

RELATIONSHIP LENDING AND DENOVO BANKS:  
AN EXAMINATION OF BANK LENDING TO SMALL FARM BORROWERS

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Abstract

In this paper we examine the lending by small banks to small farms. We find that relationships, as measured by the length of tenure of farm operators, are positively related to bank lending. We also find that denovo banks have a positive tendency to lend to small farms, similar to the tendency of denovo banks to lend to small businesses generally. When existing relationships between borrowers and incumbent lenders are stronger, however, denovo banks have greater difficulties in lending to small farms. Finally, we find that, even within the category of small banks, lending to small farms (as a percentage of a bank's assets) tends to decrease as the bank increases in size. We believe that small farms are a category of small enterprises that have been under-researched in the lending literature and that further study of these relationships would yield new and interesting results.

RELATIONSHIP LENDING AND DENOVO BANKS:  
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*But the banks are made of marble  
With a guard at every door  
And the vaults are stuffed with silver  
That the farmer sweated for*  
- first chorus of a song by Les Rice;  
popularized by Woodie Guthrie

I. Introduction

Farms and farming, especially the small "family" farm, continue to maintain an outsized grip on the images and sympathies of American society, despite the much diminished economic role of agriculture in the U.S. economy.<sup>1</sup> As part of this pattern, the image of the relationship between farmers as borrowers and banks as lenders, portrayed by the first chorus from the Les Rice song that was popularized by Woodie Guthrie, still carries a great deal of resonance: the poor farmer, taken advantage of by the rich banker.

Lost in the mythology are the important insights of modern finance: Lending is a risky business; lenders hope to get their money returned with interest (otherwise they will not be able to survive as lenders); but they always face the asymmetric information problems of adverse selection and moral hazard on the part of borrowers -- including farm borrowers. *Gathering information about and maintaining relationships with borrowers are important tools for lenders in overcoming*

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<sup>1</sup> In 1999 farming constituted 0.8% of U.S. GDP.

*these problems.*<sup>2</sup>

This paper will explore the importance of relationships for a specific set of borrowers that have not been well studied: small farms. The financing needs of small farms are similar to those of other small businesses. The largest source of lending to small farms is commercial banks, just as it is for lending to small businesses. Substantial research has shown the importance of developing relationships with banks for small businesses, and it seems likely that the same should be true for small farms.

Further, small banks tend to devote larger fractions of their assets to small business lending, and the same is true for small rural banks. In contrast to relatively transparent larger enterprises, small firms -- non-farm and farm -- are more opaque, and small banks are better able to analyze their ability to repay loans and to develop and maintain the necessary relationships. Also, recent research finds that denovo banks tend to emphasize small business lending, as compared to otherwise similar incumbent banks. Finally, agriculture is a sector that is consolidating, as well as shrinking relative to U.S. GDP, and these macro trends may have consequences for the pattern of bank lending to this sector.

This paper brings these themes together: relationships; small banks; denovo banks; and small farms. We focus on lending by small banks to small farms. We find that relationships -- as proxied by the length of farm operator tenure -- are important and tend to encourage more lending to small farms. We find further that, as is true for lending to small businesses generally, denovo banks have a proclivity to lend to small farms. However, as the strength of the existing relationships between farms and incumbent lenders increases, denovo banks have greater

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<sup>2</sup> Similarly, of course, providing information and maintaining relationships with lenders are important for creditworthy borrowers.

difficulties in pursuing that strategy. Finally, we find that even among small banks their focus on lending to small farms tends to decrease as bank size increases.

To date the research on relationship banking and agricultural lending has been sparse. This paper attempts to add significantly to the literature.

The next section explores the broad themes of agricultural lending, relationships, lending to small businesses, and denovo banks in more detail and reviews the relevant literature. The third section develops specific hypotheses based on these broad themes and describes the data and variables used in our empirical analysis. The fourth section presents our empirical results. The final section offers a brief conclusion.

## II. Literature Review and Background

Three areas of research are relevant for this paper. First we review the evidence on small farm lending in the United States. Next we discuss the primary previous studies on relationship banking and small business lending. Finally we examine the studies that have analyzed the behavior of de novo banks with respect to small business lending. This discussion provides a basis for the empirical analysis of the paper.

### A. Agricultural Lending

Commercial banks are the most important source of funds for farms and especially for small farm borrowers, as can be seen in Table 1. Banks accounted for 41% of all farm debt in 2000 and (as of 1995) for a larger fraction of smaller farms' debt. The Farm Credit System, the USDA's Farm Service Agency, and life insurance companies are the other important categories of lender to farms; the remaining lenders include merchants, equipment sellers, and individuals. Total agricultural lending by banks in 2000 is estimated to be about \$74 billion (USDA 2001).

The recent rapid consolidation of the banking industry raises concern that farmers below a certain size will find borrowing more difficult in the future. The smallest banks are by far the most important bank lenders in the market for small farm loans, as can be seen in Table 2. While banks of under \$100 million in assets held only 5.2% of total U.S. bank assets in 1999, they provided around half of the number and value of loans in various small farm loan size categories. Banks larger than \$10 billion in assets in 1999, on the other hand, account for 61% of total bank assets but grant less than 10% of both the total value of small farm loans and the number of small farm loans.

