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**The Structure of Bank Markets and the Costs of Borrowing: Evidence From FmHA Guaranteed Loans**

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# **The Structure of Bank Markets and the Cost of Borrowing: Evidence From FmHA Guaranteed Loans**

Patrick J. Sullivan\*

## **Abstract**

Changes in the structure of rural financial markets, which may have implications for the cost and availability of credit, are central to arguments for and against bank branching restrictions. This paper examines the positions of both proponents and opponents of liberalized bank branching and estimates the effect variations in rural bank structure have on the cost of Federally guaranteed farm loans. Evidence supports the view that borrowing costs are lower in more competitive banking markets. However, no support is found for the view that local (or nonlocal) bank ownership reduces costs.

## **Introduction**

Congressional debate on proposed bank reform legislation brought about much speculation over what nationwide branching provisions might mean for rural and small town credit availability. The Nation's community bankers argued that nationwide branching would lead to a credit shortage in rural and small town America as large urban-based banks syphoned deposit funds out of rural areas without making rural loans. Proponents argued that nationwide branching would increase competition in rural banking markets, lowering the cost and increasing the availability of credit (Mingle). Advocates for and against the nationwide branching provisions relied upon anecdotal evidence and untested assertions to support their claims, since data on the performance of a representative sample of rural credit markets is nonexistent.<sup>1</sup>

While the interstate branching provisions were dropped before the "Federal Deposit Insurance Corporation Improvement Act of 1991" was signed into law, interest is still keen in expanded geographic and product market authority for commercial banks. The American Bankers Association continues to push for authority for commercial banks to open branches in any State that does not quickly adopt legislation overriding Federal provisions. The Independent Bankers Association of America, State governors, and various other consumer advocacy groups are pushing for no expansion of interstate branching authority, or for

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<sup>1</sup> The terms "rural" and "nonmetropolitan" are used interchangeably in this paper, as are the terms "urban" and "metropolitan." Designations are based on exclusion or inclusion (respectively) in a Metropolitan Statistical Area as defined in 1983.

allowing interstate branching only within States that pass enabling legislation.<sup>2</sup> However, questions about the ultimate impact interstate branching might have on the structure of rural bank markets and on the cost and availability of credit remain unanswered.

This paper reviews the available literature dealing with the impact local bank market structure has on lender behavior, particularly regarding decisions that affect the cost and availability of credit. Using branch-level deposit information collected by the Federal Deposit Insurance Corporation, the structure of banking markets serving U.S. counties on June 30, 1988 is described. As States have relaxed their geographic restrictions on intrastate bank branching, increasing numbers of small communities are being served by the branches of large multi-market banking organizations. The result is a great deal of variability in the structure of local bank markets, with some counties served by only one bank while others are served by numerous banks with varying ownership characteristics.<sup>3</sup> To determine whether this variability in local bank market structure affects the cost of credit, a loan pricing model is developed using administrative data on farm loans guaranteed by the Farmers Home Administration (FmHA).

### **Local Bank Market Structure--Why Should We Care?**

Over the last 3 decades, financial institutions and local financial markets have become increasingly integrated with national and international markets. But for the typical small business, external financing is still available from relatively few financial institutions having a physical presence in the borrower's community.<sup>4</sup> And while alternative sources of financing exist in some communities, commercial banks continue to provide the bulk of

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<sup>2</sup> That is, the large banks want an inclusive bill, requiring States to opt out if they do not want branches of out-of-State banks operating within their borders. Community banks want to force interstate branching proponents to pass enabling legislation in each of the 50 States before true nationwide branch banking becomes a reality.

<sup>3</sup> County boundaries may not be the best definition of the relevant bank market facing local businesses. Depending upon the business' needs and local bank performance, the relevant market may be much smaller than the county, or much larger (Elliehausen and Wolken; Rogers, Shaffer and Pulver, 1988). But because of the ease with which county-level data can be accessed, this study assumes that banks with offices within the county's boundaries constitute the supply-side of the market for bank services used by most small and medium-sized businesses.

<sup>4</sup> Elliehausen and Wolken (1990) report that over 90 percent of the small and medium-sized businesses they surveyed consider a local bank (one within 30 miles of the firm's headquarters) to be their primary financial institution. Shaffer, et.al. (1989) report that nearly 80 percent of the debt raised by rural Wisconsin businesses was obtained within 15 miles of the firm's headquarters. Furthermore, the same study reported that 94 percent of all nonfarm business financing was for businesses within 15 miles of the lender's office. When asked what would cause them to lend outside their normal service area, 37 percent of the lenders surveyed responded that they would not do so for any reason.

institutional business credit.<sup>5</sup> As a result, the operation and performance of the local bank and bank market serving small businesses directly affect the cost and availability of credit. If local banks, for whatever reason, don't provide efficient financial intermediation, the economic growth of the area could be adversely affected.

It is within this context that arguments for and against intrastate and interstate bank branching have been addressed, even though the principal protagonists are far more concerned with bank profits and franchise value. Since commercial banks themselves are the most concerned with bank regulatory reform, the public debate has often been framed as a big versus small bank issue. While there are good reasons to believe, and some empirical evidence suggesting, that bank size and ownership influence the availability, and perhaps the cost, of financial services, the economics literature on bank market structure is far more concerned with concentration of market power. As elements of market structure, both of these factors--ownership and competition--can affect the performance of local bank markets, and both should be considered.

### **Bank Size and Ownership**

In the political debate, concerns over bank size and ownership and market size and product mix tend to be intermingled. It is argued that small independent banks tend to remain in close touch with the communities they serve. They have a vested interest in seeing their community grow and develop since the bank's fortunes are directly tied to those of the community. And since the board of directors and the bank's management are drawn from the community, small independent banks feel they are ideally suited to evaluate local loan requests and to judge the viability of local investment opportunities (Fant). From an economic development perspective, the downside of relying solely on small independent banks centers on their undiversified portfolios, limited loan making experience, lower loan limits, and avoidance of sophisticated loan transactions. Because their loan portfolios are concentrated geographically, and often by industry and product mix as well, small banks tend to hold higher reserves and make fewer loans per dollar of deposits than larger banks.<sup>6</sup> Their geographic specialization also makes it difficult for small banks to evaluate loans for unfamiliar uses or, in some cases, to fully fund the viable loan requests of the area's

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<sup>5</sup> Of course, many small businesses, particularly those still in the formative stage, rely on nonbusiness credit (such as personal credit cards, secondary home mortgages, and personal loans) or noninstitutional sources (such as personal savings, the savings of friends and family, or seller financing) for their business finance needs. However, institutional lenders, particularly commercial banks, are relied upon heavily for business credit as the firm becomes established. Combs, Pulver, and Shaffer (1983) found that among Wisconsin firms that had been in business for less than 3 years, commercial banks provided nearly 80 percent of all loans, the previous owners provided 10 percent, and the remaining 10 percent of loans came from all other sources.

