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Michael T. Belongia and R. Alton Gilbert

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Department of Agribusiness Economics
Southern Illinois University at Carbondale
Carbondale, IL 62901

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Bank loans to farmers are made primarily by relatively small banks located in rural areas. In 1984, the 5,000 agricultural banks, which had average total assets of $31 million, accounted for 60 percent of agricultural loans but only 8 percent of all bank loans.[1/] These small, rural agricultural banks are concentrated in states that restrict branch banking. Given this association between the location of agricultural banks and state branching restrictions, changes in banking structure at the state or national level, such as the acquisition of rural banks by large bank holding companies (BHCs) and the spread of interstate banking, may affect the quantity of bank loans supplied to farmers.

The implications of banking structure for agricultural lending are investigated by examining the effects of affiliation with BHCs on the agricultural lending of subsidiary banks. The first section considers the implications of economic theory for this issue. There are arguments to support the conclusion that affiliation of banks with BHCs will increase the agricultural lending of banks and arguments to support the opposite conclusion. Economic theory does not provide a strong basis for supporting one conclusion over the other. The effect of BHC affiliation on agricultural lending of banks, therefore, is an empirical question. The following sections investigate this issue by examining the effects of affiliation with BHCs on the farm loans of subsidiary banks located in rural counties in which bank customers have relatively high demand for agricultural credit.

THE INFLUENCE OF BANKING STRUCTURE ON AGRICULTURAL LENDING: THE THEORY

Although it is clear at the aggregate level that commercial bank lending to agriculture is dominated by small institutions, it is not clear why this should be the case. Until the 1980s, lending to farmers was relatively profitable for most banks. Before the declines in farmland prices in recent years, the small, rural agricultural banks had higher rates of return on equity and lower percentages of their loans written off as losses, on average, than non-agricultural banks of comparable size.[2/]

The authors are, respectively, senior economist and assistant vice president at the Federal Reserve Bank of St. Louis. C.B. Baker, Peter Barry, Stan Graham and Richard Todd made many useful comments on an earlier draft. The views expressed do not necessarily represent those of the Federal Reserve Bank of St. Louis or the Board of Governors of the Federal Reserve System. All remaining errors are solely the responsibility of the authors.

These observations raise several questions about bank lending to farmers. Do the relatively large banking organizations deliberately forego profitable lending opportunities by limiting their loans to farmers? Do the relatively large banking organizations continue to limit their loans to farmers when they acquire banks in rural areas? On the other hand, do the banks in rural areas have some advantage over the larger banks located in metropolitan areas in lending to farmers?

We use two concepts from economic theory in investigating these issues. The first concept involves a locational advantage of rural banks in lending to farmers and the second concept involves differences in opportunities to diversify risk.

Locational Advantage

Rural banks are located closer to farmers than the relatively large banks with their headquarters in metropolitan areas. Rural bankers generally know farming conditions in their communities and can assign loan applicants to different risk categories based on that knowledge. Rural bankers may also have a significant locational advantage over those in metropolitan areas in monitoring the farming operations of their borrowers. This locational advantage may explain the concentration of farm loans at small banks.

This concept of locational advantage has an implication for bank lending to farmers that can be tested empirically. In several states the relatively large banking organizations own bank subsidiaries located in rural areas. These bank subsidiaries have the same locational advantage in farm lending as other rural banks. If locational advantage is the primary reason for the concentration of farm lending among relatively small banks, the percentage of total assets invested in farm loans would not be lower at the subsidiaries of large banking organizations than at other banks in the same rural areas.

Other studies find that the subsidiaries of BHCs tend to have higher ratios of loans to assets than other banks with similar characteristics. If this result applies to BHC subsidiaries located in rural areas and if locational advantage is important in the lending to farmers, the subsidiaries of large BHCs would tend to have higher ratios of farm loans to total assets than other banks in their same rural areas.

Results of the empirical test have implications for the effects of changes in banking structure on the supply of bank loans to farmers. Suppose the ratios of farm loans to total assets at the subsidiaries of large BHCs are equal to or larger than the ratios for other banks in the same rural areas. That result would imply that the entry of relatively large banking organizations into rural banking markets would not reduce the supply of bank loans to farmers.

