BANK MERGERS AND CHANGES IN SMALL BUSINESS LENDING: SHOULD THE SIZE OF THE ACQUIRER MATTER TO SMALL BUSINESS OWNERS?

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Abstract

Along with SBCS technology development and the increasing size and prevalence of large banks there have been headlines showing increased credit availability for small businesses. While this may be true, there is reason to believe that this benefit does not blanket all small businesses equally. This research covered various underlying questions concerning SBCS technology objectives relative to mergers in the banking sector. Large and small banks already exhibit differences in small business lending, but the effects of mergers actually shift small business lending away from certain borrowers further. I used both the Mann-Whitney U-test and the Wilcoxon Signed Ranks tests to analyze the datasets. Using a separate-entity approach to compare the differences between large-small acquisitions and small-small acquisitions using the most recent FDIC merger decision reports (2010-2012), it was found that in terms of overall small business loans, increases to small business owners in terms of both volume and value for <$100K and $100K-$250K value ranges were significantly higher when small banks were acquired by other small banks. Significant differences in the datasets for each loan category were also found. In addition, marginally-risked small businesses demanding CRE loans may have better chances to receive loans from small banks while marginally-risked small businesses demanding C&I loans appear to have a higher supply with large banks. Overall, the effects of mergers seem to be in contrast to certain SBCS objectives. By comparison, India's implementation of SBCS technology seems to be more efficient and it appears if imitated in America it may hedge against certain negative effects found in this research.

Keywords: large bank acquirer, small bank acquirer, small business loans, SBCS objectives, separate-entity approach, merger effects, marginally-risked small businesses, India's SBCS technology implementation

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I. INTRODUCTION

1. Background

America now operates in a day that too big means “too big to fail” and the “too small” simply cannot compete. Big is beautiful and it can be argued that there has been a shift from supporting everyday businesses ran by everyday people to, in some ways, shunning these businesses in favor of their corporate counterparts. The banking sector is a prime example of this phenomenon and small banks are currently in a losing battle in lending to small businesses as new technology enables large corporate banks to continue their reach to this sector. Large banks are becoming very advantageous over smaller banks as the number of small banks continues to decline. Concurrently, there has been an increase in the distance between borrowers and lenders. Changes will continue further as long as the government provides support for a smaller banking sector.

As distance grows between banks and businesses there is a shift from relationship-based lending to what some researchers have coined “cookie-cutter” lending methods (see Cole, Goldberg, and White, 2004); following predetermined formulas and lending quotas. Regulators must monitor this occurrence and not allow small banks that often have relationship-lending incorporated in their methods to lose their presence in small business lending. The reason for this comes from a few concerns that will be covered later in the text. In a span of approximately 20 years, on-going change in the banking sector is highlighted by thousands of mergers that have taken place. The number of banks in this time span has dropped nearly 33% (Jagtiani, 2008, p. 29). Over half of these mergers have been between two small banks, but in term of assets, 43% of these small banks were acquired by banks with assets between $1 Billion and $10 Billion. In terms of numbers, well over 30% of these

mergers were between large banks in this asset range and small banks with less than $1 Billion in assets (Jagtiani, 2008, pp. 33-34). This means that if there are observable differences in small business lending accredited to these types of mergers, with this much concentration it would undoubtedly, collectively affect small businesses. For now, I would like to point out that as small community banks continue to be acquired by either type of bank there may be both positive and negative effects on small business lending. Much of the concern will be placed on smaller firms that are not easy computer-picks for loan opportunities, but nonetheless provide jobs to communities. Also, a degree of attention will be placed on the paradigm shift in small business lending and its creation of a new environment where these businesses are at the mercy of a formula rather than a combination of both lending technologies and an established relationship. We cannot allow the full automation of a system wherein judgment by a human is completely omitted and relationships between banks and borrowers become obsolete.

The introduction of technology to analyze and rate small businesses by Fair-Isaac, Inc. in 1993(5) has allowed commercial banks to penetrate the small business lending market. This technology enabled the quantification of the likelihood that a business will default on a loan thereby opening the door to a whole new section of the lending portfolio. The structure of these lending technologies incorporates only a few, yet strong variables in deciding whether a business owner is capable of making loan payments. Incidentally, some research points out certain inherent flaws in the models and has, as a result of cases involving large banks dropping small business loans from their portfolios in times of recession, created concerns regarding the resiliency of large banks to lend to these small businesses during economic downturns. During these occurrences, smaller banks are aware of their local communities and specialize in relationship-based lending to small businesses in need of funds and have more confidently lent following the recent economic slump (Williams, 2013, p. 9).

My goals of this research is not to push for the continued existence of all small banks per se, but rather to elucidate the importance of knowing and accepting what is necessary in order to prevent adverse selection relating to all types of small businesses no matter their financial strength. Certain studies such as Berger and Frame (2007, pp. 7-8), and Cole et al (2004, p. 230) show that at least historically, large banks have the inclination to use ratings produced by small business lending technologies, which emphasize financial factors, intensively and have tended to auto-accept or reject loans. To further add to the complexity concerning the possibility of over-emphasis on financial factors, most SBCS model development does not involve other "soft" information such as information gathered from meetings with the business owner or key employees. I fear that some pertinent information is not considered. This idea stems from the differences in the way America's small business loans rating technologies is implemented compared to India's implementation of the technology used to rate these small businesses. The reason for the comparison to India stems from the fact that there is a large concentration of SMEs that significantly contribute to India's GDP and knowing how to fuel growth in this sector has become one of India's expertise. In the way small business information opacity is overcome and the lending process is facilitated in terms of the technology itself, there are surely some aspects from which America could learn.

Following the 2007-08 recession American small businesses relied on a plethora of banks which hoarded cash and suppressed economic growth. Small and medium sized firms demanded cash to finance growth projects, but due to the opacity in information regarding their businesses, banks often hesitated to lend. As the economy has been on the mend, there is much coverage that banks are upping their lending to small businesses and that the availability of credit is much better than it once was. While the unavailability of SBL may not seem like a problem anymore, there are certain concerns that not all small businesses are sharing this improvement equally. It is especially interesting to study this area in relation to

the ongoing merger trend since the 1990s. Small banks spread throughout the United States are unlike the mammoth banks that have traditionally made their money by extending credit to large corporations. These smaller community banks operate within the same communities as small firms in need of funds and are therefore more apt to successfully monitor small business loans. The top 5 big banks hold about 40% of all domestic deposits but only make about 16% of the small business loans in America; this figure has dropped even lower in recent times while smaller banks have picked up some of the slack with an increase of $17 Billion by the end of 2011 (Kassar & Bernstein, 2011).