Also, as shown in Table 3 (and consistent with Table 2), smaller banks are much more

likely to devote a larger fraction of their assets to small farm loans. In 1999 banks with assets of under \$100 million devoted 9.5% of their assets to farm loans of less than \$250,000. By contrast, banks with assets greater than \$10 billion devoted only 0.1% of their assets to such loans. If small banks disappear through consolidation, perhaps lending to small farmers will decrease.

For the past two decades banks, including rural banks, have been going through a major merger wave and consequent consolidation, encouraged by eased state branching laws, interstate compacts, and finally the Riegle-Neal Interstate Branching Act of 1994. Residents of rural areas and their political representatives have traditionally exhibited fear, suspicion, and antipathy toward bank consolidation.

There is empirical evidence to support these concerns. Keeton (1996) analyzes bank mergers in the Tenth Federal Reserve District and finds that banks acquired by large or distant organizations reduce lending to local farms. Gilbert and Belongia (1988) find, for banks in rural areas, an inverse relationship between the size of the parent organization and the ratio of farm loans to total loans.

There is also evidence, however, that supports a more benign view of bank consolidation for rural areas. Featherstone (1996) finds that acquired rural banks did not reduce their agricultural lending during the three-year period subsequent to acquisition by a larger organization. Levonian (1996) tries to explain interbank variation in agricultural lending and identifies the size of a bank's branches in agricultural areas as the most important factor in the determination of agricultural loan levels; he concludes that consolidation will not affect agricultural credit as long as branches are not closed. Gilbert (2000) examines the expansion of large banking organizations into rural areas during the period of relaxation of geographic constraints; though the larger institutions originally bypassed the rural areas, there is reason to believe that they are moving to a presence in all areas.

Collender and Shaffer (2001) find that geographic liberalization does not impair local economic growth.

Efficiency analysis can be important in assessing the consequences of consolidation on credit availability in agriculture (Ellinger 1994). Neff et al. (1994) warn that different methodologies provide different estimates of inefficiency. Featherstone and Moss (1994) find very small economies of scale in agricultural banking and no economies of scope. Berger (1994) suggests that efficiency improvements for rural banks may reduce agricultural lending. Gilbert and Kliesen (1995) find that agricultural banks are currently well capitalized and are more profitable than other banks of similar size. They warn, however, that major problems in the agricultural sector could cause problems similar to those experienced in the early 1980s.

There is a modest literature on relationship lending and agricultural loans. Barry et al. (1997) investigate the influence of the competitiveness of agricultural lending markets on the relationship between lenders and borrowers. They find an inverse relationship between competition and the proxy for the lender-borrower relationship, borrower loyalty. Bard et al. (2000) evaluate the effect of changes in bank structure on credit availability and terms of farm loans. They employ models relating bank characteristics to loan amounts and rates. They find no overwhelming evidence positive or negative about bank consolidation as it affects agricultural lending.

#### B. Relationship banking and small business lending

It is essential that lenders have information about borrowers in order to assess loan applications. There is a substantial literature that argues that financial intermediaries have a comparative advantage in information production about borrowers (see, e.g., Diamond 1984, 1991]; Ramakrishnan and Thakor 1984; and Boyd and Prescott 1986). A firm with a longer pre-existing



relationship with its bank should have greater availability of funds and/or lower costs of funds because of possible scale economies and durable information. Studies have shown that events indicating renewal of relationships increase abnormal returns (James 1987; Billett et al. 1995).

Several recent studies have used small business finance surveys to measure the impact of bank relationships on the lending process. Petersen and Rajan (1994) find that a relationship with an institutional lender increases the availability of financing to a small business. They also find to a lesser degree that relationships reduce the cost of borrowing. In another study, Petersen and Rajan (1995) examine the effect of credit market competition on lending relationships and find that lenders tend to provide more credit at lower rates in more concentrated markets. The explanation for this finding is that a lender is more assured of a continuing relationship with a small-business borrower in a more concentrated banking market. Berger and Udell (1995) find that lenders offered firms with longer relationships lower rates and were less likely to require collateral. Berger and Udell (1996) find that large banks charge lower loan rates, require less collateral, and issue fewer loans than do small banks. Cole (1998) finds that lenders are more likely to extend credit if they have a pre-existing relationship with a borrower. Cole et al. (1999) show that the lending process for small business loans differs between large and small banks. Larger banks tend to employ standard criteria obtained from financial statements in the loan decision process while smaller banks rely more on the character of the borrower. Relationships are more important for small banks than large banks.

Relationship banking has become an important issue for small business lending in recent years because of the increase in bank consolidation. Small banks lend proportionately more to small enterprises (see, e.g., Nakamura 1993; Berger et al. 1995, 2000; Peek and Rosengren 1996; and Strahan and Weston 1996, 1998; and Berger et al. 2001b). Mergers have been found to reduce

lending to small business in some studies (Peek and Rosengren 1996; Berger et al. 1998), while in other studies no effect is found (Strahan and Weston 1996, 1998). The effect appears to depend upon the type of merger.

