

Competition in Local Agricultural Lending Markets: The Effect of the Farm Credit System

By Charles S. Morris, James Wilkinson, and Eric Hogue

The goal of U.S. antitrust laws is to protect consumers and businesses from anticompetitive behavior. One area of antitrust law prohibits business mergers that substantially lessen competition or create a monopoly. In banking, insufficient competition can be harmful for consumers and businesses. For example, if a merger of two competing banks results in a combined bank with a substantial market share, bank customers may pay higher interest rates on loans, receive lower interest rates on deposits, or have less access to credit.

The federal banking regulatory agencies are responsible for approving bank mergers. As part of the approval process, they must ensure mergers comply with antitrust laws. The agencies initially assess the competitive effects of proposed mergers using screening measures based on the deposit shares of banks operating in the market. If proposed mergers do not pass the initial screening test, the banking agencies conduct further analysis of the mergers' potential effects on competition.

One shortcoming of deposit-based measures of competition is they do not explicitly account for competition from nondepository financial firms. For example, banks compete with finance companies for business and consumer loans and with money market mutual funds for deposit products. In rural markets where agriculture is a primary business activity, the Farm Credit System's retail lenders, known as Farm Credit Associations (Associations), are particularly important nonbank

Charles S. Morris is a vice president and economist at the Federal Reserve Bank of Kansas City. James Wilkinson is an assistant vice president and economist, and Eric Hogue is a supervision and compliance analyst at the bank. This article is on the bank's website at www.KansasCityFed.org

competitors. Despite Associations' large presence in agricultural loan markets, we are not aware of any studies that have assessed the effect of Associations on banking concentration measures—in particular, their implications for banking market competition and the evaluation of competitive conditions.

In this article, we estimate local market shares of agricultural loans to assess how Associations affect competition for these loans in rural markets where agriculture is an important industry. Our analysis suggests Associations often reduce measures of local market concentration, which implies excluding them from market structure analyses may understate the market's competitiveness.

Section I reviews U.S. antitrust laws and the underlying economic theory. Section II outlines the methodology for assessing competition in banking markets, with a focus on the Federal Reserve System's process. Section III shows how including Associations as a competitor in rural agricultural lending markets affects local market concentration measures.

I. The U.S. Antitrust Framework

In the United States, antitrust laws prohibit or restrict anti-competitive business conduct and practices and protect consumers and businesses from abuses of power that can occur when a firm or group of firms controls a substantial share of a market. In banking, the federal banking agencies—the Board of Governors of the Federal Reserve System (Board), the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC)—are responsible for assessing the competitive effects of bank mergers and acquisitions (M&As) to ensure they comply with antitrust laws.¹ The agencies' merger approvals, however, are subject to review by the U.S. Department of Justice (DOJ).

The federal banking agencies and the DOJ use what is known as the Structure-Conduct-Performance (SCP) paradigm to assess whether an M&A may substantially lessen competition in banking. According to the SCP paradigm, market structure can affect firm and industry conduct, which in turn affects firm and industry performance. From an economic perspective, performance is maximized when firms set prices equal to their incremental production costs, which ensures industry resources are allocated to their most productive uses. This is the ultimate goal of antitrust policy.

Firm conduct determines the extent to which prices rise above incremental costs. Examples of such conduct include restricting product output, discriminating in the prices charged for different customer groups, and pursuing strategies that prevent new firms from entering the market.

Market structure, in turn, affects a firm's ability to engage in conduct that raises prices. Market structure can be described by factors such as the number and size distribution of firms and customers. In a product market with a single firm, the monopolist is able to maximize its profits by limiting its output, and therefore market output, to increase the market price above incremental cost. In a market with many firms, no single firm is able to influence the market price, so in equilibrium, price will equal incremental cost.

More generally, as a market's structure becomes more concentrated—for example, if the number of firms shrinks significantly or if one firm becomes much larger than others—conduct is more likely to approach that of a monopolist. For example, a small group of firms may agree (explicitly or implicitly) to collude to restrict their collective output and raise the market price above their incremental costs to increase their collective profit.

The SCP paradigm provides a practical methodology for assessing the potential competitive effects of proposed mergers. Conduct and performance are difficult to observe and measure. For example, measuring the difference between prices and incremental costs can be difficult in many industries. Abusive market practices and conduct are also often difficult to observe and prove. In contrast, structure is relatively easy to observe and measure. While a highly concentrated industry does not necessarily result in poor conduct and performance, it is more likely to do so than an unconcentrated industry. As a result, measuring industry concentration and the effect of mergers on concentration provides a good initial screening tool for assessing mergers' competitive effects.

II. The Federal Reserve's Implementation of the Structure-Conduct-Performance Paradigm

The DOJ and federal banking agencies all begin their competitive assessment of mergers by measuring pre- and post-merger concentration levels with the Herfindahl-Hirschman Index (HHI). The HHI

is the sum of the squared market shares of firms producing the same product in the same market. However, the DOJ's and banking agencies' processes differ slightly in how they measure the products and markets. This section focuses on the process used by the Federal Reserve.²

The HHI varies between 0 and 10,000 and increases as the number of firms falls or the distribution of firm sizes becomes skewed to large firms. For example, if five firms in an industry all had a 20 percent market share, the HHI would be 2,000. If two of the firms merged, the HHI would increase to 2,800.

The federal banking agencies' initial criteria for assessing the competitive effects of a merger or acquisition is whether it would (1) raise the HHI by 200 points or more to a level of 1,800 or higher in any local banking market in which both firms operate, or (2) increase the post-transaction market share for the acquiring firm to more than 35 percent in any of those markets. If the merger does not exceed these thresholds, it will generally be approved. If it exceeds one or both thresholds, the agencies conduct further analysis to determine whether the merger would be anticompetitive.

Before the banking agencies calculate an HHI, they must first define the relevant market for the antitrust analysis. Specifically, they must define the product and geographic dimensions of a market. In general, a product market includes all products and services that consumers consider to be close substitutes. The geographic area encompasses all banking service providers that customers would consider a viable alternative for meeting their banking needs. From a practical perspective, geographic markets should include any depository institution that a bank's customer would consider switching to when prices or service quality change.

