Bank Capital Ratios and the Structure of Nonfinancial Industries

Seung Jung Lee    Viktors Stebunovs\textsuperscript{1}

Federal Reserve Board

November 10, 2011

Small Business and Entrepreneurship during an Economic Recovery

\textsuperscript{1}The views expressed in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of anyone associated with the Federal Reserve System.
• Commercial banks’ balance sheets have gone through dramatic changes recently
• Much of the continued increase in capital ratios may reflect anticipated regulation (Basel III) to ensure bank safety and soundness
• However, higher capital ratios have been associated with higher loan spreads and lower loan volume
• In turn, we shed light on how higher capital ratios impact nonfinancial firm creation and size (i.e. employment)
• Specifically, we look at how changes in banks’ capital ratios affect formation and size of bank-dependent manufacturing firms
Plenty of literature on how capital levels or changes in capital regulation affected lending and loan spreads

- Santos and Winton (2010), Fischer, Mattes, and Steffen (2009)
- But not much related to real effects on non-financial firms

Plenty of literature on how bank branch deregulation affected non-financial industry structure

- But these studies do not control for changes in capital ratios
EMPIRICAL STRATEGY

Stage 1: Changes in bank capital ratios that are not related to changes in "financial health" of industries dependent on external finance
- Increase in capital ratios
- Capital regulation
- Market discipline

Stage 2: Response of banks
- Little equity issuance (costly)
- Limited loan growth
- Spreads widening
- More rationing
- Stricter underwriting

Stage 3: Response of manufacturing firms dependent on external finance
- Hypothesis 1: Fewer businesses
- Hypothesis 2: Smaller average size
- Control group: Manufacturing firms not dependent on external finance

Stage 4: Overall effect on employment in industries dependent on external finance
\[ \Delta(\text{employment}) = \Delta(\text{number of firms}) \cdot \text{(firm size)} + \Delta(\text{number of firms}) \cdot \Delta(\text{firm size}) < 0 \]
The 1977-1997 period includes two waves of changes in capital regulation

- Bank capital regulation changes in early 80s
  - Primary and secondary capital ratios
- Bank capital regulation changes in late 80s and early 90s
  - Basel I, leverage ratio, and FDICIA
- Wall and Peterson (1987, 1995) argue that capital ratio adjustments are more likely due to regulatory forces
- ... Still capital may be adjusted through market discipline
Adjusted Capital Ratios

COUNTY BUSINESS PATTERNS (CBP): OVERVIEW

Dependent variables come from CBP

- An annual series collected by Census
  - Cetorelli and Strahan (2006): ”the best way to consider industry structure over a long span of time at a disaggregated level”
- Data available by states and 2-digit SIC industry
- Data consist of number of establishments and employment in mid March
- No data are provided that would disclose the operations of an individual employer
COUNTY BUSINESS PATTERNS (CBP): SAMPLE

Few pointers about the scope and scale of CBP for 1997

- 101 million total employees; 6.8 million establishments
- For the manufacturing sector
  - Independent of external finance - 208 thousand establishments, 7.7 million employees in total
  - Dependent on external finance - 175 thousand establishments, 9.5 million employees in total
- When we clean the sample, for the manufacturing, the above numbers decrease about 5 percent
Manufacturing industries dependent on external finance

- Chemicals and allied products, electrical and electronic equipment, textile mill products, petroleum and coal products, rubber and plastic products, lumber and wood products, primary metal industries, industrial machinery and equipment, and transportation and equipment

Manufacturing industries not dependent on external finance

- Instruments and related products, printing and publishing, miscellaneous manufacturing, stone, clay, glass, and concrete products, furniture and fixtures, fabricated metal products, food and kindred products, apparel and other textiles, tobacco manufactures, and leather and leather products
AVERAGE ESTABLISHMENT SIZE
(For industries not dependent on external finance)

Average establishment size for industries not dependent on external finance

<table>
<thead>
<tr>
<th>Year</th>
<th>California</th>
<th>New York</th>
<th>Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>32.50</td>
<td></td>
<td>42.44</td>
</tr>
<tr>
<td>1979</td>
<td>30.36</td>
<td>28.15</td>
<td>34.52</td>
</tr>
<tr>
<td>1981</td>
<td>28.89</td>
<td>28.15</td>
<td>33.76</td>
</tr>
<tr>
<td>1983</td>
<td>37.59</td>
<td>36.96</td>
<td>48.13</td>
</tr>
<tr>
<td>1987</td>
<td>30.36</td>
<td>34.52</td>
<td>34.52</td>
</tr>
</tbody>
</table>

