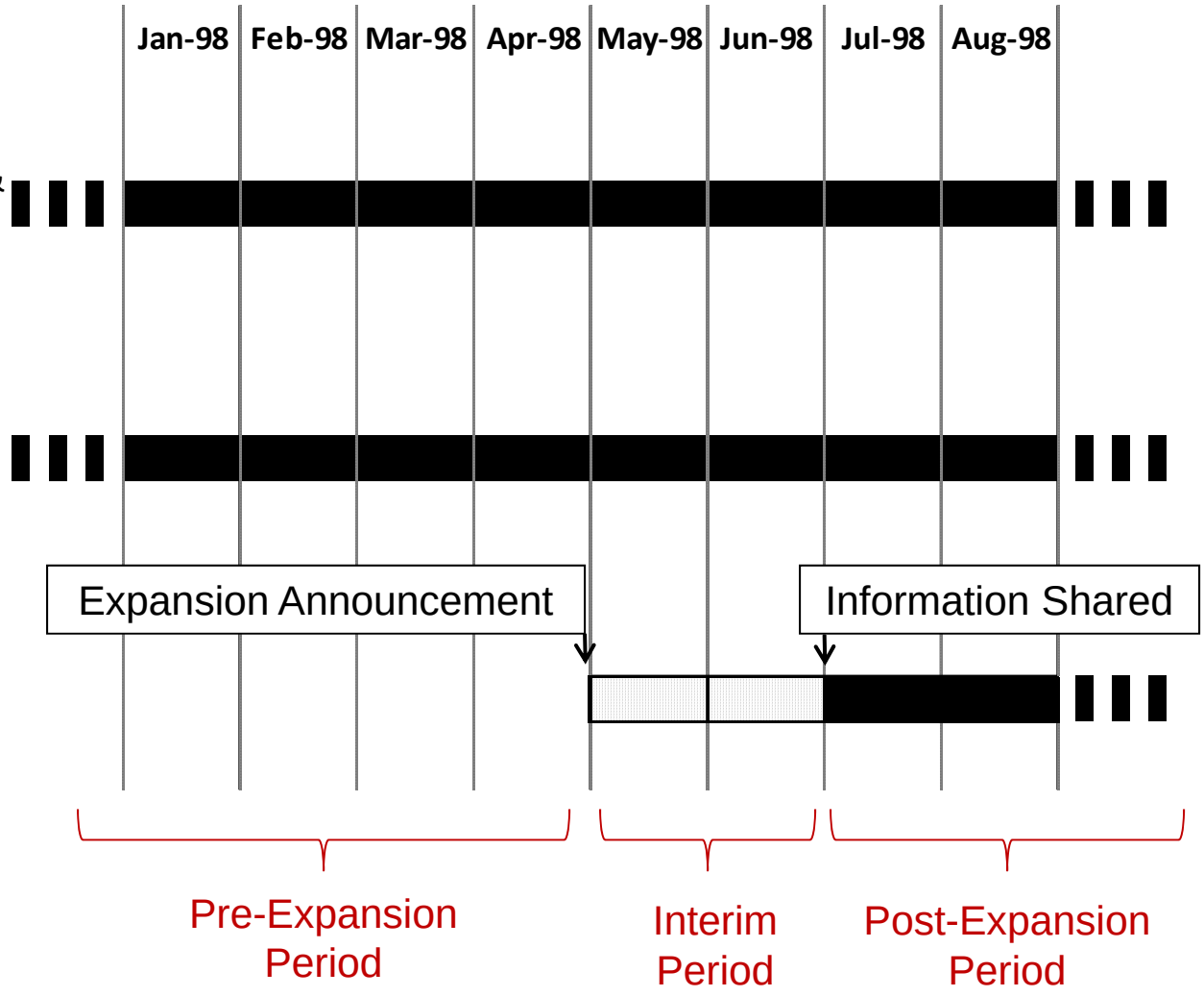
Bank reporting to Central Bank (CB):

Banks report information on debt & rating of each borrower

Information Sharing:

CB discloses information for firms in default, w/ bad risk rating (3), or w/ total debt > $200K,

CB announces registry expansion and discloses information for all firms w/ total debt > $50



