

The Effect of Bank Consolidation on Agricultural Loan Availability

Chang Xu and Ani L. Katchova
The Ohio State University
Corresponding author: katchova.1@osu.edu

*Selected Poster prepared for presentation at the 2018 Agricultural & Applied Economics Association
Annual Meeting, Washington, D.C., August 5-August 7*

Copyright 2018 by Xu and Katchova. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

The Effect of Bank Consolidation on Agricultural Loan Availability

Chang Xu and Ani L. Katchova, The Ohio State University

Selected Poster for the Agricultural and Applied Economics Association Meeting, Washington DC, August 5-7, 2018



THE OHIO STATE UNIVERSITY
FARM INCOME ENHANCEMENT PROGRAM

ABSTRACT

This study empirically estimates the effect of bank consolidation trends on agricultural loan availability in the U.S.. During the last few decades, U.S. banks have undergone a trend of consolidation, resulting in larger but fewer banks. Whether this consolidation trend affects farmers' access to credit positively or negatively is the objective of this study. We approximate agricultural loan volume in a county by summing up approximated branch-level loan data. The results show that when there is a local bank or branch consolidation, the agricultural loan volume in that county is significantly increased. However, the effect is not significant at the state level.

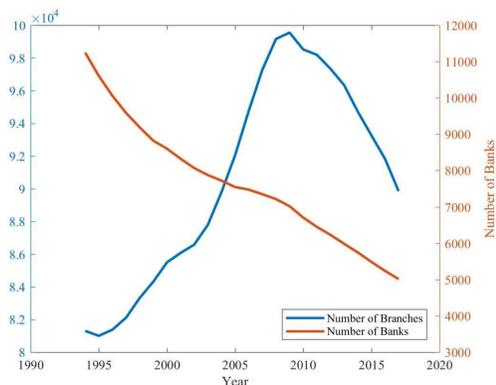
INTRODUCTION

- The 1997 Riegle-Neal Act lifted restrictions on interstate branch banking in the U.S., prompting consolidation in the banking industry since then.
- As shown in Figure 1, the number of banks in the U.S. decreased from 11,246 in 1994 to 5,011 in 2017 (56% decrease). However, the number of bank branches in the U.S. increased from 81,297 in 1994 to 89,857 in 2017 (10% increase).
- Previous research has looked into the effect of bank consolidation on bankruptcy risks and costs (Singhal & Zhu, 2013), individual and systemic risks (Nicoló et al., 2004), local branching pattern (Avery et al., 1999), income inequality U.S. (Beck et al., 2010), and small-business entrepreneurship (Samolyk & Avery, 2000). Only a few studies have looked at the bank consolidation effect in the agricultural sector.

OBJECTIVE

- To empirically test the effect of bank consolidation in an area on agricultural loan volume associated with that area.
- Differentiate the effect at county level and state level.

Figure 1: Number of Banks and Branches in the U.S. during 1994-2017



Data Source: Federal Deposit Insurance Corporation.

LITERATURE REVIEW

- Adams (2012) finds that a bank merger does not affect concentration at the local level. The effect is more likely to be for the state-level concentration.
- Wheelock (2011) finds even though mergers and acquisitions have occurred frequently in the past decade, the bank concentration at the MSA level has not increased.
- The Department of Justice assumes the market is at the local level and thus prevents mergers that would increase the local-level concentration. As a result, banks usually acquire other banks who operate in a different market than their own market, leading to an increase in the state-level concentration.
- Smith (1987) finds that lending to the agricultural sector may increase the rate of closure for banks.

DATA

- Agricultural loans data: Federal Deposit Insurance Corporations (FDIC) Call Reports
- Geographical location of bank branches: FDIC Summary of Deposit (SOD) data
- Mergers, acquisitions, and consolidation data: Federal Reserve Bank of Chicago
- County-level agricultural characteristics data: United States Agriculture Data, 1840 - 2012 (ICPSR 35206)
- ~3000 counties, four waves of data from year 1997, 2002, 2007, and 2012

MODEL

- Regression model

$$\log(ag\ loans_{it}) = \beta_0 + \beta_1 MergerDummy_{it} + \beta_2 FarmNumber_{it} + \beta_3 LogAcreage_{it} + \beta_4 LogFarmlandValue_{it} + \beta_5 County_i + \beta_6 Year_t + error_{it}$$

- Loan data are available at the bank level, not branch level. However, deposits are available at both the bank and branch level. We constructed county-level $ag\ loans_{it}$ variable as follows:

- Get bank-level ag loan variable: $agloan_{bank}$;
- Get branch-level deposit/bank-level deposit ratio: $\frac{deposit_{branch}}{deposit_{bank}}$;
- Approximate branch-level ag loan: $agloan_{bank} \times \frac{deposit_{branch}}{deposit_{bank}}$
- Sum across branches within a county: $\sum_{branch}^{county} agloan_{branch}$

- We used two types of agricultural loans:

- Farm operating loans, which are agricultural loans to finance farm operation, purchase seed, etc.
- Farmland real estate loans, which are agricultural loans to finance real estate (farmland) purchases

- $MergerDummy_{it}$ equals 1 if there was a merger of a local bank or branch in county i in year t .