Historically, the process of smaller businesses obtaining loans from these larger banks were often reflected by an onslaught of inefficiencies pertaining to time consumption and bureaucratic loops. These obstacles were not easily hurdled because decisions could not be made quickly, particularly because most of the time the loan officer had no established relationship with the business owner. Whereas smaller banks have the ability to more accurately monitor smaller loans because of the ongoing business relationship they have established with the firm often located in the same small community, larger banks have a more difficult time. This problem which prevented commercial banks from broadening their small business lending portfolios was finally overcame when a new technology was developed and implemented by banks starting as early as 1993 (FICO). This new system (Small Business Credit Scoring) enabled lending organizations to have a greater ability to assess associated risks in lending to small businesses.

Banks exist for certain reasons and demand profits just like most other businesses. In order to accomplish this, lending is absolutely pertinent. Making loans to businesses is a regular day-to-day activity that is essential for operations. Banks have to find a safe balance between increasing the number of loans and keeping default risk at check. Loaning to businesses often gets misconstrued to mean loans to large corporations, but the fact of the

matter is that it is really the smaller businesses that need cash to fuel growth and accelerate the job market and growth of a nation. Not just the best small businesses, but all small businesses need to be aided in order to grow the small business lending market. Larger banks have notoriously been inclined to lend to larger firms while refusing to lend to smaller ones. Much of this reason lies within the inherent transaction costs in the lending process. Banks have to act as intermediaries in monitoring businesses that demand loans but because these businesses do not have much public recognition they are ultimately considered riskier. Associated monitoring costs in lending to these businesses may not be handled in the most efficient way. This coupled with possible merger effects could vitally reshape the small business lending environment. Therefore, it is important to monitor for possible public policy issues and to take preventative measures if necessary.

2. Problem Identification

Much research shows that transactional lending, at least in economic upturns, allows for more access to capital for small firms. Transactional lenders, specifically those that are not primary fund suppliers to the business, heavily use small business credit scoring models that establish ratings primarily focused on eight to twelve factors (Berger & Frame, 2007, p. 7) that as research indicates may lead to more type I (not extending loans to quality borrowers) and type II errors (extending loans that will default) (Hasumi, Hirata, and Ono, 2012, p. 9). Small banks—those that have been broadly defined to have total assets less than $1 billion[1]—rely on Consumer Credit Scoring and relationship-developed soft-information much more dominantly than large banks which has not only allowed them to decrease the chance for type I and II errors, but Hasumi et al (2012, p.1) also show that long-term performance is higher,

[1] According to the Federal Reserve's December 17, 2008 Joint Press Release, this number is actually $1.109 billion. Like extant literature, I have for the sake of simplicity used $1 billion as a cut-off.

especially during economic downturns. Consequently, small businesses can rely more on small rather than large banks to extend loans in subpar economic conditions.

SBEs in the U.S. experience more difficulty compared to larger businesses when trying to acquire capital. Banks and other lending institutions are exposed to asymmetric information problems concerning small businesses and cannot accurately measure risk exposure of lending to the business and may shy away from it altogether. This is especially true for large banks that are not the business's primary bank, meaning it does not have an established relationship with the borrowing firm. Even for small banks that have established relationships this asymmetric information poses a problem in keeping their asset portfolio's risk in check. Smaller businesses simply do not have the track record banks need to accurately assess risk exposure. To remedy this problem, small lending organizations started checking the small business owner's personal credit score, also known as Consumer Credit Scoring (CCS) to analyze the financial history of the borrower (e.g., their loans and payments history). Small businesses' primary banks still use this (along with soft-information) as the most influential factor in determining whether to extend loans (Berger, Cowan, and Frame, 2011, p. 3). The monitoring process between larger publicly traded corporations and their respective larger banks is more efficient because the presence of much more symmetric information allows credit rating agencies like S&P, Moody's and Fitch to develop ratings that enable investors and financial institutions alike to assess the risk involved with lending to the particular business at hand. Assessing the risk exposure is extremely important on many fronts and SBCS technologies work toward banks' adherence to internal risk controls and Basel requirements, distinguishing safe loans from risky loans and being able to establish risk-based lending (FICO).

Along with SBCS technology development and the increasing size and prevalence of large banks there have been headlines showing increased credit availability for small

businesses. While this may be true, there is reason to believe that this benefit does not blanket all small businesses equally. More light should be shed on whether certain businesses are potentially more positively affected than others. This research will take one major direction but attempt to cover various underlying questions concerning SBCS technology and mergers in the banking sector. The overall direction pertains to the following question: By using SBCS technology, is the commercial bank's ability to quantify risk associated with higher opacity and the following ability to extend risk-based loans to all types of small business loan demanders without bias following a merger observed less in reality than in theory? In other words, I will study how the effects of mergers may shift SBL by large banks away from SBCS objectives. This does not go to say that SBCS technology is not working, but rather I am attempting to answer how these two either work together or against one another and how this may affect the availability of the different types of small business loans. Most literature focuses on changes in SBL as a result of mergers but do not discuss deeply how these changes may affect different types of businesses that have different borrowing needs and how these changes work toward or against SBCS technology objectives. By highlighting my findings in regards to these areas using recent merger data I will attempt to fill this gap as my major contribution to existing literature. In order to accomplish this, the following objectives and questions are outlined below.

Throughout this research, I will use certain terms interchangeably. Small business lending will be abbreviated as SBL and occasionally small businesses may be referred to as small business entities (SBEs). Commercial banks may be referred to as large banks and community banks may be referred to as small banks. Lastly, small business credit scoring will be referred to as SBCS.

3. Research Objectives

(1) To mark differences between pre-merger small business lending and post-merger lending in mergers involving both large acquirers and small acquirers using a single-entity and separate entity approach for comparison.

(2) To analyze the recent upward trend in small business lending and to elucidate how provided effects may differ among small businesses with different financial soundness.

(3) To offer an alternative in implementing SBCS technology that may lower the transaction costs associated with small business loans burdened by the small bank.

4. Research Questions

(1) Are there distinct differences in the small business lending environment subsequent to mergers involving different sized acquirers with their respective differences in monitoring and the implications for small businesses, including those that are not as financially sound?

(2) Is there a potential disconnect between certain SBCS technology objectives and what occurs subsequent to mergers, particularly those involving a large and small bank and what are the possible implications for small business owners?

