Public Information and Coordination:
Evidence from a Credit Registry Expansion

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with:
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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

Pre-Expansion Period  Interim Period  Post-Expansion Period
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.
Outline

• Data, empirical setting
• Main Specification and Results
• Additional Empirical Results
• Conclusions
Difference-in-Differences (DID)

\[
\ln(Debt_{it}) = \alpha_i + \xi_t + \gamma_{\text{Interim}} \text{Treat}_i \times \text{Interim}_t
\]
\[+ \gamma_{\text{Post}} \text{Treat}_i \times \text{Post}_t + \varepsilon_{it}\]

- 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

<table>
<thead>
<tr>
<th># of Lenders before April</th>
<th>Multiple Lenders</th>
<th>Single Lender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(Debt from Banks w/ Rating = 2&lt;sub&gt;it&lt;/sub&gt;)</td>
<td>ln(Debt from Banks w/ Rating = 1&lt;sub&gt;it&lt;/sub&gt;)</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect: Interim Period</td>
<td>-0.198*</td>
<td>-0.058</td>
</tr>
<tr>
<td></td>
<td>(0.103)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Effect: Post Expansion</td>
<td>-0.356**</td>
<td>-0.115**</td>
</tr>
<tr>
<td></td>
<td>(0.148)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Firm FE, Month Dummies</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations (Firm-Month)</td>
<td>2,381</td>
<td>2,368</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.914</td>
<td>0.671</td>
</tr>
</tbody>
</table>
Public Information and Coordination

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

\[
\ln(Debt_{ijt}) = \alpha_{ij} + \xi_{jt} + Treat_{i} \times \delta_{t} + \\
+ \gamma_{Interim2} \text{Treat}_{i} \times \text{Interim}_{t} \times \text{BankAssigned}_{2j} + \\
+ \gamma_{Post2} \text{Treat}_{i} \times \text{Post}_{t} \times \text{BankAssigned}_{2j} + e_{ijt}
\]

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 \(\theta_i\) independently drawn from \(f(\theta)\)

• Objective of bank \(i\):

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

• Information is (is not) shared, then \(\theta_j\) is (is not) known by bank \(i\)
  – Not shared: \(E_i(L_j)\) is independent of the realization of \(\theta_i\)
Information Sharing and Coordination

First order condition

\[ \theta_i E_i(L_j) R - L_i^{\delta-1} = 0 \]

- Bank \( i \)'s optimal level of lending is:
  - Increasing in creditworthiness \( \theta_i \)
  - Increasing in expected lending by bank \( j \)
Information Sharing and Coordination
Publicity Multiplier

- Elasticity of equilibrium lending with respect to loan creditworthiness
  \[ \eta = \frac{\partial L_i}{\partial \theta_i} \frac{\theta_i}{L_i} \]

- No information sharing: \( \eta^{NS} = \frac{1}{\delta - 1} \)

- Information sharing: \( \eta^S = \Omega \cdot \eta^{NS} \), 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

<table>
<thead>
<tr>
<th>Sample</th>
<th>All</th>
<th>Treatment Firms</th>
<th>Control Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>med</td>
<td>sd</td>
</tr>
<tr>
<td>Total debt ('000)</td>
<td>214.6</td>
<td>217.0</td>
<td>22.8</td>
</tr>
<tr>
<td>Number of lenders</td>
<td>1.88</td>
<td>2.00</td>
<td>1.06</td>
</tr>
<tr>
<td>Debt concentration (HHI)</td>
<td>0.84</td>
<td>1.00</td>
<td>0.22</td>
</tr>
<tr>
<td>Fraction debt from lead bank</td>
<td>0.88</td>
<td>1.00</td>
<td>0.17</td>
</tr>
<tr>
<td>Collateral/Debt</td>
<td>0.61</td>
<td>0.78</td>
<td>0.40</td>
</tr>
<tr>
<td>Average risk rating</td>
<td>1.10</td>
<td>1.00</td>
<td>0.31</td>
</tr>
<tr>
<td>Std. Dev. of same firm ratings</td>
<td>0.13</td>
<td>0.00</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Sample Firm Characteristics by Total Debt, March 1998

The diagram illustrates the number of borrowers and various financial metrics across different total debt ranges ($x 1000). The x-axis represents the total debt range, while the y-axis shows the number of borrowers. The diagram includes lines for the number of borrowers, collateral/debt, debt HHI, and the fraction with a rating of 1.
Financial Distress: DID Estimate of Effect of Registry Expansion on Default Hazard

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

\[ 1[Default_{it} = 1 | Default_{it-1} = 0] = \xi'_t + \lambda_{\text{Interim}} \times \text{Interim}_t + \lambda_{\text{Post}} \times \text{Post}_t + \zeta_{it} \]

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Default Hazard: 1 if Firm in Default at ( t ), and not at ( t-1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsample:</strong></td>
<td><strong>Multiple Lenders</strong></td>
</tr>
<tr>
<td>Effect on Default Hazard Rate – Interim Period</td>
<td>0.056*</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
</tr>
<tr>
<td>Effect on Default Hazard Rate – Post Expansion</td>
<td>0.030*</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
</tr>
<tr>
<td>Month Dummies</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations (Firm-Month)</td>
<td>2,546</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.104</td>
</tr>
</tbody>
</table>
Long Run: Effect of Registry Expansion on Firms with Perfect Credit Records
Sample: firms with only ratings of 1 in Pre-Expansion

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>ln(Debt_{it})</th>
<th>Default Hazard: 1 if Firm in Default at ( t ), and not at ( t-1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td># lenders pre-expansion</td>
<td>Multiple (1)</td>
<td>Single (2)</td>
</tr>
<tr>
<td>Effect Interim Period</td>
<td>-0.0455 (0.0591)</td>
<td>0.0468 (0.0472)</td>
</tr>
<tr>
<td>Effect Post Expansion</td>
<td>-0.0543* (0.0281)</td>
<td>0.0550 (0.0604)</td>
</tr>
<tr>
<td>Firm Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Month Dummies</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>In sample after default?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations (Firm-Month)</td>
<td>17,639</td>
<td>9,160</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.540</td>
<td>0.512</td>
</tr>
</tbody>
</table>
**Effect of Registry Expansion on Lender Concentration**

Sample: firms with multiple lenders in Pre-Expansion

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Debt HHI&lt;sub&gt;it&lt;/sub&gt;</th>
<th>ln(#Lenders&lt;sub&gt;it&lt;/sub&gt;)</th>
<th>Fraction by Top Lender&lt;sub&gt;it&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(3)</td>
<td>(5)</td>
</tr>
<tr>
<td>Effect – Interim Period</td>
<td>-0.0021 (0.0043)</td>
<td>0.0092 (0.0075)</td>
<td>-0.0021 (0.0041)</td>
</tr>
<tr>
<td>Effect – Post Expansion</td>
<td>0.0148* (0.0078)</td>
<td>-0.0196 (0.0148)</td>
<td>0.0122* (0.0074)</td>
</tr>
<tr>
<td>Firm Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Month Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations (Firm-Month)</td>
<td>17,577</td>
<td>17,577</td>
<td>17,577</td>
</tr>
<tr>
<td>Clusters (Firms)</td>
<td>1,042</td>
<td>1,042</td>
<td>1,042</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.826</td>
<td>0.784</td>
<td>0.817</td>
</tr>
</tbody>
</table>
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**