Bank Consolidation and Loan Pricing

Lili Xie*

Abstract

This paper examines the effects of bank mergers on loan pricing. Using a sample of U.S. commercial and industrial loans, I find that banks reduce loan interest rates after they acquire target banks with small market shares, suggesting that the efficiency gains effect dominates the market power effect in such mergers. This merger effect is largest in the first year and almost disappears by the third year after the merger. Ex-ante conditions such as the concentration of the banking market and the market overlap of merging banks significantly affect merger effects in ways consistent with theory predictions. Merger effects are also found to vary across firms: mergers lead to larger rate reductions for informationally opaque firms than for informationally transparent firms. This provides counter evidence for the concern that bank mergers will particularly hurt firms lacking high-quality quantitative information. Although merging banks reduce their loan interest rates, rival banks, i.e., banks located in the same markets as the merging banks, leave their loan interest rates unchanged after mergers occur. This can be attributed to the fact that rival banks do not get efficiency gains as merging banks do and thus do not find it profitable to follow the pricing change of merging banks.

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*Address: Department of Economics WB201, Ball State University, Muncie, IN 47306. Tel:765-285-5378.

Over the past two decades, deregulation in the banking industry has generated a sweeping trend of bank mergers and acquisitions[1], which has changed the banking landscape across the world. The change in banking structure is especially notable in the United States, which used to be characterized by a large number of small banks. Bank consolidation has reduced the number of commercial banks in the United States from 13,675 in 1987 to 7,396 in 2006, representing a decline of 46%[2]. This reduction is largely borne by small banks while mega-banks with trillion-dollar assets such as Bank of America and J.P. Morgan Chase have emerged. As bank credit is among the most important sources of external finance for businesses, the increase in banking concentration has raised great concerns from economists over its potential impact on the economy.

Mergers always raise concern over excessive market power, which extract economic rents at the cost of consumers. Due to this concern, enforcers of anti-trust policies closely examine the potential increase in market concentration that can be caused by proposed mergers and try to prevent anticompetitive mergers. In banking, this concern has led to the guideline that any merger that can cause an increase in the market Herfindahl-Hirschman Index (HHI) of more than 200 points to a level of 1800 is subject to scrutiny from the Department of Justice.

To justify their proposed mergers, practitioners often claim that there are significant synergies and cost savings that can be derived from mergers. In First Union's acquisition of Wachovia in 2001, cost savings were expected to be $890 million from consolidating 250 to 300 branches and cutting some 7,000 jobs. In addition, cross-selling of products among customers of both banks can increase revenue. In the 2000 merger between J. P. Morgan and Chase Manhattan, high revenue growth was expected from offering J.P. Morgan's greater variety of products to Chase's broad client base (see Saunders and Cornett, 2006). To see whether claimed efficiency gains from mergers are actually realized, a large literature has appeared using various methods to look for evidence. However, no consensus has been reached yet (see Berger, Demsetz, and Strahan, 1999).

This paper examines how bank consolidation affects loan pricing. Arguments for efficiency gains and market power lead to opposite predictions regarding the effects of bank consolidation on loan pricing. On one hand, the synergies and cost savings created in bank

[1]In this paper, I do not consider the difference between mergers and acquisitions hence I use the term "bank mergers" to refer to both mergers and acquisitions henceforth.

[2]Data source: the Reports of Condition and Income (Call Reports) for 1987-2006 from the Federal Reserve Bank of Chicago.

mergers, if any, could be passed on to borrowing firms in the form of more favorably priced loans. On the other hand, if bank consolidation leads to excessive market power and reduces competition in the market, banks may try to exploit their higher market power by making loans more expensive to borrowing firms. Hence the overall merger effects depend on whether the efficiency gains effect or the market power effect dominates.

As the investigation of merger effects on loan pricing requires a loan-level dataset which at least identifies the lending banks, I uses the Dealscan dataset from Loan Pricing Corporation, which not only provides detailed information on a sample of U.S. Commercial and Industrial ($C\&I$) loans but also identifies both the lending bank and the borrowing firm of each loan. I find that banks reduce loan interest rates after they acquire target banks with small market shares, suggesting that the efficiency gains effect dominates the market power effect in such mergers. This merger effect is largest in the first two years and almost disappears by the third year after merger. This result is different from Focarelli and Panetta (2003), which examines deposit rates in Italian banks and conclude that they exercise higher market power immediately after a merger, with efficiency gains being passed on to consumers only after three years. In contrast, for the U.S. loan market, mergers do not seem to have any long-term effect: there is no significant difference between the loan interest rates charged by merging and non-merging banks if it has been over three years since the merger.

To investigate how merger effects vary with ex-ante conditions, I examine the market overlap between merging banks first. Two methods are used to define market overlap. In the first method, I only consider the market with the largest deposit share (main market) for each bank and define mergers with banks located in the same main market as in-market mergers. My results show that only out-of-market mergers lead to significant loan rate reductions, which can be attributed to a lower market power effect in such mergers. For in-market mergers, the concentration level of the banking market affects the merger effects significantly. In markets with higher Herfindahl-Hirschman Index (HHI), in-market mergers are more likely to lead to higher loan interest rates. This result justifies the concern that further consolidation in concentrated markets may lead to banks with excessive market power. In the second method, I define the market overlap of merging banks as the overlap of their deposit shares in all the markets they operate in. Although high market overlap can potentially lead to higher cost savings, it can also result in banks with higher market power. My result shows that only mergers with moderate market overlap can lead to loan

rate reductions while the market power effect will take over as market overlap gets too high. Due to the lack of cost savings opportunities such as closing overlapping branches and consolidating operations, mergers with zero market overlap also do not lead to significant decrease in loan interest rates.

In bank mergers, another major concern comes from the fact that smaller banks are consolidated into bigger and more organizationally complex banks, which are generally considered as disadvantaged in collecting "soft" information, i.e., information that is hard to verify, transmit or quantify. Since soft information is deemed as particularly important in loan making to informationally opaque firms as a result of their lack of high-quality quantitative data, this change in banking structure has caused concerns over the credit availability of these firms. To address this issue, I differentiate the merger effects for firms of different information opacity. I use both firm size and whether a firm is rated by $S\&P$ to define information opacity. I find that banks reduce loan interest rates more for *unrated* firms than for *rated* firms after merger. In addition, resulting loan rate reductions from bank mergers are also greater for firms with lower assets or sales than for larger firms. These results provide counter evidence to the concern and support the recent research findings that several hard information technologies such as credit scoring and asset-based lending are also useful for lending to informationally opaque firms and the comparative advantage of large banks in processing hard information is decreasing, rather than increasing, in firms size (e.g., Berger and Udell, 2006; Berger and Black, 2007). If large firms have comparative advantage in these hard information technologies, they can use these technologies to reach the informationally opaque firms. In this case, bank consolidation will not lead to more difficult credit for these firms.