<sup>6</sup> Milkove (1985) reports that small banks, whether urban or rural, have lower loan-to-deposit and loan-to-asset ratios than larger banks. Dunham (1986) reports that community banks "export" a higher proportion of locally collected funds than do large money-center banks in the form of securities investments, federal funds transactions, and other liquid asset holdings.

dominant industry.<sup>7</sup> And while financing techniques exist which allow small banks to diversify risk and make loans that exceed legal limits, many make scant use of them.<sup>8</sup>

The opposite is believed true of large multi-market banks. These banks can easily shift resources among the markets they serve in response to shifts in demand.<sup>9</sup> Their diversified portfolios, loan experience, and higher loan limits allow them to safely make loans that smaller banks find too risky, and to make more loans per dollar of deposits. And their greater use of sophisticated financing techniques and the wide array of financial services they can economically offer to their customers allows large multi-market banks to better meet the complex financial needs of some businesses. The downside, from a particular community's perspective, is that large multi-market banks are less likely to have a strong vested interest in the community; rather, they shift resources to wherever the returns are likely to be highest. Furthermore, the lack of strong ties to the community may hamper loan evaluation procedures. Branching organizations may lack a local board of directors, and branch managers often rotate from one location to another as they move up the corporate ladder. And the loan approval decisions of both branching organizations and multibank holding company affiliates may be made by a central committee, with little local input. As a result, large organizations may be less willing or able to tailor their loan decisions to meet unique local circumstances (Markley). One particular bias often attributed to large banks is their preference for making large loans, which puts many small businesses at a distinct disadvantage.<sup>10</sup>

While the economic analysis underpinning the positions outlined above is thin, from a community perspective, it would appear that a bank market composed of both locally oriented banks and large multi-market banks is likely to be preferable to a bank market composed solely of one type of bank or the other. If a bank's size or ownership affects its

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<sup>7</sup> Markley (1987) found that in communities with undiversified economies, independent banks were far more conservative in their lending practices than were holding company affiliates which could more safely ignore affiliate-level portfolio diversification concerns. Rogers, Shaffer and Pulver (1990) report that lenders lacking expertise in making loans to specific industries are more likely to deny loan requests. They also note that firms in the area's dominant industry may find it more difficult to get their loan requests approved if the area's banks already hold a large number of that industry's loans in portfolio.

<sup>8</sup> Taff, Pulver and Staniforth (1984) found that 40 percent of the banks they surveyed made no complex loans--those guaranteed by a government agency or sold, in total or part, to other financial institutions or investors. Small banks were far less likely to make complex loans (needed to make loans exceeding a bank's legal lending limit) than were larger banks.

<sup>9</sup> Barkley and Potts (1985) report that Arizona's banks moved deposit funds among the various communities served by statewide branching systems in response to demand factors, while Colorado's unit banks were far less responsive to variations in loan demand.

<sup>10</sup> Rogers, Shaffer & Pulver (1990) report that small businesses located in communities served predominantly by large financial institutions are more likely to encounter credit approval problems, as are medium-sized firms located in communities served only by very small financial institutions.

operations, then a mix of banks with varying characteristics may be needed to satisfy the full range of a community's financial service needs. For many small communities, a local market composed of a mix of financial institutions is likely to be unsustainable even under the most liberal interstate branching regulations since demand is insufficient to support more than one or two suppliers. But there is also a question of whether a varied bank market is sustainable under any circumstances that allow easy entry. Implicit in the anti-branching position outlined above is the belief that large banks, if allowed to branch into local markets, will either drive small locally owned banks out of business, or acquire them as branches. However, the available evidence on economies of size and scope in banking does not support the position that small banks would necessarily be at a competitive disadvantage.

Estimates vary widely, but it appears that economies of scale are exhausted fairly quickly in the banking industry.<sup>11</sup> The asset size of banks exhibiting minimum average cost is in the \$75 million to \$300 million range, slightly above the weighted mean asset size of banks headquartered in nonmetropolitan areas at the end of 1990 (Mikesell and Marlor). Furthermore, the industry's average cost curve, while U-shaped, is relatively flat with only modest cost savings (5 percent or less) enjoyed by optimal-sized banks. Economies of scope, associated with changes in the product mix offered by banks, appear to be even less prevalent, amounting to only 1 to 3 percent of bank operating costs. These economies are easily dwarfed by differences in management efficiency among banks. Holding bank size, product mix, input prices and other exogenous influences constant, the average difference in bank operating costs from "best practice" banks is 20 percent or higher. Thus, short of predatory pricing by large banks, or a shift in the banking industry's cost structure, there is no reason to expect efficiently operated small banks to be at a competitive disadvantage in offering credit services.<sup>12</sup>

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<sup>11</sup> The estimates reported here are drawn from Berger and Humphrey (1992). Their article includes a review of the existing literature on economies of scale and scope in banking.

<sup>12</sup> An adverse change in the industry's cost structure, from a small bank perspective, is possible if deposit insurance coverage is reduced while a "too big to fail" policy is maintained, either explicitly or implicitly, by Federal regulators. Doing so could increase the relative cost of funds to small banks, possibly hurting their ability to compete with large multi-market banks. It is interesting that at least some large banks proposed that the banking industry accept severe reductions in deposit insurance coverage in return for broader banking powers.

Indeed, in urban, and increasingly in rural communities across the country, multi-market and locally oriented banks can and do coexist (Milkove and Sullivan).<sup>13</sup> It seems likely that this trend will continue, with or without interstate branching legislation.<sup>14</sup> The question remains, how are rural and small town borrowers being affected? Are they helped, through more readily available or affordable credit, or are they hurt as local deposits are used to fund larger loans and investments in other parts of the world?

### Competition within Local Banking Markets

Economic theory suggests that the degree of competition among firms in a market can influence prices and outputs. In the literature dealing with bank structure, it is often suggested that the number of lending institutions operating within local markets and the degree to which their output is concentrated among a few firms affects competition. Known as the "structure-performance" hypothesis, it is argued that banks operating in more concentrated markets find it easier to effectively collude to increase bank profits or otherwise soften competitive outcomes.<sup>15</sup>

In a review of the bank structure and performance literature, Gilbert (1984) reports that over 70 percent of the 44 studies he reviewed found some statistically significant support for the structure-performance hypothesis. However, serious data problems caused him to question the worth of many of these studies. Of the data most commonly analyzed (Call Reports, reflecting each lender's income and balance sheet statements), only bank profit rates reflect current performance with any degree of accuracy.<sup>16</sup> Of the 24 studies that examined profit rates, Gilbert reports that half found a statistically significant positive relationship between market concentration and profits which, under the structure-performance hypothesis, implies high prices for banking services. But the industrial organization literature offers an alternative explanation for such a relationship. Known as the "efficiency-structure" hypothesis, it suggests that differences in efficiencies within markets lead to market

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<sup>13</sup> Research indicates that entry of a large banking organization into a local market does not have a significant effect on the growth rate of small independent banks (King). Furthermore, *de novo* banks established by large banking organizations don't grow any faster than *de novo* independent banks (Rose and Savage).

<sup>14</sup> But unrestricted branching, either within State borders or across State borders, would certainly speed the process. Mengle (1990) points out that it is far easier to justify the cost of opening a branch office in a new location than it is to charter a new bank. For this reason, competition from potential entrants is higher within local markets in States that allow unrestricted statewide branching than it is in States which require multi-market firms to operate as multibank holding companies (Barkley and Potts).

<sup>15</sup> Rather than maximize profits, bank managers may choose to use their market power to minimize risk or engage in expense preference behavior (e.g., hire more employees, purchase fancier offices, or pay higher salaries than profit maximizing behavior would dictate).

<sup>16</sup> Other Call Report variables, such as average interest rates charged (paid) by banks, reflect varying maturity structures, loan (account) size and type, origination dates, paydowns (withdrawals), and interdependencies, and so are imprecise measures of performance at best (Brown; Gilbert).



concentration as the most efficient firms gain market share. Furthermore, if efficient firms displace small inefficient firms, profit levels could increase without hurting consumers. Indeed, Smirlock (1985) and others have found that when market share is held constant, market concentration loses its significance as a factor explaining variation in profits. Thus, while voluminous, most of the bank structure and performance literature is inconclusive.

Nonetheless, a small number of studies do provide unambiguous evidence that borrowers in concentrated banking markets pay higher interest rates. Gilbert reports that of the five studies he reviewed that relied on surveys of rates charged on individual business loans, the structure-performance hypothesis was supported by four.<sup>17</sup> These studies found that if the market concentration ratio increased by 10 percent, local businesses could expect to pay an additional 5 to 6 basis points on their loans, although one study (Edwards) found that rates paid by small businesses increased 18 basis points. The studies Gilbert reviewed all relied upon data collected in the 1950's and 1960's, before banking was deregulated and nonbank alternatives became so prevalent.<sup>18</sup> In a more recent study, Hannan (1991) used loan rates charged in the mid-1980's and found that in periods of stable or falling interest rates, small businesses in concentrated banking markets paid significantly higher rates. During periods of interest rate stability, the difference between rates charged within local markets having the highest and lowest concentration ratios was anywhere from 50 to 221 basis points, depending upon the type of loan. Hannan surmised that a statistically significant relationship between bank market concentration and loan rates was not observed during periods of rising interest rates because highly competitive markets adjust rates faster than less competitive markets. This lag in adjustment temporarily reduced the gap between rates charged within competitive and noncompetitive markets when market rates were rising.

