Managing Stigma during a Financial Crisis

"...as in some past episodes of financial distress, banks were reluctant to rely on discount window credit, frustrating the Federal Reserve’s efforts to enhance liquidity.” – Ben Bernanke.

Sriya Anbil

Board of Governors of the Federal Reserve System

Disclaimer: The analysis and conclusions set forth are those of the author alone and do not indicate concurrence by the Board of Governors of the Federal Reserve System or by anyone else associated with the Federal Reserve System.
Motivation

- Why are banks reluctant to borrow from their LOLR?
Motivation

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- A run on Northern Rock.

- Were banks reluctant to borrow because their identity would be revealed?
What is “stigma”? 

- Stigma is defined as the belief that the public would interpret news that a bank borrowed from its LOLR as a sign of financial weakness and would run on the bank (Madigan (2009)).
- Is this hypothesis correct?
What is “stigma”? 

- Stigma is defined as the belief that the public would interpret news that a bank borrowed from its LOLR as a sign of financial weakness and would run on the bank (Madigan (2009)).

- Is this hypothesis correct?

- Armentier, Sarkar, Shrader and Ghysels (2014): banks are willing to pay a premium to avoid borrowing from the discount window.
Research Questions

- Is there stigma if a bank is publicly revealed to have borrowed from its LOLR?
- If there is stigma, how can central banks create emergency lending facilities to alleviate this problem?
Two Empirical Challenges

- Not enough to compare banks that borrowed from the discount window to banks that did not borrow.
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- We need to know when the public learned of an LOLR loan.
  - Discount window borrowing is supposed to be anonymous.
Two Empirical Challenges

- Not enough to compare banks that borrowed from the discount window to banks that did not borrow.
- We need to know *when* the public learned of an LOLR loan.
  - Discount window borrowing is supposed to be anonymous.
- Does not exist during recent crisis.
Empirical Framework

- I use a quasi-natural experiment from the Great Depression.

  The Reconstruction Finance Corporation (RFC) was created to act as a LOLR.
  Gave loans to banks in complete secrecy.
  On August 22, 1932, the Clerk of the House of Representatives published a partial list of banks that had secretly borrowed from the RFC.

  I use a difference-in-differences setting:
  - I compare "revealed banks" to "non-revealed banks".
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- I use a difference-in-differences setting:
  - I compare “revealed banks” to “non-revealed banks”.
  - the Clerk published the list of banks that he had access to.
Trend in Deposits
RFC borrowers during the Great Depression
Preview of Results

The graph illustrates the change in deposits/assets from June 1930 to December 1932. It compares two categories: Revealed Banks (blue line) and Non-revealed Banks (green line). The data shows a decline in deposits/assets over time, with a significant drop from June 1932 to December 1932, indicated by the shaded area.
Preview of Results

- Stigma exists.
  - Revealed banks:
    - faced a drop of 5-7% in their ratio of deposits-to-assets relative to non-revealed banks.
Stigma exists.

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Revealing a partial list of banks yields stigma.
Preview of Results

- Stigma exists.
  - Revealed banks:
    - faced a drop of 5-7% in their ratio of deposits-to-assets relative to non-revealed banks.

- Revealing a partial list of banks yields stigma.

- Would stigma be reduced if many banks were revealed at the same time?

- Helps us think about the appropriate policy response.
Reconstruction Finance Corporation (RFC)

- Began giving loans on February 2, 1932.
  - interest rate of 5.5%.
  - maturities up to 3 years.
- 61% of banks could not borrow from the discount window.
ERCA amended the original RFC Act to give loans directly to public works.

- Section 201(b) added: the RFC had to submit a monthly report to Congress of borrower names.
The Publication of the List

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The Publication of the List

- ERCA amended the original RFC Act to give loans directly to public works.
  - Section 201(b) added: the RFC had to submit a monthly report to Congress of borrower names.

- President Hoover was assured that the list would remain confidential.

- But the Clerk of the House of Representatives, South Trimble, felt it was his duty to make the reports public.