This figure is a line graph measuring the average establishment size for industries not dependent on external finance for the state of California, New York, and Texas on a yearly basis from 1977 to 1997. Average establishment size is measured in the number of employees per establishment. Each state is represented by an individual line, trending downward after 1979 with a notable decline in 1983 and a notable climb in 1988.
**AVERAGE ESTABLISHMENT SIZE**
(For industries dependent on external finance)

This figure is a line graph measuring the average establishment size for industries dependent on external finance for the state of California, New York, and Texas on a yearly basis from 1977 to 1997. Average establishment size is measured in the number of employees per establishment. Each state is represented by an individual line, trending downward after 1980 with a notable decline in 1983. California’s average number of employees per establishment is 55.29 in 1977 and 45.30 in 1997, with a low of 42.77 in 1993 and a high of 65.72 in 1980. New York’s average number of employees per establishment is 68.75 in 1977 and 49.49 in 1997, with a low of 49.49 in 1997 and a high of 76.16 in 1979. Texas’s average number of employees per establishment is 69.91 in 1977 and 54.50 in 1997, with a low of 52.48 in 1994 and a high of 79.11 in 1980.
We specify that the number and size of establishments are explained by

- Credit supply factors: bank capital ratios, bank loan loss reserve ratios, bank competition and deregulation indicators, and aggregate credit conditions
- Credit demand factors: real gross state product and industry dynamics factors
**Estimation Results**

- Changes in capital ratios do not affect entry of firms
  - Incorporating is cheap and displaced employees might establish new firms
  - Real GSP appears to be more of a factor than capital ratios
- Increase in capital ratios leads to a decline in the average size
  - Expansions are costly, the financing constraint is binding
- One p.p. increase in capital ratios $\Rightarrow$ p.p. decline in the average size

<table>
<thead>
<tr>
<th></th>
<th>Panel</th>
<th>Arellano-Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>$[-0.7; -1.2]$</td>
<td>$[-1.2; -1.4]$</td>
</tr>
<tr>
<td>Long run</td>
<td>$[-3.5; -5.5]$</td>
<td>$[-3.6; -5.9]$</td>
</tr>
</tbody>
</table>
The long-run effect of a change in capital ratios on employment in bank-dependent industries?

\[
\frac{\Delta \text{Employment}}{\Delta \text{Cap.ratio}} \times \Delta \text{Cap.ratio} = \\
\text{Aver.size} \times \frac{\Delta \text{Number of establ.}}{\Delta \text{Cap.ratio}} \times \Delta \text{Cap.ratio}
\]

\[
= 0
\]

\[
+ \text{Number of establ.} \times \frac{\Delta \text{Aver.size}}{\Delta \text{Cap.ratio}} \times \Delta \text{Cap.ratio}
\]
• Employment in bank-dependent manufacturing industries in 1997 = 9.5 million
• An increase in capital ratios of one p.p. $\Rightarrow$ job losses in thousands

<table>
<thead>
<tr>
<th></th>
<th>Panel</th>
<th>Dynamic panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>$[-70; -115]$</td>
<td>$[-115; -135]$</td>
</tr>
<tr>
<td>Long run</td>
<td>$[-330; -525]$</td>
<td>$[-340; -560]$</td>
</tr>
</tbody>
</table>
CONCLUSION

- For manufacturing industries dependent on external finance one p.p. increase in capital ratios
  - Has no effect on firm creation
  - Leads to a decline in average firm size of up to 1.4 percent in the short run and up to 6 percent in the long run
- Firm creation might not decline in response to more limited access to finance
  - Setting up a business is not costly
  - Displaced employees may establish new firms
- Results highlight the effects that tighter capital adequacy standards (Basel III) may have on bank-dependent firm dynamics
The Importance of Access to Capital for Business Innovation

**Moderator:** Traci Mach, Board of Governors of the Federal Reserve System

**Who Seeks and Who Receives? Implications of Demand for and Access to Financial Capital by Young Firms**
Sheryl Winston-Smith, Temple University, Fox School of Business

**Bank Capital Ratios and the Structure of Nonfinancial Industries**
Seung Jung Lee, Board of Governors of the Federal Reserve System

**Discussant:** Clinton B. Gwin, President, Pathway Lending