

Agricultural bank acquisitions and post-acquisition performance:
examination on the role of shared knowledge

Abstract

The U.S. banking sector has experienced intensive acquisitions in recent few decades, resulting in significant decrease in the number of lending institutions. Agricultural banks have been the preferred target of such acquisition, representing 15% to 40% of the acquisitions between 1994 and 2018. Theoretically, acquisitions of businesses through acquisitions are expected to create synergies but a large body of literature has documented a negative impact of acquisitions historically. Despite the significant decrease in the number of agricultural banks due to acquisition, studies on the implications of agricultural bank acquisitions have been limited in the agricultural economics literature. In this paper, we examine the post-acquisition performance of banks that acquire agricultural banks in terms of profitability, bankruptcy risk, and loan monitoring process between 1994 and 2018. We also test whether the shared knowledge between the acquiring bank and the target bank in terms of geography, product, and culture affect the post-acquisition outcomes. Our paper finds mixed results for agricultural bank acquisitions for different types of acquisitions and time horizons, highlighting the complex implications of acquisitions . Overall, we do not find consistent improvements from agricultural bank acquisitions, but document that shared knowledge in culture and geography improves certain performance measures.

Keywords: agricultural bank, farm credit, mergers and acquisitions

JEL code: G21, G34 , Q14

Introduction

Intensive mergers and acquisition activities (M&As or consolidations) in the US banking sector has created concerns for both policymakers and consumers as bank consolidations result in abrupt changes in the risk profile, the performance, and the competition in the local lending market. According to the Federal Deposit Insurance Corporation (FDIC) which provides quarterly reports of every FDIC-insured banking institution in the United States, the number of banks has declined to less than half of their previous number over the last three decades, from 12,992 in 1994 to 5,551 in 2018. This rapid decrease is attributed to different reasons including general bank failures, but the most prominent reason behind the decrease is the intensive bank acquisitions. For instance, even after excluding acquisition activities in which a single acquirer engages in multiple acquisitions in a given year, the number of acquisition events represents between 1% and 3% of number of banks in each year. In 2018 alone, there were 168 single acquirer and single target bank acquisitions, representing 3.02 percent of the number of banks as shown in Figure 1. A significant portion of those bank acquisitions targets agricultural banks, ranging between 15% to 40% of total bank acquisitions over time.

For the agricultural sector, commercial banks are the major sources of liquidity for farmers as loan volume issued from commercial banks represents roughly 20 to 40 percent of agricultural production loans and farmland real-estate loans (Kim and Katchova, 2020). Intensive acquisition in the commercial banking sector is expected to change the local competitive lending market as well as bank characteristics, ultimately affecting borrowers and consumers in the local economy. With local agricultural banks representing a significant portion of acquisition targets, farmers also become more susceptible to the changes in their local liquidity providers. Despite these changes and concerns, the agricultural economics literature has not provided a clear understanding of

different characteristics of acquiring institutions, and whether these acquisition activities are beneficial in the post-transformation periods.

[Figure 1]

Whether the acquisition of banking institutions is beneficial for the merging institutions and for the ultimate consumers is a debated topic in the business literature, calling for a detailed research on the evaluation of the agricultural bank acquisitions. While conflicting theories and empirical studies regarding business acquisitions have failed to reach a consensus in the literature, a significant number of studies from the finance literature has documented negative outcomes of acquisitions, or diseconomies, which are supported by both theories and empirical findings especially in the 1980s and 1990s. On the other hand, the strategic management literature has developed a unique idea of examining the corporate fit and shared knowledge in evaluating the ramifications of acquisitions and how shared knowledge between merging businesses can result in significant effects on improving the post-acquisition performance.

Then, what are the ramifications of agricultural bank acquisitions from the acquiring bank's perspectives in terms of profitability, bankruptcy risk, and loan monitoring process? Also, do we observe differences in acquisition outcomes depending on the level of shared knowledge between the acquiring bank and the targeted agricultural bank? In this paper, we examine acquisitions targeting highly specialized agricultural banks and post-acquisition outcomes of those activities after considering shared geographic, loan product, and urban-rural cultural knowledge between the acquirer and the target. In strategic management literature, it has been suggested that the presence of shared knowledge may improve the post-acquisition integration process and facilitate the synergies created from acquisitions. We consider there is a shared geographic knowledge if the two players of the agricultural bank acquisition, the acquirer and the target, are physically located

in the state. With respect to the urban-rural cultural knowledge, we focus on urban versus rural combinations due to the documented cultural difference from the urban and rural businesses, and consider there is a shared cultural knowledge only if both the target bank and the acquiring bank are both located in either rural area or urban area. Lastly, we assume the presence of agricultural loan product knowledge if the acquiring bank is also an agricultural bank and thus has previous knowledge on the issuance and the monitoring of agricultural loan product. Examining agricultural bank acquisitions provides a unique setting stemming from significant differences between non-agricultural banks and agricultural banks that are characterized by some unique features. First, agricultural loans issued by agricultural banks to farmers can be viewed as highly specialized products as agricultural loan issuance should require knowledge in agricultural markets and related farm-sector forecasts, knowledge that non-agricultural banks may lack. Thus, these agricultural loans may require sufficient product knowledge to monitor and manage. Yet, it is possible that the acquisitions occurring between two banks with heavy reliance on the same product may result in the concentration of their loan product, offsetting possible benefits from the reduction in volatility coming from portfolio diversification. Second, loan issuance practices of small local community banks including agricultural banks are considered to be unique due to the reliance on soft information which is qualitative and not easily quantifiable. Therefore, the reliance on soft information by small banks creates significant cultural differences between those banks that tend to locate in rural areas and large national banks that are located in urban areas (Nakamura, 1991; DeYoung, Hunter, and Udell 2004). The literature suggests that a lack of cultural similarity or product knowledge would result in greater post-integration costs, contributing to the underperformance of merged businesses. Yet, it can be argued that small bank's reliance on soft information could be replaced by the practices of urban and large bank's reliance on hard

information which can be more efficient, complicating the influence of cultural difference as the acquisition performed by urban banks may enforce practices based on hard information and thus improving the loan issuance and monitoring process. We further focus on the geographic distance between the target and the acquirer, as geographic diversification may result in the smoothing of earnings but a large body of literature hints that geographic diversification of corporations tends to result in a reduction in the value of a firm due to the lack of knowledge regarding the local regions.

Our results suggest that there are no considerable gains in agricultural bank acquisitions in general. We do not observe significant improvements in profitability or bankruptcy risk, but rather a deterioration in agricultural loan delinquency rate which could be reflective of inefficient loan monitoring in the post-acquisition period. The presence of the negative outcomes created from agricultural bank acquisitions and the continuation of acquisition activities raises a question regarding the acquiring banks' motives behind those consolidation activities, as the deterioration in performance that stems from agricultural bank acquisitions may harm the stakeholder's value while benefiting managerial personal incentives, thus calling for more careful business practices in the acquisition market.

We contribute to the literature in multiple ways. First, to our knowledge, there has been no study examining the specific characteristics of acquiring banks in agricultural bank acquisitions beyond asset size and how different characteristics affect the performance. Our research contributes to the understanding of different types of players in the acquisition market of agricultural banks and how the acquisition affects the consolidated banking institutions with multiple performance measures. Second, our study is the first study in the literature to separate agricultural bank acquisitions based on the similarity of knowledge with three different aspects of

knowledge in terms of geography, loan product, and urban-rural culture, thus enhancing the understanding of how knowledge affects acquisition. Third, we contribute to the literature as we examine agricultural bank acquisitions that cover the years from 1994 to 2018, providing updated insights regarding agricultural bank acquisitions earlier studies.