Consistent with these principles, the criteria the agencies use to define banking product and geographic markets are largely based on U.S. Supreme Court antitrust cases.³ The agencies define the product market for banking services as a "cluster" of commercial banking products and services. The cluster includes products and services that banks offer to most households and small businesses. As a result, competitors included in HHI calculations are depository institutions—commercial banks and thrift institutions—and sometimes credit unions.⁴

The geographic markets that the agencies use are generally local, economically integrated areas. Most markets are based on Metropolitan Statistical Areas (MSAs) or are rural counties, but some markets include multiple MSAs, counties, or parts of them.⁵ Currently, the Federal Reserve recognizes more than 1,500 local banking markets in the United States and U.S. territories.

The agencies calculate market shares and the HHI for a local banking market using the deposits of all depository institutions with a presence in the market. Deposits are the only general and reasonable measure of overall banking activity available at the branch level. Indeed, the Board notes that deposits are a “reasonable indicator of the level of activity or output of a depository institution, because deposit accounts are widely held by consumers and small businesses and are held in combination with other commercial banking products. In addition, for smaller institutions, deposits may be considered a measure of a bank’s lending capacity” (Board of Governors).

When a proposed merger or acquisition exceeds the initial HHI or market share threshold, the agencies generally conduct further analysis to determine whether the merger or acquisition may not be anticompetitive. The additional analysis evaluates “mitigating factors,” which are other market characteristics or factors that might indicate the merger is less anticompetitive than the initial HHI analysis suggests. Examples of such mitigating factors are the attractiveness of the market to potential entrants, ease of entry into the market by existing out-of-market or new banks, the number of competitors, the number of competitors with significant market shares, the effects of a shrinking market, and whether the target bank is failing or experiencing severe financial difficulties (Board of Governors). In addition, the extended competitive analysis sometimes considers competition among banks in certain products, such as mortgages, credit cards, and small business loans, which could mitigate the merger’s anticompetitive effects.

However, the current approach to competitive analysis does not include nondepository financial firms, many of which are important competitors in specific banking products. Examples include the Farm Credit System (FCS) in agricultural lending, specialty lenders in mortgages and credit cards, finance companies in commercial lending, factor companies in receivable financing, and money market mutual

funds for deposits. Including these firms could significantly affect the competitive analysis of proposed mergers.

III. How Does Farm Credit System Lending Affect Competition in Agricultural Lending Markets?

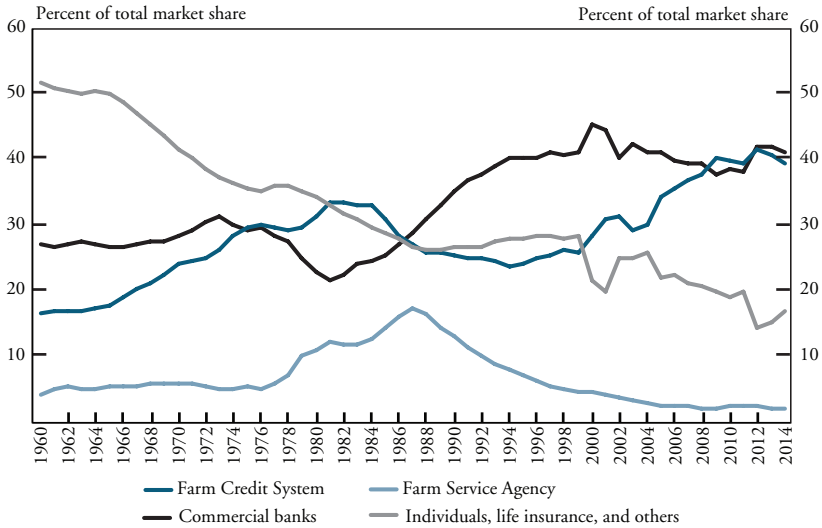
Rural areas are sparsely populated and consequently have less economic activity than metropolitan areas. As a result, most rural areas can support a limited number of banks, which often leads to high measures of banking market concentration. Agriculture is the dominant industry in many rural areas, and rural banks often specialize in lending to farmers and other agribusiness entities. However, nonbank agricultural lenders also compete with these banks, and none are explicitly included in the market shares and HHIs used in the initial competitive analyses of mergers. Along with commercial banks, the FCS is the largest lender to the agriculture sector. To see how the FCS affects local market competition in agricultural lending, we estimate bank and FCS agricultural loan market shares and HHIs in rural banking markets where agriculture is an important part of the local economy and compare the HHIs with and without Association loans.

The FCS's role in agricultural lending

While the FCS and commercial banks currently account for 80 percent of loans to agriculture, their combined dominance in the agricultural loan market is a relatively recent phenomenon (Chart 1). The FCS makes loans to their member borrowers through 76 Associations—74 Agricultural Credit Associations and two Federal Land Credit Associations (see Box for background on the FCS). As recently as the mid-1990s, the Associations' market share of agricultural loans was about 25 percent. The growth in their market share began accelerating in 2000, and by 2009, it overtook the banking industry's share for the first time since the mid-1980s. Since then, the market shares of both banks and Associations have been about 40 percent of all agriculture loans.⁶

Relative to banks, Associations have increased their share of real estate loans and production loans.⁷ Panel A of Chart 2 shows that the Association share of agricultural real estate loans is larger than the bank share, and that the gap widened from 2005 to 2014. Specifically, the Association share rose from 52 percent in 2005 to 55 percent in 2014, increasing

Chart 1
Major Farm Credit Providers



Note: The data are aggregated farm sector balance sheet information.

Sources: U.S. Department of Agriculture, Economic Research Service, Farm Income and Wealth Statistics, and U.S. Farm Sector Financial Indicators.

the gap over the bank share from 4 to 10 percentage points. Panel B of Chart 2 shows the commercial bank share of production loans is larger than the Association share, but the gap narrowed after 2005. The Association share rose from 33 percentage points in 2005 to 40 percentage points in 2014, narrowing the gap between the Association and bank shares from 34 percentage points to 20 percentage points.