Evidence has also been found that local banking market concentration affects other types of loan interest rates and rates paid on deposits.<sup>19</sup> But, with one exception, all the market concentration studies that have examined interest rates collected through surveys have dealt

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<sup>17</sup> Edwards (1964), Meyer (1967), Phillips (1967), and Jacobs (1971) all found evidence that businesses in concentrated banking markets paid higher interest rates on their loans. Flechsig (1965) found that the influence of market concentration on business loan interest rates is insignificant when regional variables are included in the estimation. Since these studies use survey data on interest rates, they avoid at least some of the data problems that studies relying on Call Report data exhibit (Gilbert).

<sup>18</sup> It has been suggested that the rising incidence of nonbank lenders, loan production offices, 800-number loan services, travelling loan officers of banks from other areas, and the commercial paper market have weakened the ability of local lenders to wield market power (Hannan).

<sup>19</sup> Rhoades (1992) reports that weekly analyses of interest rates charged on fixed rate, conventional mortgages by various lenders in 20 cities during a 16 week period in 1987-88 generally support the structure-performance hypothesis. Berger and Hannan (1989) found that banks in more concentrated markets paid significantly lower interest rates on money market deposit accounts.

exclusively or predominantly with markets in metropolitan areas.<sup>20</sup> Thus far, evidence that market concentration within rural communities affects the borrowing costs of rural businesses is lacking. In an attempt to explore this as well as other issues raised earlier in this paper, we turn to an analysis of loan, lender, and borrower information for farm loans guaranteed by the Farmers Home Administration (FmHA) during fiscal 1988.

### **FmHA's Guaranteed Farm Loans**

The primary reason for the lack of empirical evidence on how bank market structure affects rural borrowing costs is that loan-specific data for a representative sample of rural business loans is nonexistent. However, as part of the guarantee approval process, FmHA collects a great deal of information on the loans it guarantees and on the borrowers participating in the program. It also records the name and address of the lender originating each of its guaranteed loans. Unfortunately, most of this information is maintained in the agency's county offices; FmHA's central files contain little more than the name and address of the borrower and lender, and a core set of loan variables needed to verify loss claims. Recently, the agency collected additional borrower and loan data from its county offices on a representative sample of farm loans guaranteed during fiscal 1988. Using FmHA administrative files and information from the Federal Deposit Insurance Corporation (FDIC) and the Board of Governors of the Federal Reserve System, the identity of each bank branch office participating in the guarantee program that year was determined, and its financial data was linked with the borrower and loan data.<sup>21</sup> Finally, bank market characteristics, based on the FDIC's Summary of Deposits file, and other location and time-specific control variables were merged to complete the dataset.

It should be noted at the outset that guaranteed farm loans are not the ideal unit of observation for this analysis. As the "lender of last resort" to the farm sector, FmHA targets its assistance to those unable to obtain affordable credit from commercial sources. Under its guarantee programs, FmHA covers up to 90 percent of loan losses if the borrower defaults on a guaranteed loan. Since the lender remains liable for 10 percent of any loss, borrowers participating in the program are rarely in a position to shop around for better loan terms, so they probably aren't directly affected by the degree of competition among local lenders. Rather, this study uses the rates charged on guaranteed loans as a proxy for what the bank charges its other borrowers for similar types of unguaranteed loans. There is a justification

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<sup>20</sup> The one exception that surfaced in Gilbert's review of the literature was an analysis of new car loan interest rates. Stolz (1976) found no statistically significant relationship between bank market concentration in rural counties and interest rates on bank-financed new car loans.

<sup>21</sup> For a detailed description of FmHA's farm loan guarantee programs, the borrowers and lenders participating in 1988, and the loans themselves, see Koenig and Sullivan (1991). The 1991 report also contains an explanation of the survey, questionnaire design, and lender identification procedures used to develop much of the data used in the current study.

for doing so, but its validity is certainly open to question. First, the borrowers participating in the guaranteed loan programs are almost always long-term customers of the participating lender. That is, lenders use the program to continue serving their farm borrowers when creditworthiness considerations make them nervous about extending unguaranteed credit. Second, while loan terms are negotiated between the borrower and the lender, FmHA stipulates that the terms on guaranteed loans must not exceed what the bank would charge on an equivalent unguaranteed loan. Thus, rates charged on guaranteed loans should not differ greatly from what the borrower previously paid on his or her unguaranteed loans.<sup>22</sup> Indeed, the average rates charged on guaranteed farm loans were nearly identical to the average rates reported for similar types of conventional farm loans made by the commercial banking sector during 1988 (Koenig and Sullivan). However, a comparison of interest rates charged by individual lenders isn't possible since information on their conventional loan interest rates is unavailable.

Perhaps a more serious drawback is this study's use of farm loans rather than nonfarm business loans to estimate the effect of bank market structure on interest rates. It is possible that farmers enjoy a wider geographic financial market than nonfarm businesses because of greater homogeneity among farm businesses, the importance of nonlocal factors (such as Federal commodity support programs) to the farm sector's profitability, and the existence of alternate lending institutions. If true, then farmers may be largely immune from the effects of local bank market structure. While small businesses rely on local commercial banks for the bulk of their credit, the farm sector is served by other institutions whose influence on competition is difficult to control for. The Farm Credit System (FCS), in particular, is a nationwide network of cooperative lenders competing directly with commercial banks for farm borrowers.<sup>23</sup> If farmers have the option of borrowing from the FCS any time the cost of bank loans becomes too high, banks in even the most concentrated banking markets will find their influence over farm loan interest rates constrained.

While far from ideal, the guaranteed loan data has several characteristics recommending its use, the most important of which is its availability. To the best of my knowledge, this data represents the only available source of nationwide information on rural loans linked with borrower, lender, and bank market characteristics. While limited to guaranteed farm loans,

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<sup>22</sup> The similarity between interest rates on guaranteed and unguaranteed loans is likely to be particularly striking among borrowers that are new to the program. Roughly 70 percent of the borrowers participating in the guaranteed farm loan programs during fiscal 1988 were doing so for the first time (Koenig and Sullivan).

<sup>23</sup> At the end of 1988, the FCS held 27 percent of the agricultural sector's debt while commercial banks held 31 percent (Wallace and Stam). However, these numbers overstate the competitive positions of these two lenders in new loan originations. Due to financial problems, the FCS lost market share through most of the 1980's. At the same time, the commercial banking system's share of the farm loan market grew, indicating that it was the stronger competitor during most of the decade. While the guaranteed loan programs don't mirror the broader farm loan market, they may reflect the relative loan making activity of these two entities. In 1988, commercial banks originated 76 percent of all guaranteed farm loans; the FCS originated 22 percent (Koenig and Sullivan).

the data represent loans made in virtually every State in the continental U.S. As a result, observations are drawn from a wide range of counties having very different bank market structures. And unlike other surveys that cover loans made predominantly in urban areas, roughly 80 percent of this study's observations are from nonmetropolitan counties--arguably the most concerned about possible adverse impacts of interstate branching and the most likely to benefit if competition is heightened.