The rest of the paper is organized as follows. First, we provide a literature review on mergers and acquisitions from finance, strategic management, and agricultural economics. We then discuss the structure of our data and the empirical framework. Simple comparison results of bank performance measures before and after the acquisitions are provided next, followed by panel regression framework results which show that agricultural bank acquisitions do not create positive outcomes in general. In the subsequent section, we provide additional tests in order to address the issue of the influence of the target bank balance sheet on the merged bank's post-acquisition outcome, followed by discussion and conclusion.

Definitions and literature review

Acquisitions are transactions in which two or more businesses are consolidated and the ownership of businesses are transferred. Acquisitions are strategic choices that companies make in order to grow and capture positive synergies coming from the acquisition of businesses, and thus are called the inorganic growth model in the literature. Theoretically, two major sources of gains created from acquisitions are improvements in operational efficiency and increases in market power. Regardless of different sources of gains and synergies, acquisition activities are material and significant activities that companies should take for the purpose of maximizing stakeholder values. However, findings from the 1980s and 1990s suggest that efficiency gains or improvements in performance were not consistently observed (DeYoung et al., 2009). Finance literature has documented significant underperformance of businesses that engaged in acquisition activities in

the post-acquisition period. Product diversification or geographic diversification achieved through acquisitions, in many cases, result in the reduced firm value and the acquirer's performance deteriorates in both the short term and long term. The underperformance of merging businesses has been also documented in studies that examine lending institutions in general, yet the focus has been mostly on public institutions due to data availability (Bliss and Rosen 2001; Dos Santos, Errunz and Miller, 2008; DeYoung et al., 2009; Goetz, Laeven, and Levine 2013). There are multiple reasons that explain why mergers do not lead to performance improvements, and the most notable arguments include managerial hubris and agency problems. Under the managerial hubris argument, the unrealistically positive belief held by business managers that they can manage the consolidated firm more efficiently result in reckless business acquisition behaviors. Another prominent theory of agency problems also support the idea that the managers of a business may seek to gain personal benefits at the expense of shareholders of a firm, and the presence of agency problem could encourage acquisitions as managers whose incentives are tied to the size of the firm will also hastily engage in acquisitions (Roll, 1986; Piloff and Santomero, 1998). These theories together suggests that managers may seek to acquire other business even if such strategic choice might not be optimal for the firm.

In contrast, strategic management literature has developed a unique notion of the knowledge-based view on corporate acquisitions and highlights certain aspects of acquisitions that have not been addressed in the finance literature. These studies support the idea that differences in performance after acquisitions are results of differences in knowledge sources and knowledge exchanges which are facilitated by culture, product, and geographic proximity of business. In acquisition activities, competitive advantage or synergies are created more effectively when the acquirer has the capability of transferring and integrating the knowledge base of the target into the

acquirer's knowledge base (Barney, 1986; Bierly and Chakrabarti, 1996). Among various factors that affect such capability, corporate cultural similarity or cultural distance have been found to be significant, with empirical findings that support the positive influence of shared knowledge and cultural similarity, including urban-rural cultural similarity. The empirical findings suggest that negative effects tend to be larger if the acquirer and the target are dissimilar, as cultural integration costs are heavier in the post-acquisition period (Datta, 1991; Weber, 1996; Cloudt et al., 2006). Geographic proximity and product complementarity are also found to be significant factors that affect the post-acquisition integration process. Similar to finance literature, these studies show that geographic diversification or acquisition activities that lack geographic knowledge due to large geographic distances, such as cross-border acquisitions, erode the post-integration process, and lack of product complementarity or similarity may also impair the integration process (Bauer and Matzler 2014; Ensign, Lin, and Chreim 2014; Wang et al., 2017).

In agricultural economics, there have been limited studies on the implication of rural bank or agricultural bank acquisitions. Featherstone (1996) provides profitability differences between target banks and acquiring banks in the pre-acquisition period but does not necessarily examine the changes within acquiring banks nor divide acquisitions into different categories. Ahrendsen et al. (1999) examine the effects of acquisitions in the post-acquisition period with a focus on the volume of agricultural loans, but not necessarily on the bank financial characteristics or performance. One of very few papers that explicitly examine the different characteristics other than bank size is Neff and Ellinger (1996) as their studies explicitly focus on the rural and urban acquisition combinations and the probability of acquisitions. To our knowledge, there has been no careful empirical analysis on the ramifications of agricultural bank acquisitions on the performances of merging entities or research on the implication of varying degrees of shared

characteristics between the acquirer and the target. With this study, we fill the gap in the literature by carefully examining the outcomes of agricultural bank acquisitions and the implications of knowledge, thus providing an enhanced understanding of such activities for practitioners and bank regulators on the rapidly changing lending market.

Data

To examine agricultural bank acquisitions and bank performance over time, we utilize the Federal Financial Institutions Examination Council (FFIEC) bank transformation data between 1994 and 2018 and the Federal Deposit Insurance Company (FDIC) call reports which provide detailed characteristics of all FDIC-insured lending institutions. We only focus on bank mergers in which an agricultural bank transfers its assets to an acquirer and ceases to exist following the general definition of acquisition, thus excluding all other bank transformation activities such as a partial transfer of assets or government subsidy-based acquisitions. Our study deviates from most other studies that focus on changes in stock performance for publicly-held banking institutions (DeYoung et al., 2009), as we instead focus on the changes in performance measures based on accounting variables as obtained from the FDIC, thus examining for non-public banks that are not listed in the stock market. This allows us to examine more samples that are overlooked in the literature. All accounting variables are converted to 2020 real dollar values.

Following the FDIC definition, a bank is categorized as an agricultural bank if the amount of agricultural loans in the balance sheet represents 25% or more of the total loans outstanding. Yet, the FDIC definition may pose a problem since the proportion of agricultural loans may fluctuate over time and the agricultural loan amount might be slightly below the 25% threshold at the time of acquisition even if the bank had agricultural loans representing more than 25% of the total loans in the preceding quarters. Thus, we categorize a bank acquisition as an agricultural bank

acquisition if the target bank meets at least one of the following criteria: (1) a bank's agricultural loans represent more than 25% of total loans at the time of acquisition or (2) a bank's agricultural loans represent more than 15% of total loans at the time of acquisition and agricultural loans represented more than 25% of total loans in the preceding years. Through these categorizations, we do not miss banks that have significant exposure to agricultural loans but does not meet the 25% threshold temporarily at the time of acquisition.

The FFIEC data includes agricultural bank acquisition activities that are triggered by the same acquiring bank but target multiple banks in the same year. We focus on bank acquisition activities in which an acquiring bank acquires one target in a given year, because the implication of multiple acquisitions by a single acquirer in one year complicates the post-acquisition performance and the direct effect of acquisition may not be clear. Yet, these multiple acquisitions triggered by a single acquirer call for additional research in the future. Instead of tracking changes for all FDIC-insured banks, we focus only on the panel sample of banks that go through acquisition at some point in time between 1994 and 2018.