Estimating agricultural loan shares and HHIs in local markets

To calculate HHIs, we first need individual bank and Association shares of agricultural loans in local markets. Agricultural loan data, however, are available only at the bank and Association level, which may span more than one local market for banks with multiple branches and for all Associations. As a result, we must estimate agricultural loans in local markets for both banks and Associations. We estimate agricultural loans at the county level and then aggregate the estimates if the local market includes multiple counties. We then use the estimates of Association loans and bank loans in each market to calculate market shares for Associations and individual banks. Finally, we use these shares to calculate market HHIs.

Box**Farm Credit System Background**

The Farm Credit System (FCS) was established as a government-sponsored enterprise in 1916 to provide affordable long-term financing to farmers.⁸ The FCS has undergone several changes since then, but its general mission and structure have remained basically the same.

The current FCS structure was established by the Farm Credit Act of 1971. The Farm Credit Act provides several policy objectives for the FCS's lending programs to support its mission. One objective is improving "the income and well-being of American farmers and ranchers by furnishing sound, adequate, and constructive credit and closely related services to them, their cooperatives, and to selected farm-related businesses."⁹ The Act also requires the FCS to "provide equitable and competitive interest rates to eligible borrowers" and specifies "that in no case is any borrower to be charged a rate of interest that is below competitive market rates for similar loans made by private lenders to borrowers of equivalent creditworthiness and access to alternative credit."¹⁰

The FCS organizational structure includes four regional wholesale banks that primarily provide funding to 76 Associations that make loans to their members. The wholesale banks include three Farm Credit Banks (AgriBank, AgFirst, and FCB of Texas) and one Agricultural Credit Bank (CoBank). These banks have specific regions, with some overlap, and lend only to Associations in their region. CoBank has a broader lending authority than the Farm Credit Banks—for example, CoBank can lend to public utility cooperatives, finance U.S. agricultural exports, and provide international banking services for farmer-owned cooperatives.

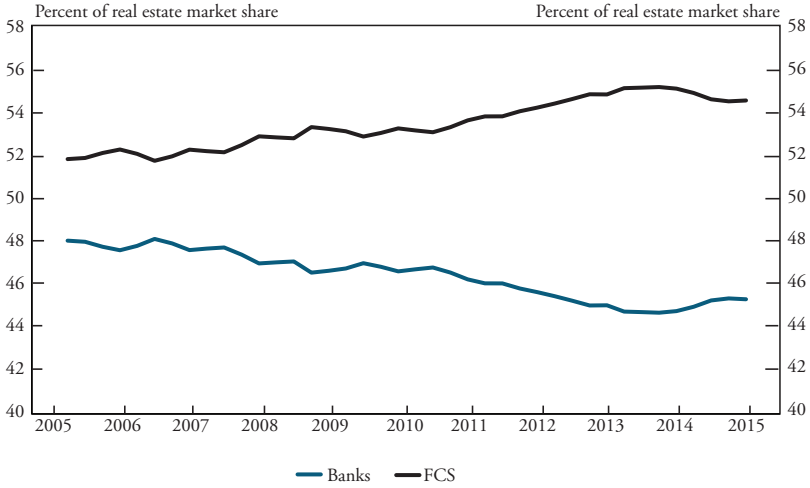
The four wholesale banks are funded by the Federal Farm Credit Banks Funding Corporation, a centralized funding corporation which raises funds in national debt markets.

The Farm Credit Insurance Corporation insures the FCS's funding. The Farm Credit Administration, a Federal agency created in 1933, regulates and supervises the FCS.

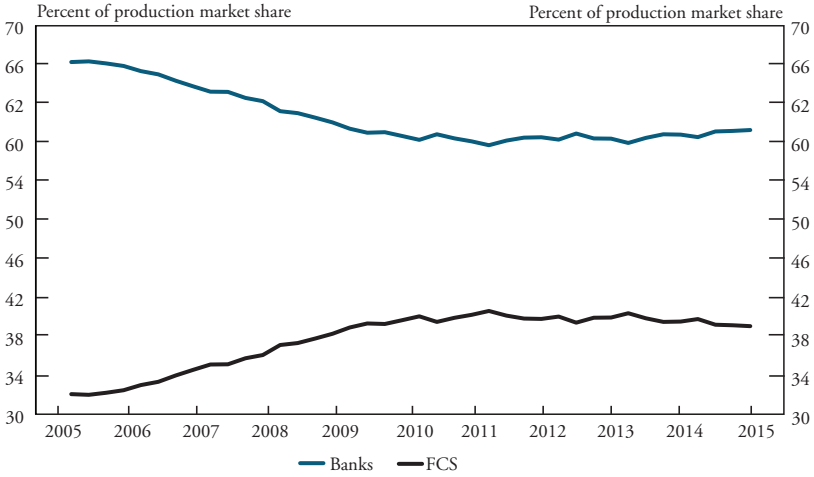
The Associations include 74 Agricultural Credit Associations and two Federal Land Credit Associations. Agricultural Credit Associations make short-, intermediate-, and long-term loans, while Federal Land Credit Associations make only long-term land loans. The Associations are cooperatives owned by borrower-members, governed by a board of directors primarily elected from borrower-members, and pay dividends to their borrower-members. The Associations each have specific lending territories, although many of the territories overlap (Farm Credit Association). The sizes of the territories vary significantly. For example, Northwest Farm Credit Services' and Farm Credit Services of America's territories span multiple states in the Northwest and Midwest portions of the country, respectively, while Legacy Land Bank in eastern Texas spans just a few counties.

Chart 2
Agricultural Loan Market Shares

Panel A: Real Estate Loans



Panel B: Production Loans



Sources: Farm Credit Administration for FCS loans and Reports of Condition and Income (Call Reports) for commercial banks.

Because banks report loans at their headquarters locations instead of at the branches where the loans are made, we must estimate local agricultural loans. Our general procedure is to allocate a bank's agricultural loans to counties based on the degree to which the counties are rural and on the level of the bank's activity in the county. Specifically, we obtain the percentage of each county that is rural from the Census Bureau, whose estimates are based on population densities for Census tracts. We measure a bank's activity in each county using its branch deposits in the county, and calculate a bank's "rural deposits" by multiplying its deposits in each county by the county's rural percentage. We then calculate the share of a bank's rural deposits for each county in which it operates and multiply the shares by its agricultural loans to estimate its county-level agricultural loans.¹¹ For multiple-county markets, we sum county loans up to the market level.