Although not directly participating in mergers, rival banks located in the same markets as the merging banks may also change their loan pricing in response to changed market structure. It has been argued that rival banks are likely to follow the action of merging banks when merging banks exercise higher market power and increase their loan interest rates but will not change their pricing if merging banks pass along some of the efficiency gains achieved in mergers to the borrowing firms in terms of cheaper credit (e.g., Kahn et al., 2005). Consistent with this argument, I find that rival banks do not follow the merging banks in reducing loan interest rates. All the results above are robust to the consideration of overlapping mergers and the use of simultaneous equation method to correct for the

endogeneity of loan terms.

The rest of the paper is organized as follows. Section 1 discusses theory and related literature on bank mergers as well as the contribution of this paper to the literature. Data used to conduct the empirical study is described in Section 2. Section 3 lays out the basic specification and estimation method. In Section 4, regression results are reported and discussed. Several robustness test results are reported in Section 5. I conclude in Section 6.

1 Bank Consolidation, Efficiency, and Market Power

In economics, the question of whether horizontal mergers create value has been studied and debated for decades. With mergers and acquisitions becoming prevalent in the commercial banking industry, this old question has generated a lot of new interests.

Theoretically, when two banks merge, there are potential benefits that could be derived from economies of scale and scope. Significant cost savings may be realized from closing overlapping branches, laying off redundant staff, selling redundant capital goods, and consolidating back office operations. Revenue enhancement may result from cross-selling products to the combined customer base from both banks. Management may get an excuse to implement unpleasant restructuring that is much needed for efficiency improvement but could not be carried out before due to internal obstruction. Moreover, better risk-return tradeoff may be achieved when banks diversify into new products and geographical markets. If these benefits can be realized, bank consolidation is surely value enhancing.

However, in this rosy picture, dangers of inefficiencies lurk. During the merging process, differences in corporate culture and communications style and conflicts over "who is in charge" can lead to unexpected costs. When the merger is complete, managerial inefficiencies may arise as the manager now has to attend to more areas of businesses and deal with all kinds of relationship in a more complicated, bigger organization. This not only could dilute the energy and efforts of the manager but could also lead the manager into unfamiliar areas, where he/she may lack the necessary expertise to make sound business decisions.

Yet the biggest concern in bank mergers arises from the increased market power achieved by consolidated banks. When two banks merge into one bank, the consolidated bank will achieve a higher market power, which may enable it to change prices to the disadvantage of consumers. Studies on banking structure have found evidence that banks exploit their market power to extract higher rents in concentrated markets. Berger and Hannan (1989)

shows that banks in more concentrated markets offer lower deposit rates while Hannan (1991) finds that they also charge higher interest rates on loans.

Several ex-ante conditions may affect the relative size of the efficiency gains effect and the market power effect in bank mergers. First of all, market overlap between merging banks can affect both the potential efficiency gains and the change in market power from bank mergers. Mergers between banks with larger market overlap may generate higher cost synergies as more overlapping branches can be closed and operations of the merging banks can be better consolidated. Meanwhile, these mergers can combine the market power of merging banks in the same markets and are also more likely to result in banks with monopoly power. Hence both the efficiency gains effect and the market power effect are likely to be higher for mergers with high market overlap and it is ambiguous which effect will increase more. Second, the concentration level of the market where a merger occurs is also an important determinant of merger effects. If a market is already highly concentrated, further consolidation in the market is likely to produce excessive market power and thus the market power effect is likely to dominate the efficiency gains effect. In contrast, consolidation in markets with low concentration is less likely to create banks with monopoly power and the market power effect should be much less of a concern. Lastly, it has also been suggested that the relative efficiency of the acquirer bank and the target bank can make a difference for the efficiency improvement in the consolidated bank (e.g., Akhavein et al., 1997). Two hypotheses have been proposed. The first hypothesis states that efficiency gains will be larger if the acquirer bank is much more efficient than the target bank. If an efficient acquirer bank takes over an inefficient target bank, it could carry the efficient practices over to the inefficient bank and thus increase the efficiency of the consolidated bank. The other hypothesis suggests that higher efficiency gains can be achieved if both merging banks have poor performance. In this case, the merger event can "wake up" the management to implement efficiency-improving restructuring and thus lead to large efficiency gains.

To examine whether efficiency gains are indeed realized in bank mergers and large enough to offset potential inefficiencies, three approaches have been employed in the literature. One approach is to directly examine whether the performance of banks improves after merger. Studies using either accounting cost ratios or cost efficiency measures derived from stochastic frontier method find little evidence for cost savings (e.g., Linder and Crane, 1992; Berger and Humphrey, 1992; Rhoades, 1993; Peristiani, 1995). Although some also fail to find any

profitability improvement (e.g., Linder and Crane, 1992; Pilloff, 1996), others find positive evidence (e.g., Cornett and Tehranian, 1992; Akhavein et. al, 1997). Another approach is to investigate using event studies whether the stock market views bank mergers favorably and thus efficiency gains are reflected in stock market performance. Some studies find evidence suggesting a transfer of wealth from the acquirer bank to the target bank while total shareholder value of the combined bank doesn't increase at merger announcements (e.g., Cornett and Tehranian, 1992; Rhoades, 1994; Lang et al., 1999). However, as many mergers are financed with new issuance of debt or equity, the above results may reflect merger effects confused with financing effects. Consistent with this conjecture, Houston and Ryngaert (1994) find that cash-financed merger deals lead to higher abnormal stock returns than equity-financed merger deals.

It is possible that some of the efficiency gains are passed on to bank borrowers in the form of more favorable pricing of bank products. Hence, the third approach is to study price changes attributable to bank mergers. Studies examining deposit rates find that bank mergers lead to lower deposit rates in the short run but higher deposit rates in the long run (e.g., Prager and Hannan, 1998; Focarelli and Panetta, 2003). This suggests that it takes time for merger benefits to materialize. Due to data limitations, only a few studies consider merger effects on loan pricing. Using a sample of loans made by Italian banks to industrial firms, Sapienza (2002) shows that mergers which involve the acquisitions of target banks with small market shares lead to lower loan rate for consolidated banks but the decrease in loan rates is larger for in-market mergers. To investigate whether similar effects exist in the U.S. market, two attempts have been made, focusing on different types of loans. Kahn et. al (2005) examines interest rates for *personal and automobile loans* at the bank-market level and finds that bank mergers lead to lower personal rates but leave auto rates unchanged. Using data from the Survey of Terms of Business Lending (STBL), Erel (2006) studies merger effects on U.S. *business loans* and also find evidence consistent with efficiency gains: banks reduce loan spreads after merger, especially for non-mega acquiring banks (total assets less than $10 billion).

