Bank failures in the financial crisis and agricultural banks

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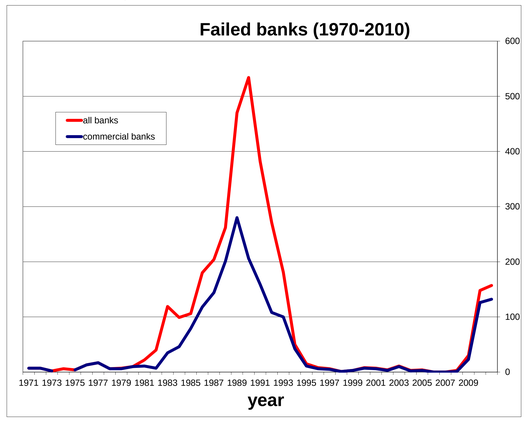
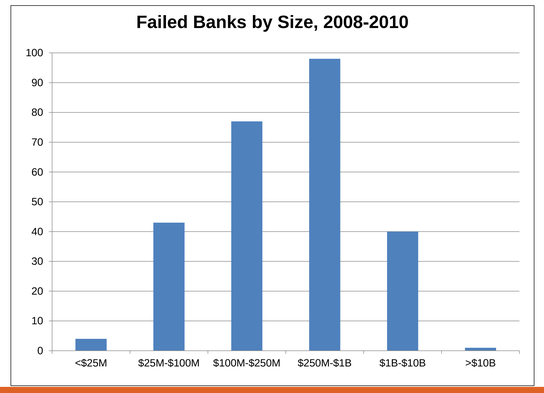
Introduction

- Financial crises have been costly in the U.S. as well as globally, so the prevention of such recurrent episodes has become a priority in policy making (Caprio and Klingebiel, 2003; Arena, 2008).
- There were 271 commercial banks in the U.S. which failed from 2007 to 2010. In 2009 and 2010, there were 120 and 132 commercial banks that failed, respectively. However, there were only 24 banks which failed from 2000 to 2006, illustrating the significance of the number of bank failures over the past 3 years (FDIC, 2010).



- There were 1368 banks failed during 1989 to 1991 with average assets of $270M, while 355 banks failed during 2008 to 2010 with average assets of $5.4B
- Failure prediction is of particular interest in the banking industry due to more direct regulation than other industries and the federal safety net provided by deposit insurance. (Cole and Gunther, 1998; Collier et al., 2003).
- Since most of the financial institutions related to agriculture did not participate in the subprime mortgage market or invest as heavily in structured market securities, agricultural banks are considered to have relatively strong financial health (Ellinger and Sherrick, 2008).



Purpose

- This study tries to answer two questions;
  1) To what extent do individual bank characteristics and financial market conditions explain the recent bank failures?
  2) Were the negative impacts of the recent financial crisis less severe for agricultural banks or banks with relatively more agricultural loans?
- The goal of this study is to estimate a failure model which allows for comparisons among the commercial banks in the U.S. In addition, this study tries to predict the probability of bank failure not only for commercial banks but also for agricultural banks.

Method

- The data used to analyze the failure of commercial banks in the U.S. are taken from the Call and Income Reports of the Federal Reserve and the Summary of Deposit data from the Federal Deposit Insurance Corporation (FDIC). County-level market and bank data are also used.
- Lagged data – one year or two year lagged data are used to predict bank failure
- A cross-sectional multivariate logit model is used to predict the bank failure using selected data.
- The posterior probability of failure can be derived directly from the following specification:

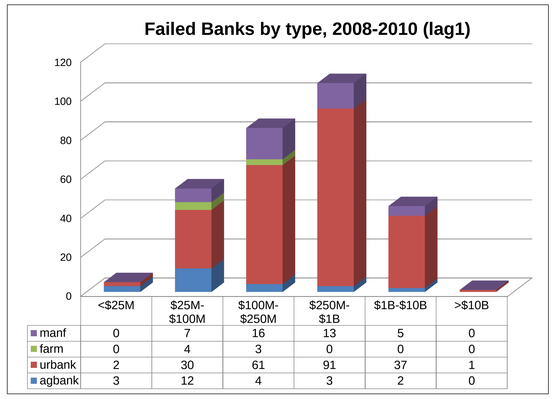
$$Z_i = \log\left[\frac{P_i}{1-P_i}\right] = \alpha + \beta_1 X_{j1} + \beta_2 X_{j2} + \cdots + \beta_n X_{jn} + \varepsilon_i$$

$$P_i = \frac{1}{1+e^{Z_i}},\ P_i \text{ is the probability of bank i's failure}$$