- Unexpectedly released the list on August 22, 1932.
713 **non-revealed** banks had loans authorized btw. Feb 2-July 20, 1932

Aug 22, 1932

Feb 2, 1932

351 **revealed** banks had loans authorized btw. July 21-31, 1932
Timeline

August 22, 1932 – 351 banks revealed; 713 banks not revealed

Interval of interest

January 26, 1933 – 713 banks revealed

Feb 2, 1932 – RFC begins
Data

all hand-collected

- Rand McNally Bankers’ Directory
  - semi-annual balance sheet information: December 31, 1929 to June 30, 1933 (8 obs. per bank, 8 books)
  - deposits, loans and discounts, bonds and securities
  - dates of bank failure, suspensions (in conservatorship)
- Moody’s: confirmation of bank failure dates
- Final sample: 1,064 banks
## Summary Statistics

**Banks with loans authorized before August 22, 1932**

As of June 30, 1932

<table>
<thead>
<tr>
<th></th>
<th>Revealed Banks (351)</th>
<th>Non-revealed Banks (713)</th>
<th>Diff. in Means</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>total assets</strong></td>
<td>2597.3</td>
<td>5539.0</td>
<td>4664.2</td>
</tr>
<tr>
<td><strong>Deposits</strong>/Assets</td>
<td>0.7042</td>
<td>0.1189</td>
<td>0.6933</td>
</tr>
<tr>
<td><strong>Loans and Discounts</strong>/Assets</td>
<td>0.6929</td>
<td>0.1664</td>
<td>0.6548</td>
</tr>
<tr>
<td><strong>Bonds and Securities</strong>/Assets</td>
<td>0.3067</td>
<td>0.1625</td>
<td>0.3444</td>
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Failed: 32 revealed banks (9.2%), 43 non-revealed banks (6.0%)

***parallel trend

**july stats**
Summary Statistics

Banks with loans authorized before August 22, 1932

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Failed: 32 revealed banks (9.2%), 43 non-revealed banks (6.0%)
Empirical Specification

- Difference-in-differences analysis:

\[
\frac{Deposits}{Assets}_{i,t} = \alpha + \beta_1 \text{Revealed}_i \times \mathbb{I}\{t = \text{List}\} + \beta_2 \text{Revealed}_i \times \mathbb{I}\{t = \text{List} + 1\} + \gamma X_{i,t-1} + \eta_t + \delta_i + \epsilon_{i,t}
\]

- Concerns
  - Unexplained bank characteristics - \(X_{i,t-1}\)
    - log of bank assets
    - state-level: log of total deposits, log of total deposits at suspended banks, number of banks, number of suspended banks, per capita income
  - Time trends in banks’ balance sheet - \(\eta_t\) Time FE
  - Unobservable bank characteristics - \(\delta_i\) Bank FE
## Stigma Exists

<table>
<thead>
<tr>
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<th>deposits-to-assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{Revealed}_i \times I{t = \text{List} - 1}$</td>
<td>-0.0049</td>
</tr>
<tr>
<td></td>
<td>(0.0072)</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times I{t = \text{List}}$</td>
<td>-0.0482***</td>
</tr>
<tr>
<td></td>
<td>(0.0163)</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times I{t = \text{List} + 1}$</td>
<td>0.0007</td>
</tr>
<tr>
<td></td>
<td>(0.0264)</td>
</tr>
<tr>
<td>$X_{i,t-1}$</td>
<td>No</td>
</tr>
<tr>
<td>Bank Fixed Effects $\delta_i$</td>
<td>Yes</td>
</tr>
<tr>
<td>Time Fixed Effects $\eta_t$</td>
<td>Yes</td>
</tr>
<tr>
<td>Obs.</td>
<td>6303</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.6255</td>
</tr>
<tr>
<td></td>
<td>6303</td>
</tr>
<tr>
<td></td>
<td>0.6626</td>
</tr>
</tbody>
</table>
Graphical Representation

The graph shows the change in deposits/assets over time from June 1930 to June 1933. The x-axis represents the date, with labels ranging from 30 Jun 1930 to 30 Jun 1933. The y-axis represents the change in deposits/assets, ranging from -0.4 to 0.0.