This paper uses a different loan-level dataset, the Dealscan dataset, to study the impact of bank mergers on loan pricing in the United States. Different from the Survey of Terms of Business Lending (STBL), Dealscan identifies borrowing firms besides the lending banks. Making use of characteristics of both the borrowing firms and the lending banks, this pa-

per investigates a broader range of questions regarding bank mergers than previous studies. Among them, I consider merger effects up to six years after the merger to see whether long term effects as those found for deposit rates by Focarelli and Panetta (2003) also exist in loan interest rates. I also consider how rival banks located in the same markets as the merging banks adjust their loan pricing. Although this question has been investigated in the Italian market by Sapienza (2002), no evidence has been provided for the U.S. market, which is characterized by a higher percentage of banks operating in multiple markets. In addition, with information on firm characteristics, I also contribute to the issue of whether bank mergers will particularly reduce the credit availability of informationally opaque firms. According to Stein (2002), organizations with more complex structures are disadvantaged in investing in projects that involve "soft" information since this type of information cannot be credibly communicated between agents. As bank consolidation produces more layers of management, the organizational distance between the agent who collects "soft" information and the agent that makes the lending decision increases, leading to less efficient relationship lending, which involves "soft" information. As informationally opaque firms generally lack high-quality quantitative data and are considered as relying on "soft" information, many are concerned that bank mergers will lead to less favorable loan pricing for these firms. This paper particularly addresses this concern by comparing loan pricing changes for informationally opaque and transparent firms after bank mergers.

2 Data

Five data sources are used in constructing my final dataset for the sample period of 1995-2004. After the Reagle-Neal Act was passed in 1994, there have been active bank consolidation and significant changes in banking structure. It would be interesting to examine the merger effects during this particular period and compare them with previous findings for other periods.

My sample of U.S. Commercial and Industrial ($C\&I$) loans is obtained from Loan Pricing Corporation's Dealscan, which provides detailed information on loan contracts such as loan interest rate, loan amount, maturity, purpose, and whether the loan is secured. Loans with missing information on key variables including loan interest rate, maturity, deal amount, and whether the loan is secured are removed. A particularly attractive feature of Dealscan data is that it provides the identities of both the borrowing firm and the lending bank for

each loan. No other loan level dataset in the United States has this feature. As a result, it is possible to match Dealscan with other datasets to find out key firm and bank characteristics.

Bank characteristics have been found to affect loan interest rates significantly (e.g., Hubbard et al., 2002). I use the Reports of Condition and Income (Call Reports) data provided by the Federal Reserve Bank of Chicago to obtain such bank information as equity ratio, percentage of non-performing loans, ratio of liquid assets to total assets, and bank size. Dealscan contains a large proportion of syndicated loans, which involve more than one lender. The lenders are grouped into two categories, the lead lenders and the participants. Since the lead lenders are responsible for negotiating loan terms and preparing loan contracts while the participants play a minimal role in the lending process except for providing funds, I take the usual practice in the literature by considering the lead lenders only. However, for many loans in Dealscan, more than one lead bank is reported. This then presents the problem of which lead bank's characteristics are important for determining the loan contract terms. Without further information on the relative importance of lead banks, I choose to focus on loans with one lead lender only. Besides the mechanical benefit of determining the influential bank for each loan, this restriction could make loans under examination more homogeneous and also ensure that dynamic interactions between lead lenders would not affect how merging banks alter their loan pricing. Table 1 presents selected loan characteristics for loans in my sample and all loans in Dealscan during 1995-2004. It is important to note that the average loan size and maturity of my sample are lower than those of the full sample and a larger proportion of loans in my sample is secured. Hence a caveat about the results found in this paper is that they may not be applied to the largest loans. As Dealscan does not provide a bank ID which allows easy connection with Call Reports, manual matching by bank name is needed. Further challenge comes from the fact that during my sample period a significant number of mergers occurred between banks within the same bank holding company, which makes it even more difficult to identify the lending banks in Call Reports. To overcome this problem, I combine all commercial banks within the same bank holding company into one single "bank" and assign the bank holding company ID to this combined "bank". For banks not in bank holding companies, their original bank IDs are kept.

I use annual Compustat to obtain firm characteristics such as total assets, industry, leverage ratio, current ratio, market to book ratio, return on assets, asset tangibility, and growth rate. To be consistent with previous studies, I exclude firms in the financial industry

(SIC code starting with 6) or in regulated industries (SIC code starting with 49). Although Dealscan provides the ticker number of a firm, it is missing or incorrect for a large proportion of firms. Hence, for these firms, I search manually by firm name for a possible match with Compustat.

Loans that can't be matched with either Compustat or Call reports are removed and the final sample contains 3379 loans. Table 2 presents the summary statistics of banks. The loans in my sample are made by 983 banks. The median bank has $48.5 billion in total assets and $29.8 billion in total loans. Each bank makes 3.44 loans on average. Table 3 gives the summary statistics of firm characteristics for the 2477 firms in my sample. The median firm has $102.33 million in total assets and $114.69 million in total sales.

To identify banks affected by mergers, I obtain the list of bank mergers and acquisitions from the Federal Reserve Bank of Chicago[3]. For the purpose of this paper, I exclude mergers between failing banks, between non-commercial banks, or between banks within the same bank holding company. Mergers involving target banks that are too small are unlikely to produce significant results and thus I also remove mergers where the total assets of the target bank is less than 10% of the total assets of the acquirer bank. In addition, I drop mergers where target banks remain in Call Reports or Summary of Deposits one year after consolidation. In other words, I only consider mergers where two or more banks consolidate into one surviving bank. With these restrictions, 784 mergers that occurred between 1995-2004 remain. Table 4 presents the summary statistics of key loan, bank or firm characteristics for merging and non-merging banks separately. We can see from the table that merging banks offer lower interest rates than non-merging banks. In addition, loans provided by merging banks are also larger and have longer maturity. Although these observations are suggestive of a negative relationship between mergers and loan interest rates, they may have been caused by the differential characteristics across banks and firms. For instance, the table also shows that merging banks are larger, better capitalized and have lower percentages of non-performing loans and their borrowing firms are also larger and have higher return on assets. Hence, to identify merger effects, I will use multi-variable regressions in the following section.

[3]I am very thankful to Doug Evanoff and Rich Rosen for providing this dataset to me.

3 Methodology

3.1 Banking Market

Before discussing the basic specification and estimation method, it is necessary to address the issue of banking markets first. Consistent with the Justice Department and previous studies, a relevant banking market in this paper is defined as a Metropolitan Statistical Area (MSA) or a rural county. In the U.S. banking system, a significant number of banks operate in different markets. As banking structure is an important determinant of banks' pricing behavior, the challenge then lies in deciding which market among all the markets that a bank operates in would be relevant. To address this problem, I use the strategy often adopted in previous studies (e.g., Berger and Mester, 1997, 2003): I use the Summary of Deposits from FDIC to identify the largest market of a bank in terms of deposits and associate the bank with this market only. This market is referred to as the main market of the bank. Although ignoring other markets that banks operate in, this strategy shouldn't cause much concern since for most banks the main market takes up a significant share of total deposits and only 1% of the banks has less than 25% of their deposits in their main markets.