Variables

- Bank characteristics
  - Size: Assets
  - Profitability: ROA
  - Liquidity risk: Loan to deposit ratio
  - Solvency: Equity to asset ratio
  - Bank Type: MBHC, agricultural loan ratio, location of head office, agricultural bank.
- Market characteristics
  - Growth: County-level deposit growth rate, population growth rate
  - Concentration: HHI, Number of head offices in a county
  - Regional characteristics: Farm counties
- Hypotheses
  - Positive relationship: Liquidity risk, Concentration
  - Negative relationship: Size, Profitability, Solvency, Rural and Ag bank, Growth, Farm Counties, Ag loan rate

Failed banks from 2008 to 2010



	<$25M	$25M-$100M	$100M-$250M	$250M-$1B	$1B-$10B	>$10B
manf	0	7	16	13	5	0
farm	0	4	3	0	0	0
urbank	2	30	61	91	37	1
agbank	3	12	4	3	2	0

- Location: 222 urban banks and 41 rural banks were failed.
- Agricultural banks: 24 failed banks were agricultural banks which were relatively small sized banks.
- County type;
  - Farm counties: 7 banks whose size were between $25M to $250M
  - Manufacturing counties: 41 banks (29 banks sized b/w $100M and $1B)

Results

2010 Failures

- One-year lagged data
  - 127 failed banks, 7,016 total banks used
  - Positive effect: HHI, number of head office in county, loan to deposit ratio, MBHC
  - Negative effect: equity to asset ratio, ROA
- Two-year lagged data
  - 127 failed banks, 7,254 total banks used
  - Positive effect: HHI, number of head office in county, loan to deposit ratio, MBHC
  - Negative effect: rural bank, equity to asset ratio, ROA, agricultural loan rate

2009 Failures

- One-year lagged data
  - 116 failed banks, 7,254 total banks used
  - Positive effect: population growth rate, number of head office in county, log of asset, loan to deposit ratio
  - Negative effect: equity to asset ratio, ROA
- Two-year lagged data
  - 117 failed banks, 7,465 total banks used
  - Positive effect: population growth rate, number of head office in county, log of asset, loan to deposit ratio
  - Negative effect: rural bank, equity to asset ratio, ROA, agricultural loan rate

Results - continued

2008 Failures

- One-year lagged data
  - 20 failed banks, 7,465 total banks used
  - Positive effect: HHI, loan to deposit ratio
  - Negative effect: rural banks, equity to asset ratio, ROA
- Two-year lagged data
  - 20 failed banks, 7,556 total banks used
  - Positive effect: loan to deposit ratio

2008-2010 Pooled Panel

- One year lagged data
  - 264 failed banks, 29,027 total banks
  - Positive effect: HHI, number of head office in county, log of asset, loan to deposit ratio, MBHC
  - Negative effect: rural bank, equity to asset ratio, ROA, agricultural loan rate
- Two year lagged data
  - 265 failed banks, 29,962 total banks
  - Positive effect: HHI, population growth rate, number of head office in county, log of asset, loan to deposit ratio, MBHC
  - Negative effect: rural bank, equity to asset ratio, ROA, agricultural loan rate

Conclusions

- Unlike previous studies, this study shows that large bank may be more likely to fail.
- Rural banks and banks with higher agricultural loans are less likely to fail.
- A more concentrated banking system may enhance market power and boost bank profits, reducing the likelihood of failure.
- In a growing market with high population growth rates, bank failure probability may increase.
- The results support other studies in estimating the effect of Liquidity, Solvency, and Profitability measures on failure probability.
- Agricultural banks, a bank's deposit growth rate, and county characteristics are not significant.

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