[Table 1]

Table 1 presents the number of acquisitions that are further divided into subcategories of interest. Our final sample comprises of 1,051 agricultural bank acquisitions between 1994 and 2018. The first set of categories is based on geographic location based on states in which the headquarters are located. In-state acquisitions, in which the acquirer and the target are headquartered in the same state, account for 947 cases and we consider these acquisitions to have geographic knowledge in acquisition activities. These observations indicate that geographic proximity may be an important driver of acquisitions but the benefit of geographic diversification

in terms of reduction in volatility might not be significant. The second set of categories is based on loan product knowledge, which is based on the agricultural exposure in terms of the proportion of agricultural loans to total loans of the acquirer. Most agricultural bank acquisitions are triggered by banks that already had significant exposure to agricultural loans, implying that acquiring banks may have sufficient loan product knowledge of the agricultural industry. Under this category, 760 acquirers are found to be agricultural banks with at least 25% of their loans in agricultural loans. The next set of categories is based on urban-rural cultural knowledge. In this paper, we categorize bank acquisitions as culturally similar acquisitions if the acquirer and the target are both headquartered in either metropolitan or rural area. In 773 cases, the acquirer and the target are both headquartered in rural or urban areas and thus culturally similar. Overall, the data suggest that agricultural bank acquisition tends to occur when the acquirer and the target have shared characteristics or when the acquirer is expected to have better knowledge in terms of geographic region, loan product, and culture. In order to test whether different types of acquisitions result in heterogeneous outcomes, we employ various tests as discussed in the next few sections.

Methodology

We use several models to measure the changes in performance of banks that engage in agricultural bank acquisitions and the influences of geographic, loan product, and urban-rural cultural similarities on the post-acquisition outcomes. With the panel data of banks obtained from the FDIC database, we measure changes first through comparisons between pre-acquisition period performance and post-acquisition period performance, and then through OLS panel regression models. While we present the comparison between the pre-acquisition performance and the post-acquisition performance of the acquiring bank, as the simple comparisons do not necessarily account for different individual bank characteristics that may influence those performance

measures, we then employ a fixed-effect regression model to examine the effect of the agricultural bank acquisition on acquiring bank's performance with the following equation:

$$\begin{aligned}
 Y_{i,t} = & a + Acquisition_{i,t-1} + Geographic\ Knowledge_{i,t-1} + Loan\ Product\ Knowledge_{i,t-1} \\
 & + Cultural\ Knowledge_{i,t-1} + Size_{i,t-1} + Equity_{i,t-1} + Deposits_{i,t-1} \\
 & + Cost\ Efficiency_{i,t-1} + Year_t + \varepsilon_{i,t} \quad (1)
 \end{aligned}$$

In Equation (1), $Y_{i,t}$ represents three different measures of bank performance: ROA, Z-score, and agricultural delinquency rate. On the right-hand side of the equation, we control for bank characteristics that may influence the performance measures based on the existing literature. As bank performance is closely tied to the size of the firm, we first control for bank size which is measured as a natural logarithm of total assets, denoted as $Size_{i,t-1}$ in the equation. $Equity_{i,t-1}$ is defined as the percentage of equity relative to total asset, reflecting the capital structure of the banking institution. $Deposits_{i,t-1}$ is the percentage of total deposits to total assets. $Tier1_{i,t-1}$ capital ratio is defined as the ratio of tier 1 ratio to the total assets. $Cost\ Efficiency_{i,t-1}$ is measured as bank expenses, including interest expense and non-interest expenses, divided by total assets, multiplied by 100 for consistency. These control variables are lagged for one period (t-1) in order to address the issue of reverse causality, as commonly done in the literature that examines the effect of firm characteristics on performances.

Our main variables of interest are indicator variables for different types of acquisitions. $Acquisition_{i,t-1}$ takes a value of one if a bank has acquired an agricultural bank in the previous year. To measure the effect of geographic overlap and knowledge, we include $Geographic\ Knowledge_{i,t-1}$ indicator variable that takes a value of one if an acquisition was made in the previous period and the acquisition was made within the state, zero otherwise. To measure the influence of agricultural loan product knowledge, $Loan\ Product\ Knowledge_{i,t-1}$ indicator

variable is used, which takes a value of one if an acquisition was made in the previous period and the acquiring bank was also an agricultural bank. Lastly, to measure the effect of urban-rural cultural knowledge on acquisition performance, $Cultural\ Knowledge_{i,t-1}$ indicator takes a value of one if an acquisition was made in the previous period and the acquisition was made between culturally similar banks in terms of headquarters being located in urban versus rural areas. These indicator variables capture the influence of similarity and knowledge with respect to geography, loan product, and urban-rural culture. In order to address the issue of heteroskedasticity and autocorrelation, all regressions are clustered at a bank level. We exclude bank-fixed effect following the general acquisition literature; theoretically, bank fixed effects control for time-invariant unobserved bank characteristics, but changes in corporate management and culture caused by acquisition activities imply that these unobserved characteristics change over time. Thus, while we have the year fixed effect in the equation, we do not include bank-fixed effect.

The first performance measure is profitability measured as the return on assets (ROA), a widely used measure of performance of any type of business. If acquisition activities result in efficiency gains and improvement in performance, we would expect that such improvement should be observed through improvements in ROA. All the ROA values described in this paper are in percentage. Our second performance measure is the bankruptcy risk, which is measured through Z-score. Z-score is an inverse measure of overall bank risk and proxy for the firm's probability of failure. This particular measure can be interpreted as the distance to bankruptcy (Berger et al., 2017; Zamore, Beisland, and Mersland 2019). Z-score is calculated as the following:

$$Z\ score_t = \frac{ROA_t + E/A_t}{SD_{ROA}} \quad (2)$$

In the numerator, bank profitability (ROA) is added to the equity-to-asset ratio (E/A), which is then divided by the standard deviation of ROA. Z-score examines whether the current level of

profitability and capital structure is enough to cover the volatility of bank profit. For ROA and E/A, accounting values at year t are used, while the standard deviation of ROA is calculated based on the four quarters preceding year t , similar to Berger et al. (2017) in which average values of standard deviations of ROA around the time of acquisition are used. If acquisition activities result in improved performance of the merged financial entity, one would expect that the Z-score will also increase, thus bankruptcy risk would be lower.

Our third performance measure is the agricultural delinquency rate, which is calculated by dividing the total nonperforming agricultural loans by the total agricultural loans:.

$$\text{Agricultural Delinquency Rate}_{it} = 100 * \frac{\text{Nonperforming Ag Loans}_{it}}{\text{Total Ag Loans}_{it}} \quad (3)$$

All the agricultural delinquency rate described in this paper are expressed in percentage. We consider this particular variable as a performance measure as it signals the bank's ability to screen out borrowers with ill-prospectus with higher probability of default in the future. In other words, well-managed and better performing banks should be able to distinguish possible borrowers with different probability of default in the future based on the information given, and such screening process should enable banks to issue loans to borrowers who are more likely to repay the loans. Such ability should be more visible through the accept/reject decisions of loan evaluations in the pre-issuance stage, but such data are not publicly available. If a bank acquisition results in an improvement in the loan evaluation process and creates efficiency, it is expected that the portion of default status agricultural loans to decrease as an improved monitoring process should be able to filter risky loans that are likely to default during the loan evaluation process.

As discussed in the previous section, our main categorizations of acquisitions are based on geographic similarity, loan product similarity, and urban-rural cultural similarity. If geographic

overlap enables the acquiring bank to have a better understanding of the geographic regions and if geographic familiarity and knowledge affect the smoother transfer of knowledge of business, it is expected that the geographic familiarity would enhance the post-acquisition performance. Regarding the loan product knowledge, if the acquiring bank has previous knowledge of agricultural loan issuance and if such knowledge facilitates the post-acquisition process, it is expected that the presence of loan product knowledge will improve the performance. Lastly, if the cultural gap created by rural vs. urban practices hampers the post-acquisition integration process, then it is expected that the lack of urban-rural cultural difference associated with urban and rural business acquisition would improve the post-acquisition performance.