(3) Are there differences in the small business lending environment of large banks that were involved in a merger compared to similar, large banks that were not?

The flow of this research will begin by covering existing literature in the next chapter to discuss the important facts surrounding SBCS technology and the lending environment. This will include describing what SBCS is, its development, objectives, and methods. Then SBCS technology implementation will be discussed and differences in monitoring between large and small banks will be examined. After clarifying what existing literature covers, I then highlight my hypotheses to test in order to fill literature's less discussed areas. The third

chapter covers the specific methodology that I will use in order to answer those questions as well as sources of data and particular limitations to my research. In closing of the chapter, I will state expectations from my study's results and in chapter 4 I will compare the findings to extant literature as well as my expectations. From there, I will reflect on my objectives and answer my hypothesis. In chapter five, the final chapter, I will connect the findings to possible policy concerns involving small businesses and the acquisition of loans as well as alternatives to SBCS technology implementation using India as the focus point in this comparison. The final portion will be dedicated to the current ways in which certain organizations are already working toward maintaining a solid lending environment for small businesses.

II. LITERATURE REVIEW

Large banks, by nature, have always held certain characteristics in small business lending; even with the addition of SBCS technology, certain patterns have emerged that are in contrast to small bank lenders. The deviation from past ways in dealing with small business relationships; namely relationship lending, has led to a paradigm shift making it difficult for many small banks to compete with big-name banks in SBL. SBCS has decreased the need for personal relationships that once allowed community banks to have an edge in SBL to in recent years not be able to compete with large commercial banks. Commercial banks' competitiveness is largely attributed to its ability to lend at lower rates. Large commercial banks are able to offer lower interest rates in two ways: through larger economies of scale they enjoy as well as the adoption and use of SBCS technologies in their small business lending portfolios. The economies of scale of large commercial banks is quite straightforward: due to their size they are able to expand over many territories, especially after the introduction of internet banking which enables small businesses to be approved and receive loans by accessing lending opportunities over the internet. This allows large banks to spread the costs of SBCS technology over a large customer base which makes ratings per customer manageable. Nonetheless, when lender-borrower proximity is closer more information regarding borrowers is held by community banks which increases credit availability. The more community banks there are operating in the same communities as borrowers the more small businesses can be accepted for loan opportunities. With differences in monitoring, however, it may be more costly to small businesses.

According to Cole et al (2004) and Jagtiani (2008), following a 33% drop in the number of banks between the years 1990-2006 there has been an uproar of public policy concerns that a substantial decrease in the number of small banks may hamper the ability for small businesses to obtain loans. "It is well established that larger banks allocate smaller

percentages of their assets to small business loans than do smaller banks" (Cole et al, 2004, p. 228). Besides the fact that there are major monitoring differences between large and small banks, large banks specialize in large business loans with no information transparency issues. These differences, however, are not the only reasons to believe that small businesses may be affected by continued mergers in the banking sector. Agarwal, Sumit and Hauswald (2010) show that even distance plays a role in affecting SBL. Using extant literature the following sections will go into further detail regarding the differences in monitoring between large and small banks (e.g., relationship vs. transactional lending and differences regarding rating technologies) and the effects of mergers. Evidence for existing concern will be highlighted followed by other concerns that I have along with my hypotheses.

1. SBCS Technology: The Good, Bad and Rejected

1.1 What is SBCS Technology?

SBCS is a quite new phenomenon in the banking industry that has been utilized by larger lending institutions and comes in many forms tailored to specific needs. In general, SBCS technology "involves analyzing consumer data about the owner of the firm and combining it with relatively limited data about the firm itself using statistical methods to predict future credit performance" (Berger & Frame, 2007, p. 6). In the words of Loretta Mester, vice president and economist for the Research Department at the Philadelphia Federal Reserve Bank and the head of the department's Banking and Financial Markets section,

> Credit scoring is a method of evaluating the credit risk of loan applications. Using historical data and statistical techniques, credit scoring tries to isolate the effects of various applicant characteristics on delinquencies and defaults. The method produces a 'score' that a bank can use to rank its loan applicants or borrowers in terms of risk. (p. 4)

Credit rating models are imperfect predictors of default or serious delinquencies but should assign higher scores to businesses that perform well and lower scores to businesses with subpar performances. Imperfect means the models will sometimes be prone to type I and II errors; some borrowers will not receive a rating that is truly representative of their ability to make timely payments. Much of the concern involving this technology lies in the way commercial banks utilize the technology. Large banks often have tendencies to use the technology as an automatic decision-making tool in accepting or rejecting loans. This factor along with other differences large banks exhibit in small business lending raises other concerns as well. Much of this research is related to whether it is possible some small business owners are not equally benefited by the shift of ownership of SBL loans to large bank lenders.

SBCS is used to rate different types of loans depending on the specific type of technology that is implemented by the bank. Over the past twenty-five years SBCS has been widely used in consumer credit markets to issue credit cards and other types of loans such as auto loans and home equity loans (Loretta, 1997, pp. 5-6). It was not until the 1990s that models fit for business loans were developed by the Fair-Isaac Corporation. As previously mentioned, SBCS is a hard-information oriented transactions lending tool that dissolved the need for close proximity and established relationships (Berger & Frame, 2007, p. 6). Berger and Frame continue to explain that although there are other types of technologies that also focus on financial factors, SBCS involves "personal consumer data on the owner obtained from consumer credit bureaus, data on the business collected by the financial institution, and in some cases, information on the firm from commercial credit bureaus." This technology is not solely used for opaque businesses. The technology can also be used to reduce underwriting costs that negatively affect bank financial performance. Therefore, it is easy to notice that in more than one way, large banks have developed a competitive edge in SBL

accredited to the technology and differences in bank characteristics such as economies of scale.

1.2 SBCS Development

According to Berger and Frame (2007) most large U.S. banks did not adopt SBCS until the mid-1990s because the loan process was non-standardized and too much heterogeneity existed. This heterogeneity covers many different aspects that made it difficult to pool data together which hindered predictability in the models. Each bank has different underwriting approaches and there are many different borrowers of varying financial strength and loan volume and value demands. Adaptations of past models occurred when there was a statistical realization that variation in the smallest business credits were highly explained by information pertaining to the principal owners (p. 7).