3.2 Specification and Estimation

The basic specification estimated has the following form:

$$\begin{aligned} AISD_{i,j,k,t} =& \beta_0 + \beta_1 \cdot Merge_{i,t}^{0-3} + \beta_2 \cdot Mrgsize_{i,t} + \beta_3 \cdot HHI_t \\ &+ \beta_4 \cdot B_{i,t-1} + \beta_5 \cdot F_{j,t-1} + \beta_6 \cdot L_{k,t} + d_t + \epsilon_{i,j,k,t} \end{aligned} \tag{1}$$

where $AISD_{i,j,k,t}$ is a measure of the interest rate charged by bank i to firm j in loan k at time t. This measure is the "all-in-spread drawn" in Dealscan, which is equal to the sum of loan interest rates and all other loan-related fees such as annual fees and up-front fees expressed as a spread over the London Interbank Offering Rate (LIBOR). For loans not based on LIBOR but other benchmark rates such as the prime rate or the federal funds rate, a constant which reflects the average historical difference between LIBOR and the used benchmark rate is used to adjust the loan spread to LIBOR-based spread (see Hubbard et al., 2002). Time dummies d_t are included in the regression to control for time fixed effects

so that differences in macroeconomic conditions across time will not account for the results. The specification is estimated using Ordinary Least Squares (OLS) with robust standard errors clustered by the borrowing firm[4].

To find out post-merger effects on loan pricing, I define $Merge_{j,t}^{0-3}$ as the dummy variable which equals 1 if the lending bank was an acquirer bank between 0 to 3 years before the loan. The coefficient β_1 will be negative if the efficiency gains effect dominates and positive if the market power effect dominates. As noted by the Justice Department and previous merger studies, banking market concentration is an important determinant of the market power effect. The variable $Mrgsize_{i,t}$ captures the change in market structure induced by bank merger and is measured as the market share of the target bank in its main market in terms of deposits. Presumably, if a bank acquires another bank with a large market share, the acquirer bank's market power will experience a large increase, which is likely to induce the bank to charge higher interest rate on loans. This market power effect also depends on the structure of the market in which the bank operates. Mergers occurring in markets with higher concentration are more likely to produce firms with monopoly power and thus result in unfavorable pricing to customers than mergers occurring in markets with lower concentration even if the increase in concentration is the same. I consider the concentration of the main market of a bank as the market Herfindahl-Hirschman index (HHI), HHI_t.

In the presence of informational frictions, firms incur switching costs if they change banks and thus the financial conditions of banks can affect firms' borrowing costs. Banks in healthier financial conditions as indicated by higher capital adequacy and liquidity and lower non-performing loan ratios generally have lower costs of funds and can offer loans at lower interest rates. In the bank vector $B_{i,t-1}$, I include log of bank assets, capital adequacy as measured by the ratio of equity to total assets, liquidity as measured by the percentage of liquid assets in total assets, and the ratio of non-performing loans (loans that are past due at least 90 days) to total loans. All these variables take one-year-lag values.

Consistent with current research on loan determinants, I consider two types of borrower characteristics in $F_{j,t-1}$. Borrower risk is one important factor in loan pricing as it predicts the default probability of firms. To control for borrower risk, I include return on assets, current ratio (current assets/current liabilities), book leverage ratio, average 3-year sales growth rate, market to book ratio, and industry dummies (1-digit SIC) in the regressions.

[4]Similar results are obtained when clustering by year or bank.

Besides borrower risk, research in information asymmetry has pointed out that information opacity is another factor determining loan interest rate. In particular, firms with higher assets or a higher percentage of tangible assets have less information asymmetry problems and thus generally fetch lower interest rates. Hence, I also consider firm size (log of total assets) and asset tangibility (the ratio of property, plant, and equipment ($PP\&E$) to total assets) in my specification.

While making loans, banks tend to use non-price items such as collateral and loan size to control information and incentive problems. Hence the setting of loan interest rates will be significantly affected by these non-price items. For that matter, I include loan maturity, deal size, loan purpose, loan type, whether the loan is collateralized, whether the loan rate is based on prime rate, and whether the loan is a syndicated loan (with more than 1 lender) in the regression. In particular, I follow Hubbard et al. (2002) by grouping loan purposes into general purposes, recapitalization, leveraged buyout (LBO), Aquisition, and Miscellaneous. For loan types, I consider whether a loan is a bridge loan, part of a revolving line of credit, or a term loan. However, many non-price items are endogenous. For instance, banks are more likely to require collateral on loans in which the borrowing firms have more severe information and incentive problems. As these firms also tend to be firms with higher default risk, higher loan interest rates may be found together with the presence of collateral while in fact the presence of collateral should lead to lower interest rates, all else equal. For the moment, I will ignore the problem by simply including these non-price items in the specification but I will use Simultaneous Equations to address this endogeneity problem in the robustness test section.

4 Merger Effects on Loan Pricing

4.1 Overall Merger Effects

Table 5 presents the regression results for the full sample. As we can observe from column (a), banks reduce their loan interest rates by 11 basis points after merger, suggesting that the efficiency gains effect dominates the market power effect. Consistent with the concern that banks in concentrated markets can exercise higher market power, I find that banks in more concentrated markets charge higher interest rates as shown by the positive coefficient on HHI. The table also shows that banks in better financial conditions (higher liquidity, higher equity ratio, higher assets, or lower non-performing loans) offer lower loan interest

rates, consistent with these banks having lower costs of funds. As the increase in the acquirer bank's market power and thus the merger effects may depend on the size of the target bank, I include target bank's market share in its main market in the regression in column (b). I find that the larger the target bank's market share, the lower the reduction in loan interest rates. When the target bank's market share increases to around 30(%), merger effects found above disappears, suggesting that the market power effect has become strong enough to offset the efficiency gains effect. If the target bank's market share increases further, the market power effect will take over and banks will charge higher loan interest rates after experiencing mergers.

To examine the change in merger effects across time, I separate loan pricing changes after merger in different years in column (c). $Merge^0$, $Merge^1$, $Merge^2$ and $Merge^3$ equal 1 if the lending bank was an acquirer bank in the current quarter, 1-4 quarters ago, 5-8 quarters ago, and 9-12 quarters ago respectively at the time of the loan. Comparing the coefficients of the merger dummies, we can see that the reduction in loan interest rate is largest in the first two years after merger and becomes insignificant by the third year. This result is consistent with the statement in Rhoades (1996) that "the almost unanimous agreement among the experts we interviewed [is] that about half of any efficiency gains [cost efficiency] should be apparent after one year, and all gains should be realized within three years". The decrease in merger effects over the years also make one doubt whether there is any long-term effect in bank merger. Focarelli and Panetta (2003) find that although Italian banks exercise higher bank power by decreasing their deposit rates if they were involved in mergers 0-3 years ago they increase deposit rates when the mergers occurred 3-6 years ago. They explain the difference between the short-term and long-term effect of mergers as a result of the time for banks to realize efficiency gains. To see whether there is any such long-term merger effect for U.S. loan rates, I include the variable $Merge^{4-6}$, which equals 1 if a bank engaged in merger activity 4-6 years ago, in the regression in column (d). The slightly positive coefficient suggests that there is no long-term effect of mergers on loan pricing in the United States.