Diversification of Risk

Proximity of rural banks to farmers may be an advantage in lending to farmers, but there are disadvantages for small banks located in rural areas. The small banks that are not part of larger banking organizations are limited in their ability to diversify risk by lending to businesses in a variety of industries. Large banks are able to lend to firms in many industries, and through the efforts of traveling loan officers and the operation of loan production offices, large banks can lend to firms located outside their communities and states. The relatively high concentration of farm loans among small, rural banks may reflect the limited opportunities of these banks to lend to businesses in other industries. Perhaps the relatively large banking organizations make the amounts of loans to farmers that meet their criteria for diversified loan portfolios. The small, rural banks that are not in larger banking organizations may invest relatively high percentages of their assets in loans to farmers because of limited opportunities to diversify their assets.

The significance of differences in opportunities to diversify risk in explaining the concentration of farm loans among small, rural banks can be determined by testing the following hypothesis: The bank subsidiaries of large BHCs located in rural areas invest smaller percentages of their assets in farm loans than other banks in their same rural communities. Such an empirical result would imply that removing restrictions on the operation of large banking organizations in rural areas would tend to reduce the supply of bank loans to farmers. Under the perspective that emphasizes differences in opportunities to diversify risk, the small rural banks make relatively high percentages of their loans to farmers because they have limited opportunities to lend to firms in other industries. If more of these small, rural banks gain greater opportunities to diversify risk by lending to businesses in a variety of industries, they would reduce the percentages of their assets invested in farm loans.

RESULTS FROM THE EXISTING LITERATURE

Most of the studies that deal with this issue report that BHC affiliation has no influence on the agricultural loans of subsidiary banks.[3/] These studies, however, do not focus specifically on agricultural loan ratios and do not restrict the observations to those for banks in rural areas; consequently, large proportions of the observations involve banks in urban areas. It would not be surprising that an affiliation with BHCs would not influence the agricultural lending of banks in areas in which their customers have little or no demand for agricultural loans.

The few studies that focus on rural banks do report some effects of affiliation with BHCs on bank lending. Markley (1984) reports that,

among banks located in rural Virginia, those affiliated with BHCs had lower ratios of agricultural to total loans than other rural banks. It is difficult to evaluate this observation, however, since no test statistics are reported and no distinctions are made among BHCs by the size of the organizations (that is, some BHCs own many banks with billions of dollars in combined assets, whereas other BHCs own only one bank each). Finally, the Markley study does not hold local demand factors constant in comparing the agricultural loan ratios of affiliated and independent banks.

Barry and Pepper (1985) estimate the influence of BHC affiliation on the loan-to-deposit ratios of rural banks. They find that banks affiliated with BHCs have higher loan-to-deposit ratios than other banks, holding other influences constant. Their findings are similar to those of other studies that have examined the influence of BHC affiliation on loan-to-deposit ratios without focusing exclusively on rural banks. Barry and Pepper however, do not estimate the influence of BHC affiliation on the shares of bank loans made to farmers. Moreover, like Markley, they do not distinguish between large and small BHCs.

THE NATURE OF THE OBSERVATIONS

Given these unresolved issues in the literature, we examine the influence of the asset size of banking organizations on farm lending in a way that eliminates as an issue the locational advantages for small, rural banking organizations. In several states, the relatively large banking organizations have bank subsidiaries in rural areas and, therefore, the same advantage of proximity to farmers as other banks in the same areas. This study compares the ratios of agricultural loans to total loans and agricultural loans to total assets of the subsidiaries of large BHCs with those ratios of other banks in the same counties. Comparisons with banks in the same counties that are not in large BHCs hold constant influences other than the affiliation of a rural bank with a large BHC, such as the local demand for agricultural credit.

Choice of Time Periods

Data on the agricultural loan ratios of banks are derived from mid-year observations for the years 1975, 1980, and 1983 through 1985. Mid-year observations are used because most (if not all) agricultural loans for the year are on the books of banks by then. The use of mid-year observations also avoids some problems with the later quarters, including loan repayments and end-of-year window dressing for bank financial reports.

These years were chosen to represent different conditions in the agricultural sector of the economy. The year 1975 is near the beginning of the rapid increases in farm debt and land prices that occurred in the 1970s and early 1980s; 1980 is near the peak of agricultural land

prices. In the remaining years, 1983 through 1985, farmland prices declined sharply and farmers and their creditors experienced increasing financial stress.