Most models in existence have conjointly worked with Robert Morris Associates and Fair-Isaac—the largest external provider of SBCS—and therefore Fair-Isaac's Small Business Scoring System (SBSS®) will be used in explaining the technology's development. Development of SBCS technologies involved separating loans into three categories: good, bad, and rejected loans. For SBSS® good was defined as one that had not been 30 days delinquent more than twice in the first four years outstanding, bad was one that was more than 60 days delinquent. Rejected loans were examined for characteristics; this process was known as reject inference (Hand & Henley, 1997, p. 526). After these loans were separated, statisticians could then formulate models using actual loan performances. Participating banks provided 300 accounts (100 good, 100 bad and 100 rejected) along with consumer credit bureau reports for up to two of the company owners and the company's commercial credit report (Asch, 1995 as cited by Longenecker, Moore, Petty, 1997, p. 7). In total, 17 large domestic banks (later reformed to 25) participated in providing FICO with the needed data

(Berger & Frame, 2007, p. 8). The four sources of data used to create the model were as follows:

1) Consumer credit bureau report data,
2) Business credit bureau report data,
3) Company financial ratios restated relative to RMA[2] industry norms,
4) Credit application data.

Asch as cited by Longenecker et al continues that weighted scores of the owners were calculated and then combined with the firms' scores and then highly collinear variables or those that did not make much contribution to predictability were omitted from the model. In general, scores pertaining to the owner included factors such as income, net worth, available credit, prior delinquencies and bankruptcies (Berger & Frame, 2007, p. 7). Berger and Frame go on to state that scores relating to the firm include financial ratios (e.g., profitability and leverage), the presence of past credit problems, as well as the type of business by standard industrial classification (SIC). Segmentation analysis was also conducted to increase predictive power. Subpopulations were created based on sales, status of incorporation, geographic location, loan type (line of credit, or term loan), industry groupings, and total current request for credit. Upon completion of the data examination, two scorecards were used based on the total current request for credit: 1) firms requesting less than $35,000, and 2) firms requesting more than $35,000. The preceding methodology in creating the models for SBSS® was again based on good and bad loans. To ensure population representation, reject inference[3] was used to simulate how the rejected loans, if accepted, would have performed.

[2] Risk Management Association
[3] More on reject inference can be found in Longenecker et al (1997, p. 7).

2. Implementation and Monitoring

2.1 Commercial vs. Community Banks

According to Berger and Frame (2007), most large banks, even though they may have proprietary models, usually purchase SBCS technology from outside vendors. This is especially true when banks extend loans outside communities in which they operate a branch. It is common to purchase these models from the Fair-Isaac Corporation due to its array of products. They have several different models that can tailor to different bank strategies. For example, there are models depending on the type of credit (e.g., loans, leases, line of credits), and the size of credit—loans under $50K, less than $100K, or less than $250K. Some lenders only use the models for credits under $100K, others may use a combination of them. There are also less mature models aimed at credits in excess of $250K (p. 8). Nonetheless, more commonly large banks use the technology more for rating smaller small business loans. This is not surprising because large banks tend to specialize in large loans where more interest revenue can be earned and therefore may be capable of rating these loans using proprietary models.

In SBL, since large banks focus on using the technology for lower value loans it appears large banks are still more confident in lending larger value loans just as it specializes in lending to large businesses—and therefore large loans—rather than small businesses. Large banks have not opened up equally to small businesses as they have with large businesses. SBCS technology aims to allow large banks to open up more to small businesses than they would have in absence of the technology. However, as Glenn Goldman, chief executive of Capital Access Network, which helps small businesses find credit, states, “It’s much more efficient to devote time to a single $1 million transaction than to twenty $20,000 transactions” (Helm, 2013). Therefore, the potential push-and-pull factor between a large bank’s expertise

and SBCS technology must be scrutinized. Also, not all large banks use the technology in the same fashion. Large banks could also use the technology with the major purpose of reducing the opacity problem and to be able to set contract terms more accurately (Berger & Frame, 2007, p. 8). This purpose for using the technology will be consistent with relatively higher monitoring costs which hamper bank flexibility in lending more SBL; these banks will tend to have less risk, but fewer small business loans than comparable banks that use the technology with a cost-saving strategy.

In order to justify lending to small businesses that will generate less interest revenue per loan, of course large banks, and often small banks, have to minimize associated transaction costs and have sufficient loan volume. Therefore, it is not surprising to see more concentration in the microloan section within the lending portfolio. However, it is essential to keep in mind that it may be enticing for commercial banks to use the technology as an "auto-accept/reject" tool in order to meet the volume levels that justify the increased exposure—a numbers game (Berger & Frame, 2007, p. 8). In fact, research suggests that reduced underwriting costs, which are associated with auto-accept/reject usage, is the dominant way to implement the technology (Berger & Frame, 2007, p. 19). Essentially, large banks use the cost-saving feature as a way to offset the potential losses from bad loans as loan volume increases. Hence, it is worthy to consider the possible downside of heavy reliance on large banks for loan opportunities in the wake of an ongoing merger trend since the 1990s. "We never want to see lenders in the position where they are skimming off the easiest loans," says David Jeffers, Fannie Mae's vice president for corporation relations for eleven years (Longenecker et al, 1997, p. 9). Indeed, small businesses never want to see this occur in the lending sector which decreases the chances for marginally-risked businesses to obtain loans. However, Ami Kassar, founder and chief executive of Multifunding, a small business loan brokerage, claims that it may already be too late: even though small business lending has

picked up, large lenders are only aggressively lending to the top 10% of financially strong firms (Quittner, 2013). More information on the trend of small business lending is presented in the *Trends and Performance in the Banking Sector* section.

Community banks do not currently heavily use SBCS technology. According to Berger et al (2011) in terms of rating technology, small banks tend to focus on using Consumer Credit Scoring (CCS) technology driven from information on the principal owner rather than the business itself (p. 4). Another key point, however, is in addition to these scoring models, community banks—often acting as SBEs' primary banks—have access to soft-information regarding the business and owner that large banks mainly do not. Soft-information is by nature mostly qualitative where much of the determining factors concern information gathered over time from relationships (Berger & Frame, 2007, p. 6). Since small banks utilize this type of loan monitoring, they are often referred to as "relationship lenders." Community banks rarely use scoring as auto-accept tools and frequently use different sources of information simultaneously in the decision of whether to extend loans (p. 16). In the same study, it was found that only around 14% of small banks use SBCS technology at all. It is important to note the reason for this, however. Small banks are known to face several difficulties in contrast to large banks: the inability to take advantage of economies of scale in operating expenses; and the inability to attract a pool of new customers due to (a) a thin selection of financial services and (b) competition with nonbank financial institutions (Emmons, R Alton, & Yeager, 2004, pp. 1-2). Therefore, it has been impractical for small banks to implement SBCS due to high capital costs and low loan volume (Longenecker, 1997, p. 8). Nonetheless, small banks' combination of CCS and soft-information allows for more accurate ex-ante monitoring (i.e., fewer type I & II errors), interim, or ongoing monitoring, and ex-post monitoring.