As bank mergers can induce dynamic changes in local banking markets, it is also interesting to see whether there is any pricing change in banks that are located in the same markets as the merging banks (rival banks). As suggested by previous studies (e.g., Kahn et al., 2000; Focarelli and Panetta, 2003), if merging banks exercise their higher market power and increase interest rates, rival banks may follow their pricing strategy and also increase loan

interest rates. However, if merging banks pass along some of the efficiency gains achieved in mergers to borrowing firms in the form of cheaper loans, rival banks will not change their pricing as it would not be profitable for them to do so. To see whether this is true, I identify all the markets where one or more banks were acquired during the sample period as merger affected markets and the variable *Rival* equals 1 for all banks whose main markets are among the merger affected markets in all years after the the first merger that occurred in the market. As seen in column (e), although merging banks reduce their loan interest rates after merger, rival banks do not follow their action. This confirmed the argument that rival banks can not afford to reduce loan interest rates as the merging banks do.

4.2 In-Market Mergers vs. Out-of-Market Mergers

One important condition that determines the increase in acquirer bank's market power is whether it operates in the same market as the target bank. Mergers between banks operating in the same markets, the so-called in-market mergers, can possibly produce banks that can monopolize the markets. Hence, we might expect merger effects to be different for in-market and out-of-market mergers. To separate in-market mergers from out-of-market mergers, I use data from the Summary of Deposits data provided by FDIC to identify the markets that banks in my sample operate in. As many banks operate in more than one markets, I use two methods to define the two types of mergers.

In the first method, I define mergers where the merging banks have the same main market as in-market mergers and otherwise as out-of-market mergers. In the second method, I consider all markets that merging banks operate in. I define the market overlap between the two banks as:

$$\text{Marketoverlap} = \sum_{i=1}^{K} \text{Min}(Depshare_i^1, Depshare_i^2), \tag{2}$$

where $Depshare_i^1$ and $Depshare_i^2$ are the deposit shares (%) of the acquirer bank and the target bank in market i respectively and K is the total number of different markets in which the merging banks operate in. If both banks get 100% of their deposits from the same market, *Marketoverlap* will be equal to 100 (%). If there is no common market between the merging banks, *Marketoverlap* will be equal to 0 (%). Hence the *Marketoverlap* for a merger can vary between 0 and 100 (%)[5].

[5]This is different from the market overlap measure used in other papers. In Erel (2006), the market overlap measure defined can take a value higher than 100% when both merging banks operate in one single

To examine differential effects across mergers, I estimate the basic specification for different sub-samples of loans. To form each sub-sample, the group under examination is added to the control group of loans made by banks that were not involved in mergers. For instance, loans made by banks that were involved in in-market mergers are added to the control group to form the sub-sample used in the in-market merger regression. Similarly, loans made by banks that were involved in out-of-market mergers are added to the same control group to form the sub-sample for the out-of-market merger regression.

The regression results are reported in Table 6. In the first two columns, I compare the effects of in-market mergers and out-of-market mergers defined using the first method. As shown by the coefficients, in-market mergers indeed lead to greater market power effect than out-of-market mergers. Banks reduce their loan interest rates by about 18 basis points 0-3 years after experiencing out-of-market mergers but do not reduce or may even increase their loan rates if involved in in-market mergers. In addition, the concentration level of the common main market that banks in in-market mergers operate in can affect the size of the merger effects. As shown by the third column, the interaction term between $Merger^{0-3}$ and HHI is significantly positive. A 200-point increase in the market HHI can reduce the merger effects by approximately 60 basis points[6].

In the last three columns, I examine the market overlap of banks in all markets they operate in. Instead of classifying mergers as in-market or out-of-market mergers, I examine mergers with high market overlap, low market overlap, or 0 market overlap where market overlap is considered as high if it is above 30 (%)[7]. It can be seen that the efficiency gains effect dominates the market power effect only in mergers with low market overlap. Mergers with high market overlap lead to a dominance of the market power effect. Although mergers with zero market overlap can avoid the creation of excessive market power, there are also less cost saving opportunities and synergies in such mergers.

4.3 Information Opacity

In the banking literature, information asymmetry between firms and creditors is considered as an important determinant of lending technology and credit availability. Informationally opaque firms, firms for which high-quality information is scarce and the information asym-

market. The measure used in this paper avoids this problem.

[6]This is calculated as 0.31×200.

[7]Similar results are obtained when other cutoff values are used.

metry problem is severe, are considered as reliant on lending technologies that are more personal and relationship-based than informationally transparent firms. Many have thus expressed concerns that the creation of larger banking institutions through consolidation will lower the credit access by informationally opaque firms as the layers of management in larger banks would prevent the banks from making lending decisions based on "soft" information[8] efficiently. To see whether this concern is valid, I examine the differential effects of mergers on firms of different information opacity.

One important problem to address is how to measure information opacity/transparency. Following the literature in information asymmetry, I consider four different measures in my analysis. The first two measures consider whether a firm has a $S\&P$ debt rating. As debt ratings reflect information on firms' credit risk, firms that have debt ratings are likely to have lower information asymmetry problems than firms that do not. The variable '$S\&PLT$' equals 1 if the borrowing firm has an $S\&P$ long-term domestic issuer credit rating. I also consider the variable '$S\&PSenior$', which equals 1 if the borrowing firm has an $S\&P$ senior unsecured debt rating. The other two measures are related to firm size as generally there is more information available on larger firms due to their higher publicity and better information technology. I use both firms' total assets and net sales (in logs) to measure firm size. All four measures are *negatively* correlated with information opacity, i.e., higher values indicate lower information opacity and higher information transparency.