### C. De novo banks and small business lending

Recent research has shown that the possible reduction in small business lending caused by bank consolidation may be partially offset by entry of new banking organizations that concentrate on small business lending. Goldberg and White (1998) find that de novo banks, defined as banks that are no more than three years old, make more small business loans than do other incumbent banks of similar size. DeYoung (1998) and DeYoung et al. (1999) extend this study to examine the effects of bank age generally on the lending to small business. These studies find that as de novo banks age they make fewer loans to small business, holding other factors constant. This result is supported by Berger et al. (2001b).

With this background established, we now turn our attention to our specific hypotheses concerning farm lending and the sources of our data.

### III. Specific Hypotheses, the Data, and the Variables

#### A. Hypotheses

This paper focuses on three main questions:

1. Are relationships important for banks' lending to small farms? The theoretical argument for sustained relationships between lender and borrower, as a means of mitigating the usual asymmetric information problems that are inherent in lender-borrower arrangements, are clear (Petersen and Rajan 1994, 1995). Relationships have been found to be important for banks' lending to small businesses (Petersen and Rajan 1994, 1995; Berger and Udell 1995, 1996; Cole 1998; Cole et al. 1999). Lending to small farms is the agricultural counterpart to lending to small businesses.

*We hypothesize that lender-borrower relationships are important for this type of agricultural lending as well.*<sup>3</sup>

2. Do denovo banks in rural areas focus on lending to small farms as an important business strategy? It is well documented that denovo banks generally emphasize lending to small businesses as an important strategy (Goldberg and White 1998; DeYoung 1998; DeYoung et al. 1999; Berger et al. 2001b). Do their rural counterparts employ a similar strategy?

Why might denovo banks focus on small business lending or -- for rural banks -- small farm lending? To begin, since denovo banks are likely to be relatively small, their loans to any single borrower will be limited in size;<sup>4</sup> hence any loans to a business or a farm will perforce be small. If the business or farm is large, its borrowing needs are likely to be beyond the lending capacity of a

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<sup>3</sup> Barry et al. (1997) provide indirect evidence that supports the importance of relationships. We attempt to test for more direct evidence.

<sup>4</sup> Safety-and-soundness regulations by bank regulators generally limit the size of a bank's loan to any single borrower to be no larger than 15% of the bank's capital (net worth).

small (denovo) bank. But why would the denovo bank undertake a strategy of lending to businesses or farms, rather than consumer lending, residential mortgage lending, or securities investments? The bank's senior executives may be ambitious loan officers from a neighboring bank (or downsized "refugees" from a recent merger) who believe that they have a comparative advantage in recognizing good risks among the business/farm entrepreneurs in their local area, or the loan officers may even bring good loan customers with them from their former bank. Further, the wave of bank mergers of the 1980s and 1990s have clearly created opportunities and niches, such as small business lending, that denovo banks could occupy and that incumbents may be too sluggish in response (Berger et al. 2001a). The same could be true for rural banks and farm lending.

*We hypothesize that rural denovo banks tend to focus on lending to small farms as an important strategy.*

3. Are rural denovo banks hampered in pursuing their small farm lending strategy by the strength of existing lender-borrower relationships? The business/farm customers for a denovo bank can come from three sources: start-up enterprises; currently unserved enterprises (many of which may be recent start-ups); and enterprises that are currently loan customers of other lenders. If start-up enterprises -- current and recent -- are relatively rare, then the denovo bank will have to pursue -- "steal away" -- the customers of other lenders. But if these relationships are strong, the denovo bank will have greater difficulty in pursuing this strategy.

Start-up farms are much less common than are start-up enterprises generally. Agriculture is not a rapidly expanding part of the U.S. economy. The agricultural sector has generally been shrinking as a percentage of U.S. GDP: In 1980 farms accounted for 2.0% of GDP; in 1999 the comparable percentage was 0.8%. The agricultural sector is also consolidating. In 1980 there were

2,440,000 farms in the U.S.; in 1999 there were 2,194,000 farms.

In this environment a denovo bank that might otherwise pursue a strategy of lending to small farms will have a tougher time: There is a dearth of recent or start-up potential customers; the currently unserved small farms may be uninterested in obtaining bank credit or may be clearly uncreditworthy; and the current loan customers of incumbent banks have existing relationships with those banks that may be difficult for the denovo bank to break. Faced by these difficulties a denovo bank might well decide to pursue a different strategy that focuses on a different category of borrower.