Identification

- Coordination incentives
  - Interim period: banks know private assessment will become public, but learn nothing from registry
  - Lending change in anticipation to other lenders' reaction
  - Only if lender's private information may affect other lenders' priors (bad news, multiple lenders)
- Causal effect
  - Difference-in-differences: use firms with total debt above $200,000 as counterfactual

Outline

- Data, empirical setting
- Main Specification and Results
- Additional Empirical Results
- Conclusions

Data

- Credit Registry
- Monthly cross-section of bank-firm pairs:
  - Outstanding debt amount
  - Risk rating: 1 (best) to 5 (in default)
- Period:
  - Pre-period: Jan-98 to Apr-98
  - Interim period: May-98 to Jun-98
  - Post-expansion period: Jul-98 to Jun-99 (12 months)

Sample

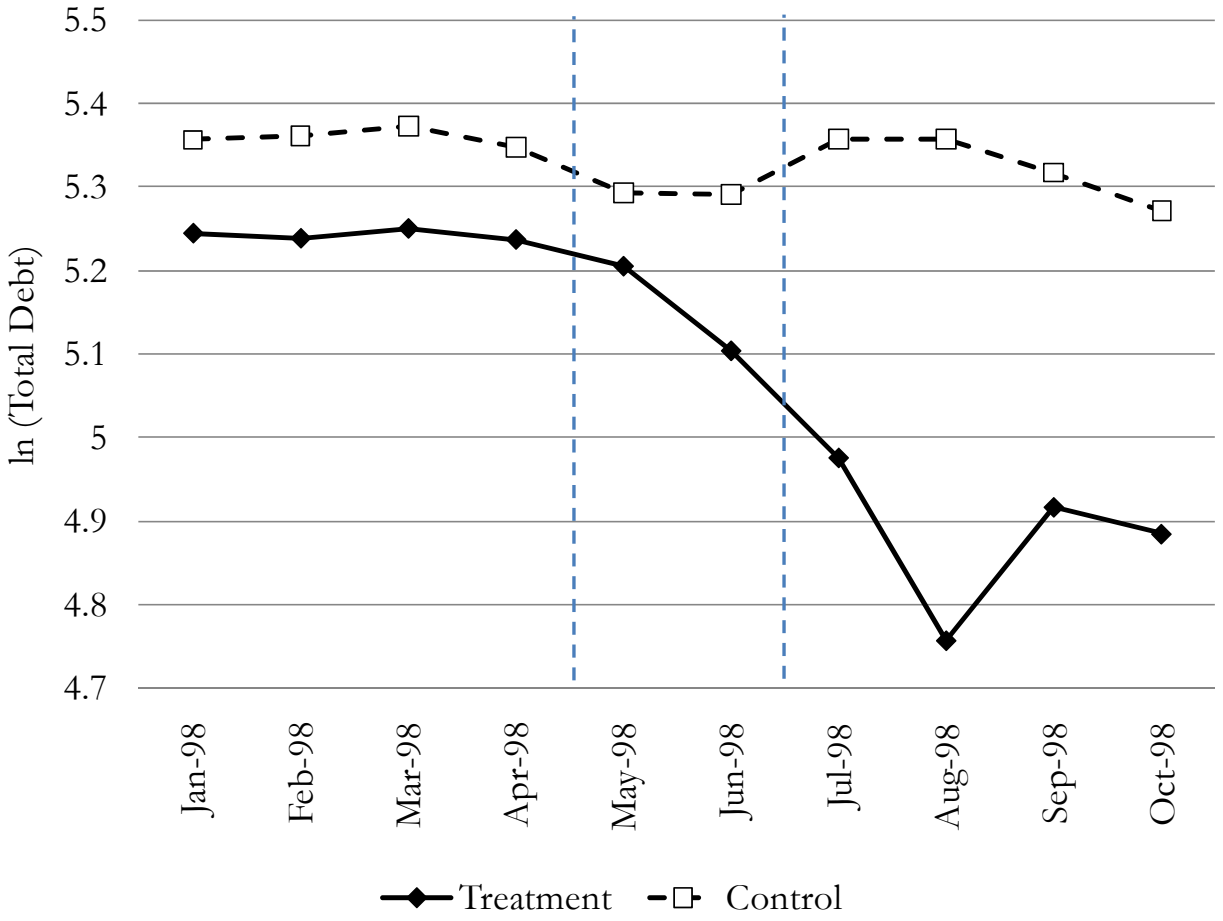
- Exclude firms with ratings above (worse than) 2 before Apr-98
- Firms with total debt during Jan-Mar 1998:
  - Treatment: $150,000 to $200,000
  - Control: $200,000 to $250,000
- Misclassification of control as treatment:
  - Total debt above $200,000 before January 1998, but below that number between January and March
  - Biases estimates towards zero