RESULTS

- Descriptive Analysis

Variables	N	Mean	Min.	Max.
Farm operating loan volume in a county (\$1,000)	8981	118,379.50	1	252,044,890
Farmland real estate loan volume in a county (\$1,000)	8981	97,168.37	0	106,453,665
Whether a local bank or branch has been merged	8981	0.1019	0	1
The number of farms in a county	12364	675.75	0	6,687
Total farm acreage in a county (acres)	12288	297,791	0	6,209,424
Farmland value per farm (\$)	12348	769,905	0	21,522,636

RESULTS

- Panel model for farm operating loans:

Dependent Variable:	County-level	State-level	County-level
Log Farm Operating Loans	Model 1	Model 2	Model 3
Merger Dummy	0.219***	-0.0718	0.196***
Lagged Merger Dummy			0.066
Number of Farms	0.0000106	-0.0000124	0.0000105
Log of Total Acreage	-0.196	1.182	-0.185
Log of Farmland Value per Farm	0.293***	0.700*	0.300***
County fixed effects	Yes		Yes
State fixed effects		Yes	
Year fixed effects	Yes	Yes	Yes
# of observations	8,888	199	6,172
Adjusted R-sq	0.748	0.86	0.783

- Panel model for farmland real estate loans:

Dependent Variable: Log Farmland Real Estate Loans	County-level	State-level	County-level
Model 4	Model 5	Model 6	Model 6
Merger Dummy	0.233***	0.265	0.201***
Lag Merger Dummy			0.0611
Number of Farms	0.0000263	-0.00000143	0.0000897
Log of Total Acreage	-0.386***	0.583	-0.3562091**
Log of Farmland Value per Farm	-0.072	0.453*	-0.062
County fixed effects	Yes		Yes
State fixed effects		Yes	
Year fixed effects	Yes	Yes	Yes
# of observations	8781	199	6073
Adjusted R-sq	0.711	0.936	0.746

- At the county-level, when a local bank or branch merges with other banks, both the farm operating loan volume and farmland real estate loan volume in that county significantly increase.
- Total acreage negatively affects agricultural loan volume for farmland real estate loans.
- Farmland values have a significantly positive effect on farm operating loan volume.

- We also conducted the regression without including farm characteristics variables, which are available only every 5 years. This allows us to include data from 1994 to 2017.

	Farm Operating Loans		Farmland Real Estate Loans	
	County-level	State-level	County-level	State-level
Merger dummy	0.175***	0.086	0.141***	0.165**
Control Variables	No	No	No	No
County fixed effects	Yes		Yes	
State fixed effects		Yes		Yes
Year fixed effects	Yes	Yes	Yes	Yes
# of observations	51,227	1,154	50571	1151
Adjusted R-sq	0.752	0.858	0.739	0.907

CONCLUSIONS AND IMPLICATIONS

- At the county level, consolidation significantly increases local agricultural loan volume for both operating loan and real estate loan categories.
- At the state level, consolidation has no significant effects on local agricultural loan volumes.
- If there was a bank merger/consolidation in a county/state, then farm operating loans increase by 21.9% at the county level and is insignificant at the state level.
- If there was a bank merger in a county/state, then farmland real estate loans increase by 23.3% at the county level and is insignificant at the state level.
- Bank consolidation seems to increase agricultural loan volume at the county level, therefore, consolidation is beneficial for farms by providing higher loan volume.
- It is possible that consolidation leads to increased efficiency in bank operations.
- Banks may be choosing agricultural loans as diversification strategy therefore increasing agricultural loan volume.

BIBLIOGRAPHY

- Adams, R. M. (2012). Consolidation and merger activity in the United States banking industry from 2000 through 2010.
- Avery, R. B., Bostic, R. W., Calem, P. S., & Canner, G. B. (1999). Consolidation and bank branching patterns. *Journal of Banking & Finance*, 23(2), 497-532.
- Beck, T., Levine, R., & Levkov, A. (2010). Big bad banks? The winners and losers from bank deregulation in the United States. *The Journal of Finance*, 65(5), 1637-1667.
- Nicoló, G. D., Bartholomew, P., Zaman, J., & Zephirin, M. (2004). Bank consolidation, internationalization, and conglomerations: Trends and implications for financial risk. *Financial markets, institutions & instruments*, 13(4), 173-217.
- Samolyk, K., & Avery, R. B. (2000). Bank consolidation and the provision of banking services: The case of small commercial loans.
- Singhal, R., & Zhu, Y. E. (2013). Bankruptcy risk, costs and corporate diversification. *Journal of Banking & Finance*, 37(5), 1475-1489.
- Smith, Hilary H. (1987). "Agricultural Lending: Bank Closures and Branch Banking [2]." *Economic Review-Federal Reserve Bank of Dallas*, 27.
- Wheelock, D. C. (2011). Banking industry consolidation and market structure: impact of the financial crisis and recession. *Federal Reserve Bank of St. Louis Review*, 93(6), 419-438.

Contact Information

Chang Xu, Ph.D. Candidate, xu.1348@osu.edu

Ani Katchova, Associate Professor and Farm Income Enhancement Chair, katchova.1@osu.edu