Associations also report all loans at their headquarters location. However, we do not have data on local office activities analogous to a bank's branch deposits. Thus, we allocate agricultural loans to individual counties based on the level of agricultural activity in each county. We measure agricultural activity using aggregate marketing proceeds from crops and livestock in the county. For each Association, we calculate each county's share of agricultural activity and allocate Association agricultural loans to each county in proportion to its share of agricultural activity. As with bank loans, we sum county loans for multiple-county markets.

Selecting agricultural loan markets

To determine market areas, we start with rural banking markets. Typically, these markets correspond with rural counties. However, Federal Reserve Bank staff may adjust market boundaries when appropriate to reflect local business patterns.

We consider several factors in selecting individual markets, including the importance of agricultural activity and the characteristics of the Association that serves the market area. Given our focus on agricultural lending, we include markets only if agricultural activity is economically important. The criteria we use to define whether agricultural activity is economically important are based on the USDA's definition of "farming-dependent" counties. The USDA defines a county as farming dependent if farm earnings are 15 percent or more of total county

earnings or if 15 percent or more of employed county residents work in farm occupations. The USDA includes the occupation option to account for farming-dependent economies that may not meet the earnings threshold, most often due to negative farm earnings for a given year.¹²

Following the USDA's general methodology, we calculate an index of agriculture importance using a three-year average of a county's maximum farm earnings and farm employment shares. We consider a market "agriculture-important" if the index is at least 5 percent and "agriculture-dependent" if the index meets or exceeds the USDA threshold of 15 percent. All markets in the analysis meet the agriculture-important threshold.

We also consider the characteristics of Associations in selecting markets. These characteristics are important because the allocation process assumes a proportional relationship between Association lending and agricultural activity measured by crop and livestock marketing proceeds. This assumption is less likely to hold for Associations that cover very large geographic areas, have non-contiguous territories, or are "overchartered"—that is, cover areas that are also included in another Association's territory. Thus, we select rural banking markets completely within smaller Associations with contiguous territories and in areas that are not overchartered.

Using county earnings and employment data for 2011–13, we select 86 agriculture-important markets from the local banking markets the Federal Reserve uses for antitrust analysis (Map 1).¹³ All but eight of the markets are single counties, and the largest market comprises 11 counties. Of the 86 markets, 48 meet the agriculture-dependent criteria.

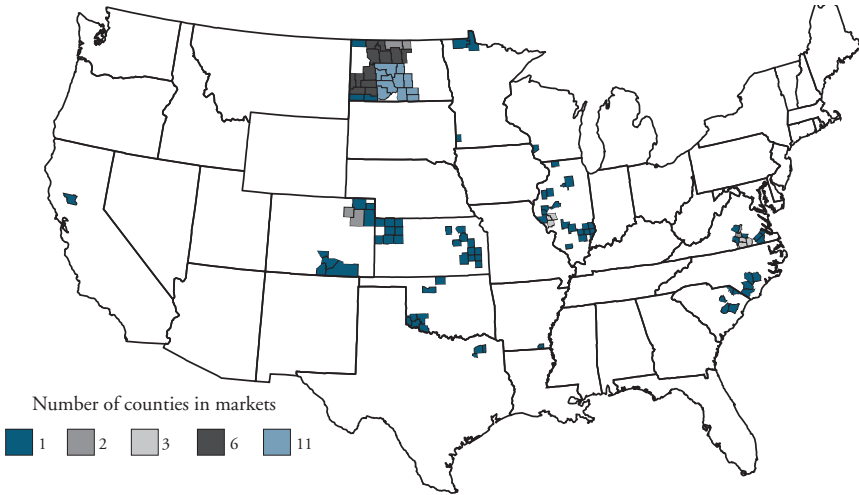
The effect of Associations on competition in local agricultural lending markets

We assess the effect of Associations' lending on market competition by comparing HHIs calculated with and without Association loan shares. Whether adding a competitor to a market increases or decreases concentration is an empirical question. For example, if the additional competitor is large relative to other competitors, market concentration can increase.¹⁴

Table 1 shows summary statistics on banks, Associations, and market HHIs with and without Associations included for the agriculture-

Map 1

Agriculture-Important Banking Markets



Source: Authors' calculations. See Appendix for data sources.

important and agriculture-dependent markets, as well as a third type of market that we label “agricultural-bank” markets. Agricultural banks are banks with a ratio of agricultural loans to total loans of 25 percent or more. We define a market as an agricultural-bank market if 20 percent or more of the banks are agricultural banks. Agricultural activity is also likely to be important in rural markets that have a relatively large number of banks with highly concentrated agricultural loan portfolios. Thus, the agricultural-bank market is an alternative proxy for markets that are highly dependent on agriculture. Of the 86 agriculture-important markets, 56 (in 2005) and 62 (in 2014) are agricultural-bank markets.

Panel A of Table 1 summarizes trends in the number of banks and Associations in the markets. The median number of banks is essentially the same across all market groups—five banks in every year except for 2005, when agricultural-bank markets had six. The Associations' median share of agricultural loans increased from 2005 to 2014 in all three market groups, which is consistent with the national trends shown in Charts 1 and 2. Overall, Association loan shares decreased in relatively few markets from 2005 to 2014—among the 86 agriculture-important markets, their loan shares decreased in only 21 markets and decreased by more than 2 percentage points in only 12 markets.

Table 1
Local Banking Market Summary Statistics

Panel A: Market Composition

	Agriculture-important markets		Agriculture-dependent markets		Agricultural-bank markets	
	2005	2014	2005	2014	2005	2014
Number of markets	86	86	48	48	56	62
Number of banks (median)	5	5	5	5	6	5
Association agricultural loan market share (median)	37%	45%	39%	44%	34%	39%

Panel B: Market Competition Measures

	Agriculture-important markets		Agriculture-dependent markets		Agricultural-bank markets	
	2005	2014	2005	2014	2005	2014
HHI: deposits, banks (median)	3,064	3,037	3,135	3,124	2,478	2,950
Markets <1,800 (number / percent)	14 / 16%	11 / 13%	5 / 10%	5 / 10%	12 / 21%	10 / 16%
HHI: agricultural loans, banks (median)	3,457	3,690	3,549	3,807	2,833	3,534
ΔHHI: agricultural loans - deposits, banks (median)	372	600	229	590	173	523
Markets <1,800 (number / percent)	11 / 13%	7 / 8%	5 / 10%	2 / 4%	11 / 20%	7 / 11%
HHI: agricultural loans, banks and Associations (median)	3,343	3,688	3,343	3,634	2,684	3,082
ΔHHI: agricultural loans, banks and Associations - banks (median)	-413	-419	-554	-612	-413	-653
Markets <1,800 (number / percent)	9 / 10%	4 / 5%	3 / 6%	1 / 2%	9 / 16%	4 / 6%

Note: Agricultural banks are banks with a ratio of agricultural loans to total loans of 25 percent or more. An agricultural-bank market denotes a market in which 20 percent or more of the banks are agricultural banks.