[Table 2]

We first report the comparison results for ROA, Z-score, and agricultural loan delinquency for banks that acquire agricultural banks between $t-1$ and $t+1$. Table 2 reports the ROA of the acquiring bank in the pre-acquisition period and in the post-acquisition period. The results show that agricultural bank acquisitions result in a significant decrease in profitability. The mean ROA of acquiring banks in the pre-merger period is 0.604% which decreases to 0.564% in the post-merger period, and the difference is statistically significant. In contrast to findings suggested from the strategic management literature which suggest that acquisitions with higher level of shared knowledge would increase the post-acquisition performance, the early test results indicate that geographic knowledge, loan product knowledge, or urban-rural cultural knowledge result in a decrease of performance of ROA in the post-acquisition period, as we do not observe any improvement in ROA across different types of acquisitions. Overall, and for banks acquisitions with shared knowledge in terms of geography, loan product, and urban-rural culture, acquisitions result in reduced profitability in the post-acquisition period.

[Table 3]

Table 3 reports Z-scores values of the acquiring bank in the pre-acquisition period and in the post-acquisition period, and overall results are similar to findings from Table 2. A decrease in Z-score implies that the bankruptcy risk for the acquiring bank has increased, as Z-score is an inverse measure of bankruptcy risk. Z-score for agricultural bank acquisitions significantly decreases from 38.612 in the pre-acquisition period to 35.509 in the post-acquisition period. We observe that decreases are consistent regardless of different types of agricultural bank acquisitions, but out-of-state acquisitions and different-culture acquisitions result in statistically insignificant changes. Table 4 reports agricultural delinquency rate changes in a similar manner. We observe that acquiring bank's agricultural loan delinquency rate goes up in general, from 0.357% to 0.402% in two periods, but none of the differences are statistically significant. Acquisitions with cultural knowledge is the only exception as the agricultural delinquency rate decreases in the post-acquisition period, but the difference is statistically insignificant as well.

[Table 4]

These results indicate that the acquirer's performance does not improve in the post-acquisition period and with two measures, ROA and Z-score, the performance of the acquiring bank significantly decreases. A serious concern arises as the observed underperformance might have been driven by pre-merger characteristics of the target agricultural bank. Since the acquisition of an agricultural bank means that the balance sheet of the target bank is transferred to the acquiring bank, post-acquisition performance could simply reflect the influence of the combined target bank's balance sheet and the acquirer's balance sheet. If an acquisition activity itself creates synergy or diseconomy, then changes in performance should be significant even after considering the influence of the target bank characteristics. To address the issue, we substitute the pre-

acquisition characteristics of the acquiring bank with the weighted average of pre-acquisition characteristics of the acquiring bank and the targeted bank based on their asset sizes. In the pre-acquisition period, then, instead of relying on the bank A characteristic Y_A only, we calculate $Y_{Weighted,t}$ based on the weights of A and B, where the weights are based on bank asset sizes.

$$Y_{Weighted,t} = \frac{Size_A}{Size_A + Size_B} * Y_{A,t} + \frac{Size_B}{Size_A + Size_B} * Y_{B,t} \quad (4)$$

Assuming that the merger between the two banks does not result in either positive synergy or diseconomy, then the expected bank characteristics of the merged bank in the post-acquisition period is expected to be similar to the weighted average of the bank characteristics of A and B in the pre-acquisition period. Since we are interested in the effect of the acquisition, this particular method may provide more valid results as the influence of the target banks in the pre-acquisition period is addressed.

[Table 5]

[Table 6]

[Table 7]

Table 5 presents results when pre-merger ROA is calculated based on the weighted average ROA of an acquiring bank and a target bank with weights. Certain results are strikingly different from the results shown in Table 2; it is shown that post-acquisition ROA of the consolidated bank improves relative to the weighted average ROA of the acquiring and acquired bank in the pre-acquisition period. The difference signals that targeted agricultural banks have lower profitability and the observed decrease in ROA in the post-acquisition period needs more scrutiny, as suggested by Featherstone 1996 which shows that target agricultural banks tend to have a lower level of profitability. We consider this result as an improvement in performance, but with a caveat; for all agricultural bank acquisitions, Table 6 results show that the pre-acquisition period weighted average value of Z-score is 52.771, which is higher than the pre-acquisition Z-score of the

acquiring bank shown in Table 3, which was 38.612. This first indicates that target bank Z-scores, on average, are relatively higher. The observed difference in Z-score value of 17.26 between two periods in Table 6, is greater than the difference in Table 3 of 3.10, implying that the deterioration is greater for acquiring bank especially when considering the acquisition of target agricultural banks with higher Z-score. Even after acquiring agricultural banks that previously had high Z-score, the Z-score of the acquiring bank does not improve in the post-acquisition period. A similar idea applies to the loan risk of Table 7; even after acquiring agricultural banks that have lower delinquency rates, the acquiring bank's loan risk increases after the acquisition. Combined with findings from ROA, it seems that agricultural bank acquisitions result in increased risk for the combined entity which is compensated by an increase in profitability. The observed difference between simply tracking the performance measures of acquiring bank only and tracking the weighted average values of the target bank and the acquiring bank highlights the effects of the target bank characteristics on the acquiring bank characteristics, and we incorporate this aspect in the later section as well.

[Table 8]

As the simple comparison of performance measures between two periods do not necessarily account for various bank characteristics that influence performance measures, we then provide results for the regression framework as introduced in Equation (1). First, we provide regression results for ROA in Table 8. Effects of agricultural bank acquisitions on bank profitability disappear after controlling for various bank characteristics. While the coefficients on $Acquisition_{i,t-1}$ are positive, these improvements are statistically insignificant. Additionally, different types of acquisitions such as in-state acquisitions, agricultural acquirer, and acquisitions made between culturally similar banks do not result in significant improvements in bank performance. These

findings are consistent with findings in the finance literature which show that acquisition of businesses might not result in improved performance in terms of profitability.

[Table 9]

Table 9 shows that agricultural bank acquisition results in a decrease of Z-score regardless of different specifications but the coefficients are insignificant in all cases other than in Column (5), as indicated by the coefficients on the acquisition dummy variable. A notable finding here is that only the same culture acquisition, as indicated by the coefficient on *Cultural Knowledge*_{*i,t-1*}, results in significant improvements in the acquiring bank performance reflected in higher z-score. The coefficient on same urban-rural culture indicator stays significant in Column (1) and Column (5). The significant increase in z-score means that bankruptcy risk decreases with this particular type of bank acquisitions, which is consistent with findings from the strategic management literature which argues that the integration on two businesses is more efficient if there is a shared urban-rural culture in terms of the same urban or rural location of their headquarters for the consolidated banks. The finding that same-state acquisitions, as indicated by the coefficients on *Geographic Knowledge*_{*i,t-1*}, do not result in improved performance suggests that benefits of geographic focus or knowledge on the local geography could be minimal in domestic settings, and thus it is possible that geographic diversification that occurs out-of-state might result in bigger influence in the smoothing of earnings and profitability (DeLong, 2001).

[Table 10]

Table 10 reports the results for the agricultural delinquency rate. Negative coefficients indicate decreases in the agricultural delinquency rates, an indication of positive improvements for loan performance. Similar to the findings from Table 9, we observe that acquisitions with urban-rural cultural knowledge, as shown in Column (5), has a negative and significant coefficient of -0.134,

a decrease of agricultural loan default rate by 0.134%. This again supports the idea that culturally similar bank acquisition in terms of urban-rural settings results in superior performance. While the shared geographic knowledge indicator variable, $Geographic\ Knowledge_{i,t-1}$, did not have significant coefficients for the regressions with ROA and Z-score as dependent variables, we observe that the coefficient of the indicator variable in Column (3) is -0.129 and is statistically significant, indicating a decrease in the agricultural delinquency rate for acquisitions with shared geographic knowledge. This provides empirical support for the geographic shared knowledge improving the performance of agricultural bank acquisitions in our study. Overall, we fail to find positive evidence of agricultural bank acquisitions in terms of different performance measures, but shared knowledge in urban-rural culture and in local geography conditions are found to improve the bankruptcy risk and the loan monitoring process.

