Did capital requirements in the early 20th century United States promote bank stability?

Community Banking Research and Policy Conference
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Motivation

• Capital requirements are designed to promote bank stability

• Rethink capital requirements after financial crises
Challenges analyzing impact of capital requirements on bank stability

• Changes in capital requirements are often responses to ongoing economic events
  – Basel III following recent financial crisis
  – OCC raising minimum capital requirements following bank runs in 1933

• Estimating impact of capital requirements on bank outcomes may be biased
Strategy

- Structure of capital requirements for national banks in early 20th century United States provides an appropriate setting
  - Minimum Capital requirements graded according to town population
    - Amount of capital required doubles at specific population thresholds
  - Compare national banks in towns slightly above and below each population threshold
    - Study excludes state banks

<table>
<thead>
<tr>
<th>Town Population</th>
<th>Population&lt;3,000</th>
<th>3000</th>
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*Source: OCC Annual Reports, 1900 and 1910; White, 1983; Banking Act of 1933*
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<td></td>
<td>$200,000</td>
<td></td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>1933-</td>
<td>$50,000</td>
<td></td>
<td>$50,000</td>
<td></td>
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Bank capital across town populations, 1905

Bank capital across town populations, 1905

Bank capital across town populations, 1905

Bank capital across town populations, 1905, Established<1900

Bank capital across town populations, 1905

Bank capital across town populations, 1905

18% difference in capital

Are banks choosing towns with lower capital requirements?
Methodology

• Estimate local polynomial regressions for bandwidth of ±1000
  – Focus on lowest population cut-off of 3,000
    • “rural areas of the country” where “low population density required, numerous widely, dispersed banking offices” (White, 1983)

\[
\text{BankOutcome}_{bis} = \beta_0 + \beta_1(Pop - 3000)_{bis} + \beta_21(Pop_{bis} \leq 3000)_{bis} + \beta_3Pop_{bis}1(Pop_{bis} > 3000)_{bis} + \epsilon_{bis} \tag{1}
\]

\[
Pop_{bis} \in [2000, 4000]
\]
\[
b = \text{bank}, i = \text{town}, s = \text{state}
\]
## Results

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Log(Capital &amp; Surplus)</th>
<th>Log(Assets)</th>
<th>Leverage</th>
<th>Loans/Assets</th>
<th>Suspension Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Pop-3000)</td>
<td>0.0001</td>
<td>0.0002**</td>
<td>0.0001</td>
<td>9.72e-06</td>
<td>-0.000557*</td>
</tr>
<tr>
<td></td>
<td>(8.42e-05)</td>
<td>(9.05e-05)</td>
<td>(0.0002)</td>
<td>(2.33e-05)</td>
<td>(0.000286)</td>
</tr>
<tr>
<td>1(Pop&gt;3000)</td>
<td>0.18***</td>
<td>0.125*</td>
<td>-0.127</td>
<td>-0.0345</td>
<td>-0.108</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.074)</td>
<td>(0.199)</td>
<td>(0.0220)</td>
<td>(0.307)</td>
</tr>
<tr>
<td>(Pop-3000)*1(Pop&gt;3000)</td>
<td>-2.06e-05</td>
<td>-7.06e-08</td>
<td>0.0002</td>
<td>2.32e-05</td>
<td>0.000726</td>
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<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0004)</td>
<td>(3.86e-05)</td>
<td>(0.000519)</td>
</tr>
<tr>
<td>Constant</td>
<td>11.11***</td>
<td>11.95***</td>
<td>3.597***</td>
<td>0.847***</td>
<td>-1.653***</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.086)</td>
<td>(0.286)</td>
<td>(0.0223)</td>
<td>(0.188)</td>
</tr>
<tr>
<td>State Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Bandwidth</td>
<td>±1000</td>
<td>±1000</td>
<td>±1000</td>
<td>±1000</td>
<td>±1000</td>
</tr>
<tr>
<td>Observations</td>
<td>856</td>
<td>856</td>
<td>856</td>
<td>856</td>
<td>856</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.242</td>
<td>0.203</td>
<td>0.18</td>
<td>0.267</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, Town Clustered Standard errors
Robustness checks and Extensions

• Observe impact for banks at lower end of capital distribution

• Different Bandwidths

• Falsification tests
Did minimum capital requirements promote bank stability?

• On average, banks subject to higher capital requirements hold 18% more capital
  – Results driven by banks operating at lower end of the capital distribution
    • Increase a bank’s capital by 28% for banks operating in the bottom 10th percentile of capital distribution

• Find that banks subject to higher capital requirements did not experience lower leverage or suspension rates
  – Modest evidence of banks increasing their assets

• Minimum capital requirements did not prevent bank suspensions
  – Findings contribute to the explanation as to why the United States banking system was fragile and experienced more than 33 banking panics from 1863-1933 (Calomiris and Haber, 2014)
Policy Implications

• Minimum Capital Requirements
  – Require banks to be a certain size
  – Regulation too blunt and may not address the scope of risk a bank is engaging in

• Ratio Capital Requirements
  – Raising ratio requirements lead to asset shrinking instead of capital creation (Gropp et al, working paper)
    • Reduction in credit supply

• Need both types of capital regulation
  – Limit the scope of risk while maintaining the credit supply
Future Work

• Include State banks
  – State banks subject to different minimum capital requirements (among many other regulations)
    • Market concentration in towns close to population thresholds
    • Access to credit at the town level
  – Observe impact of capital requirements on economic growth