### Geographic Market Size

The first question that needs to be addressed is whether guaranteed farm loans are made within localized markets. FmHA's central loan file contains information on nearly 12,000 guaranteed farmer loans originated in fiscal 1988. While determining the size of the market each borrower faced is well beyond the scope of this study, it's fairly easy to determine whether both the borrower and the lending office were located within the same zip code area. As can be seen in table 1, 60 percent of all loans were extended to borrowers in the lender's zip code area. For commercial banks, 64 percent of their guarantee program borrowers were located within the same zip code area. For our purposes, the county is considered the local market. While determining each borrower's and lender's county location isn't as straightforward as determining zip codes, it appears that the vast majority (over 88 percent) of guaranteed loans originated by commercial banks were made to borrowers located within the same county as the lending office. The percentage of "local" borrowers varies little by lender size, ownership, or branching structure with two exceptions. Banks headquartered in the same county as the lending office made virtually all of their guaranteed loans within the county. But banks headquartered in a county other than the one in which the lending office was located (i.e. nonlocally based banks) made about one-third of their guaranteed loans to nonlocal farmers. This suggests that the branch offices of multi-market branching systems, if they make loans at all, may serve larger geographic markets than the typical community bank.

Based on the geographic distribution of borrowers, it appears that most guaranteed farm loans are made within local markets. While it might be interesting to examine the local bank market structure facing farmers who borrowed from more distant lenders, for simplicity our analysis will be restricted to examining the loans of borrowers whose lender was a commercial bank office located within the same county. A total of 1,756 guaranteed loans originated in fiscal 1988 satisfy these and other requirements.<sup>24</sup> Of these, survey data is

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<sup>24</sup> To increase homogeneity and reduce data problems, the regression portion of this analysis excludes other FmHA guaranteed loans as well. First, only fixed rate loans are analyzed. Since FmHA's central files are continuously updated, the interest rate on variable rate loans changes each time the bank submits a status report on its guaranteed loans, making comparisons meaningless. Second, to reduce competitive distortions caused by the largely unobserved activities of the FCS, only operating loans are analyzed. The FCS remains the dominant lender in the farm mortgage market so bank behavior may not influence borrowing costs much for longer termed loans. Banks are the dominant lender of short-term loans, so it within these markets that their behavior should have the greatest influence. Third, the database includes only loans obligated and closed in fiscal 1988 which have a simple interest rate structure (i.e., multiple rate loans are excluded).

Table 1--FmHA Guaranteed Farmer Loan Programs: Localized Lending Predominates

Lender characteristics	Loans originated	Borrower and lender in same:	
		Zip code area	County
	<u>Number</u>	<u>Percent of loans</u>	
All lenders	11,759	60.7	--
All commercial banks <sup>1</sup>	8,977	63.8	88.3
Small (under \$75m)	6,717	65.2	87.5
Mid-size (\$75m - 300m)	1,501	60.0	89.9
Upper medium (\$300m - \$1b)	240	62.5	92.1
Large (over \$1b)	519	56.5	93.5
Locally based banks	5,851	69.1	100.0
Nonlocally based banks	3,126	53.7	66.5
Multi-market branch banks	1,949	59.3	92.2
MBHC affiliates <sup>2</sup>	2,455	59.6	91.0
Small	327	62.1	91.4
Mid-size	632	62.5	90.8
Upper medium	220	65.9	87.3
Large	1,276	56.5	91.7

-- Data not available.

<sup>1</sup> Includes FmHA guaranteed farm ownership and farm operating loans originated in fiscal 1988 by a bank office included in the FDIC's Summary of Deposits file for June 30, 1988. Loans originated by banks that failed prior to June, or which were subsequently acquired or repamed, may not be included in these calculations. Bank size categories are based on the value of bank assets.

<sup>2</sup> Includes banks affiliated with multibank holding companies. The size categories are the same as those used to classify banks, but are based on the combined assets of all banks affiliated with the holding company.

available on 259 loans. These are the loans examined in the analytical portion of this presentation.

### Local Bank Market Structure

How rural markets look (compared with each other, with urban markets, or with the public's perceptions) depends on how ownership structure is taken into account. If we view multibank holding company (MBHC) affiliates the same as independent locally-oriented banks--that is, examine markets at the bank firm level--then local bank market structure looks very different than if we view MBHC affiliates as part of a larger bank organization. In practice, MBHC affiliates are not a perfect substitute for branch offices. MBHC affiliates

have their own boards of directors, there are restrictions on how funds are transferred among affiliates of the same holding company, and in many cases, they operate with a great deal of autonomy.<sup>25</sup> However, they can't be considered "independent" firms either, since they operate according to rules established, or at least approved by, the parent holding company. Empirical evidence suggests that, on average, MBHC affiliates behave differently from similar independent banks, making riskier loans, holding fewer liquid assets, and charging higher interest rates (Markley; Pozdena). Nonetheless, autonomy of MBHC affiliates, and their behavior, varies considerably.

While neither view is without its drawbacks, this paper measures local financial market characteristics based on the characteristics of the bank organizations (rather than the bank firms) that populate them.<sup>26</sup> Measures of market competitiveness (e.g., the number of banks and bank concentration) are largely unaffected by how MBHC affiliates are treated since relatively few counties are served by more than one affiliate of the same MBHC. But for other market characteristics, such as the degree of local orientation and the presence of large banks, how MBHC affiliates are treated makes a big difference in measurements. Not surprisingly, more counties are served by large, multi-market, nonlocally based bank organizations than by large, multi-market, nonlocally based bank firms.<sup>27</sup>

Table 2 presents information on the characteristics of urban and rural counties, as well as counties which had farmers participating in the FmHA loan guarantee programs in 1988 ("FmHA" counties). Since previous evidence of the relationship between borrowing costs and local bank market structure was based predominantly on urban observations, it's interesting to note differences between columns 2 and 4. On average, urban counties were served by twice as many bank organizations as were "FmHA" counties in 1988, and the typical urban market was much less concentrated (as measured by the Herfindahl-Hirschman index). As you would expect, a much higher percentage of "FmHA" counties were served exclusively by small bank organizations (those with less than \$75 million in assets) and by locally based bank organizations (those headquartered within the county). But surprisingly, about the same proportion of urban and "FmHA" counties were served exclusively by large bank organizations (those with assets exceeding \$1 billion) and by nonlocally based bank organizations.

As previously alluded to, the degree to which banks in very concentrated banking markets can wield market power depends, in part, on potential competition as well as actual

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<sup>25</sup> Dunham (1986) found that MBHC affiliates do not mirror the portfolio decisions of the parent holding company, but neither do they behave like independent banks of similar size.

<sup>26</sup> As used here, bank organization refers to the holding company for MBHC affiliates and to the bank firm for unaffiliated banks and single bank holding company affiliates.

<sup>27</sup> Of nonmetropolitan counties served by one or more bank offices, 47 percent are served by large, 79 percent by multi-market, and 74 percent by nonlocally based bank organizations. The corresponding percentages for bank firms are 26, 59, and 49, respectively.

competition. In the farm loan market, all banks face competition from the FCS and other local lending institutions, but they also face varying degrees of potential competition from other banks that may choose to establish a branch or affiliate in the county. If banks in highly concentrated banking markets charge unusually high interest rates, other bank organizations allowed to operate within the State may be tempted to move into these markets. The extent to which this potential competition dampens the effects of market power depends upon how accessible and attractive the market is to potential competitors. Accessibility is determined largely by State regulations pertaining to interstate banking and intrastate bank branching.<sup>28</sup> Since it is harder and more costly to charter a new bank than it is to open a branch office, bank markets located in States that limit bank branching are more insulated from potential competitors than are bank markets in statewide branching States. Figure 1 shows the type of intrastate branching allowed in each State at the end of 1986.<sup>29</sup> With rare exceptions, unrestricted branching is concentrated within the coastal States. Most midwestern States still imposed restrictions on intrastate branching in the 1980's, with 6--the unit banking States--prohibiting branching entirely. As a result, urban bank markets are more likely to be located within States that allow unrestricted branching than either rural or "FmHA" bank markets (Table 2). Rural and "FmHA" counties are more likely to be located within unit banking States, reducing the influence of potential competition from banks located elsewhere.