The interaction term between each measure of information opacity/transparency and $Merger^{0-3}$ is included separately in regressions reported in Table 7. Two results are worth noting. First, banks charge lower interest rates on firms that are more informationally transparent, i.e., firms which have a $S\&P$ long-term credit rating, a $S\&P$ senior unsecured debt rating, higher assets or higher sales. This is consistent with the theory that it is less costly for banks to get information on the creditworthiness of these firms and thus banks are willing to offer lower interest rates. Second, the significantly positive coefficients on all interaction terms show that mergers lead to lower interest rates on loans to informationally opaque firms than on loans to informationally transparent firms. According to column (a), banks reduce loan rate by 18 basis points for firms without $S\&P$ Long-term credit rating but only 3 basis points for firms with $S\&P$ Long-term credit rating after experiencing mergers. If

[8] "Soft" information is generally qualitative information that is hard to verify and transmit, for instance, whether the firm management is honest and has the entrepreneurial ability to run the business well. Relationship lending is a lending technology that is generally considered as based on soft information.

we consider firm size as measured by log of total assets instead, an increase of one standard deviation (1.6 units, corresponding to approximately $4.95 million in assets), the rate reduction caused by mergers will decrease by approximately 17 basis points[9]. These results provide evidence against the argument that bank mergers will reduce the credit availability of informationally opaque firms and support the recent findings in banking research that there are hard information technologies that can also be useful for lending to small firms and the comparative advantage of large banks in hard information technologies is decreasing, rather than increasing, in firm size (Berger and Udell, 2006; Berger and Black, 2007). Berger and Udell (2006) argue that it is over-simplistic to assume that all hard information technologies are unsuitable for informationally opaque firms and large banks are disadvantaged in lending to these firms. They identify several hard information technologies that are useful in lending to firms with little high-quality quantitative information. If this is true, the creation of larger banks in bank mergers may not lead to more difficult credit for informationally opaque firms as long as larger banks have comparative advantage in those hard information technologies. Given the better computer technology and more efficient hard information monitoring at large banks, this provides a plausible explanation for my finding that there is a larger decrease in loan interest rate for informationally opaque firms after bank mergers.

5 Robustness Tests

In the regression analysis, I have tried many different specifications and also considered various samples in which firms with negative or excessive growth rates or loans with spreads in the top and bottom 1% are removed. Similar results are obtained in these tests. To further ensure the robustness of my results, I also conduct the following robustness tests.

5.1 Overlapping Mergers

Some banks may engage in a series of mergers within a few years. As I consider post-merger effects up to 6 years, my results may be affected by the overlapping mergers in my sample. According to previous literature, it generally takes three years to fully complete the reorganization and reap all the benefits from a merger. For this reason, I consider two mergers with the same acquirer bank that occurred within three years of each other as in a series of mergers undertaken by the acquirer bank to achieve a specific business goal. For each

[9]This is calculated as 10.43×1.6.

series of mergers, I only keep the last merger and then define the merger variables according to the remaining mergers. All the results found above are robust to this adjustment.

5.2 Mergers before 1995

My merger sample and loan sample are both for the period of 1995-2004. This then presents one potential problem: loans that were affected by mergers before 1995 are not identified as merger affected. To address this problem, I look for and add to my merger sample the mergers that occurred between 1989-1995. However, since I only have Summary of Deposits data for after 1994[10], I cannot identify in-market mergers versus out-of-market mergers and the market overlap between merging banks for these mergers. However, other results are qualitatively similar to those found above.

5.3 Endogeneity

As mentioned before, one concern of using OLS is that many loan terms are endogenously determined. To make sure that endogeneity is not the cause of my results, I use simultaneous equations and 2SLS estimation to address the problem. Following Calomiris (2006), I consider a Loan Supply Equation, where loan spread is the dependent variable, and a Loan Demand Equation, where loan amount is the dependent variable. They are specified as follows:

$$\begin{aligned} AISD_{i,j,k,t} =& \beta_0 + \beta_1 \cdot LoanAmt_{i,j,k,t} + \beta_2 \cdot Merge_{i,t}^{0-3} + \beta_3 \cdot Mrgsize_{i,t} + \beta_4 \cdot HHI_t \quad (3) \\ &+ \beta_5 \cdot F_{j,t-1} + \beta_6 \cdot L_{k,t} + \beta_7 \cdot LogofBankAssets_{i,t-1} + \beta_8 \cdot SUP_{t-1} + d_t + \epsilon_{i,j,k,t}, \\ LoanAmt_{i,j,k,t} =& \alpha_0 + \alpha_1 \cdot AISD_{i,j,k,t} + \alpha_2 \cdot F_{j,t-1} + \alpha_3 \cdot L_{k,t} \quad (4) \\ &+ \alpha_4 \cdot LogofBankAssets_{i,t-1} + \alpha_5 \cdot DEM_{t-1} + d_t + \mu_{i,j,k,t} \end{aligned}$$

Here $F_{i,t-1}$ and $L_{j,t}$ are the firm-characteristic and loan-characteristic vectors introduced before[11]. As bank size can affect both the loan interest rate offered by banks and the loan amount that firms request, log of bank assets is included in both equations. In the Loan Supply Equation, I consider the merger dummy $Merge^{0-3}$, target bank market share $Mrgsize$

[10] The FDIC does not provide Summary of Deposits data before 1994.

[11] $F_{i,t-1}$ includes firm assets, asset tangibility, return on assets, current ratio, book leverage ratio, average 3-year sales growth rate, market to book ratio, and industry dummies (1-digit SIC). $L_{j,t}$ includes loan maturity, loan type dummies, loan purpose dummies, whether a loan is collateralized, whether a loan is a syndicated loan, whether a loan is based on the prime rate.

and market concentration HHI as these will affect whether banks will exercise higher market power by increasing loan spread or pass along efficiency gains to borrowers by offering cheaper credit. In the supply variable vector SUP, I consider bank characteristics including liquidity, capital adequacy and non-performing loan ratio as these bank characteristics can affect banks' costs of funds and thus their loan pricing. To identify the Loan Demand Equation, I consider the variables $SICblev$ and $SICgrowth$, which are respectively the average book leverage and 3-year growth rate of the SIC-1-digit industry that the borrowing firm is in. Presumably, in an industry with higher leverage or higher growth, firms' borrowing need would be higher. I use 2SLS method to estimate the simultaneous equations. The results are qualitatively the same as those found using OLS.

6 Conclusion

With banking deregulation across the world, bank mergers have become more and more popular. However, no consensus has been reached on whether bank mergers improve economic efficiency yet. On one hand, there may be significant efficiency gains from economies of scale and scope that may be achieved in mergers. On the other hand, bank mergers may create excessive market power and obstruct competition. Due to these two opposing effects, the overall merger effect is ambiguous. Using a sample of U.S. commercial and industrial loans from Dealscan, this paper contributes more evidence to this issue by studying the impact of bank mergers on loan pricing. My results show that mergers involving target banks with smaller local market shares lead to cheaper credit to borrowing firms, consistent with a dominance of the efficiency gains effect. Different from Focarelli and Panetta (2003), I find that the merger effect is largest in the first year and is almost exhausted by the third year after the merger. The relative size of the efficiency gains effect and the market power effect is affected by banking market concentration and the market overlap of merging banks. Mergers occurring in markets with high concentration tend to result in a dominance of the market power effect, which justifies policy makers' close watch on market concentration. While examining the market overlap between merging banks, I find that mergers involving banks with no market overlap do not lead to significant rate reductions as these mergers do not offer many cost saving opportunities. Neither do mergers involving banks with high market overlap as these mergers can lead to excessive market power. Only mergers with moderate market overlap can lead to a dominance of efficiency gains.