Sources: Authors' calculations. See Appendix for data sources.

Panel B of Table 1 provides summary statistics for HHIs based on three measures of market activity and market participants—the traditional deposit measure for bank market shares, estimated agricultural loan market shares for banks only, and estimated agricultural loan market shares for banks and Associations. We use the deposit-based HHIs for banks as a benchmark for comparing bank agricultural-loan HHIs. We then compare the bank-and-Association HHIs to bank agricultural-loan HHIs to assess how Associations affect competition in agricultural lending markets. As expected, given the relatively few banks in all three market groups, the median HHIs for all market categories in 2005 and 2014 are very high.

The median deposit-based HHI is about 3,000 for agriculture-important and agriculture-dependent markets in both years and for agricultural-bank markets in 2014. The median HHI for agricultural-bank markets in 2005 is significantly lower at about 2,500. These results are consistent with the median number of banks shown in Panel A for all three market groups in each year. Few markets have HHIs below the 1,800 post-merger threshold that would allow a merger to be approved without an extended competitive analysis.

The middle section of Panel B shows statistics for HHIs calculated with agricultural loan shares assuming only banks are competing in the market. The median HHIs here are larger than the median deposit HHIs. For the agriculture-important and agriculture-dependent markets, the median HHIs are about 3,500 in 2005 and rise in 2014 to about 3,700 in agriculture-important markets and 3,800 in agriculture-dependent markets. For agricultural-bank markets, the median HHI is much lower, at about 2,800 in 2005, but increases to about 3,500 in 2014.

An alternative way to look at the difference between agricultural-loan and deposit HHIs is a market-by-market comparison of the differences between them. For all market groups, the median difference in the HHIs is positive, ranging from a low of 173 in agricultural-bank markets in 2005 to a high of 600 in agriculture-important markets in 2014. Finally, for every market group and in both years, the number of markets below the 1,800 threshold is less than or equal to the number of markets based on deposits, which is consistent with the larger agricultural-loan HHIs.

Panel B of Table 1 suggests markets are more competitive when Associations are included as market competitors with banks. Including

Associations reduces the median HHIs for the agriculture-dependent and agricultural-bank markets in both years and for the agriculture-important market in 2005. For the agriculture-important and agriculture-dependent markets, the median HHI is about 3,300 in 2005 and somewhat higher in 2014—about 3,700 for the agriculture-important markets and 3,600 for the agriculture-dependent markets. For the agricultural-bank market, the median HHI is much lower in both years at about 2,700 in 2005 and 3,100 in 2014. At the individual market level, the median difference between the bank-and-Association HHIs and the bank HHIs is negative and large. The differences range from -413 in agriculture-important and agricultural-bank markets in 2005 to -653 in agricultural-bank markets in 2014.

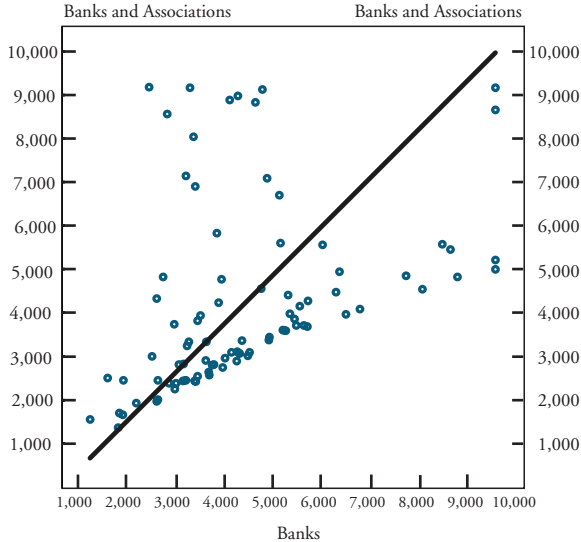
Overall, the summary statistics suggest including Associations in a market structure analysis tends to lower HHIs. Charts 3–5 provide a more detailed assessment of individual markets by plotting bank-and-Association HHIs against bank HHIs for each of the three market groups in 2014. Chart 3 shows that including Associations in agriculture-important markets lowers the HHI in 51 of 86 markets, or 59 percent. These markets are represented by the points below the 45 degree line. In addition, the HHI declines are relatively large—the index declines by 26 percentage points or more in 22 of the markets (25 percent) and by 13 percentage points or more in 43 of the markets (50 percent).

Interestingly, the relationship between the bank-and-Association HHI and bank HHI differs depending on whether including Associations causes the HHI to increase or decrease. For markets in which the HHI increases, the relationship is highly scattered, with a correlation of 63 percent. In seven markets, adding Associations increases the HHI from less than 5,000 to more than 8,500.¹⁵ The increases in HHIs are due to very low bank lending in these markets—the average Association market share is 95 percent.

In contrast, for markets in which the HHI decreases when Associations are included, the declines are systematic. The correlation between the bank-and-Association HHI and bank HHI for declining markets is 88 percent. The estimated slope coefficient from a linear regression of the bank-and-Association HHI on the bank HHI is 0.57.¹⁶ In other words, when including Associations reduces market concentration, the reduction rises with the size of the bank HHI.