The graph includes two lines: blue for Revealed Banks and green for Non-revealed Banks. Both lines show a decrease in change in deposits/assets over time, with a significant drop in the latter part of 1932 to 1933.
Reducing Stigma

- Stigma exists.
Reducing Stigma

- Stigma exists.
- How can we reduce stigma?
- Look at number of banks revealed within a city.
Reducing Stigma

- Stigma exists.

- How can we reduce stigma?

- Look at number of banks revealed within a city.

- Revealing many bank identities at the same time or just reveal the few?
Example

- Assumptions:
  - shocks hitting cities varied in intensity (Wicker 1996)
  - banks lent locally (Mitchener and Richardson 2014)
Interpretation of the data

- A revealed bank in City A did worse than a revealed bank in City B.

- No stigma for the revealed banks in City B.
Interpretation of the data

How can we think about the entire banking system?

City A

City B

Hypothetical City with No Stigma

Revealed  Not Revealed
Interpretation of the data

- How can we think about the entire banking system?

- City A does worse than City B if...

  - the non-revealed banks in City A did the same as the non-revealed banks in City B.
  - assuming the banks that didn’t borrow in City A did the same as the banks that didn’t borrow in City B.
Interpretation of the data

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Interpretation of the data

- In cities where nearly all banks were revealed...
  - no difference between the revealed and non-revealed banks.
  - information about nearly all the banks was revealed at the same time.
Interpretation of the data

- In cities where nearly all banks were revealed...
  - no difference between the revealed and non-revealed banks.
  - information about nearly all the banks was revealed at the same time.

- Revealing many banks at the same time is better than revealing few banks.
Appropriate Policy Response

- A lending facility that reveals the identities of many banks at the same time might have less stigma.
  - coordination mechanism that allows banks to request loans at the same time.
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- Benefit of coordination mechanism:
  - if identities are revealed, likely that $\geq 1$ identity will be revealed
  - prevents only 1 identity being leaked individually
Appropriate Policy Response

- A lending facility that reveals the identities of many banks at the same time might have less stigma.
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- Benefit of coordination mechanism:
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  - prevents only 1 identity being leaked individually

- Many banks need to borrow from the LOLR.
Conclusion

- Stigma exists.
- Stigma is large and warrants the attention of policy makers.
- Revealing many banks at the same time is better than revealing few.
- A lending facility that reveals many bank identities at the same time may have less stigma.
Robustness

- Compare banks that had loans authorized in July
  - Significant drop in the ratio of deposits-to-assets of 8% for revealed banks.

- Loan authorization date ≠ Loan application date

- Compare revealed banks that had loans authorized between Feb. 2-July 20 to non-revealed banks
  - Significant drop the ratio of deposits-to-assets of 11.5% for revealed banks

- Robust to alternative specifications
  - loan controls
  - deposit level
  - adjusted assets
  - revealed banks loans bonds

- Banks that never borrowed?
Revealed banks hoarded cash

<table>
<thead>
<tr>
<th></th>
<th>Loans Assets $i,t$</th>
<th>Bonds Assets $i,t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List - 1}$</td>
<td>-0.0108 (0.038)</td>
<td>0.0056 (0.067)</td>
</tr>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List}$</td>
<td>-0.0244 (0.0181)</td>
<td>0.0113 (0.0110)</td>
</tr>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List + 1}$</td>
<td>0.0195 (0.0255)</td>
<td>0.0402*** (0.0154)</td>
</tr>
</tbody>
</table>

- $X_{i,t-1}$: Yes
- Bank Fixed Effects $\delta_i$: Yes
- Half-Year Fixed Effects $\eta_t$: Yes

- Obs.: 6256
- $R^2$: 0.6036

- limitations to the data
Total Borrowings of Depository Institutions from the Federal Reserve

Source: St. Louis Federal Reserve Economic Data
## Effect on Deposits for Loans Authorized in July

<table>
<thead>
<tr>
<th>Formula</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List} - 1}$</td>
<td>-0.0139</td>
<td>(0.0124)</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List}}$</td>
<td>-0.0546**</td>
<td>(0.0250)</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List} + 1}$</td>
<td>0.0231</td>
<td>(0.0514)</td>
</tr>
</tbody>
</table>

- $X_{i,t-1}$                        | Yes
- Bank Fixed Effects $\delta_i$     | Yes
- Half-Year Fixed Effects $\eta_t$  | Yes