Choice of States

In the states that permit BHCs to own more than one bank, the bank subsidiaries may be located throughout the state, subject to approval by the Federal Reserve Board. Some states permit banks to have branches throughout the state. Data on the composition of assets are available for the individual bank subsidiaries of BHCs but are not available for the individual branches of banks. Therefore, to permit comparison of the agricultural loan ratios of the offices of large banking organizations to the agricultural loan ratios of other banks in the same counties, observations are limited to rural counties in states that permit BHCs to own more than one bank but do not permit statewide branching. The 10 states listed in table 1 meet these criteria in each of the years.

Identifying Large BHCs

Large BHCs are those large enough to have greater opportunities than small, rural, independent banks to diversify risk by lending to firms in a variety of industries. Rather than attempting to estimate a relationship between the size of banking organizations and their opportunities for diversifying risk, we derived comparisons of agricultural loan ratios using two alternative levels for the minimum size of large BHCs based on the total domestic banking assets of their subsidiaries. The two asset levels for identifying large BHCs were varied among the years to reflect the growth of total assets in the banking system. The results presented in table 2 used the following criteria for the minimum size of large BHCs: in 1975, $300 million; in 1980, $500 million; and in 1983 through 1985, $750 million. The results using cut-off levels for large BHCs twice as high as these levels yielded essentially the same results.

Identifying the Counties in the 10-State Sample

Agricultural loan ratios were calculated for counties that meet the following criteria:

(1) The county is outside metropolitan areas.

(2) At least one bank in the county is a subsidiary of a large BHC.

(3) At least one bank in the county is not a subsidiary of a large BHC.

(4) Agricultural loans are 17 percent (the current national average) or more of total loans at either the subsidiaries of large BHCs or the other banks in the county. This criterion eliminates counties in which there is relatively limited demand for agricultural loans.

Table 1 lists the number of counties in each of ten states that meet these criteria.

The Agricultural Loan Ratios

Tests for the effects of bank structure on farm lending were based on two measures of agricultural loan ratios: agricultural loans to total loans, and agricultural loans to total assets. Differences in the ratios of agricultural to total loans provide interesting information on how affiliation with BHCs affects the choices of banks among their potential borrowers. To avoid possible misinterpretations based only on these ratios, however, one must also look at differences in the ratios of agricultural loans to total assets. For example, it is possible that the subsidiaries of large BHCs have the same industrial composition of their loans as other banks in the same counties, but hold relatively large shares of their assets as deposits with the lead banks of their BHCs located in metropolitan areas. Under these conditions, the comparisons of the ratios of agricultural loans to total loans would show no difference at subsidiaries of large BHCs, but these subsidiaries would have lower ratios of agricultural loans to total assets.

Another possibility is that the banks that are not subsidiaries of large BHCs may have lower ratios of loans to assets because of more limited opportunities to diversify risk in their loan portfolios. Their best alternative to investment in agricultural loans is more likely to be Treasury securities rather than loans to firms in non-agricultural industries. If the ratios of agricultural loans to total loans were not significantly different, the subsidiaries of large BHCs would tend to have higher ratios of agricultural loans to total assets. A third possibility is that the subsidiaries of large BHCs have lower ratios of agricultural loans to total loans but higher ratios of agricultural loans to total assets.

TEST RESULTS

In each year, the subsidiaries of large BHCs made a smaller percentage of their loans to farmers than the other banks in the same counties (table 2). The means of the differences are significantly different from zero each year.[4/]

The implications of these results for the supply of agricultural credit can be illustrated using the results for 1980. Table 2 shows that, on average, the percentage of agricultural loans made by the subsidiaries of large BHCs in rural areas is 8 percentage points less than the agricultural loan ratios of other banks in the same counties. In other words, if banks in a given county that are not in large BHCs make 20 percent of their loans to farmers, the subsidiaries of large BHCs in the same county would make about 12 percent of their loans to farmers.

The mean differences in agricultural loan ratios in 1983 through 1985 were about the same as in 1980. Thus, these comparisons show no significant change in the relative supply of agricultural loans by banks in large BHCs during the agricultural sector's current period of financial stress.