Chart 3

Agricultural Loan HHIs: Banks and Associations versus Banks (Agriculture-Important Markets)



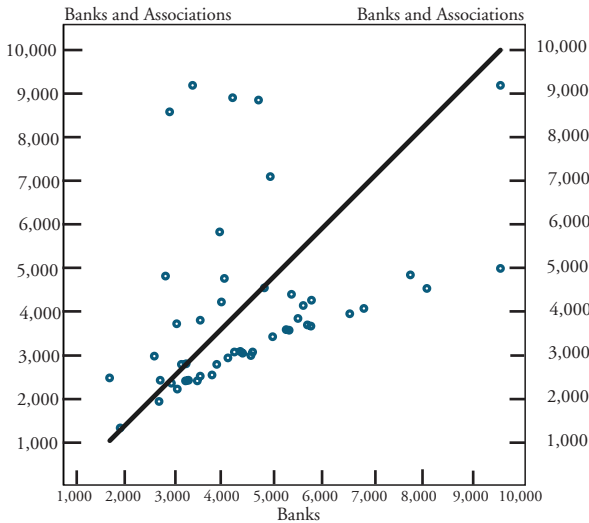
Source: Authors' calculations. See Appendix for data sources.

The results for the agriculture-dependent markets are similar (Chart 4). Including Associations increases HHIs in 17 of the 48 markets (35 percent). In these markets, the relationship between the HHIs is also scattered—the correlation is 64 percent and the HHI increases from less than 5,000 to more than 8,500 in four markets. Again, these are markets in which bank lending is relatively low and Associations market shares are high. The HHIs decline in 31 of the 48 markets, or 65 percent. The correlation coefficient (0.86) and regression slope coefficient (0.57) are essentially the same as in the agriculture-important results.¹⁷ The distribution of declines is also similar to that of the agriculture-important markets—HHIs decline 28 percentage points or more in 12 markets (25 percent) and 15 percentage points or more in 24 markets (50 percent).

Finally, the results for the agricultural-bank markets provide the strongest support for the view that including Associations makes banking markets in agricultural areas appear more competitive (Chart 5). The relationship among increasing-HHI markets is much more systematic than in the other two market groups, with a correlation of 87 percent and no markets in the top-left quadrant.¹⁸

Chart 4

Agricultural Loan HHIs: Banks and Associations versus Banks (Agriculture-Dependent Markets)



Source: Authors' calculations. See Appendix for data sources.

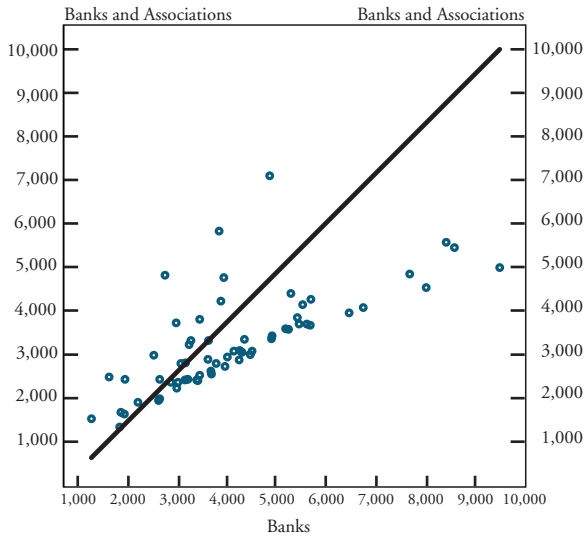
However, the percentage of agricultural-bank markets in which Associations reduce concentration is the highest among the three market groups—HHIs decline in 41 of the 62 markets, or 66 percent. Moreover, they decline 28 percentage points or more in 16 of the markets (25 percent) and 19 percentage points or more in 31 of the markets (50 percent). The correlation among the markets with declining HHIs is 96 percent, and the regression-slope coefficient is 0.45.¹⁹ These results indicate including Association lending reduces HHIs more in markets with higher initial concentration, and that this effect is stronger in agricultural-bank markets than in agriculture-dependent or agriculture-important markets. Overall, the results across all three market groups suggest the degree to which Associations increase market competitiveness increases with the importance of agriculture to the local economy.

The effect of Associations on competition when banks merge

To examine how including Associations affects competition when banks merge, we look at hypothetical mergers between the second- and third-largest banks in each market based on agricultural loan shares and compare the changes in HHIs calculated with and without Association loans.²⁰ Since this approach would be appropriate only for banks that

Chart 5

Agricultural Loan HHIs: Banks and Associations versus Banks (Agricultural-Bank Markets)



Notes: Agricultural banks are banks with a ratio of agricultural loans to total loans of 25 percent or more. An agricultural-bank market denotes a market in which 20 percent or more of the banks are agricultural banks. Source: Authors' calculations. See Appendix for data sources.

are active agricultural lenders, we restrict our analysis to mergers in the 57 agricultural-bank markets that have at least three banks.

In-market mergers will always increase a market's HHI, because the number of banks declines and the share of the acquiring bank increases. Indeed, the HHI increase will be two times the product of the market shares of the merging banks. However, the change in the HHI will always shrink when Associations are included, because including Association loans reduces bank loan shares.

Table 2 shows that although the markets are more concentrated after a merger, including Associations can significantly decrease the number of markets in which the change in the HHI is greater than 200. The median post-merger bank HHI is 4,049, while the median post-merger bank-and-Association HHI is smaller—3,233—but still high. Only three markets (with Associations) or four markets (without Associations) have post-merger HHIs below the 1,800 threshold level used in an initial screening.

However, among these 57 markets, the median increase in the HHI is much smaller when Associations are included—the median increase in bank-and-Association HHIs is 181 compared with a median increase

Table 2

Effect of Mergers on HHIs in Agricultural Bank Markets

	Banks	Banks and Associations
HHI: pre-merger (median)	3,382	3,004
HHI: post-merger (median)	4,049	3,233
Markets <1,800	4	3
Change in HHI: post-merger (median)	591	181
Markets <200	8	32

Note: The table summarizes the effect of mergers between the second and third largest banks based on agricultural loan market shares in the 57 Agricultural-Bank markets with three or more banks.

Source: Authors' calculations. See Appendix for data sources.

of 591 in the bank HHIs. Importantly, in 32 markets, the change in bank-and-Association HHIs is below the initial screening threshold of 200, compared with eight markets when the HHI includes only banks. For example, the Pittsfield, Ill., market has nine banks. When Associations are not included in the HHI calculations, the agricultural market shares of the second- and third-largest banks are 14 percent and 13 percent. A hypothetical merger of these banks would increase the market's HHI by 345. When Associations are included, the market shares of these banks are 9 percent and 8 percent, and the increase in the HHI is only 144. Thus, these results suggest that when measures of competition consider Associations, mergers between banks are less likely to generate competitive concerns.