*We hypothesize that rural denovo banks that face stronger relationships between small farm borrowers and incumbent banks are less likely to pursue small farm lending as a strategy.*

## B. The Sample, the Data, and the Variables

The data set that we use for this paper is the same data set that was used in Goldberg and White (1998).<sup>5</sup> Our sample focuses on annual observations of bank loans to farms for the years 1987-1994. We restrict our analysis to rural banks<sup>6</sup> with assets of less than \$100 million (and greater than \$5 million<sup>7</sup>). We can thereby be reasonably assured that any individual farm loan would be less than \$1 million in size,<sup>8</sup> the size that is considered the upper limit of "small" loans

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<sup>5</sup> Further detail on the characteristics of the sample that are not discussed below can be found in Goldberg and White (1998).

<sup>6</sup> We define a rural bank to be any bank that has its headquarters outside a metropolitan statistical area (MSA).

<sup>7</sup> We excluded banks with assets below \$5 million because we feared that these "micro" banks might be anomalous for reasons that are irrelevant to the focus of this study.

<sup>8</sup> Again, this follows from the safety-and-soundness limits on the size of a loan to a single borrower that was noted above.

that would likely be lent to a small farm.<sup>9</sup> Also, we are thereby focusing on a group of banks that, as is indicated in Table 3, are relative "specialists" in making loans to small farms.

The data are drawn from the FDIC Call Reports and from USDA sources. The specific data sources are best described alongside the specific variables, which are discussed below and are summarized in Table 4.

1. Dependent variables. We use three alternative dependent variables. The first, *AGNRELN/A*, is the ratio of a bank's non-real-estate agricultural lending to the bank's total assets, as of December 31 in each year covered by our sample. The second, *AGRELN/A*, is the ratio of the bank's agricultural real estate lending to its total assets. The third, *AGTLN/A*, is the sum of the bank's non-real-estate agricultural lending plus its agricultural real estate lending, divided by its total assets (i.e., the sum of *AGNRELN/A* and *AGRELN/A*). All of these dependent variables come from the FDIC's Call Reports.

2. Independent variables. We start with the variables that are primary to our hypotheses. To capture the potential for strong relationships between lender and borrower, we use the average length of tenure, *AVTEN*, for farm operators in the state in which the bank is headquartered. These data are provided in the Bureau of the Census's Census of Agriculture for 1987 and 1992.<sup>10</sup> As was stated above, we expect this variable to have a positive coefficient.

We define a denovo bank, *DNV*, as a bank that has started operations in the year of observation or in the previous three years. The list of denovo banks comes from the FDIC.<sup>11</sup> The

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<sup>9</sup> The USSBA (2000) describes loans in the \$250,000-\$1,000,000 range as "larger small".

<sup>10</sup> For the years between 1987 and 1992 we interpolate evenly between the tenure values shown for 1987 and 1982. For 1993 and 1994 we use the 1992 values.

<sup>11</sup> We excluded "denovo" banks that were newly formed to take over the assets and operations of failed banks.

variable takes the form of a simple 1,0 dummy variable. If denovo banks tend to stress lending to small farms as a strategy, we expect this variable to have a positive coefficient.

The variable *AVTEN\*DNV* represents the interaction of *AVTEN* and *DNV*. If denovo banks have more difficulties where existing relationships between borrowers and lenders are stronger, we expect this variable to have a negative coefficient.

Moving to the secondary or control variables, we include the bank's size, *ASSET94*, as represented by the bank's total assets (in 1994 dollars<sup>12</sup>) on December 31 of each year in our sample. The data come from the FDIC's Call Reports. As was discussed in Section II, it is well established that larger banks generally have lower ratios of small business loans to assets, and the data for small farm loans for 1999 in Table 3 support the expectation that the same should apply for loans to small farms. However, within the small bank category (i.e., banks with assets below \$100 million), Goldberg and White (1998), DeYoung (1998), and DeYoung et al. (1999) all found that small business lending is positively related to bank size, while the results in Berger et al. (2001b) are mixed. Consequently, we have no strong expectations with respect to the sign on this variable.

Banks' lending to farms should be positively related to the size and well-being of the agricultural sector surrounding the bank. We capture this macro environment with two variables: *LFARMINC* is the log of the ratio of the annual gross farm income (in 1994 dollars) for the state in which the bank is headquartered, divided by the number of small rural banks in that state. *FINCGR5* is the five-year growth rate for real gross farm income in the state in which the bank is headquartered. Gross farm income by state is derived from reports by the USDA's Economic Research Service.

We include two variables to represent state branching restrictions: *UNITB* is a 1,0 dummy

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<sup>12</sup> We use the GDP deflator for all conversions to 1994 dollars.

variable indicating whether the state was a unit banking state, as of the mid 1980s; *SWB* is a 1,0 variable indicating whether the state has statewide branching as of the mid 1980s.<sup>13</sup> The source of this information is Amel (1993).<sup>14</sup> We include the state branching variables because they may be indicators of market structure that are not readily captured through other variables.

Finally, since our regressions pool the annual observations for 1987-1994, we include 1,0 dummy variables for the observations in each year after the initial year: *DUM88...DUM94*. These annual dummy variables allow us to capture any changes in small bank lending proclivities toward small farms over the course of the time period covered by our sample.