The subsidiaries of large BHCs also have lower ratios of agricultural loans to total assets than other banks in their same counties. The mean differences in the ratios of agricultural loans to total assets are smaller, in absolute value, than the mean differences in the ratios of agricultural loans to total loans. This difference reflects the higher ratios of total loans to total assets at the subsidiaries of large BHCs.[5/] This observation supports the view that the rural banks in large BHCs diversify risk by lending to firms in a variety of industries, whereas other rural banks limit their exposure to the agricultural sector of the economy by investing larger shares of their assets in securities, such as those of the U.S. Treasury.

CONCLUSIONS

In several ways, this study is an improvement over the existing literature on the influence of bank structure on farm lending. First, the study focuses exclusively on banks in rural areas, whereas most of the studies that examine the effects of BHC affiliation on farm loan ratios include a high percentage of urban banks in their samples. This study also incorporates improvements in controlling for the size of BHCs and controlling for local demand factors in comparing the agricultural loan ratios of banks in large BHCs with those of other banks.

The ratios of agricultural loans to total loans are significantly lower at banks in large BHCs than at other banks in the same rural counties. The significance of this finding for the supply of agricultural credit is mitigated to some extent by the tendency of the subsidiaries of large BHCs to have higher ratios of total loans to total assets. The net result, however, is that the ratios of agricultural loans to total assets are significantly lower than those of other banks in the same rural counties.

The results are consistent with the view that many small, rural banks specialize in agricultural lending because of limited opportunities to diversify their risk by lending to firms in a wider variety of industries. Given this interpretation, an increase in the acquisition of small commercial banks in rural areas by large banking organizations would tend to reduce the supply of agricultural credit through commercial banks.

Finally, the differences between the agricultural loan ratios of the subsidiaries of large BHCs and the other banks in their same rural counties have not risen in recent years. These results, therefore, do

not support the hypothesis that the subsidiaries of large BHCs have reduced their agricultural loan ratios relative to those of other banks in their same areas during the recent years of financial stress in the agricultural sector.

FOOTNOTES

1/ Agricultural banks are identified as commercial banks with ratios of agricultural loans (real estate and nonreal estate loans) to total loans that exceed the average ratio for commercial banks. See Melichar (1985).

2/ Melichar (1984) and Benjamin (1985).

3/ For surveys of the literature on the effects of affiliation with BHCs on bank performance, see Curry (1978), Schillereff (1982) and Brown (1983). Curry states that the studies indicate a tendency for affiliate banks to increase the ratios of various types of loans to total assets, but they do not indicate this effect for farm loans (p. 100).

4/ With only a few exceptions, the mean differences for each of the 10 states have the same sign as the mean differences across all 10 states, presented in table 2. Those exceptional cases involve mean differences based on relatively few observations. For states with observations for 11 or more counties, the signs of the mean differences are the same as the signs for all states combined.

5/ Some of the other studies also find that subsidiaries of BHCs have higher ratios of total loans to total assets than other banks. See Curry (1978), Schillereff (1982) and Brown (1983).

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Table 1
Location of Rural Counties included in the Study

States	Number of counties				
	1975	1980	1983	1984	1985
Alabama	4	3	1	1	1
Colorado	6	6	4	5	5
Georgia	1	0	1	3	4
Iowa	22	34	41	43	43
Michigan	2	4	6	6	3
Minnesota	37	35	33	31	31
Missouri	31	42	39	40	36
Ohio	10	8	8	6	8
Texas	5	12	14	17	14
Wisconsin	8	9	10	10	10
Combined states	126	153	157	162	155

Table 2
Differences between the Agricultural Loan Ratios for Banks in Large BHCs and Other Banks in the Same Rural Counties

Difference in the ratio of	1975	1980	1983	1984	1985
Agricultural loans to total loans	-11.60%	-7.95%	-7.71%	-8.38%	-8.08%
	(-8.08)	(-7.26)	(-6.77)	(-7.84)	(-7.30)
Agricultural loans to total assets	-4.50	-4.06	-2.93	-3.16	-3.04
	(-5.63)	(-5.60)	(-3.95)	(-4.51)	(-4.05)
Total loans to total assets	3.40	2.43	3.49	3.76	3.91
	(3.34)	(3.24)	(3.43)	(3.74)	(3.74)

Note: t-statistics in parentheses