Attractiveness, from a business perspective, depends upon the profit potential a market exhibits. Other things being equal, potential competitors are likely to find larger, wealthier markets more attractive than smaller, poorer markets. As can be seen in Table 2, the typical urban bank market is much larger--as measured by total deposits held by bank offices located within the county--than the typical rural or "FmHA" bank market. Bank deposits in the typical urban county are nearly 6 times greater than those in the typical "FmHA" county. Other things being equal, the potential profits from entering a large market are greater than those expected from entering a small market, reducing the influence of potential competitors on rural and small town bank behavior. It would appear that, based on both accessibility and attractiveness considerations, "FmHA" county markets should be less affected by potential competitors than the typical urban market. Nonetheless, the importance of potential competitors as a determinant of market behavior is likely to vary considerably within both county groups.

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<sup>28</sup> Since rural communities are unlikely targets for interstate banking expansion, interstate banking laws are far less likely to influence bank behavior in rural markets than in urban markets. While most States allow some form of interstate banking, crossing State borders still requires chartering a new bank or, more commonly, acquiring one of the State's existing bank organizations. As a result, it is the State's intrastate branching laws that ultimately determine how accessible rural markets are likely to be viewed.

<sup>29</sup> Included in the group of limited branching States are those that permit statewide branching through mergers but continue to prohibit *de novo* branching. While this limitation isn't geographically binding, it reduces the threat of nonlocal banks being able to easily move into rural bank markets.

Table 2--Characteristics of Urban, Rural and "FmHA" Banking Markets, 1988<sup>1</sup>

Bank market characteristics	Urban	Rural	FmHA
		<u>Number</u>	
Counties with one or more bank offices <sup>2</sup>	713	2,359	1,819
Mean:			
Bank organizations per county <sup>3</sup>	11.3	4.1	5.7
Herfindahl-Hirschman index <sup>4</sup>	26.04	42.96	35.91
County deposits (\$millions)	2,279	164	380
Counties served by:		<u>Percent</u>	
1-2 bank organizations	4.6	29.4	17.9
3-5 bank organizations	21.0	47.2	42.7
6-9 bank organizations	33.7	19.3	27.8
10 or more bank organizations	40.7	4.1	11.6
Counties served <u>exclusively</u> by:			
Small (< \$75 million) bank organizations	2.0	27.2	23.1
Large (> \$1 billion) bank organizations	3.4	5.3	3.3
Locally based bank organizations <sup>5</sup>	3.5	26.0	22.2
Nonlocally based bank organizations <sup>5</sup>	9.3	16.4	11.7
Counties served by a:			
Combination of locally and nonlocally based bank organizations	87.2	57.7	66.1
Multi-market bank organization(s)	97.8	79.4	83.5
Counties located in States with:			
Unrestricted bank branching	28.6	21.8	21.1
Unit banking	10.4	19.9	18.0

<sup>1</sup> Banking markets are defined by county boundaries. Urban (rural) banking markets are those located inside (outside) Metropolitan Statistical Areas in 1983. An "FmHA" banking market is a county containing one or more farmers that participated in the guaranteed farm operating or farm ownership program during fiscal 1988.

<sup>2</sup> One urban county (Charles City, VA) and 23 rural counties were without a commercial bank office. Means and percentage distributions were calculated excluding counties with no bank office.

<sup>3</sup> A bank organization is the bank firm for independent and single bank holding companies, but is the holding company for multibank holding company (MBHC) affiliates.

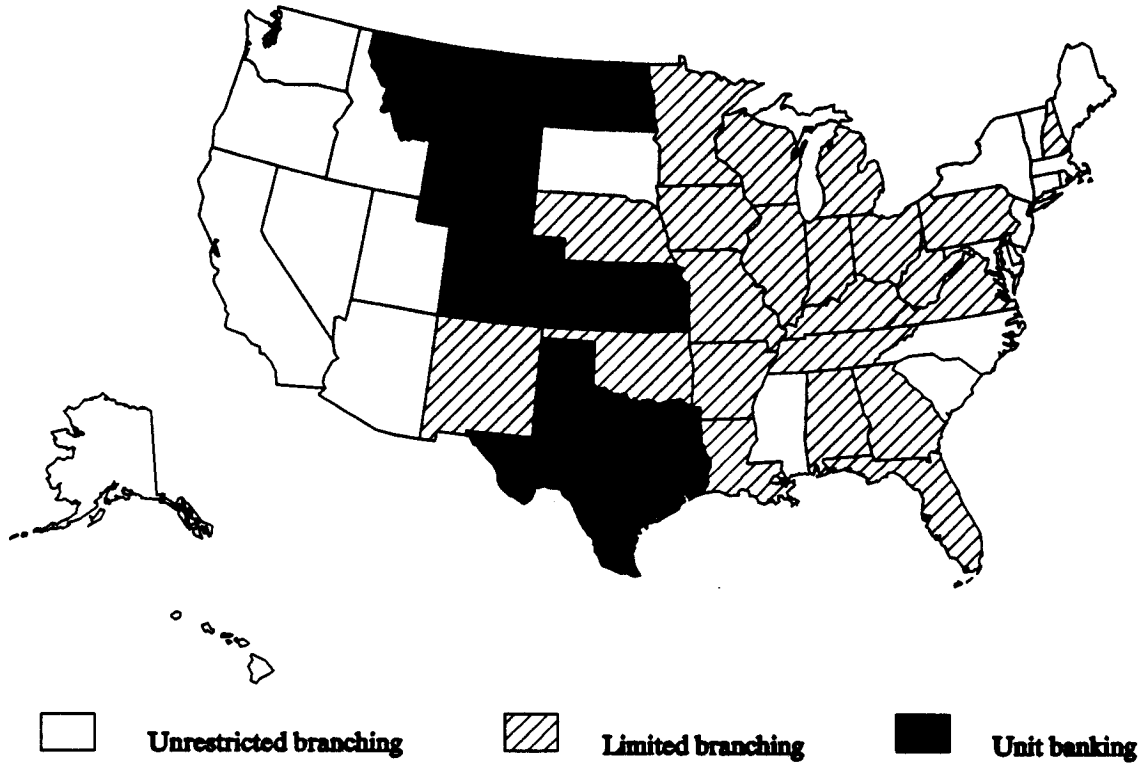
<sup>4</sup> The sum of the squared shares of total county deposits held by bank organizations located in the county on June 30, 1988. The higher the index, the more concentrated the bank market is; for one-bank counties, this index is 100.

<sup>5</sup> When applied to MBHC organizations, determining the organization's headquarters county is somewhat subjective. For our purposes, the MBHC was assumed to be headquartered in the same county as the MBHC's largest bank if that bank was at least twice the size of the next largest bank. For MBHC's with no dominant bank, local orientation is based upon the location of the While organization's affiliated banks. If over two-thirds of the organization's bank assets are with affiliates headquartered in the county, the organization is assumed to be locally oriented.



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**Figure 1--State Branching Laws**



Source: Amel (1988) and Milkov and Sullivan (1990)

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### Model Specification

Building on the general approach adopted by Hannan (1991) and others, I postulate that the interest rate charged on a specific loan is a function of the market rate of interest at the time the loan was made, the characteristics of the loan, the creditworthiness of the borrower, characteristics of the particular lender making the loan, and characteristics of the local banking market. That is:

$$r_{jkl}^i = \alpha + \beta_1 r_t + \beta_2 LN_j + \beta_3 BR_k + \beta_4 BK_i + \beta_5 MK_l + \epsilon_{ijkl},$$

where:

$r_{jkl}^i$  is the interest rate bank  $i$  charges for loan  $j$  to borrower  $k$  in market  $l$  during time period  $t$ ,

$r_t$  is the market rate of interest during time period  $t$ ,

$LN_j$  is a vector of characteristics of loan  $j$ ,

$BR_k$  is a vector of characteristics of borrower  $k$ ,

$BK_i$  is a vector of characteristics of bank  $i$ ,

$MK_l$  is a vector of characteristics of bank market  $l$ , and

$\alpha$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  are coefficients and  $\epsilon_{ijkl}$  denotes the error term.