Our empirical model, then, is

$$Y_t = f(\text{AVTEN}_t, \text{DNV}_t, \text{AVTEN}_t * \text{DNV}_t, \text{ASSET94}_t, \text{LFARMINC}_t, \text{FINCGR5}_t, \text{UNITB}, \text{SWB}, \text{DUM88...DUM94}),$$

where *Y* represents (alternatively) *AGNRELN/A*, *AGRELN/A*, or *AGTLN/A*. The model is estimated with ordinary least squares regressions.

It is to these results that we now turn.

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<sup>13</sup> States with intermediate branching restrictions are thus the "base case" in the regressions reported in Table 5.

<sup>14</sup> We use the mid 1980s as the date for characterizing state banking restrictions since this is about the time that our sample begins, and state banking structures are slow to change; e.g., despite subsequent relaxations, the unit banking restrictions in states such as Illinois and Texas have continued to influence strongly the structure of these banking markets.



#### IV. Regression Results

Table 5 presents the results of ordinary least squares regressions for the data and the model described in Section III. Column (1) represents the results for non-real-estate agricultural lending (*AGNRELN/A*); column (2) represents the results for agricultural real estate lending (*AGRELN/A*); and column (3) represents the results for total real estate lending (*AGTLN/A*).<sup>15</sup>

As can be seen, the results of all three regressions support our major hypotheses quite well. The influence of the average tenure of farm operators (*AVTEN*) in a bank's state is positive and significant in all three regressions. Longer tenure of farm operators encourages greater lending by banks to small farms -- arguably, because of the greater development of relationships. An extra year of tenure implies a higher ratio of total agricultural lending to bank assets of 2.66 percentage points, or an increase of 19.53% based on the mean agricultural ratio of the sample of small banks of 13.67%.

By itself, the dummy variable for a denovo bank (*DNV*) has coefficients that are positive, sizable, and significant in all three regressions. Denovo banks do tend to embrace loans to small farms as an important business strategy, as compared with otherwise similar incumbent banks. This is consistent with the findings of Goldberg and White (1998), DeYoung (1998), DeYoung et al. (1999), and Berger et al. (2001b) with respect to denovo banks and loans to small businesses generally.

There is a further effect, however. The interaction of a state's average tenure of farm operators and the denovo bank dummy variable (*AVTEN\*DNV*) yields coefficients that are

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<sup>15</sup> In addition to the pooled-years model presented in Table 4 and discussed in the text, we also ran separate regressions for the individual years. In the interests of space conservation we do not present them here. They are largely consistent with the results of the pooled regression.

consistently negative, sizable, and significant. Longer tenure appears to discourage denovo banks from making more loans to small farms -- arguably, because denovo banks find it harder to wrest loan customers from other banks when incumbents' relationships are longer and stronger. In addition, there are few start-up farms whose lending business is "up for grabs" and therefore more easily won by a denovo bank.

The net effect of *DNV* and *AVTEN\*DNV* can be calculated by adding the coefficient for *DNV* to the coefficient on *AVTEN\*DNV* multiplied by a specified value for *AVTEN*. For the state with the shortest tenure (Alaska, 12.9 years), a denovo bank would have a lower ratio of total agricultural loans to assets (as compared with an otherwise similar bank) of 1.3 percentage points ( $11.6 - 1.00 \times 12.9 = -1.3$ ); for the state with the longest tenure (North Dakota, 22.5 years), a denovo bank would have a lower ratio (as compared to an otherwise similar bank) of 10.9 percentage points; and for the average tenure across all states of 19.6 years, a denovo bank would have a lower ratio (as compared to an otherwise similar bank) of 8.0 percentage points.<sup>16</sup>

The effect of bank size (*ASSET94*) for this sample of small banks is clearly negative: an additional \$10 million in assets for a bank reduces its ratio of total agricultural loans to assets by 0.9 percentage points, or a reduction of 6.58% from the sample mean. Thus, even among small banks, the ratio of agricultural loans to total assets declines as the bank increases in size.

The effect of (the log of) gross farm income (per small bank) in a state (*LFARMINC*) is uniformly positive and significant, as is expected. A doubling of the sample mean value (\$31.85 million per small bank) would increase the average small bank's ratio of total agricultural lending to assets by 3.78 percentage points. The effect of the recent growth in farm income (*FINCGR5*) is

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<sup>16</sup> This surely is the explanation for the result, noted in Goldberg and White (1998), that denovo banks appeared to be less inclined to lend to small farms.

mixed: It has a significant positive effect on non-real-estate agricultural lending, but a negative and significant effect on agricultural real estate lending.<sup>17</sup> The two effects largely cancel, so that the effect on total agricultural lending is mildly negative but insignificant.

The coefficients on the unit banking indicator (*UNITB*) are uniformly positive and significant, and are sizable for non-real-estate agricultural lending and for total agricultural lending. Since unit banking states tended to be mid-western states with substantial numbers of farms, this variable may be (along with *LFARMINC*) another indicator of stronger farm demand for loans; or, since rural markets in these states are likely to be more concentrated than in those states where at least some branching was permitted, this result may be another instance of the Petersen-Rajan (1995) effect of greater concentration's encouraging more durable relationships and thus encouraging more lending.