Long-term Effects of Agricultural Bank Acquisitions

The previous section examined the effects of agricultural bank acquisition on bank performance a year after. In this section, we test whether agricultural bank acquisitions have long-term effects on bank performance. For the complete realization of synergies in acquisitions, previous literature on the acquisitions suggests that the post-integration process, in which two consolidating banks go through process to integrate businesses, may take multiple years to complete but there has been no consensus on the duration of the integration process (Lakshman, 2009). A special concern must be stressed in evaluating the outcome of acquisitions after a prolonged time period as a bank may also undergo other structural changes that may not be attributed to the acquisition events itself, so the interpretation of the long-term effects needs more caution. In order to examine whether we observe the long-term effects, the next set of regressions

examine the long-term effects of agricultural bank acquisitions. Specifically, we create dummy variables for agricultural bank acquisition indicator variable and knowledge variables that are lagged for two periods or two years. In order to address the autocorrelation issue that can arise when these double lagged variables are regressed with one-period lag variables, we only regress the performance measures on these indicator variables with two-year lag.

[Table 11]

[Table 12]

[Table 13]

Table 11 provides results for return-on-assets. Compared to the results from Table 8, we observe that there are changes in the profitability in the long-term, but most of the results are again insignificant. From columns (1) and (5), we observe that coefficients on the same culture acquisition at $t-2$ are negative and statistically significant, but the magnitudes are rather small, as the decreases are around -0.03%. Combined with results from Table 9 in which we observed significant decreases in bankruptcy risk, we interpret the negative coefficients in Table 11 as acquisitions that occur with shared urban-rural cultural knowledge reduce volatility in earnings in the year after the acquisition, but this may also offsets the profitability in the subsequent period, as one would predict from basic risk and return relationship, in which the decrease in the risk (volatility) should be offset by a reduction in return (profitability).

Table 12 provides results for the long-term effects of agricultural bank acquisitions on bankruptcy risk. First, we observe that the increase in z-score corresponding to a reduction in the bankruptcy risk caused by shared urban-rural cultural knowledge is rather short-term, as we do not observe significant long-term changes two years after the acquisition. The coefficients for loan product knowledge are negative and significant. A possible explanation for such observations is that, first, shared loan product knowledge in terms of specializing in agriculture may not improve

overall bankruptcy risk in the post-acquisition periods, and second, the concentration of the same type of loan product does not result in benefits associated with loan portfolio diversification.

Long-term results for agricultural delinquency rate are provided in Table 13. In Column 2, it is shown that the coefficient on agricultural bank acquisition is negative and significant, but the effect disappears when other indicator variables are regressed together. Coefficients for loan geographic knowledge are negative and significant in Column 1 and 3. The reduction in agricultural delinquency rate from geographic knowledge was also observed in the earlier table Table 10, and thus we consider the consistent reductions in agricultural delinquency rate in both one-year and two-years after the acquisition that occurred with higher level of geographic knowledge.

Yet again, it has to be noted that the time to complete the integration process is still unknown in the literature and banks may go through material changes between the observed years and the year of acquisitions, so the interpretation needs to be made more cautiously.

Regression with Weighted Average Values of the Acquirer and the Target

As discussed previously for Table 5 through Table 7, the post-acquisition performance measures of the consolidated bank can be influenced significantly by the characteristics of the target agricultural bank. This means that the observed changes in the post-acquisition period could be driven by the pre-acquisition characteristics of the target bank, complicating the effect of the acquisition itself. If the acquisition of agricultural banks results in significant changes, then these changes should be observable even after addressing the influence of the target bank characteristics. To address the issue, we perform additional tests with the weighted average values between the acquiring bank and the target bank. For this set of models, the dataset is reconstructed in a way that the variables for the right-hand side of the Equation (1) change from the acquiring bank

characteristics to the weighted average values between the acquiring bank and the target bank based on the relative asset size, similar to Equation (4). Thus, the regression equation changes to:

$$\begin{aligned}
 Y_{i,t} = & a + Acquisition_{i,t-1} + Geographic\ Knowledge_{i,t-1} + Loan\ Product\ Knowledge_{i,t-1} \\
 & + Cultural\ Knowledge_{i,t-1} + Weighted\ Size_{i,t-1} + Weighted\ Equity_{i,t-1} \\
 & + Weighted\ Deposits_{i,t-1} + Weighted\ Cost\ Efficiency_{i,t-1} + Year_t + \varepsilon_{i,t}
 \end{aligned} \tag{5}$$

For year t , if there was an acquisition in $t-1$, then the values for the lagged control variables on the right-hand side are the corresponding weighted average values between the target bank and the acquiring bank in $t-1$. If there is no observed acquisition in $t-1$, then the values for the right-hand side of the equation are equal to those of the acquiring bank only. In this way, we address the influence of the target bank balance sheet only in the year before acquisition on the performance measures of the acquiring bank after the acquisition while controlling for multiple issues that may arise by simply adding the target bank characteristics on the equation.

[Table 14]
 [Table 15]
 [Table 16]

Table 14 reports results for Equation (5) with the dependent variable of return-on-assets. Similar to the findings in previous tables, we do not observe statistically significant improvements in ROA, even after considering the possible influence of target bank characteristics. Other indicator variables for different types of knowledge, including geographic, loan product, or urban-rural culture also do not result in improvements in this particular performance measure. On the other hand, Table 15 shows that there are some improvements/reduction in bankruptcy risk as observed with the positive coefficients. With the reconstructed data that addresses the influence of target bank characteristics, coefficients on the geographic knowledge are now positive and significant. Similar to Table 9, urban-rural cultural knowledge again yield positive and significant

coefficients, again confirming the idea that shared knowledge in terms of same state and same culture may mediate the negative outcomes of acquisitions as shared knowledge may facilitate the integration process and thus synergy is gained. The reduction in bankruptcy risk might be associated with a reduction in the profitability volatility, from the fact that post-acquisition ROA does not improve as shown in the previous table and the equity-to-asset is expected to shrink due to the general buyout structure of business acquisitions, meaning that there might be not much improvement in the numerator terms of equation (1). Table 16 presents results for the agricultural delinquency rate. In Table 10, in which the regression is based on the acquiring bank's characteristics alone, we observed that the various characteristics have a positive effect on agricultural loan delinquency rate regardless of different specifications. With weighted average values, improvements that we observed for geographic knowledge and urban-rural cultural knowledge from Table 10 disappear in Table 16, implying that when considering for the influence of target agricultural bank financial characteristics, the agricultural bank acquisitions do not result in the loan monitoring process at least in one-year term.

Overall, we find weak evidence for the argument that an agricultural bank acquisition results in improved performance of an acquiring bank. We track changes in the post-acquisition period of an acquiring bank through simple mean comparisons, weighted average comparisons, and panel fixed regressions. Our results suggest that simply tracking the changes in the acquiring bank performance may not provide a whole picture of the outcome of acquisition as pre-acquisition characteristics of a targeted bank may significantly affect the post-acquisition characteristics of the acquiring bank. Our regression framework suggests that agricultural bank acquisitions do not show synergy or improvements in bank performance. Few findings include (1) acquisitions in which the acquiring bank and the targeted bank share similar culture may result in

improvement/reduction in performance in terms of bankruptcy risk and agricultural delinquency rates and (2) same state acquisitions result in improvement/reduction in agricultural loan delinquency rates. These results suggest that cultural familiarity and geographic overlap enhance the post-acquisition performance to some degree.