Where large banks tend to be more rules based, small banks have notably more flexibility in ex-ante monitoring for loans. Loan officers at small bank branches do not have to endure so many bureaucratic disempowerments to extend loans; there is more of a "character" based approach (Cole et al, 2004, p. 229). Large banks face a more severe threat of agency issues than do small banks where "top management can more easily monitor the behavior of loan officers and coordinate operations" (Cole et al, 2004, p. 230). Much of the reason for this is that managers and owners have a greater chance to be the same in small bank operations. It follows that information centered on established relationships have more focus than formulas in assessing whether to extend a loan.

In order to describe more in detail the differences in monitoring between large and small banks I turn to the results from a study conducted by Cole et al (2004) concerning distinctions in variable importance in the decision to accept a loan. These findings are highlighted in figure 1. Going down the t-test column in *Panel D,* there is a significant difference in the firm size variable between the two banks. This means that small banks lend more to smaller small businesses than do large banks. The next significant difference is the African-American variable. Cole et al (2004) interpret this not as racial discrimination, but rather a gray-area between some of the financial factors such as an owner's personal wealth, income and credit history. SBCS technology, which generates scores that banks tend to heavily use, allows for explicit reason in accepting or rejecting a loan. This enables large bank lenders to not violate the Equal Credit Opportunity Act.[4] Small banks appear to favor minorities—again most likely explained by less emphasis on financial factors. Whether the business owner banks in person also plays a significantly different role in acceptance between the banks. This supports the importance of relationship lending by small banks and the lack

[4] For details, see Equal Credit Opportunity Act legislation by the United States DOJ. Equal Credit Opportunity Act of 1974, 15 U.S.C. § 1691.

thereof in large banks. Standalone significant factors for large banks in the acceptance of loans are as follows: being able to provide accurate financial information, cash-to-assets, African-American ownership, loan-size-to-assets, the number of sources and whether the business banks in person. Accurate financial information is key to getting accepted at large banks. This is consistent with their inclination to use SBCS with particular emphasis on financial factors. The same goes for cash-to-assets and African-American ownership because both are related to financial factors. Significance in the number of sources SBEs use is consistent with large banks preferring to be the only supplier of funds to a particular business. In other words, large banks are less inclined to lend to recipients of multiple sources of funds (p.248). The negative significance of whether the borrower banks in person is consistent with the large bank lending nature to lend across longer distances which make it impractical for owners to bank in person.

Small bank standalone significant variables are as follows: firm and owner delinquencies, loan amount, and deposit and loan relationships. Firm and ownership delinquencies comes as somewhat of a surprise because typically large banks are more prone to focus on standard criteria in approving a loan. Nonetheless, even though small banks show more flexibility in lending to businesses than do large banks, it seems past delinquencies are still a major concern for acceptance among small banks. The negative sign for loan amount suggests that small banks tend to lend more to smaller small businesses than do large banks. With smaller assets, small banks simply do not have the capacity like large banks do in lending high-value loans. Finally, deposit and loan relationships is again consistent with small bank nature to lend more based on relationships. Having an existing relationship before applying for a loan at a small bank is associated with a higher chance of acceptance. Shared significant factors between both banks are firm size and age. The older and larger the firm is the more loan availability there is by both banks. However, magnitudes for both variables are

higher for large banks but only statistically significant for firm size. Firm size and age are not only associated with financial factors such as revenue, which large banks favor, but also the availability of more soft-information, which small banks favor.

Figure 1. Differences in Monitoring Between Large and Small Banks

	Panel A. All Banks		*Panel B.* Large Banks		*Panel C.* Small Banks		*Panel D.* Large-Small Difference	
Variable	Marginal Effect	*t*-Stat.	Marginal Effect	*t*-Stat.	Marginal Effect	*t*-Stat.	Marginal Effect	*t*-Test
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.162	1.16	−0.209	−0.54	0.369	2.32**	−0.577	−1.39
Firm Characteristics								
Financial Records	0.041	2.09**	0.097	2.15**	0.013	0.67	0.085	1.73*
ln(Firm Size)	0.051	3.84***	0.093	3.74***	0.027	2.39**	0.066	2.43**
ln(Firm Age)	0.070	2.85***	0.115	2.25**	0.038	1.80*	0.077	1.39
ROA	0.008	0.77	−0.003	−0.13	0.017	1.47	−0.020	−0.78
Debt-to-Assets	−0.014	−0.71	−0.060	−1.38	0.017	0.68	−0.077	−1.53
Cash-to-Assets	0.089	1.98**	0.295	2.95***	−0.018	−0.44	0.313	2.91***
Firm Delinquencies	−0.021	−2.17**	−0.013	−0.58	−0.025	−2.42**	0.012	0.52
Owner's Delinquencies	−0.032	−2.79***	−0.031	−1.11	−0.020	−2.04**	−0.011	−0.36
African-Am Owner	−0.046	−0.66	−0.432	−2.18**	0.001	0.01	−0.433	−2.12**
Female Owner	0.010	0.35	0.008	0.13	0.002	0.05	0.006	0.09
Owner's Age	−0.001	−0.90	−0.004	−1.32	−0.000	−0.25	−0.003	−1.10
Loan Characteristics								
ln(Loan Amount)	−0.016	−1.66*	−0.002	−0.08	−0.022	−2.18**	0.020	0.81
Loan-Size-to-Assets	−0.014	−2.23**	−0.030	−2.37**	−0.010	−1.43	−0.020	−1.41
Collateralized Loan	0.020	0.84	0.040	0.64	0.018	0.83	0.022	0.33
Relationship Characteristics								
Deposit Relationship	0.015	0.60	−0.050	−0.70	0.067	2.50**	−0.118	−1.54
Loan Relationship	−0.032	−1.59	0.014	0.28	−0.063	−2.62***	0.077	1.36
Fin Mgt Relationship	0.030	1.32	0.006	0.13	0.036	1.37	−0.028	−0.51
ln(Length of Relationship)	−0.001	−0.74	−0.005	−1.01	−0.000	−0.11	−0.004	0.86
Number of Sources	−0.026	−3.05***	−0.037	−2.06**	−0.011	−1.51	−0.025	−1.32
Distance	−0.017	−1.22	−0.032	−1.21	0.011	0.59	−0.043	−1.32
Bank in Person	−0.064	−2.16**	−0.157	−2.58***	−0.022	−0.80	−0.136	−2.03**
Bank Characteristics								
ln(Bank Assets)	−0.036	−8.01***	−0.050	−2.46**	−0.029	−2.72***	−0.021	−0.92
SIC Dummies	Yes		Yes		Yes			
Log-Likelihood	−999.879		−813.476		−770.579			