Sample, continued

- Rating distribution:
  - 93% of bank-firm rating pairs is 1
  - Conditional on a rating of 2, the probability another lender assigned a rating of 1 to the same firm is 70%
- Only disclosure a 2 rating will affect priors
  - Main analysis sample: firms with at least one rating of 2

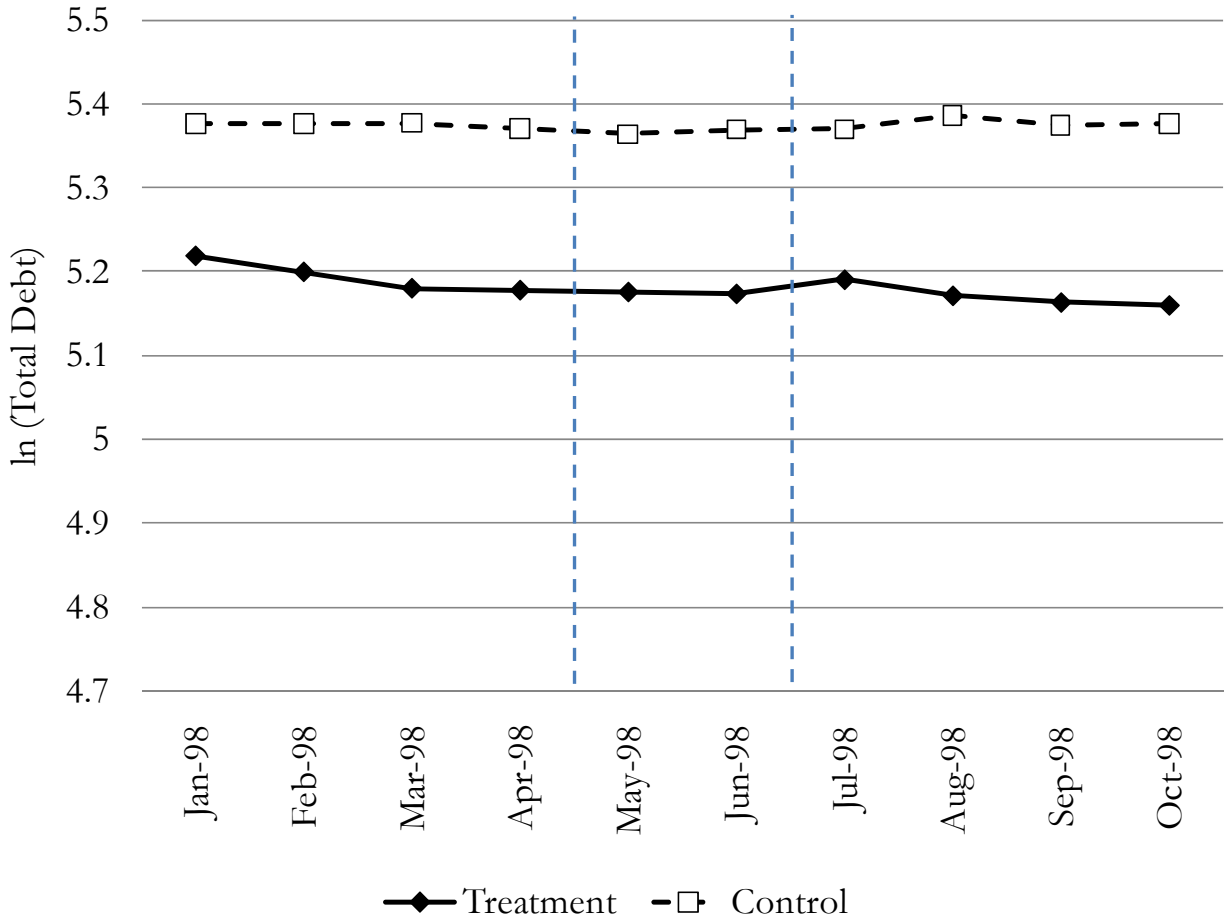
Total (log) Debt of Firms with Multiple Lenders and at Least One Rating of 2