- Obs.                               | 2400
- $R^2$                              | 0.6213
## Effect on Deposits for Revealed Banks with Earlier Authorized Loans

<table>
<thead>
<tr>
<th>Expression</th>
<th>deposits over assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List - 1}$</td>
<td>-0.0119 (0.0118)</td>
</tr>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List}$</td>
<td>-0.0716** (0.0354)</td>
</tr>
<tr>
<td>$Revealed_i \times \mathbb{I}{t = List + 1}$</td>
<td>-0.0362 (0.0547)</td>
</tr>
</tbody>
</table>

- $X_{i,t-1}$, Yes
- Bank Fixed Effects $\delta_i$, Yes
- Half-Year Fixed Effects $\eta_t$, Yes

- Obs. 4771
- $R^2$ 0.6588
## Effect on Deposits with Loan Controls

<table>
<thead>
<tr>
<th>deposits over assets</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revealed(_i) \times \mathbb{1}{t = \text{List} - 1}</td>
<td>-0.0034</td>
<td>(0.0083)</td>
</tr>
<tr>
<td>Revealed(_i) \times \mathbb{1}{t = \text{List}}</td>
<td>-0.0473**</td>
<td>(0.0224)</td>
</tr>
<tr>
<td>Revealed(_i) \times \mathbb{1}{t = \text{List} + 1}</td>
<td>-0.002</td>
<td>(0.0284)</td>
</tr>
</tbody>
</table>

- \(X_{i,t-1}\) \hspace{1cm} Yes
- Bank Fixed Effects \(\delta_i\) \hspace{1cm} Yes
- Half-Year Fixed Effects \(\eta_t\) \hspace{1cm} Yes
- Loan Controls \hspace{1cm} Yes

- Obs. \hspace{1cm} 6303
- \(R^2\) \hspace{1cm} 0.6690

---

**Note:** The table above shows the coefficients and their standard errors for different interactions involving the revealed status of deposits. The results suggest a significant negative effect of revealed deposits on deposits over assets, particularly for the period \(t = \text{List}\), with a coefficient of -0.0473**. The model includes various controls such as lagged variables, bank-specific fixed effects, half-year fixed effects, and loan controls, and has a high R-squared value of 0.6690.
## Effect on Deposit Levels

<table>
<thead>
<tr>
<th>Term</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List} - 1}$</td>
<td>-0.1134</td>
<td>0.1111</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List}}$</td>
<td>-0.3699*</td>
<td>0.2302</td>
</tr>
<tr>
<td>$\text{Revealed}_i \times \mathbb{I}{t = \text{List} + 1}$</td>
<td>0.2873</td>
<td>0.3133</td>
</tr>
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</table>

- $X_{i,t-1}$: Yes
- Bank Fixed Effects $\delta_i$: Yes
- Half-Year Fixed Effects $\eta_t$: Yes

- Obs.: 6207
- $R^2$: 0.6118
Effect on Deposits using adjusted assets

<table>
<thead>
<tr>
<th>deposits over adjusted assets</th>
<th></th>
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<td>$Revealed_i \times \mathbb{I}{t = List - 1}$</td>
<td>-0.0137</td>
</tr>
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<td>(0.0114)</td>
<td></td>
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<tr>
<td>$Revealed_i \times \mathbb{I}{t = List}$</td>
<td>-0.0518***</td>
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<td>(0.0201)</td>
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<td>$Revealed_i \times \mathbb{I}{t = List + 1}$</td>
<td>0.0047</td>
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<td>(0.0283)</td>
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- $X_{i,t-1}$ Yes
- Bank Fixed Effects $\delta_i$ Yes
- Half-Year Fixed Effects $\eta_t$ Yes

<p>| |</p>
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<td>Obs.</td>
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<td>$R^2$</td>
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Banks with loans authorized between July 10-31, 1932

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<td>0.7206</td>
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<td>Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loans and Discounts</td>
<td>0.6929</td>
<td>0.1664</td>
<td>0.6586</td>
</tr>
<tr>
<td>Assets</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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## City Summary Statistics