The lack of consistent improvements in agricultural bank acquisitions raises a serious question regarding the motives of those acquisition activities, as the results indirectly suggest that the improvement in firm performance may not be the goal of acquisitions, but possibly the management hubris or agency problems might be triggering these agricultural bank acquisitions.

Discussion and Conclusion

As discussed earlier, the implications of agricultural bank acquisitions, despite the significance for the agricultural lending market, have not been extensively studied in the literature. We contribute to the literature by examining the impact of the agricultural bank acquisitions, and by incorporating theories from distinctive business literature to enhance the understanding of the post-acquisition performance. In this study, we have examined different implications of bank acquisitions based on theories developed from the strategic management literature, with a focus on acquisitions with different levels of shared knowledge between acquiring and targeted banks. More specifically, we examine whether geographic knowledge, product knowledge, or cultural knowledge has a different impact on post-acquisition performance. We first track the changes in three performance measures of the acquiring bank between pre-acquisition and post-acquisition periods. The early set of results indicate that acquiring bank's performance measures deteriorate in the post-acquisition period. However, some of the results are reversed when weighted-average values were employed, highlighting the importance of carefully considering both the target and the acquiring bank characteristics. In the fixed effect regression, we do not find any improvement

in bank profitability. Overall, the results indicate that agricultural bank acquisitions might not be as beneficial as one would expect, but shared knowledge base in terms of geographic regions and culture may help the merged banks, also hinting that lack of cultural or geographic knowledge would further deteriorate post-acquisition performances.

The mixed findings regarding the general performance of agricultural bank acquisitions again highlight the complex nature of business acquisitions. We consider these results as a warning regarding the motives of agricultural bank acquisitions, as the results indicate that agricultural banks are getting acquired without observable improvement in performance post acquisition. Again, it has been strongly argued that acquisitions are triggered by management hubris or by agency problems, in which managers may seek to acquire another business for the purpose of empire building and increase in the personal compensation which might be closely tied to the size of the business. The possibility that management hubris or agency problems drives the acquisition activities needs more scrutiny, but data on the structure of management compensation package is not publicly available, posing a limit to this study while suggesting a further research opportunity. Still, the lack of evidence for improvements following agricultural bank acquisitions should also create concerns for practitioners and market participants, as a deterioration of bank financial health may trigger further acquisition, possibly creating monopolistic or oligopolistic lending market in which farmers may be adversely affected in the long run.

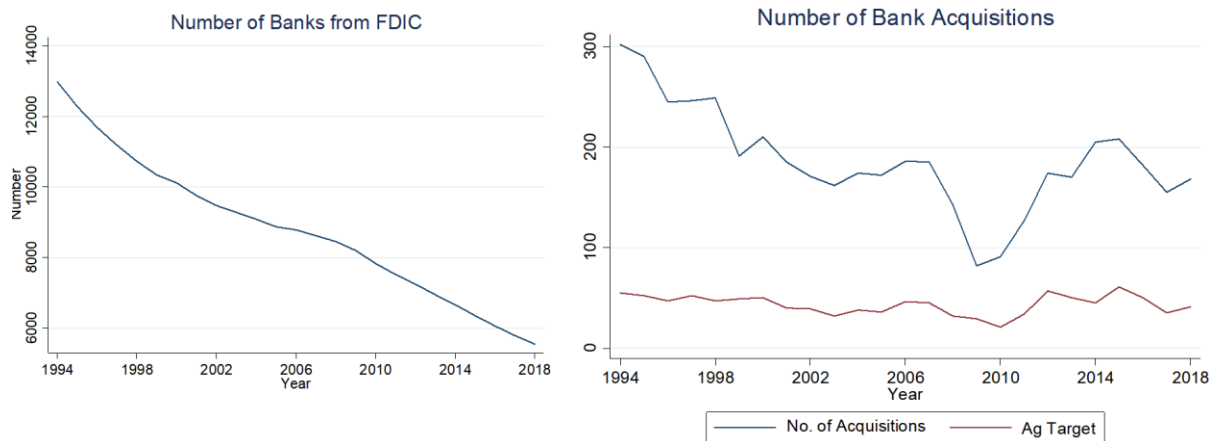
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Figure 1: Trends in US bank acquisitions, 1994-2018



Notes: Number of banks outstanding in FDIC database is reported on left, and the overall number of acquisitions and acquisitions that target agricultural banks for the final sample are reported on right.

Table 1: Number of agricultural bank acquisitions, 1994-2018

	No. of Acquisitions
Total Agricultural Bank Acquisitions	1,051
Geographic Knowledge	
In-state acquisitions	947
Loan Product Knowledge	
Acquirer: Agricultural Bank (Ag exposure > 25%)	760
Cultural Knowledge	
Same Urban-Rural Culture Acquisitions	773

Notes: This table reports the number of agricultural bank acquisitions in which the acquiring bank engaged in only one acquisition per year, leaving acquisition activities in which an acquiring bank acquired multiple banks in a given year.

Table 2: Agricultural bank acquisition and ROA, 1994-2018

	Pre-Merger (t-1)	Post-Merger (t+1)	t-statistics	Pr(T > t)
ROA				
Acquisitions	0.604	0.564	-3.038	0.002
with geographic knowledge	0.606	0.562	-3.188	0.002
with loan product knowledge	0.615	0.572	-2.651	0.008
with cultural knowledge	0.605	0.565	-2.570	0.01

Notes: This table reports the profitability, as measured by return-on-assets in percentage term, for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 3: Agricultural bank acquisition and z-score, 1994-2018

	Pre-Merger (t-1)	Post-Merger (t+1)	t-statistics	Pr(T > t)
Z-score				
Acquisitions	38.612	35.509	-1.991	0.047
with geographic knowledge	38.461	35.579	-1.728	0.084
with loan product knowledge	38.401	35.616	-1.691	0.091
with cultural knowledge	38.003	35.361	-1.660	0.097

Notes: This table reports Z-score, an inverse measure of bankruptcy risk, for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. For the formula used to calculate the value, please refer to equation (2.1). T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 4: Agricultural bank acquisition and agricultural delinquency rate, 1994-2018

	Pre-Merger (t-1)	Post-Merger (t+1)	t-statistics	Pr(T > t)
Ag delinquency rate (%)				
Acquisitions	0.357	0.402	0.760	0.447
with geographic knowledge	0.353	0.386	0.543	0.587
with loan product knowledge	0.293	0.329	0.570	0.569
with cultural knowledge	0.347	0.333	-0.265	0.791

Notes: This table reports agricultural loan delinquency rate for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. For the formula used to calculate the value, please refer to equation (2.2). T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 5: Agricultural bank acquisition and weighted average ROA in t-1, 1994-2018

	Pre-Merger (t-1)	Post-Merger (t+1)	t-statistics	Pr(T > t)
ROA				
Acquisitions	0.487	0.564	4.943	0.000
with geographic knowledge	0.486	0.562	4.464	0.000
with loan product knowledge	0.509	0.572	-3.595	0.000
with cultural knowledge	0.493	0.565	3.875	0.000

Notes: This table reports the profitability, as measured by return-on-assets in percentage term, for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. Pre-acquisition period ROA is the weighted average ROA of the acquiring bank and the target bank based on respective total asset. T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 6: Agricultural bank acquisition and weighted average z-score in t-1, 1994-2018