Ideally, loan interest rates should be modelled at a point in time rather than over an extended time period to hold macroeconomic influences constant. However, the dataset being used in this study includes loans made throughout an entire year, and was not designed to maximize observations at any point during the year. To complicate matters further, fiscal 1988 was not a period characterized by stable financial markets. The year began with the stock market crash of October 19, 1987, which had a pronounced effect on all financial markets.<sup>30</sup> As a result, interest rates dropped at the beginning of the study period before rising fairly steadily during the second half of the study period. To capture these nationwide variations in the rate of return on alternative uses of loanable funds, the yield on 1-year Treasury notes recorded during the week the loan was closed is included in the equations. The interest rate on FmHA guaranteed farm loans should increase or decrease along with changes in the market rate, although varying adjustment periods could reduce the strength of any statistical association considerably.

Loan characteristics that could affect interest rates include the size of the loan, the number of years until the loan matures, whether it is a note or a line of credit, and whether it is part of FmHA's debt adjustment program or a State-sponsored interest subsidy program. Fixed costs involved in making and servicing loans mean that interest rates generally decline as loan size increases, other considerations held constant. And given an upward sloping yield curve, as existed in 1988, interest rates tend to increase as loan maturity lengthens. Finally, interest rates on lines of credit are expected to be higher than those on notes, while loans involved in interest subsidy programs are expected to have lower rates.<sup>31</sup> The type of interest (fixed or variable) could also affect interest rates, but our analysis is restricted to fixed rate loans because of control problems with variable rates.

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<sup>30</sup> The Federal fiscal year begins on October 1st and ends on September 30th.

<sup>31</sup> In 1988, FmHA subsidized half the cost of interest write-downs on guaranteed loans if the write-down was needed to keep the farmer in business. FmHA's share was limited to a 2 percent interest write-down. In addition, a few States operate farm credit programs which provide interest write-downs on FmHA guaranteed farm loans. Any loan on which the borrower's interest rate was lower than the lender's interest rate is assumed to be publicly subsidized.

Based on the credit scoring literature, the borrower characteristics that are consistently found to influence default or loan loss risk are liquidity, solvency, and repayment ability (Miller and LaDue). Since these factors indicate probabilities of default, they may affect the interest rate a borrower pays on his or her loans.<sup>32</sup> Liquidity measures a borrower's ability to meet short-term obligations, and should be negatively related with interest rates. Cash income relative to expenses is used to measure liquidity in this analysis, together with the ratio of real estate to total debt outstanding. Solvency indicates the ability of a farm business to withstand temporary fluctuations in economic conditions. If debt is high, relative to assets, a drop in asset values could leave outstanding debt undersecured. As a result, the borrower's debt/asset ratio should be positively related with interest rates. Repayment ability reflects the profitability of the investment being financed and should be negatively related with interest rates. Because of multicollinearity problems, the equation does not include any measure of repayment ability.

The ratios describing each borrower's financial position are based on projections for the 1988/89 crop year rather than on historical measures of actual performance. Since these projections determine whether the loan is eligible for the guarantee program--that is, they indicate that the borrower needs assistance, but also that he or she is expected to survive and repay the loan--they likely demonstrate less variability than actual performance measures would. In an attempt to measure actual (although presumably unobserved) risk, a dummy variable is included which indicates whether or not the loan was in default as of June 15, 1992.<sup>33</sup> Assuming that lenders viewed these loans as high risks at the time the loan was made, the coefficient should have a positive sign. Another possible indicator of risk is whether the borrower participated in the guarantee programs prior to fiscal 1988. Since previous participation may indicate a long term problem, rather than a temporary problem, one would expect these borrowers to face higher borrowing costs. Finally, following the lead of Turvey and Brown (1990), a series of enterprise dummy variables is also included to reflect variations in the riskiness of dairy, beef, and other miscellaneous farms relative to cash grain farms.

Lender characteristics that might affect interest costs include the bank's loan to deposit ratio, whether it has a local board of directors, and whether it is affiliated with an MBHC. While several other bank characteristics might also influence bank behavior, they tend to be highly correlated with each other, and so are excluded from our analysis. Bank MBHC affiliation

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<sup>32</sup> If lenders charge differential interest rates which vary with default risk, the relationship between borrower characteristics and interest rates should be straightforward. If, however, banks ration credit based on default risk, but don't charge differential interest rates, then higher risk borrowers will be channelled toward higher cost lenders. If these include local banks, the relationship between borrower characteristics and interest costs should still emerge, but if high cost lenders are composed primarily of nonbank or nonlocal lenders, then our analysis may fail to detect any relationship.

<sup>33</sup> Operating loans have maturities up to 7 years, but the average in fiscal 1988 was 3.6 years (Koenig and Sullivan). For loans which had already been paid off by June 15, 1992, the default dummy indicates whether or not FmHA paid a loss claim on the loan.

and local orientation are included to see if these characteristics affect interest rates, holding creditworthiness considerations constant. No particular relationship is hypothesized *a priori*. The bank's loan to deposit ratio is expected to be positively related with interest rates, at least when the ratio becomes sufficiently high, as increased demand for loanable funds pushes their cost up.

Our primary interest is in the effect local bank market structure, as measured by actual and potential competition and ownership characteristics, has on the cost of credit. Actual competition is measured by the number of bank organizations located in the county and is assumed to be inversely related with interest rates. That is, as the number of competing credit suppliers within a local market increases, the cost of credit should decline. The Herfindahl-Hirschman index can also be used to measure the effect of bank market concentration on pricing behavior. However, in markets with few banks, variation in their number is likely to affect competition directly. Only as the number of competitors becomes sufficiently large does market concentration *per se* become critical.<sup>34</sup> As previously noted, other lenders, most notably the Farm Credit System, also compete for farm borrowers in many local markets. Unfortunately, the only measure of nonbank lender competition available is whether these lenders made guaranteed farm loans to county residents during the study period. A dummy variable is included in the equation to reflect the active presence of nonbank lenders in the market and is expected to be negatively related with interest rates.

Since potential competition can also influence bank behavior, measures of each market's accessibility and attractiveness to banks located elsewhere are included. Dummy variables, indicating whether the market is located within a State that allows unrestricted statewide branching or in a unit banking State, capture some of the variation in accessibility.<sup>35</sup> Statewide branching should hold down interest rates while unit banking should increase borrowing costs, other things being equal. The average amount of deposits held by banks within the county is included to reflect the market's attractiveness to potential competitors. A negative sign is anticipated for this variable. To account for the effect local orientation (as reflected by bank ownership) has on borrowing costs, the share of market deposits held by locally-oriented bank organizations is included in the equation. No particular relationship is hypothesized *a priori*.

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<sup>34</sup> In urban markets with many competitors, noncompetitive pricing is easier to sustain in highly concentrated markets where most suppliers follow the lead of the dominant firm(s). But in markets with few competitors, noncompetitive behavior is sustainable even if all suppliers have an equal share of the market.

<sup>35</sup> Unfortunately, there remains a great deal of variation within the excluded category--States that place limits on intrastate branching but do not prohibit it. Not only do the severity of restrictions vary from State to State, but their relevance to individual markets within a State is also likely to vary considerably. For example, a county located next to a metropolitan area in a State that allows branching within contiguous counties faces much more potential competition than one of the State's isolated rural counties. These variations in accessibility are not captured in our model.

Table 3 presents the means and standard deviations of each of these variables for both the sample of loans for which borrower information was collected, and the "universe" of all loans meeting our selection criteria. Given the fact that the sample was designed to be representative of loans originated across the country in fiscal 1988, it is reassuring that the means and standard deviations of these two groups are very similar.<sup>36</sup> However, compared with the local bank market characteristics of all the counties served by FmHA's guarantee programs (Table 2), a disproportionate number of the loans we analyze were originated in unit banking or restricted branching States. Only 7 to 10 percent of our loans come from statewide branching States, while 21 percent of "FmHA" counties are located in such States. Since program usage is highest in the Midwest and Mississippi Delta, a discrepancy between the distribution of loans and counties is not surprising. The loan data clearly over represents locally oriented banking markets, but it includes a wide range of local banking market characteristics.