My findings also suggest that although mergers can generate larger banks, they do not necessarily lower the credit availability of informationally opaque firms. In fact, I find that merging banks reduce loan interest rates even more for informationally opaque firms. This result has important policy implications as policy makers are concerned that as large banks are disadvantaged in collecting soft information, informationally opaque firms will be negatively affected by bank mergers. The finding that mergers actually benefit informationally opaque firms support the finding in Berger and Black (2007) that large banks can have comparative advantages in several hard information technologies, which are also useful for lending to informationally opaque firms.

Besides merging banks, I also consider the effect of mergers on rival banks, that is, banks located in the same markets as the merging banks. Consistent with the argument that rival banks do not find it profitable to follow merging banks' action when efficiency gains dominate in mergers, I find that rival banks leave their loan interest rates unchanged although merging banks lower their loan interest rates after the merger. Overall, my findings in this paper suggest that although there is a lack of direct evidence that mergers lead to efficiency gains in terms of improved cost ratios or profit ratios, merging banks may have passed along some efficiency gains to borrowing firms, including both informationally opaque and transparent firms.

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7 Appendix

7.1 Tables

Table 1: Loan Characteristics

This table presents summary statistics on selected loan characteristics for the regression sample used in the paper and the full sample of loans in Dealscan for 1995-2004. Loans with missing data on interest rate, lenders, whether the loan is secured, deal amount, or maturity are removed from both the regression sample and the full sample. *All-In-Spread Drawn* is equal to the sum of loan interest rate and all other loan-related fees such as annual fees and up-front fees expressed as a spread over the London Interbank Offering Rate (LIBOR). *Secured* is a dummy indicating whether the loan is collateralized. *Prime* is a dummy indicating whether the loan interest rate is based on prime rate.

Panel A. Regression Sample for 1995-2004					
Variable	Mean	St. Dev.	Min	Median	Max
All-In-Spread Drawn	227.37	114.02	-4	225	955
Deal Amount (Millions)	83.5	182	0.25	30	3000
Maturity (months)	36.97	24.23	1	36	252
	No(0)	Yes(1)			
Secured	16.40%	83.60%			
Prime	8.23%	91.77%			

Panel B. Complete Dealscan Data for 1995-2004					
Variable	Mean	St. Dev.	Min	Median	Max
All-In-Spread Drawn	234.53	115.18	-4	238.75	955
Deal Amount (millions)	82.7	186	0.25	28.2	300
Maturity	36.36	24.27	1	36	276
	No(0)	Yes(1)			
Secured	7.63%	92.37%			
Prime	15.36%	84.64%			

Table 2: Bank Characteristics

This table presents summary statistics on the lending banks in my sample. There are 983 lending banks in the sample. *Liquidity* is measured as the percentage of liquid assets in total assets. *Capital adequacy* is the ratio of book equity to total assets. *Non-performing loan ratio* is the ratio of non-performing loans (loans at least 90 days past due) to total loans. *Number of loans* is the total number of loans that a bank made in my sample.

Variable	Mean	St. Dev.	Min	Median	Max
Total Assets (billions)	98.2	136	0.011	48.5	712
Total Loans (billions)	58.5	77.2	0.005	29.8	413
Liquidity (%)	11.85	11.32	0	8.69	86.7
Capital Adequacy (%)	8.56	3.69	5.04	8.05	61.03
Non-performing Loan Ratio (%)	1.12	0.73	0	0.93	5.68
Number of Loans	3.44	3.88	1	2	38

Table 3: Firm Characteristics

This table presents summary statistics on the borrowing firms in my sample. There are 2477 firms in the sample. *ROA* is the ratio of Earnings before Interest and Tax (EBIT) to total assets. *Asset Tangibility* is the ratio of Property, Plant and Equipment (PPE) to total assets. *Current Ratio* is the ratio of current assets to current liabilities. *Book Leverage* is the difference between total assets and book equity divided by total assets. *Market-to-Book* is the ratio of market assets to book assets. *3-year Sales Growth* is the percentage increase in total sales in the past three years.

Variable	Mean	St. Dev.	Min	Median	Max
Total Assets (millions)	421.05	1362.70	0.001	102.33	22389.55
Total Sales (millions)	448.71	1238.58	0.0104	114.69	22370.98
ROA (%)	6.26	88.20	-4100	12.38	93.48
Asset Tangibility (%)	28.47	23.06	0	21.28	99.34
Current Ratio (%)	2.47	2.79	0	1.93	65.98
Book Leverage (%)	47.27	21.54	1.62	46.22	99.72
Market-to-Book	2.88	41.18	0.35	1.45	1884.1
3-year Sales Growth	269.80	3241.23	-100	42.58	121560.9

Table 4: Merging Banks vs. Non-merging Banks

This table compares summary statistics of key variables between merging banks and non-merging banks. *All-In-Spread Drawn* is equal to the sum of loan interest rate and all other loan-related fees such as annual fees and up-front fees expressed as a spread over the London Interbank Offering Rate (LIBOR). *Liquidity* is measured as the percentage of liquid assets in total assets. *Capital adequacy* is the ratio of book equity to total assets. *Non-performing loan ratio* is the ratio of non-performing loans (loans at least 90 days past due) to total loans. *ROA* is the ratio of Earnings before Interest and Tax (EBIT) to total assets. *Asset Tangibility* is the ratio of Property, Plant and Equipment (PPE) to total assets. *Current Ratio* is the ratio of current assets to current liabilities. *Book Leverage* is the difference between total assets and book equity divided by total assets. *Market-to-Book* is the ratio of market assets to book assets. *3-year Sales Growth* is the percentage increase in total sales in the past three years.

	Merging Banks			Non-merging Banks		
Variable	Mean	St. Dev.	Median	Mean	St. Dev.	Median
All-In-Spread Drawn	219.41	107.66	225	230.59	116.58	230
Deal Amount (Millions)	17.57	1.28	17.62	17.08	1.43	17.03
Maturity (months)	3.43	0.70	3.58	3.35	0.76	3.58
Bank Assets (Billions)	332	209	281	89.3	111	53.3
Liquidity	11.31	6.31	10.69	12.95	10.87	9.98
Capital Adequacy	8.68	1.46	8.50	8.25	3.12	7.89
Non-performing Loan	1.02	0.35	0.88	1.21	0.77	0.98
Firm Assets (Millions)	502.86	1758.15	123.44	367.14	1320.98	79.92
ROA (%)	9.38	86.75	12.56	6.58	32.56	12.20
Asset Tangibility (%)	28.30	21.66	22.05	29.00	23.21	21.93
Current Ratio (%)	2.29	1.64	1.94	2.56	3.38	1.92
3-year Sales Growth	135.70	543.59	48.35	319.10	3740.59	38.85
Book Leverage (%)	128.25	3427.99	49.08	61.09	50.73	51.41
Market-to-Book	2.80	40.35	1.40	1.96	1.92	1.44

Table 5: Overall Merger Effects

This table reports regression results for the full sample. $Merge^{0-3}$ equals 1 if the lending bank was involved in a merger 0-3 years before the loan. $Merge^{0}$, $Merge^{1}$, $Merge^{2}$ and $Merge^{3}$ are dummies for different merger years. *Rival* equals 1 if the bank is a rival bank located in the same market as the merging bank. HHI is the Herfindahl-Hirschman Index of the main banking market of each bank. $Mrgsize$ is the market share of the target bank in a merger and equals 0 if the bank is not a merging bank. *Liquidity* is the ratio of a bank's liquid assets to its total assets. $CapitalAdequacy$ is measured as the ratio of a bank's equity to its total assets. $NonperformingLoan$ is the ratio of loans that are at least 90 days past due to total loans. Control variables for loan characteristics and firm characteristics are included in the regressions but not reported in the table. Robust standard errors are reported in the parentheses.