As of June 30, 1932

<table>
<thead>
<tr>
<th>No. of cities</th>
<th>% of revealed banks within a city</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
</tr>
<tr>
<td>All cities</td>
<td>817</td>
</tr>
<tr>
<td>Cities with 1 bank</td>
<td>252</td>
</tr>
<tr>
<td>Cities with at least 2 banks</td>
<td>565</td>
</tr>
<tr>
<td>Cities with at least 3 banks</td>
<td>318</td>
</tr>
<tr>
<td>Cities with at least 4 banks</td>
<td>204</td>
</tr>
<tr>
<td>Cities with at least 5 banks</td>
<td>140</td>
</tr>
</tbody>
</table>
## Summary Statistics on Failed Banks

<table>
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<tr>
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<th>Total</th>
<th>Revealed</th>
<th>Not Revealed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed</td>
<td>315 (29.6%)</td>
<td>105 (29.9%)</td>
<td>210 (29.5%)</td>
</tr>
<tr>
<td>Failed btw. August 22, 1932 and January 26, 1933</td>
<td>75 (7.0%)</td>
<td>372 (9.2%)</td>
<td>43 (6.0%)</td>
</tr>
<tr>
<td>Failed after January 26, 1933</td>
<td>240 (22.6%)</td>
<td>73 (20.8%)</td>
<td>167 (23.4%)</td>
</tr>
</tbody>
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Timeline

August 22, 1932 – 351 banks revealed; 713 banks not revealed

February 2, 1932 – RFC begins

January 26, 1933 – 713 banks revealed

4 more lists published during this period

216 (of 713) banks revealed before January 26, 1933

restricted control
Timeline

- August 22, 1932 – 351 banks revealed; 713 banks not revealed
- January 26, 1933 – 713 banks revealed
- Feb 2, 1932 – RFC begins
- 4 more lists published during this period
- 216 (of 713) banks revealed before January 26, 1933

- 497 banks remain non-revealed on Jan. 26, 1933 = “Restricted Control Group”
Literature Review

- Literature on stigma
  - Armentier, Sarkar, Shrader, and Ghysels (2014); Furfine (2003); Kleymenova (2011); Ennis and Weinburg (2013)

- Literature on bank secrecy
  - Dang, Gorton, Holstrom, and Ordonez (2014); Hautcoeur, Riva, and White (2013)

- Literature on the Reconstruction Finance Corporation
  - Calomiris, Mason, Weidenmier, Bobroff (2013)
Trends in Bank Size

- Revealed Banks
- Non-revealed Banks
- Never Borrowed Banks
Trends in Deposit Levels

The graph shows the trends in deposit levels from 31 Dec 1930 to 31 Dec 1932. The lines represent different categories:

- **Revealed**
- **Not Revealed**
- **Never Borrowed**

The graph indicates a decline in deposit levels over the period, with the 'Revealed' category maintaining a higher level compared to 'Not Revealed' and 'Never Borrowed' categories.
Trends in Remaining Liabilities

change in remaining liabilities over assets

31dec1930  31dec1931  31dec1932

- Revealed
- Not Revealed
- Never Borrowed
## Summary Statistics

**Banks that Never Borrowed**

<table>
<thead>
<tr>
<th></th>
<th>Non-Revealed Banks (713)</th>
<th>Never Borrowed (130)</th>
<th>Diff. in Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obs.</td>
<td>Mean</td>
<td>Std. Dev</td>
</tr>
<tr>
<td>total assets</td>
<td>713</td>
<td>4664.2</td>
<td>6348.3</td>
</tr>
<tr>
<td>log(total assets)</td>
<td>713</td>
<td>7.95</td>
<td>0.92</td>
</tr>
<tr>
<td>Deposits</td>
<td>713</td>
<td>0.69</td>
<td>0.12</td>
</tr>
<tr>
<td>Loans</td>
<td>713</td>
<td>0.65</td>
<td>0.15</td>
</tr>
<tr>
<td>Bond</td>
<td>713</td>
<td>0.34</td>
<td>0.14</td>
</tr>
<tr>
<td>Liabilities – Deposits</td>
<td>713</td>
<td>0.31</td>
<td>0.12</td>
</tr>
</tbody>
</table>

**sum stats never borrowed**