The coefficients on the statewide branching indicator (*SWB*) are positive and significant for non-real-estate agricultural lending, negative and significant for agricultural real estate lending, and they cancel out to negative and insignificant for total agricultural lending. We have no ready explanation for this pattern of signs.<sup>18</sup>

The coefficients on the annual dummy variables (*DUM88...DUM94*) are uniformly negative and significant for non-real-estate agricultural lending. Holding other things constant, the *AGNRELN/A* ratios were lower in later years than in 1987, reaching a low point in 1992. By contrast, the coefficients on the annual dummy variables are uniformly positive and significant for

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<sup>17</sup> The reason for this latter negative effect is unclear.

<sup>18</sup> As a substitute for *UNITB* and *SWB* we also tried (as a robustness check) state dummy variables, thus creating more of a "fixed effects" framework (since the annual dummy variables were also included). The main results concerning the effects of farm tenure and denovo banking continued to hold.

agricultural real estate lending for all years. Holding other things constant, the *AGRELN/A* ratios were higher in later years than in 1987, and they rise steadily through 1994. The two effects cancel out for total agricultural lending, so that four of the seven coefficients are insignificant.

Overall, the regressions strongly support our major hypotheses concerning relationship lending and denovo banks' strategies and provide additional explanatory power for understanding banks' lending to small farms.

## V. Conclusion

Relationships are surely important for successful lending to otherwise opaque borrowers. In this paper we have focused on relationship lending for an under-researched group: small farm borrowers. Our regression results show the importance of relationships in two dimensions: First, longer tenure of farm operators, which we use to proxy the length and strength of lending relationships, encourage more bank lending. Second, the tendency of denovo banks to focus on lending to small farms is significantly reversed by their difficulties in wresting loan customers away from incumbent lenders when those existing relationships are longer and stronger: Lending by denovo banks to small farms decreases when farm operator tenure is greater.

We provide an additional finding that should be of interest to policy makers: The well-known pattern that larger banks tend to devote a smaller percentage of their assets to lending to small enterprises holds for small farm lending even within the size range of banks below \$100 million. Thus, the consolidation of even small banks is likely to have adverse consequences for lending to small farms.

The topics of lending relationships and lending to small enterprises are surely worthy of continued study. We believe that small farms are a category of small enterprises that have been under-researched in the lending literature and that further study of these relationships would yield new and interesting results.

## References

Bard, Sharon K., Peter J. Barry, and Paul N. Ellinger, 2000, Effects of commercial bank structure and other characteristics on agricultural lending, *Agricultural Finance Review* 60.

Barry, Peter J., Paul N. Ellinger, and LeeAnn McEdwards Moss, 1997, Lending relationships, customer loyalty, and competition in agricultural banking, *Agricultural Finance Review* 57.

Berger, Allen N., 1994, Issues in measuring the efficiencies of agricultural banks: Discussion, *American Journal of Agricultural Economics* 76, 672-674.

Berger, Allen N., Seth D. Bonime, Lawrence G. Goldberg, and Lawrence J. White, 2001(a), The dynamics of market entry: The effects of mergers and acquisitions on entry in the banking industry, working paper, Board of Governors of the Federal Reserve System.

Berger, Allen N., Lawrence G. Goldberg, and Lawrence J. White, 2001(b), The effects of dynamic changes in bank competition on the supply of small business credit, *European Finance Review*, 5, 115-139.

Berger, Allen N., Anil K. Kashyap, and Joseph M. Scalise, 1995, The transformation of the U.S. banking industry: What a long, strange trip it's been, *Brookings Papers on Economic Activity* 1995 (2), 155-218.

Berger, Allen N., Anthony Saunders, Joseph M. Scalise, and Gregory F. Udell, 1998, The effects of bank mergers and acquisitions on small business lending, *Journal of Financial Economics* 50, 187-229.

Berger, Allen N., and Gregory F. Udell, 1995, Relationship lending and lines of credit in small firm finance, *Journal of Business* 68, 351-381.

Berger, Allen N., and Gregory F. Udell, 1996, Universal banking and the future of small business lending, in A. Saunders and I. Walter, eds., *Universal Banking: Financial System Design Reconsidered* (Irwin, Chicago, IL), 558-627.

Billett, Matthew T., Mark J. Flannery, and Jon A. Garfinkel, 1995, The effect of lender identity on a borrowing firm's equity return, *Journal of Finance* 50, 699-718.

Boyd, John, and Edward C. Prescott, 1986, Financial intermediary coalitions, *Journal of Economic Theory* 38, 211-232.

Cole, Rebel A., 1998, The importance of relationships to the availability of credit, *Journal of Banking and Finance* 22, 959-977.

Cole, Rebel A., Lawrence G. Goldberg, and Lawrence J. White, 1999, Cookie-cutter versus character: The Microstructure of small business lending by large and small banks, in

*Business Access to Capital and Credit*, edited by Jackson L. Blanton, Alicia Williams, and Sherrie L.W. Rhine, A Federal Reserve System Research Conference, 362-389.