IV. Conclusion

The federal banking regulatory agencies are responsible for ensuring bank mergers are not anticompetitive. The initial competitive assessment of proposed mergers is based on the deposit shares of depository institutions operating in the market. One shortcoming of these deposit-based measures is they do not explicitly account for competition from nondepository financial firms. The FCS in particular is an important competitor for banks in rural markets that make agricultural loans.

This article uses data on bank and Association loans to estimate local market shares of agricultural loans in rural markets where agriculture is an important industry. We estimate agricultural loan-based market shares and HHIs and use these measures to assess how Associations affect local market competition. Our results show including Associations as competitors can significantly affect measures of market

concentration. In particular, when measuring market concentration using loan shares (instead of deposit shares), including Association lending can significantly reduce measures of concentration. In addition, the effect tends to be larger in more concentrated markets and as a market's economic dependence on agriculture increases.

We also show that including Associations not only reduces the change in the HHI after a merger but may reduce the change below the 200 point threshold. As a result, a merger that would otherwise increase the HHI by more than 200 points would be less of a competitive concern when accounting for competition from Associations.

These results imply excluding Associations from market structure analyses may understate market competitiveness in rural markets where agriculture is an important part of the local economy. They also suggest similar results may apply to other significant product lines for certain banks.

The results, of course, are dependent on the assumptions we use to disaggregate Association and bank agricultural loans to local market levels. Future research would greatly benefit from more granular, location-based agricultural loan data.

Appendix Data Sources and Variable Construction

Data sources

Cash receipts from crop and livestock marketing: Bureau of Economic Analysis, Table CA45 (Line Code 10)

Commercial bank branch deposits: Federal Deposit Insurance Corporation, Summary of Deposits, Total Deposits (DEPSUMBR)

Commercial bank loans: Federal Financial Institutions Examination Council, Reports of Condition and Income (Call Reports)

Agricultural Production Loans (RCFD1590)

Farmland Loans (RCFD1420)

Total Loans and Leases, Net of Unearned Income (RCFD2122)

Earnings: Bureau of Economic Analysis, Tables CA5, CA5N

Farm Earnings (Line Code 81)

Total Earnings: Wages and Salaries (Line Code 50) +
Proprietors' Income (Line Code 70)

Employment: Bureau of Economic Analysis, Tables CA25, 25N

Farm Employment (Line Code 70)

Total Employment (Line Code 10)

Farm Credit Association agricultural production and real estate loans:
Farm Credit Administration

Farm Credit Association mergers: Farm Credit Association websites

Farm credit providers: U.S. Department of Agriculture, Economic Research Service, Farm Income and Wealth Statistics, Farm Sector Balance Sheet and Selected Financial Ratios, available at <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/balance-sheet.aspx>

GeoFIPS codes (for merger adjustments): U.S. Census Bureau, 2010 FIPS Codes for Counties and County Equivalent Entities, available at <https://www.census.gov/geo/reference/codes/cou.html>

Local banking markets: Competitive Analysis and Structure Source Instrument for Depository Institutions (CASSIDI), available at <https://cassidi.stlouisfed.org/>

Rural population densities: U.S. Census Bureau Lists of Population, Land Area, and Percent Urban and Rural in 2010 table, available at <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>

Farm Credit Association merger adjustments

We adjust the Association data for mergers that occurred from 2005 to 2014. For example, the current Texas Farm Credit Services (Texas FCS) was three separate entities in 2005: AgCredit of South Texas, Texas AgFinance, and AgriLand FCS. For this analysis, we combine the initial three institutions into a pro-forma Texas FCS when calculating total agriculture lending in 2005. In addition to adjusting Association loan volumes for mergers, we also adjust Association coverage areas.

Geographic market definitions and allocations

Geographic market areas are based on local banking markets used by the Federal Reserve. Information about these markets is available on the Federal Reserve's CASSIDI website. However, not all counties are in CASSIDI-defined markets. In these cases, we treat the counties as a market, which is the initial or default assumption in competitive analysis of banking mergers.

Our analysis uses data for 86 markets. Eight markets include more than one county, three of which include whole counties and portions of counties. We allocate bank deposits and loans based only on branches located within the market, and we identify branch locations using CASSIDI. Depending on the market characteristics, we assign Association loans to either the entire county, a portion of the county, or none at all. Once all counties in a market are allocated their appropriate Association agricultural loans, we aggregate county-level loans up to the market level, treating Association loans as coming from a single entity.

Minot market. The Minot market in North Dakota covers the entire counties of Burke, Mountrail, Pierce, Renville, and Ward, almost all of McHenry county, and approximately one-third of

Bottineau County. For purposes of assigning Association loans in the Minot market, all of McHenry County and one-third of Bottineau County were included in the market.

Bottineau market. The Bottineau market (adjacent to Minot) covers all of Rolette County, two-thirds of Bottineau County, and a very small portion of McHenry County. To assign Association loans in the Bottineau market, we include only two-thirds of Bottineau County.

Bismark/Mandan market. The Bismark/Mandan market in North Dakota encompasses the entire counties of Burleigh, Emmons, Grant, Kidder, Logan, McIntosh, McLean, Mercer, Oliver, and Sioux, but only half of Sheridan County. In addition, two Associations cover McLean and Sheridan—Farm Credit Services of Mandan (FCS Mandan) and Farm Credit Services of North Dakota (FCS North Dakota). Based on the Association coverage of these counties, we assign 25 percent of FCS Mandan’s McLean County agricultural loans and 75 percent of FCS North Dakota’s McLean County agricultural loans to the Bismark/Mandan market. In addition, we assign 80 percent of FCS Mandan’s Sheridan County agricultural loans and 20 percent of FCS North Dakota’s Sheridan County agricultural loans to this market. Because the Bismark/Mandan Market includes only half of Sheridan County, we include only half of the Sheridan County Association allocations in the final market calculations (bank loans in Sheridan County are included for those branches in the Bismark/Mandan half of the county.)