Treatment (control) firms have total debt between $150K and $200K ($200K and $250K) between Jan-Mar 2008



Total (log) Debt of Firms with a Single Lender and a Rating of 2

Treatment (control) firms have total debt between $150K and $200K ($200K and $250K) between Jan-Mar 2008



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Difference-in-Differences (DID)

$$\ln(Debt_{it}) = \alpha_i + \xi_t + \gamma_{Interim} Treat_i \times Interim_t + \gamma_{Post} Treat_i \times Post_t + \varepsilon_{it}$$

- Dependent variable: debt of firm i at time t
  - Estimate separately using debt with: bank that assigned a 2, bank that assigned a 1, total debt.
- Firm FE, month dummies
- Treat = 1 if firm in treatment group
- Interim (Post) = 1 during interim (post-expansion) period
- Interactions: DID estimate
- Standard errors clustered at firm level

DID Estimate of Effect of Registry Expansion on Debt

Sample: firms with at least one rating of 2 in Pre-Expansion

# of Lenders before April	Multiple Lenders			Single Lender
Dependent Variable	ln(Debt from Banks w/ Rating = 2 $_{it}$)	ln(Debt from Banks w/ Rating = 1 $_{it}$)	ln(Debt$_{it}$)	ln(Debt$_{it}$)
	(1)	(2)	(3)	(4)
Effect: Interim Period	-0.198*	-0.058	-0.075	-0.013
	(0.103)	(0.065)	(0.078)	(0.131)
Effect: Post Expansion	-0.356**	-0.115**	-0.135***	0.000
	(0.148)	(0.057)	(0.045)	(0.180)
Firm FE, Month Dummies	Yes	Yes	Yes	Yes
Observations (Firm-Month)	2,381	2,368	2,546	993
R-squared	0.914	0.671	0.581	0.556

Publicity Multiplier: Differential Effect on Debt by Banks with Good and Bad News

$$\ln\left(Debt_{ijt}\right) = \alpha_{ij} + \xi_{jt} + Treat_i \times \delta_t + \\ + \gamma_{Interim2} Treat_i \times Interim_t \times BankAssigned2_j + \\ + \gamma_{Post2} Treat_i \times Post_t \times BankAssigned2_j + e_{ijt}$$

	$\ln(Debt_{ijt})$
Effect on Debt by Banks w/Rating = 2 – Interim Period	-0.214**
	(0.106)
Effect on Debt by Banks w/Rating = 2 – Post Expansion	-0.319**
	(0.158)
Firm × Bank Fixed Effects	Yes
Bank × Month Dummies	Yes
Treat × Month Dummies	Yes
Observations (Firm-Month-Bank)	4,749
R-squared	0.921

Additional Empirical Results

- Financial Distress
  - For firms with a rating of 2 the hazard rate of default increases 5.6 percentage points in interim period
  - No effect if firm has a single lender
- Concentration of Firm's Debt Across Banks
  - Higher 12 months after the registry expansion
- Long Run (12 Months): Average Lending
  - 5% decline in debt by firms with initially perfect ratings
  - No effect for firms with a single lender

Conclusion

- Creditors have incentives to coordinate lending decisions when the firm is close to financial distress
- Publicity multiplier: creditors' decisions are more sensitive to the same piece of news when it is public
- Publicity of information can alter the average level of lending
  - Endogenous response: concentrated lending

Additional Slides

- Material From Longer Talk Kept here

Preview of Results

- Lending decline (19.8%) during interim period: by banks that assigned a rating of 2 pre-expansion
  - No lending change to same firms during interim period by banks that assigned a rating of 1
  - Lending by these banks drops in the post-expansion period, after the rating of 2 becomes public
- Financial distress: default hazard increases during interim and post-expansion periods
- Lender concentration: borrowers concentrate debt in fewer lenders

Information Sharing and Coordination
Set-Up

- Two banks lend to the same firm (L_i, L_j)
- The probability that bank i's loan is repaid is $\theta_i L_j$
- Each bank's θ_i independently drawn from $f(\theta)$
- Objective of bank i:

$$\max_{L_i \geq 0} \quad L_i R \times \left[\theta_i E_i\left(L_j\right)\right] - \frac{1}{\delta} L_i^{\delta}$$

- Information is (is not) shared, then θ_j is (is not) known by bank i
  - Not shared: $E_i\left(L_j\right)$ is independent of the realization of θ_i