	Pre-Merger (t-1)	Post-Merger (t+1)	t-statistics	Pr(T > t)
Z-score				
Acquisitions	52.771	35.509	-8.697	0.000
with geographic knowledge	52.734	35.579	-8.096	0.000
with loan product knowledge	53.384	35.616	-7.556	0.000
with cultural knowledge	51.785	35.361	-7.471	0.000

Notes: This table reports Z-score, an inverse measure of bankruptcy risk, for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. For the formula used to calculate the value, please refer to equation (2.1). Pre-acquisition period Z-score is the weighted average Z-score of the acquiring bank and the target bank based on respective total asset. T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 7: Agricultural bank acquisition and weighted average agricultural loan delinquency in t-1, 1994-2018

	Pre-Merger(t-1)	Post-Merger(t+1)	t-statistics	Pr(T > t)
Ag delinquency rate				
Acquisitions	0.189	0.402	4.598	0.000
with geographic knowledge	0.186	0.386	4.189	0.000
with loan product knowledge	0.154	0.329	3.489	0.001
with cultural knowledge	0.184	0.333	3.772	0.000

Notes: This table reports agricultural loan delinquency rate for acquiring banks in pre-acquisition period (t-1) and post-acquisition period (t+1) in second and third columns. For the formula used to calculate the value, please refer to equation (2.2). Pre-acquisition period agricultural loan delinquency rate is the weighted average agricultural loan delinquency rates of the acquiring bank and the target bank based on respective total asset. T-statistics and corresponding p-values are reported in fourth and fifth columns respectively.

Table 8. Agricultural bank acquisitions: return-on-assets

Agricultural bank acquisitions: return on assets					
	(1)	(2)	(3)	(4)	(5)
Size $(t-1)$	0.0121 (0.00755)	0.0120 (0.00739)	0.0122 (0.00745)	0.0119 (0.00750)	0.0122* (0.00738)
Equity $(t-1)$	-0.0188 (0.307)	-0.0173 (0.307)	-0.0180 (0.307)	-0.0176 (0.307)	-0.0186 (0.307)
Tier 1 $(t-1)$	-0.0000719 (0.0000567)	-0.0000718 (0.0000566)	-0.0000717 (0.0000567)	-0.0000720 (0.0000567)	-0.0000719 (0.0000567)
Deposits $(t-1)$	-0.000351 (0.000221)	-0.000348 (0.000222)	-0.000349 (0.000222)	-0.000348 (0.000222)	-0.000352 (0.000221)
Cost Efficiency $(t-1)$	-7.970 (6.489)	-7.963 (6.487)	-7.975 (6.478)	-7.960 (6.495)	-7.975 (6.492)
Acquisition $(t-1)$	0.0159 (0.0150)	-0.00795 (0.00967)	0.00700 (0.0170)	0.00150 (0.0142)	0.00448 (0.0106)
Geographic Knowledge $(t-1)$	-0.00972 (0.0215)		-0.0170 (0.0151)		
Loan Product Knowledge $(t-1)$	-0.00985 (0.0199)			-0.0134 (0.0200)	
Cultural Knowledge $(t-1)$	-0.0117 (0.0175)				-0.0174 (0.0120)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0568	0.0567	0.0568	0.0566	0.0568

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 9. Agricultural bank acquisitions: z-score

Agricultural bank acquisitions: z-score					
	(1)	(2)	(3)	(4)	(5)
Size $_{(t-1)}$	-2.400*** (0.682)	-2.366*** (0.672)	-2.376*** (0.673)	-2.376*** (0.681)	-2.385*** (0.671)
Equity $_{(t-1)}$	250.6*** (54.31)	250.4*** (54.33)	250.5*** (54.30)	250.4*** (54.31)	250.5*** (54.36)
Tier 1 $_{(t-1)}$	-0.00341* (0.00195)	-0.00341* (0.00194)	-0.00342* (0.00195)	-0.00342* (0.00194)	-0.00341* (0.00194)
Deposits $_{(t-1)}$	0.0178 (0.0179)	0.0173 (0.0179)	0.0173 (0.0179)	0.0172 (0.0179)	0.0178 (0.0179)
Cost Efficiency $_{(t-1)}$	530.6*** (141.8)	529.4*** (141.5)	530.8*** (141.4)	529.4*** (141.4)	530.4*** (141.8)
Acquisition $_{(t-1)}$	-1.486 (1.251)	-0.967 (1.003)	-1.977 (1.299)	-0.256 (0.948)	-2.487** (1.192)
Geographic Knowledge $_{(t-1)}$	-0.114 (1.232)		1.144 (0.955)		
Loan Product Knowledge $_{(t-1)}$	-1.475 (1.655)			-1.001 (1.674)	
Cultural Knowledge $_{(t-1)}$	2.309* (1.397)				2.105* (1.133)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0660	0.0658	0.0659	0.0659	0.0659

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Dependent variable Z- score is calculated as $Z_t = \frac{ROA_t + E/A_t}{SD_{ROA}}$, which is a inverse measure of bankruptcy risk. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 10. Agricultural bank acquisitions: agricultural delinquency rate

Agricultural bank acquisitions: agricultural delinquency rate					
	(1)	(2)	(3)	(4)	(5)
Size $(t-1)$	0.176*** (0.0245)	0.173*** (0.0240)	0.175*** (0.0242)	0.174*** (0.0242)	0.174*** (0.0243)
Equity $(t-1)$	1.170 (0.822)	1.177 (0.822)	1.173 (0.822)	1.178 (0.821)	1.168 (0.823)
Tier 1 $(t-1)$	0.000249 (0.000370)	0.000248 (0.000369)	0.000249 (0.000369)	0.000249 (0.000370)	0.000247 (0.000369)
Deposits $(t-1)$	-0.0000957 (0.00104)	-0.0000742 (0.00104)	-0.0000764 (0.00104)	-0.0000691 (0.00104)	-0.000107 (0.00104)
Cost Efficiency $(t-1)$	16.49*** (6.339)	16.56*** (6.314)	16.44*** (6.330)	16.61*** (6.340)	16.48*** (6.291)
Acquisition $(t-1)$	0.104 (0.118)	0.0116 (0.0419)	0.126 (0.0785)	-0.0145 (0.0955)	0.108 (0.0848)
Geographic Knowledge $(t-1)$	-0.0712 (0.0886)		-0.129* (0.0716)		
Loan Product Knowledge $(t-1)$	0.0665 (0.110)			0.0363 (0.105)	
Cultural Knowledge $(t-1)$	-0.107 (0.0980)				-0.134* (0.0772)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0138	0.0137	0.0138	0.0137	0.0138

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 11. Long-term effect of agricultural bank acquisitions: return-on-assets

Agricultural bank acquisitions: return on assets					
	(1)	(2)	(3)	(4)	(5)
Acquired (t-1)	0.0168 (0.0153)	-0.00759 (0.00987)	0.00763 (0.0172)	0.00182 (0.0145)	0.00529 (0.0107)
Acquired (t-2)	0.0218 (0.0222)	0.00927 (0.0102)	0.0249 (0.0208)	0.00333 (0.0158)	0.0317** (0.0132)
Same state (t-1)	-0.0101 (0.0216)		-0.0174 (0.0152)		
Same state (t-2)	0.000569 (0.0226)		-0.0178 (0.0173)		
Acquirer: Ag Bank (t-1)	-0.00955 (0.0204)			-0.0134 (0.0203)	
Acquirer: Ag Bank (t-2)	0.0151 (0.0199)			0.00848 (0.0202)	
Same Culture (t-1)	-0.0124 (0.0175)				-0.0181 (0.0121)
Same Culture (t-2)	-0.0329* (0.0188)				-0.0311** (0.0144)
Control variables	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	17,867	17,867	17,867	17,867	17,867
R-squared	0.0561	0.0567	0.0568	0.0567	0.0560