In panel A, the full sample of 1,102 observations is used in estimation of a bank's decision to extend or deny credit, simultaneous with the firm's decision to apply for credit at a large or a small bank. In panel B (panel C), the selected sample of 517 observations for large banks (585 observations for small banks) is used in estimation of the bank's decision to extend or deny credit, simultaneous with the firm's decision to apply for credit at a large bank (small bank). Results for the firm's decision to apply for credit at a large or small bank appear in Table 3. For each variable identified in column (1), the panels present the variable's estimated marginal effect and *t*-statistic. Not shown are eight one-digit SIC dummy variables. In panel D is the result of a *t*-test for significant differences in the large and small bank marginal effects. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

2.2 SBCS Objectives

SBCS technology has of course been completely essential in allowing commercial banks to penetrate the small business lending sector. The technology's purpose is centralized around enabling banks to reach multiple objectives that not only increases bank efficiency, but is also aimed at benefiting SBEs. The main objectives of SBCS according to Mester, L. (1997) and Berger et al (2011) along with a more detailed description are as follows:

- Decrease the time it takes to monitor for a loan.
- Allow for equal assessment of potential borrowers.
- Increase the overall quantity of small business lending.
- Increase small business lending to marginally-risked borrowers.
- The ability to lend over longer distances.

Starting with some of the most obvious objectives, SBCS technology is designed to increase the rate at which businesses can be monitored in the ex-ante and subsequently be decided of worthiness for a loan. Mester, L. (1997) explains that SBCS greatly reduces monitoring time from approximately 12.5 hours to less than an hour (p. 8). The actual time it takes to monitor for a loan depends on whether the particular bank relies solely on the technology or conjunctively uses other information. The second objective listed deals with fair monitoring regardless of borrower characteristics such as race, gender, etc. in adherence to The Equal Credit Opportunity Act (p. 9). Furthermore, the technology is supposed to be unbiased in increasing lending in all areas no matter the local income ranges. SBCS allows for explicit reasoning in whether it approved or rejected a business loan. Initial concerns were that low-income borrowers or minorities—who may be associated with different borrowing needs—may not be incorporated in the data from which the models were built (p. 9). Even though, according to a study by Fair-Isaac this proved not to be the case, concern over the model's resiliency remains intact which is discussed in more detail in the next section. The next

objective, presented in Berger et al (2011) is an increase in the quantity of SBL. Since SBCS technology shortens the time needed for business assessment and loan decisions, more businesses can receive loans. Many banks show this to be the case. One such example is the Hibernia Corporation, a Louisiana bank that at the time had $6.3 billion in assets. Before implementing the technology, Hibernia typically processed 100 applications a month. After implementation, this number jumped up to 1,100 applicants per month (Longenecker et al, 1997, p. 8). The next objective mentioned is to allow more lending to relatively riskier borrowers. SBCS assigns a rating to businesses which enables banks to conduct risk-based lending in setting loan rates where riskier borrowers pay a higher interest rate than safer businesses. In essence, SBCS is aimed not only to improve the ability to lend more in terms of raw numbers, but also it is aimed to increase loan availability to marginally-risked businesses. This should also include the increased capacity to lend to other business sectors other than commercial and industrial loans with the help of SBCS that can apply ratings to businesses in other industries. Finally, not surprisingly, it is aimed at increasing lending over longer distances (Berger et al, 2011, p. 2). One of the main attractions of the technology for large banks is the newfound ability to lend outside of their own territories and without any prior relationships increase their SBL portfolios. This last objective is quite inclusive and in-part includes other goals of the technology. For the sake of meticulousness, I broke them down into separate points.

2.3 Pitfalls

2.3.1 Scoring Methods

Some concern regarding the accuracy of the models, and therefore the effects on small businesses, stems from economical perspectives. The belief is that these models were created using data on businesses that do not take into consideration the effects of economic downturns on the predictability of the models (Mester, 1997, p. 10). Historically, when

economic slumps prevail, SBCS loans have performed sub-optimally compared with loans extended between relationship lenders and the respective borrowers. Evidence has been provided by other studies that in economic downturns SBCS loans sustain a 0.82 percentage-point increase in the probability of default compared with loans by primary banks that show a 0.46 percentage-point decrease in default probability (Hasumi et al, 2012, p. 24).

A potential inherent problem which lies in FICO's SBSS® and other SBCS models is that data is pooled from previously existing loans that may be, according to certain studies, exposed to selection bias. By using preexisting small business owner information there may be some instances where models produce unrepresentative scores on businesses which may give rise to issues regarding the accuracy in assessing small firms. Hand and Henley (1997) shed light on this issue in discussion of population drift. This means that as time passes there may be a shift in the distributions of small businesses that may prove detrimental to the predictability of SBCS models. This is expected due to the fact that "applicant populations are subject to economic pressures and a changing competitive environment" (p. 525). If banks using SBCS technology increases its lending to small businesses by using mass marketing, it is essential the pool of lenders behave the same way lenders do from which the models were built; otherwise, "the model may not accurately predict the behavior of these new applicants" (Mester, 1997, p. 10).

In terms of particular statistical methods, linear probability, logit, probit, and discriminant analysis are all different models that can be used. It is essential to say nonetheless each model assumes different assumptions on the distribution of the data (Hand & Henley, 1997, p. 525). Therefore, it follows that as the distribution of the applicant population possibly shifts, the certain type of statistical models being implemented becomes very important. This perhaps goes to explain the findings by Williams, V. (2013) that in economic downturns large banks are outperformed in SBL by relationship lenders that utilize

both CCS, which mostly pertains to financial data on the business owner, as well as existing relationships which provide lenders with more soft-information on not only the borrower but also the business.