Information Sharing and Coordination

First order condition

$$\theta_i E_i\left(L_j\right)R - L_i^{\delta-1} = 0$$

- Bank i's optimal level of lending is:
  - Increasing in creditworthiness θ_i
  - Increasing in expected lending by bank j

Information Sharing and Coordination

Publicity Multiplier

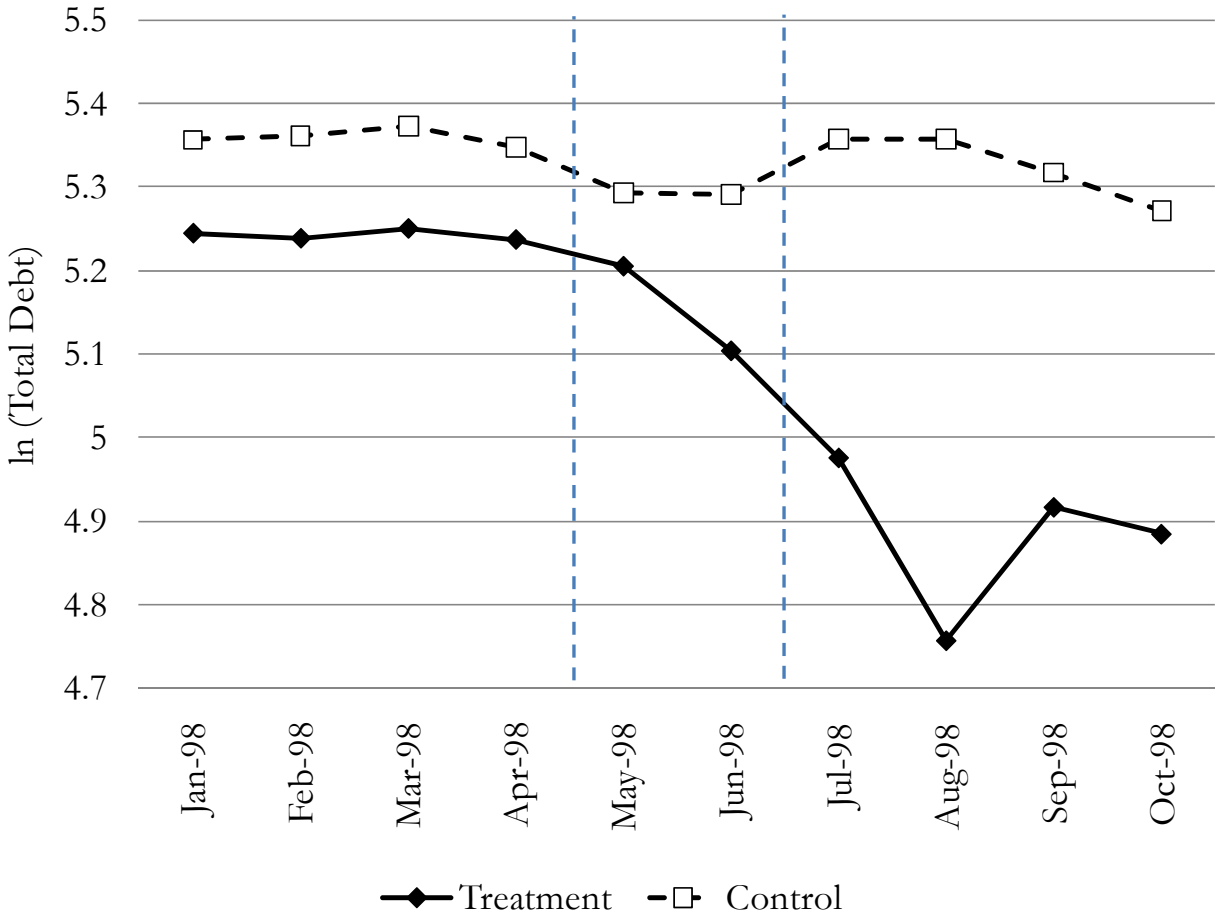
- Elasticity of equilibrium lending with respect to loan creditworthiness

$$\eta \equiv \frac{\partial L_i}{\partial \theta_i}\frac{\theta_i}{L_i}$$

- No information sharing: $\eta^{NS} = \frac{1}{\delta - 1}$
- Information sharing: $\eta^{S} = \Omega \cdot \eta^{NS}, \quad where\ \Omega > 1$
- Empirically test $H_1 : \eta^{S} - \eta^{NS} > 0$