	(a)	(b)	(c)	(d)	(e)
$Merge^{0-3}$	-11.15^{a}	-15.10^{a}		-14.77^{b}	-14.04^{a}
	(4.05)	(4.63)		(5.92)	(5.10)
$Merge^{0}$			-10.77		
			(11.05)		
$Merge^{1}$			-22.16^{a}		
			(5.74)		
$Merge^{2}$			-18.87^{a}		
			(5.61)		
$Merge^{3}$			-4.67		
			(6.05)		
$Merge^{4-6}$				0.75	
				(8.82)	
Rival					3.44
					(5.70)
HHI	0.01^{a}	0.01^{a}	0.01^{a}	0.01^{a}	0.01^{a}
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$Mrgsize$		0.46^{b}	0.54^{b}	0.45^{c}	0.48^{b}
		(0.21)	(0.22)	(0.25)	(0.21)
$LogofBankAssets$	-5.24^{a}	-6.58^{a}	-6.78^{a}	-6.61^{a}	-6.68^{a}
	(1.43)	(1.54)	(1.55)	(1.58)	(1.54)
Liquidity	0.59^{a}	0.62^{a}	0.61^{a}	0.61^{a}	0.62^{a}
	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
$CapitalAdequacy$	-1.66^{b}	-1.93^{b}	-1.69^{b}	-1.93^{b}	-1.91^{b}
	(0.75)	(0.76)	(0.74)	(0.75)	(0.75)
$NonperformingLoan$	14.21^{a}	14.75^{a}	14.59^{a}	14.72^{a}	14.79^{a}
	(3.04)	(3.03)	(3.01)	(3.04)	(3.03)
Observations	2780	2780	2780	2780	2780
R^2	0.4732	0.4742	0.4757	0.4742	0.4743

Superscripts ^{a}, ^{b} and ^{c} indicate significance at 1%, 5%, and 10% respectively.

Table 6: Differential Merger Effects for Mergers of Different Market Overlap
This table considers differential merger effects across mergers with different market overlap. Columns (a)-(c) consider in-market mergers versus out-of-market mergers where in-market mergers are defined as mergers involving banks located in the same main market. Columns (d)-(f) consider the unique definition of market overlap between the merging banks where market overlap is defined as the overlap of deposit shares between the merging banks in all the markets they operate in and varies between 0 and 100 (%). Market overlap is considered as high if it is above 30 (%) and low if it is greater than 0 and less than or equal to 30 (%). $Merge^{0-3}$ equals 1 if the lending bank was involved in a merger 0-3 years before the loan. HHI is the Herfindahl-Hirschman Index of the main banking market of each bank. $Mrgsize$ is the market share of the target bank in a merger and equals 0 if the bank is not a merging bank. Control variables for loan characteristics, firm characteristics and bank characteristics are included in the regressions but not reported in the table. Robust standard errors are reported in the parentheses.

	Same Main Market			Market Overlap		
	Yes	No	Yes	High	Low	Zero
$Merge^{0-3}$	17.83	-18.86^{a}	-348.91^{a}	12.36	-21.22^{a}	-20.22
	(13.80)	(4.94)	(128.82)	(10.31)	(5.19)	(22.95)
HHI	0.01^{b}	0.01^{a}	0.01^{b}	0.01^{a}	0.009^{b}	0.01^{a}
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
$Merge^{0-3} \times HHI$			0.31^{a}			
			(0.11)			
$Mrgsize$	-2.45^{c}	0.55^{b}	-1.49	-1.02	0.69^{a}	0.32
	(1.30)	(0.22)	(1.24)	(0.66)	(0.26)	(0.52)
Observations	1299	2628	1299	1326	2529	1219
R^2	0.5623	0.4719	0.5655	0.5580	0.4779	0.5525

Superscripts ^{a}, ^{b} and ^{c} indicate significance at 1%, 5%, and 10% respectively.

Table 7: Differential Merger Effects across Firms of Different Opacity

This table reports results for how information opacity affects merger effects. $Merge^{0-3}$ equals 1 if the lending bank was involved in a merger 0-3 years before the loan. HHI is the Herfindahl-Hirschman Index of the main banking market of each bank. $Mrgsize$ is the market share of the target bank in a merger and equals 0 if the bank is not a merging bank. $S\&PLT$ equals 1 if the firm has an $S\&P$ long-term domestic issuer credit rating and 0 otherwise. $S\&PSenior$ equals 1 if the firm has an $S\&P$ senior unsecured debt rating and 0 otherwise. Control variables for loan characteristics, firm characteristics and bank characteristics are included in the regressions but not reported in the table. Robust standard errors are reported in the parentheses.

	(a)	(b)	(c)	(d)
$Merge^{0-3}$	-18.31^{b}	-17.30^{a}	-64.82^{a}	-54.34^{a}
	(7.99)	(4.89)	(11.33)	(11.74)
HHI	0.01^{a}	0.01^{a}	0.01^{a}	0.01^{a}
	(0.004)	(0.004)	(0.004)	(0.004)
$Mrgsize$	0.45^{b}	0.46^{b}	0.45^{b}	0.45^{b}
	(0.21)	(0.21)	(0.21)	(0.21)
$S\&PLT$	-22.06^{a}			
	(5.27)			
$Merge^{0-3} \times S\&PLT$	15.32^{b}			
	(6.80)			
$S\&PSecured$		-10.62^{c}		
		(5.57)		
$Merge^{0-3} \times S\&PSecured$		13.80^{c}		
		(8.05)		
$LogofFirmAssets$			-11.17^{a}	
			(2.14)	
$Merge^{0-3} \times LogofFirmAssets$			10.43^{a}	
			(2.17)	
$LogofFirmSales$				-6.47^{a}
				(2.12)
$Merge^{0-3} \times LogofFirmSales$				8.12^{a}
				(2.16)
Observations	2780	2780	2780	2780
R^2	0.4772	0.4749	0.4783	0.4768

Superscripts ^{a}, ^{b} and ^{c} indicate significance at 1%, 5%, and 10% respectively.