It is important to keep in mind SBCS technologies could also contain certain bias generated from protecting "secret formulas." If a company has produced its own rating technology, it will not be willing to be completely transparent to the academic community because providing too much information could be detrimental to its core competence. Other problems revolve around protecting applicant confidentiality (Hand & Henley, 1997, p. 526). So in measuring whether SBCS technology is as good as it is proclaimed to be, we should not focus on the positive attributes the technology is supposed to provide but rather monitor the performances and compare these performances to loans extended by small banks to assess how the technology is actually used. Numerous studies exist on the matter. Other than keeping secret formulas out of the public eye, the actual type of SBCS banks choose to implement also becomes a very important factor. As it has already been established, there are a few different models which can provide flexibility in ex-ante monitoring for loans, but at the same time requires banks to actually select the specific model or combination of models which I fear could lead to bias ratings or adverse selection and an increase in the transaction costs burdened by banks if the specific models are not representative of the borrowers. One model cannot fit all types of small businesses and the purchase of multiple models increases costs that lenders have to underwrite. These models, therefore, do have innate flaws and are truly imperfect predictors.

2.3.2 The Larry Rule

Especially in the case of large banks that possess the cost-saving motive for applying SBCS in loan selection, some businesses that are credit worthy will not be extended loans because other soft information is non-existent. This information involving the business and business

owner is essential to more accurately assess the risk involved in the lending process. Without this information the adverse selection problem is likely to occur and marginally-risked businesses may endure more difficulties obtaining loans. Adverse selection can be noticed in the following example that illustrates innate flaws in numbers gaming. Larry Lindsey, a former Federal Reserve governor, was once denied a ToysRus® application because the model did not take into account sufficient soft information (Dean, 2008). Although the Larry Rule applies to consumer loans, I contend that this same type of error can be observed in the banking sector in extending small business loans when less-than-optimal information about the firm is held by the lending institution.

Mr. Lindsey elucidated a specific problem occurring when too much emphasis is placed on numbers. He showed that it is nothing other than possible for a person to be denied credit when a flawed system is used. In this case, personal credit bureaus placed too much emphasis on the number of applications for store-specific credit cards as a signal for a riskier borrower. Having a six-figure income, being a millionaire, and being a member of the most prestigious financial committee of the world should be proof enough that he is quite capable of making timely payments (Dean, 2008). However, because the system was flawed and did not take into consideration other, more important factors, Mr. Lindsey was denied the credit card. This goes to show it is very possible that by focusing too intensively on numbers (numbers gaming) worthy borrowers may be shunned, or turned away. This problem is exacerbated when small businesses increasingly rely on large banks for loans.

3. Mergers in the Banking Sector: A Paradigm Shift in Small Business Lending

3.1 Bank Consolidation

The 33% drop in the number of community banks over a 20-year time span discussed earlier does not portray the whole picture of the extensive consolidation that has taken place. According to the 2012 FDIC Community Bank Study, over nearly a 30-year period from 1984 to 2011, as the number of FDIC insured banks and thrift institutions fell 59%, total industry assets grew almost fourfold, from $3.7 trillion to $13.9 trillion (p. 2-4). Banks with over $10 billion in assets held almost all of this growth with most of the concentration in the largest institutions. Discussing change in the number of institutions is also paramount in

Table 1. Total Offices of Banking Organizations that Became the Four Largest by 2011

	Number of Banking Offices	Percent of Total U.S. Banking Offices
Total Banking Offices of the Four BHCs in 1994	3,904	4.8%
Offices Added Through Acquistion, 1994-2011	12,859	-
Total Banking Offices of the Four BHCs in 2011	18,743	19.1%

(Source: FDIC, 2012)

explaining the merger trend. These changes are highlighted in table 1 and figure 2. Looking first at table 1, from 1994 to 2011, the number of banking offices held by the four largest BHCs rose from 3,904 to 18,743. In terms of the percent of total U.S. banking offices, offices held by these institutions experienced a 14.3% increase to 19.1%. In terms of all institutions holding greater than $10 billion in assets in 1984, the percentage of assets held by these banks by 2011 increased elevenfold to 80%. Overall, the 107 largest institutions acquired or consolidated 1,258 charters worth $5.6 trillion in total assets (p. 2-3). Of these 1,258 charters, targets had already directly or indirectly acquired or consolidated 7,515 charters since 1984. In other words, large banks in excess of $10 billion in assets acquired (directly or indirectly) 57% of all charters that exited the industry between 1984 and 2011 (p. 2-9).

Referring to figure 2, in 1984, there were 15,663 banking institutions with less than $1 billion in assets and 2,238 institutions with greater than $1 billion in assets. By 2011 these numbers changed to 6,794 and 563, respectively. These numbers truly show just how much

consolidation has reshaped the banking industry. Within the large bank group with over $10 billion in assets that did not become a part of the four largest institutions by 2011, 29 institutions held 22% of industry assets (p. 2-4). By 2011, there were 94 banks that held 35% of industry assets. This ongoing consolidation trend, in turn, presents both a direct and indirect threat to small businesses in needs of capital. On an aggregate basis, even if initial mergers do not effect small business borrowers it is not out of the question, through other bank mergers, for very large banks to eventually capture once small banks. To make matters worse, in the time period from 1984 to 2011, the composition of these largest institutions shifted toward retail lending. In other words, as banks become larger there is a tendency for banks to shift away from SBL to other forms of lending.

Figure 2 also shows that even the 4,888 newly created charters declined by 59% with the majority exiting through merger (p. 2-11). This casts doubt on Denovo banks' ability to pick up marginally-risked businesses that are declined for loans at large institutions. Small banks, through intense competition with large commercial banks, make up the majority of failed banks among the 1984-base banks and newly chartered banks in this time period (74%). Traditionally, small banks had a comparative advantage in lending to small businesses for a number of reasons: they had closer ties to local businesses which often meant established relationships; a small scale of operations provided an advantage over large banks in that there were fewer levels of hierarchy to prevent easy acceptance of loan requests (Petersen and Rajan, 2002; Berger, 2003; Bernanke, 2006 as cited by Gilbert & Wheelcock, 2013, p. 199). Small banks capitalized on a simple system that worked. Many different small banks could span over many territories and lend to many small businesses in need of capital. This system worked because banks could lend to businesses in close proximity which meant the availability of soft-information.