Total (log) Debt of Firms with Multiple Lenders and at Least one Rating of 2

Treatment (control) firms have total debt between $150K and $200K ($200K and $250K) between Jan-Mar 2008



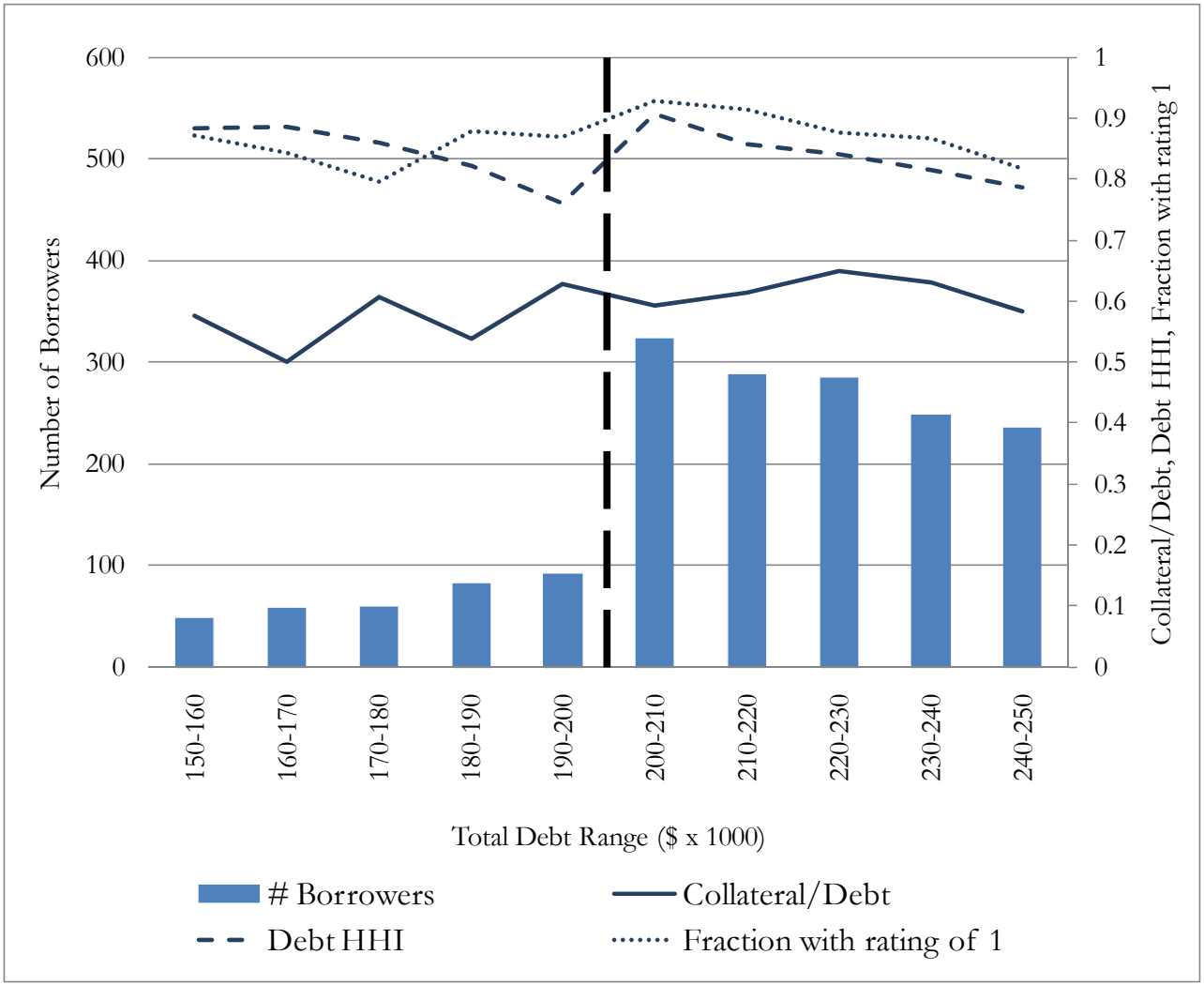
Firm Descriptive Statistics

Pre-Expansion Cross Section

Subsample: March 1998, Firms with rating of 2 or better before expansion announcement