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1995, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 12. Long-term effect of agricultural bank acquisitions: z-score

Agricultural bank acquisitions: z-score					
	(1)	(2)	(3)	(4)	(5)
Acquired (t-1)	-1.539 (1.317)	-0.928 (1.061)	-2.055 (1.360)	-0.188 (1.006)	-2.602** (1.242)
Acquired (t-2)	1.675 (2.020)	-0.138 (0.761)	-0.318 (1.642)	1.932 (1.476)	0.0912 (1.098)
Same state (t-1)	-0.117 (1.265)		1.283 (0.994)		
Same state (t-2)	0.597 (1.887)		0.207 (1.510)		
Acquirer: Ag Bank (t-1)	-1.573 (1.742)			-1.026 (1.762)	
Acquirer: Ag Bank (t-2)	-2.935* (1.649)			-2.894* (1.681)	
Same Culture (t-1)	2.582* (1.428)				2.342** (1.173)
Same Culture (t-2)	-0.321 (1.312)				-0.311 (1.030)
Control variables	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	17,867	17,867	17,867	17,867	17,867
R-squared	0.0649	0.0645	0.0646	0.0647	0.0646

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1995, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 13. Long-term effect of agricultural bank acquisitions: agricultural delinquency rate

Agricultural bank acquisitions: agricultural delinquency rate					
	(1)	(2)	(3)	(4)	(5)
Acquired (t-1)	0.0906 (0.120)	0.0102 (0.0438)	0.113 (0.0798)	-0.0169 (0.0988)	0.104 (0.0869)
Acquired (t-2)	0.00572 (0.0901)	-0.0812** (0.0353)	0.0386 (0.0597)	-0.108 (0.0859)	-0.0337 (0.0634)
Same state (t-1)	-0.0580 (0.0900)		-0.118 (0.0730)		
Same state (t-2)	-0.137* (0.0794)		-0.136** (0.0664)		
Acquirer: Ag Bank (t-1)	0.0690 (0.114)			0.0375 (0.109)	
Acquirer: Ag Bank (t-2)	0.0518 (0.0940)			0.0363 (0.0904)	
Same Culture (t-1)	-0.112 (0.100)				-0.131* (0.0789)
Same Culture (t-2)	-0.00585 (0.0884)				-0.0663 (0.0737)
Control variables	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	17,867	17,867	17,867	17,867	17,867
R-squared	0.0149	0.0148	0.0149	0.0147	0.0149

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1995, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 14. Regression results with weighted average values: return-on-assets

	Agricultural bank acquisitions: return on assets				
	(1)	(2)	(3)	(4)	(5)
Size $(t-1)$	0.0125* (0.00746)	0.0129* (0.00746)	0.0126* (0.00743)	0.0128* (0.00749)	0.0126* (0.00748)
Equity $(t-1)$	0.0755 (0.304)	0.0960 (0.294)	0.0807 (0.303)	0.0943 (0.294)	0.0806 (0.300)
Tier 1 $(t-1)$	-0.00756 (0.00579)	-0.00740 (0.00570)	-0.00751 (0.00577)	-0.00742 (0.00571)	-0.00753 (0.00577)
Deposits $(t-1)$	-0.0416* (0.0242)	-0.0346 (0.0219)	-0.0400 (0.0248)	-0.0348 (0.0218)	-0.0401* (0.0218)
Cost Efficiency $(t-1)$	-3.631 (2.613)	-3.621 (2.611)	-3.629 (2.610)	-3.619 (2.613)	-3.632 (2.615)
Acquisition $(t-1)$	0.00897 (0.0172)	-0.0109 (0.0164)	-0.00210 (0.0193)	0.000535 (0.0179)	-0.00270 (0.0145)
Geographic Knowledge $(t-1)$	-0.00664 (0.0257)		-0.0134 (0.0215)		
Loan Product Knowledge $(t-1)$	-0.0136 (0.0189)			-0.0164 (0.0189)	
Cultural Knowledge $(t-1)$	-0.0116 (0.0166)				-0.0157 (0.0135)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0423	0.0423	0.0424	0.0422	0.0424

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 15. Regression results with weighted average values: z-score

	Agricultural bank acquisitions: z-score				
	(1)	(2)	(3)	(4)	(5)
Size $(t-1)$	-2.543*** (0.664)	-2.679*** (0.657)	-2.559*** (0.661)	-2.674*** (0.660)	-2.600*** (0.661)
Equity $(t-1)$	2.445*** (0.563)	2.342*** (0.542)	2.429*** (0.560)	2.342*** (0.542)	2.405*** (0.554)
Tier 1 $(t-1)$	-0.00341* (0.00196)	-0.00423** (0.00169)	-0.00356* (0.00191)	-0.00422** (0.00169)	-0.00371** (0.00184)
Deposits $(t-1)$	-0.000336 (0.0191)	-0.0390* (0.0211)	-0.00682 (0.0193)	-0.0389* (0.0210)	-0.0151 (0.0192)
Cost Efficiency $(t-1)$	208.3 (133.8)	203.4 (131.7)	207.8 (133.6)	203.5 (131.9)	205.8 (132.8)
Acquisition $(t-1)$	1.708 (1.488)	7.316*** (2.528)	2.140 (1.601)	6.814*** (2.239)	3.823* (1.987)
Geographic Knowledge $(t-1)$	5.544*** (1.931)		7.818*** (2.099)		
Loan Product Knowledge $(t-1)$	-0.555 (1.578)			0.721 (1.651)	
Cultural Knowledge $(t-1)$	4.398*** (1.639)				6.609*** (1.822)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0591	0.0574	0.0588	0.0573	0.0584

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.

Table 16. Regression results with weighted average values: agricultural delinquency rate

Agricultural bank acquisitions: agricultural delinquency rate					
	(1)	(2)	(3)	(4)	(5)
Size $(t-1)$	0.178*** (0.0247)	0.178*** (0.0247)	0.178*** (0.0247)	0.178*** (0.0248)	0.178*** (0.0246)
Equity $(t-1)$	0.00996 (0.00843)	0.0104 (0.00823)	0.0102 (0.00839)	0.0104 (0.00821)	0.00986 (0.00839)
Tier 1 $(t-1)$	0.000259 (0.000373)	0.000263 (0.000373)	0.000261 (0.000373)	0.000263 (0.000374)	0.000258 (0.000371)
Deposits $(t-1)$	-0.000194 (0.00107)	-0.0000111 (0.000975)	-0.0000962 (0.00105)	-0.00000820 (0.000974)	-0.000235 (0.00105)
Cost Efficiency $(t-1)$	7.534* (4.199)	7.529* (4.187)	7.524* (4.190)	7.552* (4.203)	7.501* (4.175)
Acquisition $(t-1)$	0.193* (0.117)	0.172*** (0.0617)	0.186** (0.0789)	0.175* (0.104)	0.206** (0.0848)
Geographic Knowledge $(t-1)$	0.0151 (0.0909)		-0.0211 (0.0803)		
Loan Product Knowledge $(t-1)$	0.00881 (0.108)			-0.00400 (0.103)	
Cultural Knowledge $(t-1)$	-0.0703 (0.0999)				-0.0631 (0.0853)
Observations	18,693	18,693	18,693	18,693	18,693
R-squared	0.0138	0.0138	0.0138	0.0138	0.0138

Notes: This table reports results from panel regressions examining agricultural lending on a bank level, from June 30, 1994, to June 30, 2018, for agricultural banks. Standard errors are clustered on bank level. ***, **, or * indicates the significance level of 1%, 5%, or 10%, respectively.