Deposit HHIs

We calculate deposit HHIs using bank and thrift branch deposit data with a 50 percent weight on thrift deposits. Standard practice assigns thrift deposits a 50 percent weight because thrifts typically do not provide the full cluster of banking services (Board of Governors of the Federal Reserve System). We aggregate the branch data for each bank and thrift up to the local market level. The deposit HHIs differ from the standard CASSIDI HHIs because we aggregate the deposit HHIs to the bank or thrift level instead of the holding company level. We use deposit market shares to calculate deposit HHIs.

Data adjustments

We make several adjustments to raw data to correct for irregularities and anomalies such as cities and counties with the same name (for example, the City of St. Louis and St. Louis County) which are not distinguished in the U.S. Census Bureau data. We also make adjustments for cities within counties that have separate GeoFips codes.

Endnotes

¹Section 7 of the Clayton Act of 1914 (as amended in 1936 and 1950) prohibits M&As in which the effect “may be substantially to lessen competition, or to tend to create a monopoly” (15 U.S.C. §18). The Bank Merger Act, Home Owners’ Loan Act, and Bank Holding Company Act give federal banking agencies specific authority to approve M&As of banks, thrifts, and holding companies they supervise (Bank Merger Act: 12 U.S.C. §1828(c)(5)(B); Bank Holding Company Act: 12 U.S.C. §1842(c)(1)(B); Home Owners’ Loan Act, 12 U.S.C. 1467a(e)(2)(B)).

²Much of the general information in this section can be found in the Federal Reserve’s “Frequently Asked Questions” document on the competitive analysis for mergers and acquisitions (Board of Governors of the Federal Reserve System).

³United States v. Philadelphia National Bank, 374 U.S. 321, 356 (1963). The DOJ, however, does not use the “cluster” definition. Instead, when the DOJ conducts its competitive review, it uses two product markets—retail banking products and services and small business banking products and services. Other relevant cases reaffirming the Philadelphia National Bank decision include United States v. Connecticut National Bank, 418 U.S. 656 (1974) and United States v. Phillipsburg National Bank & Trust Co., 399 U.S. 350 (1970).

⁴Although thrifts compete with banks in a variety of services such as deposits and home mortgage loans, they typically have not provided the full range of retail banking services. For example, thrifts historically have not been active in commercial lending due to legal restrictions.

⁵The information used to define geographic banking markets includes commuting and shopping patterns, interviews with local government and business leaders, and surveys of local households or small businesses. Geographic markets for some products, such as credit card or mortgage loans, may be regional or national in scope. Up-to-date geographic market definitions are available on the Federal Reserve’s CASSIDI website, <https://cassidi.stlouisfed.org/>.

⁶Examples of other major lenders to the agricultural sector include the Farm Service Agency, life insurance companies, farm implement dealers, and individuals. The composition of the data used to measure debt owed to commercial banks changed in 2012. Specifically, farm sector debt owed to savings associations moved from the Individuals and Others category to the Commercial Bank category, resulting in an increase in the Commercial Bank share and a corresponding decrease in the Individuals and Others share. This compositional change does not affect the overall trends in Chart 1. While the commercial bank market share would have been slightly lower from 2012 to 2014, the FCS and bank market shares would still be roughly the same.

⁷The data are aggregated from individual Association and bank balance sheets and begin in 2005 because that is the first year for which individual

Association data are available. The Association agricultural real estate and production loan data are aggregated from Association balance sheets and were obtained from a Freedom of Information Act request to the Farm Credit Administration. The bank lending data are from the Reports of Condition and Income (Call Reports).

⁸See Monke for a more detailed overview of the Farm Credit System.

⁹12 U.S. Code §2001(a)

¹⁰12 U.S. Code §2001(c)

¹¹For some bank merger applications submitted to the Federal Reserve, the staff conducting the competitive analysis may analyze competition for small business loans. Under certain circumstances, the estimate of market-level small business loans also relies on the assumption that local market loans are proportional to local market deposits.

¹²The USDA's most recent data for farm-dependent counties are for 2004, which are based on average earnings from 1998–2000 and farm employment in 2000.

¹³The earnings and employment data are from the U.S. Bureau of Economic Analysis. The most recent county-level earnings and employment data are from 2013, so the agriculture-importance index is calculated using data from 2011 to 2013. The index is used to determine the agriculture-important and agriculture-dependent counties for 2005 and 2014.

¹⁴For example, a market with five competitors that each makes \$100 in loans would have an HHI of 2,000. Adding a new competitor that makes \$500 in loans would increase the HHI to 3,000.

¹⁵These markets are in California, North Carolina (3), South Carolina (2), and Virginia.

¹⁶The estimated coefficient is statistically significant with a t-statistic of 12.9, and the regression's adjusted R^2 is 0.77.

¹⁷The estimated slope coefficient is statistically significant with a t-statistic of 9.2, and the regression's adjusted R^2 is 0.74.

¹⁸The estimated slope coefficient of the HHI regression is 1.22. The t-statistic is 7.5, and the adjusted R^2 is 0.74.

¹⁹The estimated coefficient is statistically significant with a t-statistic of 21.2, and the regression's adjusted R^2 is 0.92.

²⁰These are the largest mergers that do not include the market's top bank as measured by agricultural loan share.

References

- Board of Governors of the Federal Reserve System. 2014. "How do the Federal Reserve and the U.S. Department of Justice, Antitrust Division, Analyze the Competitive Effects of Mergers and Acquisitions under the Bank Holding Company Act, the Bank Merger Act and the Home Owners' Loan Act?" *Banking Information & Regulation FAQs*, available at <http://www.federalreserve.gov/bankinfo/reg/competitive-effects-mergers-acquisitions-faqs.htm>.
- Farm Credit Association. 2015. "Farm Credit System Institution Territories," available at <http://www.fca.gov/Download/Maps/InstitutionTerritory-Map01-2015.pdf>
- Monke, Jim. 2015. "Farm Credit System," Congressional Research Service, April 6.
- U.S. Department of Agriculture (USDA). 2015. "County Typology Codes," *USDA Economic Research Service*, available at <http://www.ers.usda.gov/data-products/county-typology-codes/documentation.aspx>.