Sample	**All**			**Treatment Firms**			**Control Firms**		
	mean	med	sd	mean	med	sd	mean	med	sd
	n = 1,715			n = 337			n = 1,378		
Total debt ('000)	214.6	217.0	22.8	178.7	181.2	14.3	223.4	222.1	14.3
Number of lenders	1.88	2.00	1.06	1.89	2.00	1.13	1.88	2.00	1.04
Debt concentration (HHI)	0.84	1.00	0.22	0.83	1.00	0.23	0.85	0.99	0.21
Fraction debt from lead bank	0.88	1.00	0.17	0.88	1.00	0.18	0.89	1.00	0.17
Collateral/Debt	0.61	0.78	0.40	0.57	0.71	0.39	0.61	0.80	0.40
Average risk rating	1.10	1.00	0.31	1.12	1.00	0.32	1.10	1.00	0.31
Std. Dev. of same firm ratings	0.13	0.00	0.32	0.16	0.00	0.35	0.12	0.00	0.31

Sample Firm Characteristics by Total Debt, March 1998



Financial Distress: DID Estimate of Effect of Registry Expansion on Default Hazard

Sample: firms with at least one rating of 2 in Pre-Expansion

$$1[Default_{it} = 1 \mid Default_{it-1} = 0] = \xi'_t + \lambda_{Interim} Treat_i \times Interim_t + \lambda_{Post} Treat_i \times Post_t + \zeta_{it}$$

Dependent Variable:	Default Hazard: 1 if Firm in Default at *t*, and not at *t-1*	
Subsample:	Multiple Lenders	Single Lender
	(1)	(2)
Effect on Default Hazard Rate – Interim Period	0.056*	-0.008
	(0.030)	(0.028)
Effect on Default Hazard Rate – Post Expansion	0.030*	0.033
	(0.016)	(0.022)
Month Dummies	Yes	Yes
Observations (Firm-Month)	2,546	993
R-squared	0.104	0.057

Long Run: Effect of Registry Expansion on Firms with Perfect Credit Records

Sample: firms with only ratings of 1 in Pre-Expansion

Dependent Variable	$\ln(Debt_{it})$		Default Hazard: 1 if Firm in Default at *t*, and not at *t-1*	
# lenders pre-expansion	Multiple	Single	Multiple	Single
	(1)	(2)	(3)	(4)
Effect Interim Period	-0.0455	0.0468	0.0026	-0.0068
	(0.0591)	(0.0472)	(0.0047)	(0.0074)
Effect Post Expansion	-0.0543*	0.0550	0.0033	-0.0037
	(0.0281)	(0.0604)	(0.0038)	(0.0068)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Month Dummies	Yes	Yes	Yes	Yes
In sample after default?	Yes	Yes	No	No
Observations (Firm-Month)	17,639	9,160	13,370	9,073
R-squared	0.540	0.512	0.183	0.167

Effect of Registry Expansion on Lender Concentration

Sample: firms with multiple lenders in Pre-Expansion

Dependent Variable	Debt HHI_{it}	$\ln(\#Lenders_{it})$	Fraction by Top $Lender_{it}$
	(1)	(3)	(5)
Effect – Interim Period	-0.0021	0.0092	-0.0021
	(0.0043)	(0.0075)	(0.0041)
Effect – Post Expansion	0.0148*	-0.0196	0.0122*
	(0.0078)	(0.0148)	(0.0074)
Firm Fixed Effects	Yes	Yes	Yes
Month Dummies	Yes	Yes	Yes
Observations (Firm-Month)	17,577	17,577	17,577
Clusters (Firms)	1,042	1,042	1,042
R-squared	0.826	0.784	0.817

Placebo Tests

- Shift forward by 12 months:
  - Firm in placebo treatment (control) if total debt between $150,000 and $200,000 ($200,000 and $250,000) Jan-Mar 1999 instead of 1998
  - 2,313 (2,435) placebo treatment (control) firms: no sharp distribution discontinuity
  - Misclassification error: 52.4% of firms in the placebo treatment group had debt>$200,000 between Jan-Dec 1998
- Shift upwards by $100,000:
  - Firm in placebo treatment (control) if total debt between $250,000 and $300,000 ($300,000 and $350,000) Jan-Mar 1998
- All estimates not-significant