Collender, Robert N. and Sherrill L. Shaffer, 2001, Local bank office ownership, deposit control, market structure, and economic growth, *Economic Research Service*, U. S. Department of Agriculture.

DeYoung, Robert, 1998, Comment on Goldberg and White, *Journal of Banking and Finance* 22, 868-872.

DeYoung, Robert, Lawrence G. Goldberg, and Lawrence J. White, 1999, Youth, adolescence, and maturity of banks: credit availability to small business in an era of banking consolidation, *Journal of Banking and Finance*, 23, 463-492.

Diamond, Douglas W., Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393-414.

Diamond, Douglas W., Monitoring and reputation: the choice between bank loans and directly placed debt, *Journal of Political Economy* 99, 688-721.

Ellinger, Paul N., 1994, Potential gains from efficiency analysis of agricultural banks, *American Journal of Agricultural Economics* 76, 652-654.

Featherstone, Allen M., 1996, Post-acquisition performance of rural banks, *American Journal of Agricultural Economics* 78, 728-733.

Featherstone, Allen M. and Charles B. Moss, 1994, Measuring economies of scale and scope in agricultural banking, *American Journal of Agricultural Economics*, 76, 655-661.

Gilbert, R. Alton, 2000, "Nationwide Branch Banking and the presence of Large banks in Rural Areas," *Review* (Federal Reserve Bank of St. Louis), 82 (May/June), 13-28.

R. Alton Gilbert and Michael T. Belongia, 1988, The effects of affiliation with large bank holding companies on commercial bank lending to agriculture, *American Journal of Agricultural Economics* 70, 69-78.

R. Alton Gilbert and Kevin L. Kliesen, 1995, Deregulation or reregulation of agricultural banks, *American Journal Agricultural Economics*, 77, 757-761.

Goldberg, Lawrence G., and Lawrence J. White, 1998, De novo banks and lending to small business: An empirical analysis, *Journal of Banking and Finance* 22, 851-867.

James, Christopher, 1987, Some evidence on the uniqueness of bank loans, *Journal of Financial Economics* 19, 217-235.

Keeton, William R., 1996, Do bank mergers reduce lending to businesses and farmers? New

evidence from tenth district states, *Economic Review*, Federal Reserve Bank of Kansas City (Third Quarter), 63-75.

Levonian, Mark E., 1996, Explaining differences in farm lending among banks, *Economic Review*, Federal Reserve Bank of San Francisco, (Number 3), 12-22.

Nakamura, Leonard I., 1993, Commercial bank information: Implications for the structure of banking, in M. Klausner and L. J. White, eds., *Structural Change in Banking* (Business One Irwin, Homewood IL), 131-160.

Neff, David L., Bruce L. Dixon, and Suzhen Zhu, 1994, Measuring the efficiency of agricultural banks, *American Journal of Agricultural Economics* 76, 662-668.

Peek, Joseph, and Eric S. Rosengren, 1996, Small business credit availability: How important is size of lender? in A. Saunders and I. Walter, eds., *Universal Banking: Financial System Design Reconsidered* (Irwin, Chicago, IL), 628-655.

Petersen, Mitchell A., and Raghuram G. Rajan, 1994, The benefits of lending relationships: Evidence from small business data, *Journal of Finance* 49, 3-37.

Peterson, Mitchell A. and Raghuram G. Rajan, 1995, The effect of credit market competition on lending relationships, *Quarterly Review of Economics* 110, 407-443.

Ramakrishnan, Ram T. S. and Anjan V. Thakor, 1984, Information reliability and a theory of financial intermediation, *Review of Economic Studies* 51, 415-432.

Strahan, Phillip E., and James P. Weston, 1996, Small business lending and bank consolidation: Is there cause for concern? Federal Reserve Bank of New York Working Paper (March).

Strahan, Phillip E., and James P. Weston, 1998, Small business lending and the changing structure of the banking industry, *Journal of Banking and Finance* 22, 821-845.

U. S. Department of Agriculture (USDA), Economic Research Service, 1997, Credit in rural America, Agricultural Economic Report No. 749.

U.S. Department of Agriculture (USDA), Economic Research Service, 2001, Agricultural income and finance; situation and outlook report, February.

U. S. Small Business Administration (USSBA), 2000, *Small farm lending in the United States*, Third Edition, June.



Table 1: Sources of Farm Credit, 1995 and 2000

	<u>All farms</u>	<u>1995</u>	<u>Small farms<sup>a</sup></u>	<u>2000</u>	<u>All farms<sup>b</sup></u>
Commercial banks	40%		43%		41%
Farm Credit System	25		15		26
Farm Service Agency	7		18		4
Life Insurance Cos.	6	}			6
Others	23		24		22
Total:	100%		100%		100%

<sup>a</sup> Farms with a net worth of less than \$250,000.

<sup>b</sup> Small farm data are not available.