### Regression Results and Implications

Tables 4 and 5 contain estimated parameters for two separate Ordinary Least Squares regression models applied to our sample and the "universe" of fixed rate operating loans guaranteed by FmHA. In the first model, market competition is measured by the log of the number of bank organizations operating within the local market. The logarithmic form reflects the anticipated decreasing marginal effect each additional bank has on local market competition. The second model replaces the bank count variable with a measure of the local banking market's concentration--the Herfindahl-Hirschman index, expressed as a percent. All other explanatory variables remain the same within the two models.

Using survey data, both models explain roughly 25 percent of the variation in farm loan interest rates--a respectable performance given the market conditions that prevailed in 1988.<sup>37</sup> However, only 6 of the estimated parameters (out of 23) are significantly different from 0 at or below the 5 percent level. Nonetheless, the variables reflecting market competition are significant, and have the anticipated signs. As the number of banks in the market increases, interest rates on farm loans decline. And as the bank market concentration ratio increases, interest rates rise. The size of the market competition coefficients based on all fixed rate loans is roughly half of the coefficients based on the sample, but the signs remain the same and all estimated parameters are statistically significant.

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<sup>36</sup> The survey was not purely random. To insure that no county office was over burdened, no more than 15 percent of the loans in any county office's portfolio were sampled. Borrower data was collected for 259 of the 1,756 loans in our "universe." Because of missing values for one or more of the explanatory variables, the regression equations were estimated with slightly fewer observations.

<sup>37</sup> By way of comparison, Rhoades (1992) obtained  $R^2$ 's of 0.338 to 0.521 on his analysis of weekly samples of mortgage rates. Hannan (1991) calculated  $R^2$ 's of 0.05 to 0.32 for small business loans made during 3 selected months in 1984-86.

Table 3--Descriptive Statistics: FmHA Guaranteed Fixed Rate Operating Loans

Variables	Units	Survey data:		"Universe" data:	
		Mean	Standard deviation	Mean	Standard deviation
Interest rate	Percent	11.35	0.97	11.37	0.98
1-year Treasury yield during the week of loan closing	Percent	7.21	0.46	7.17	0.44
Loan characteristics:					
Amount	\$1,000s	89.64	77.97	96.71	75.98
Maturity	Years	3.35	2.46	3.29	2.42
Line of credit	0/1 dummy <sup>1</sup>	0.42	0.49	0.42	0.49
Subsidized interest program	0/1 dummy	0.24	0.43	0.22	0.41
Borrower characteristics:					
Cash income/expense	Percent	167.11	151.74	--	--
Real estate/total debt	Percent	75.20	72.20	--	--
Debt/asset	Percent	75.17	51.25	--	--
Default prior to 6/92	0/1 dummy	0.02	0.14	0.04	0.19
Previous participant	0/1 dummy	0.32	0.47	0.30	0.46
Dairy farm <sup>1</sup>	0/1 dummy	0.14	0.34	--	--
Beef, hog, sheep farm <sup>1</sup>	0/1 dummy	0.11	0.32	--	--
Misc. farm enterprise <sup>1</sup>	0/1 dummy	0.27	0.44	--	--
Lender characteristics:					
Loan/deposit	Percent	59.53	12.63	60.08	13.63
No local board of directors	0/1 dummy	0.05	0.23	0.08	0.27
MBHC affiliate	0/1 dummy	0.21	0.41	0.23	0.42
Local Market characteristics:					
Banks operating in market	Number	5.80	3.52	6.07	3.86
Herfindahl-Hirschman index	Percent	31.76	17.55	31.34	16.88
Nonbank lender(s) in market	0/1 dummy	0.47	0.50	0.46	0.50
Statewide branching allowed <sup>1</sup>	0/1 dummy	0.07	0.26	0.10	0.30
Unit banking State <sup>1</sup>	0/1 dummy	0.21	0.41	0.21	0.41
Average bank deposits	\$millions	37.02	26.47	36.57	25.92
Local share of bank deposits	Percent	70.61	30.20	70.94	30.00

-- Data not available.

<sup>1</sup> Dummy variables take on the value 1 when the characteristic is true, and 0 otherwise. For the farm enterprise series, cash grain farms are the excluded category. For the State branching law series, States which restrict intrastate branching, but do not prohibit it, comprise the excluded category.

Table 4--OLS Regression Coefficients: Interest Rates on Fixed Rate Operating Loans  
Fiscal Year 1988 Survey Data

Variable	Model 1		Model 2	
	Parameter	t-ratio	Parameter	t-ratio
Intercept	12.898	12.26**	12.186	11.70**
1-year Treasury yield (%)	-0.089	0.70	-0.084	0.66
Loan characteristics:				
Amount (\$1,000)	-0.002	2.54*	-0.002	2.61**
Maturity (years)	-0.051	1.62	-0.050	1.60
Line of credit dummy	0.082	0.60	0.073	0.54
Subsidized interest dummy	0.996	6.03**	0.994	6.05**
Borrower characteristics:				
Cash income/expense (%)	0.001	1.16	0.001	1.21
Real estate/total debt (%)	-0.002	1.86	-0.002	1.90
Debt/asset (%)	-0.001	0.64	-0.001	0.69
Default dummy	0.511	1.11	0.548	1.20
Previous participant dummy	0.111	0.80	0.122	0.89
Dairy farm dummy	-0.122	0.62	-0.111	0.57
Beef, etc. farm dummy	-0.018	0.09	-0.050	0.25
Misc. farm dummy	0.165	0.99	0.165	1.01
Lender characteristics:				
Loan/deposit (%)	-0.006	1.13	-0.006	1.12
No local board dummy	-0.034	0.11	0.017	0.06
MBHC affiliate dummy	-0.018	0.10	-0.020	0.11
Local Market characteristics:				
Number of banks (log)	-0.236	2.26*	---	--
Herfindahl index (%)	---	--	0.010	2.79**
Nonbank lender(s) dummy	0.246	1.98*	0.247	2.01*
Statewide branching dummy	0.172	0.62	0.149	0.54
Unit banking dummy	0.489	3.20**	0.460	3.01**
Average bank deposits (\$M)	-0.003	1.06	-0.003	1.32
Local share of deposits (%)	-0.003	1.20	-0.003	1.11
Adjusted R <sup>2</sup>	0.243		0.252	
F-Value	4.402**		4.575**	
Number of observations	234		234	

\* \*\* Significant at the 5 percent and 1 percent level, respectively.

Table 5--OLS Regression Coefficients: Interest Rates on Fixed Rate Operating Loans  
Fiscal Year 1988 "Universe"

Variable	Model 1		Model 2	
	Parameter	t-ratio	Parameter	t-ratio
Intercept	10.928	28.31**	10.567	27.42**
1-year Treasury yield (%)	0.050	1.01	0.050	1.01
Loan characteristics:				
Amount (\$1,000)	-0.002	6.95**	-0.002	6.96**
Maturity (years)	-0.037	3.40**	-0.038	3.46**
Line of credit dummy	0.036	0.74	0.034	0.71
Subsidized interest dummy	0.827	13.50**	0.824	13.48**
Borrower characteristics:				
Default dummy	0.064	0.56	0.070	0.61
Previous participant dummy	0.058	1.11	0.058	1.11
Lender characteristics:				
Loan/deposit (%)	0.003	1.91	0.004	2.04*
No local board dummy	0.064	0.68	0.059	0.63
MBHC affiliate dummy	0.080	1.27	0.081	1.30
Local Market characteristics:				
Number of banks (log)	-0.128	3.41**	---	--
Herfindahl index (%)	---	--	0.005	3.55**
Nonbank lender(s) dummy	0.123	2.77**	0.128	2.88**
Statewide branching dummy	0.053	0.60	0.057	0.65
Unit banking dummy	0.322	5.68**	0.315	5.52**
Average bank deposits (\$M)	-0.000 <sup>1</sup>	0.26	-0.001	0.76
Local share of deposits (%)	0.000 <sup>1</sup>	0.34	0.000 <sup>1</sup>	0.45
Adjusted R <sup>2</sup>	0.162		0.163	
F-Value	22.140**		22.212**	
Number of observations	1,748		1,748	

\* \*\* Significant at the 5 percent and 1 percent level, respectively.

<sup>1</sup> 0.000 denotes a number smaller than 0.0005.



The sample model coefficient indicates that a borrower in a county with 3 banks can expect his or her interest rate to drop by about 3 basis points (0.03 percent) with the addition of a fourth bank operating in the county. If the typical "FmHA" county was served by the number of banks typically found in urban counties, interest rates would be 7 basis points lower. A similar pattern emerges using the Herfindahl-Hirschman index to measure changes in banking market concentration. For the typical "FmHA" county, a 10 percent decrease in market concentration should reduce borrowing costs by roughly 4 basis points. If the typical "FmHA" county enjoyed the same level of bank concentration as the typical urban county, interest rates on farm loans would fall 10 basis points. These estimates are much smaller than those reported by Hannan (1991) for fixed rate small business loans. But his findings also indicated that competitive effects diminish and can disappear during periods of rising interest rates. Roughly 2/3's of the guaranteed loans obligated during fiscal 1988 were closed during a sustained period of rising market interest rates, and credit markets were far from stable for the entire study period.

The Statewide branching dummy variable was not significant, indicating that banks in unrestricted branching States behave very much like those in States that apply branching restrictions that fall short of prohibition. However, the unit banking dummy variable was significant and positive, indicating that banks in unit banking States charge interest rates that are roughly 1/2 percent higher than those charged by banks in other States. Since severe branching restrictions reduce the ease of market entry by potential competitors, banks in unit banking States appear more willing to wield their market power than do banks in States with more liberal branching laws.

Paradoxically, the coefficient for the nonbank lender dummy is positive, indicating that the presence of nonbank lenders increases the interest rates charged by banks rather than decreasing them. However, the sign of the parameter may reflect the effect of higher interest rates rather than the cause. That is, if nonbank lenders are more likely to become active in markets where banks charge high interest rates, then a positive coefficient is possible even though their presence represents increased competition for local banks. Complicating matters further is the fact that our measure of nonbank competition is based upon whether a nonbank lender originated any guaranteed loans within the county. Since the primary nonbank institution active in farm lending is the FCS, which predominantly makes variable rate farm mortgage and operating loans and avoids fixed rate loans, its entirely possible that the effects of increased competition are not felt in the market for fixed rate operating loans. A more "market-specific" measure of nonbank competition may be needed to capture the affect nonbank lenders have on borrowing costs.

The estimated parameters of the bank ownership and local orientation variables are all insignificant, indicating that these characteristics do not influence borrowing costs, at least not directly. And none of the borrower characteristics have significant coefficients when a 2-tailed t-test is applied. Applying a 1-tailed t-test, the estimated coefficient for the real estate

debt/total debt ratio is significant at the 5 percent level and has the anticipated negative sign. But taken as a group, the borrower characteristics derived from survey data (i.e., the income, balance sheet, and enterprise type variables) did not significantly increase the explanatory power of the estimated equations, nor did their inclusion or exclusion have a pronounced affect on the estimated parameters of the other explanatory variables. Given the fact that the loans being analyzed are all guaranteed by the Federal Government, which in turn requires lenders to charge interest rates similar to those paid on unguaranteed loans, the lack of strong association between risk factors and borrowing costs could be viewed as encouraging. However, the use of projected financial ratios in our analyses, rather than actual performance measures, could mask risk-based differential loan pricing if it exists.

Looking at the estimated parameters for the remaining variables, a number had unanticipated signs in both tables. Of the significant (or nearly so) coefficients, years to maturity and the subsidized interest program dummy variable had unanticipated signs. Among fixed rate operating loans, those with longer maturities pay lower rates, contrary to expectations. One possible explanation is that longer-termed equipment loans are better secured than shorter-termed operating loans. Another possibility is that lenders offer lower rates on some loans to encourage their existing borrowers to refinance short-term conventional loans as longer termed guaranteed loans.<sup>38</sup> Given the persistence of the coefficient's sign and its statistical significance, something about longer termed guaranteed farm operating loans makes them attractive enough to lenders to counteract the expected influence of term structure on borrowing costs.

The coefficient for the subsidized interest rate dummy implies that banks receive higher interest rates on their subsidized loans than on their other guaranteed loans. While not entirely surprising given the fact that subsidized borrowers are likely to be among the bank's weakest, the parameter indicates that public subsidies are likely to be split between the borrower and the lender. For FmHA's debt adjustment program, if the borrower receives a 4 percent interest write-down on paper, the rate paid by the borrower is likely to be 3 percent under what other guarantee program borrowers pay. The lender "collects" the other 1 percent by charging a higher initial interest rate before applying the write-down. As a result, instead of matching lender write-downs dollar for dollar, the FmHA debt adjustment program appears to contribute \$2 for every \$1 of net interest reduction by participating lenders.

Finally, loan amount enters the equation with a negative coefficient that is consistently significant, indicating that larger loans pay lower interest rates, other things being equal. And while not consistent across all specifications of the model, the lender's loan to deposit ratio has a significant positive coefficient in the market concentration specification based on all fixed rate loans. Both findings match *a priori* expectations.

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<sup>38</sup> Refinancing accounted for 30 percent of the operating loans guaranteed by FmHA in 1988 (Koenig and Sullivan). Since the borrower pays the guarantee fees while the lender receives a more secure, liquid asset, banks may find it advantageous to charge lower rates on refinancing loans than they do on new borrowing.

## Conclusions

During the public debate over the merits of interstate branching, the fear was often expressed that expansion of multi-market, "big city" banks into rural communities would reduce credit availability and slow economic growth. On the other hand, proponents argued that increased competition would revitalize rural financial markets and spur economic development. While the potential effects of changes in bank market structure on credit availability are at the heart of concerns over bank branching, interest cost implications are also important determinants of business investment decisions. Using administrative data on fixed rate operating loans guaranteed by the FmHA, we have attempted to determine whether local bank market structure--as measured by competition and ownership characteristics--affects borrowing costs in rural and small town communities. Evidence indicates that, while the cost implications are not large, increased financial market competition lowers interest rates on farm loans. However, no evidence was found suggesting that bank ownership or local orientation affect borrowing costs.

Because of the special nature of the agricultural credit market--with its specialized Nationwide lenders, emerging secondary markets, and government sponsored programs--this analysis could be viewed as a strict test of the market-structure hypothesis. Local banks face much more potential and actual competition from nonbank lenders on their farm loans than they do on their other small business loans. As a result, evidence that bank market structure affects farmer borrowing costs implies that other businesses are also affected, and probably to a much greater extent than our estimates indicate. Since it is the nonfarm business sector that serves as the engine of growth in most rural communities, regulations which reduce local bank market competition could be detrimental in the long run.

Nonetheless, statistical evidence is only as convincing as the underlying theoretical model, and before closing, one of our model's major shortcomings needs to be acknowledged. Within any market, price is determined by the interaction of supply and demand. While we didn't develop the underlying supply and demand functions in this paper, our model is nonetheless a reduced-form loan rate equation that reflects, however imperfectly, underlying economic forces. As a result, our variables may reflect shifts in demand as well as supply, with the estimated parameters reflecting the combined influences of all the factors affecting the variable. This is true of any reduced-form equation, but the lack of explicit demand factors in our model makes interpretation of the estimated coefficients particularly hazardous. As a result, the evidence reported here should be viewed as preliminary.

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