Sources: USDA (1997, 2001)

Table 2: Distribution of Farm Loans by Bank Size, 1999

<u>Asset size of bank</u>	<u>Total assets</u>	<u>Total farm loans</u>	<u>Farm loans &lt;\$100K (\$amount)</u>	<u>Farm loans &lt;\$100K (numbers)</u>	<u>Farm loans &lt;\$250K (\$amount)</u>	<u>Farm loans &lt;\$250K (numbers)</u>	<u>Farm loans &lt;\$1M (\$amount)</u>	<u>Farm loans &lt;\$1M (numbers)</u>
<\$100M	5.2%	36.5%	53.6%	53.5%	48.1%	52.0%	44.6%	51.4%
\$100M-\$500M	11.3	29.3	31.1	29.9	32.2	30.3	32.6	30.4
\$500M-\$1B	4.2	5.5	3.9	4.3	4.8	4.5	5.2	4.6
\$1B-\$10B	18.0	10.6	5.1	5.9	6.9	6.3	7.9	6.5
>\$10B	61.3	18.1	6.3	6.4	7.9	6.8	9.7	7.1
All Banks	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: USSBA (2000)

Table 3: Small Farm Loans (under \$250,000) as a Percentage  
of a Bank's Assets, Averages for June 1999

<u>Bank asset size</u>	<u>Small farm loans as a % of a bank's assets</u>
<\$100M	9.5%
\$100M-\$500M	2.9
\$500M-\$1B	1.2
\$1B-\$10B	0.4
>\$10B	0.1

Source: USSBA (2000)

Table 4: Variables Used: Acronyms, Definitions, and Mean Values (1987-1994)

<u>Acronym</u>	<u>Definition</u>	<u>Mean</u>
AGNRELN/A	A bank's non-real-estate agricultural loans expressed as a percentage of the bank's assets at year end	9.04%
AGRELN/A	A bank's agricultural real estate loans expressed as a percentage of the bank's assets at year end	4.24%
AGTLN/A	A bank's total agricultural loans expressed as a percentage of the bank's assets (i.e., AGNRELN/A + AGRELN/A)	13.67%
AVTEN	Average length of farm operator tenure (in years) in the state in which the bank is headquartered	19.63
DNV	A 1,0 dummy variable that takes the value 1 if the bank began operations in the year of observation or in the previous three years	0.0157
AVTEN*DNV	Interaction term: the multiplication of AVTEN and DNV	0.2936
ASSET94	A bank's total assets at year end (in millions of 1994 dollars)	\$39.79
FARMINC	Gross farm income per bank (in millions of 1994 dollars) for the state in which a bank is headquartered (LFARMINC = ln(FARMINC))	\$31.85
FINCGR5	The five-year growth rate of constant-dollar gross farm income (from five years earlier to the current year) for the state in which a bank is headquartered	0.1174
UNITB	A 1,0 dummy variable that takes the value 1 if the state in which the bank is headquartered is a unit-banking state, as of the mid 1980s	0.7097
SWB	A 1,0 dummy variable that takes the value 1 if the state in which the bank is headquartered is a statewide branching state, as of the mid 1980s	0.0443
DUM88...DUM94	1,0 dummy variables that take the value 1 for the year of observation	0.1386-0.1097

Table 5: Regression Results, 1987-1994  
(t-statistics in parentheses)

Dep. Var.:	(1) <u>AGNRELN/A</u>	(2) <u>AGRELN/A</u>	(3) <u>AGTLN/A</u>
Constant	-41.67 (54.36)	-9.47 (26.44)	-51.14 (54.31)
AVTEN	2.06 (62.23)	0.60 (38.57)	2.66 (65.33)
DNV	7.68 (2.02)	3.95 (2.23)	11.63 (2.50)
AVTEN*DNV	-0.69 (3.42)	-0.31 (3.25)	-1.00 (4.02)
ASSET94	-0.08 (43.07)	-0.01 (15.06)	-0.09 (40.79)
LFARMINC	3.18 (33.27)	0.60 (13.40)	3.78 (32.19)
FINCGR5	3.86 (9.65)	-3.92 (13.40)	0.05 (0.11)
UNITB	5.58 (52.78)	0.69 (13.98)	6.27 (48.29)
SWB	2.13 (8.73)	-2.19 (19.22)	-0.06 (0.21)
DUM88	-0.37 (2.37)	0.24 (3.21)	-0.14 (0.71)
DUM89	-0.71 (4.41)	0.38 (5.06)	-0.33 (1.67)
DUM90	-1.22 (7.11)	0.71 (8.89)	-0.51 (2.40)
DUM91	-1.10 (6.20)	0.89 (10.81)	-0.20 (0.93)
DUM92	-1.64 (9.24)	0.97 (11.66)	-0.67 (3.08)
DUM93	-1.10 (6.25)	1.17 (14.15)	0.06 (0.29)
DUM94	-0.88 (4.96)	1.38 (16.70)	0.50 (2.31)
R-sq.	0.25	0.11	0.25
n	42,281	42,281	42,281