Figure 2. Transition Matrix: Structural Change Among Community and Non-community Banks, 1984-2011

Group of Origin		Institutions That Closed: 1985-2011					Institutions Reporting in 2011		
		Failed	Consolidated	Merged	Other Closing	Total	Community Banks	Noncommunity Banks	Total
Number of Institutions									
Community Banks in 1984	15,663	1,902	2,893	5,459	172	10,426	5,004	233	5,237
Noncommunity Banks in 1984	2,238	179	1,321	566	38	2,104	50	84	134
Total Banks in 1984	17,901	2,081	4,214	6,025	210	12,530	5,054	317	5,371
New Charters, 1985-2011	4,888	474	715	1,558	155	2,902	1,740	246	1,986
Total, Banks in 1984 Plus New Charters	22,789	2,555	4,929	7,583	365	15,432	6,794	563	7,357
Percent of Institutions in Group of Origin									
Community Banks in 1984	100%	12%	18%	35%	1%	67%	32%	1%	33%
Noncommunity Banks in 1984	100%	8%	59%	25%	2%	94%	2%	4%	6%
Total Banks in 1984	100%	12%	24%	34%	1%	70%	28%	2%	30%
New Charters, 1985-2011	100%	10%	15%	32%	3%	59%	36%	5%	41%
Total, Banks in 1984 Plus New Charters	100%	11%	22%	33%	2%	68%	30%	2%	32%

(Source: FDIC, 2012)

Historically, a large number of small banks heightened efficacy in this type of system. Once the number of banks decreased, more and more soft-information on potential borrowers started to dissipate. Therefore, the efficiency sustained by their niche in lending to small businesses also began to wane. As the number of small banks has drastically decreased since the 1990s, along with the saturation of SBCS rating methodologies among large banks, the share of small business lending has drastically changed for both commercial and community banks. A few decades ago, small banks held the majority of SBL. In 2012, large and very large banks together account for more than 68.6% of total small business loans (Williams, 2013, p. 11). It is evident in this drastic change small banks are no longer strong enough to compete in the area where a niche used to be held. Thus, changes in SBL due to recent advances in large bank SBL policies coupled with the effects of mergers are of key significance. As big bank market share for SBL has increased, it has become harder for small banks to compete since larger institutions offer lower rates and have stronger brand images, market influence, and product diversity that attempts to tailor to small business owners'

specific needs. Lately, small banks too are finding innovative ways to stay competitive partaking in projects to provide as much service as possible to recapture some of its core competence in helping small businesses in their communities. This will not be enough to recapture its competiveness, however. Other measures will have to be taken.

3.2 Trends and Performance in the Banking Sector

3.2.1 Trends in Small Business Loan Supply and Demand

Data shows a trend for commercial banks to seemingly misuse SBCS technologies in the manner that large banks have a tendency to auto-accept or reject loans. Studies such as Berger et al (2011) mark the differences in the way commercial banks and community banks implement the technologies. Large banks that are inclined to heavily weigh small business credit scores implies that small businesses with strong balance sheets and income statements are able to have access to more loans while the others have to turn to non-traditional lenders and credit unions. Turning to other lenders, however, may not be so easy. According to a study by Biz2Credit presented in figure 3, which analyzed primary data related to small businesses that had credit scores of at least 680 cited by Quittner (2013) in an article from Inc.com, large banks increased their lending in the $25,000 to $3 million range by 6.1% from July 2012 to July 2013. Figures of a 2% increase, a 9.5% decrease, and a .9% decrease for small banks, credit unions and non-traditional alternative lenders respectively are shown. It is for this reason claims that small businesses released from the loan portfolios of large bank acquirers following a merger are picked up by other small banks or alternative lenders lose some assurance in light of these figures. On one hand, this figure shows a substantial increase in the approval rate for financially strong small businesses among large banks. On the other hand, however, other lenders' approval rates for these businesses are stagnant and if, consequent to a merger, marginally risked small businesses were to be dropped it may be difficult to find a loan with other remaining banks when even the financially sound small

business loan approval rates are just 49.4%, 45.1%, and 63.2% for small banks, credit unions and alternative lenders, respectively.

Figure 3. Small Business Loan Bank Approval Rates

Month	Big Bank Approval %	Small Bank Approval %	Credit Union Approval %	Alternative Lenders Approval %
Jul. 2012	11.30%	47.40%	54.60%	64.10%
Aug. 2012	10.90%	47.80%	52.90%	64.50%
Sept. 2012	14.20%	47.60%	52.40%	64.60%
Oct. 2012	14.80%	50.10%	49.20%	64.70%
Nov. 2012	13.20%	49.20%	48.40%	64.50%
Dec. 2012	14.90%	49.80%	47.60%	63.80%
Jan. 2013	15.30%	49.90%	46.90%	63.70%
Feb. 2013	15.90%	50.30%	45.90%	63.70%
Mar. 2013	15.70%	50.80%	45.50%	63.60%
Apr. 2013	16.80%	50.90%	45.20%	63.40%
May. 2013	17.30%	49.50%	45.00%	63.30%
June 2013	16.9%	49.8%	44.8%	63.4%
July 2013	**17.4%**	**49.4%**	**45.1%**	**63.2%**

(Source: A study conducted by Biz2Credit)

Following the Lehman Shock and the recession that followed, according to a 2012 bank study conducted by the Small Business Administration's Office of Advocacy small businesses' demand for loans has continued to decline. According to Kassar and Bernstein (2011) much of this may be explained by small business owners' lack of willingness to endure the associated transaction costs in trying to secure funds from banks. When SBEs do go to acquire capital, one trend that has emerged is the transition in how small businesses now have a greater tendency to switch from their primary banks to longer distanced commercial banks in response to advances in SBL policies. This trend is the result of more than one factor. One element is a fuller saturation of SBCS technology used by large institutional lenders. Since commercial banks are using this technology at a higher propensity, smaller banks have had heavier competition in loan rates. The second factor is a decreased proportion of small banks and the effect of longer distances between borrowers and lenders as a result of on-going mergers that has led to borrowers being more indifferent in choosing between large or small banks (Agarwal et al, 2010). Primary banks (i.e., small banks in close

proximity) actually monitor loans more accurately than non-primary banks and because of the greater ability to monitor, they are able to, on average, lend more in times of economic hardship. If a small business chooses to go acquire capital from a second source, Agarwal et al (2010) also found, however, the decision to obtain loans from a non-primary bank can be detrimental to the relationship held between the primary bank and small business. Therefore, in economic upturns small businesses may change lenders to take advantage of lower rates, but when the economy begins to contract migration back to primary banks may not be entirely possible and could possibly contribute to harder acquisition of funds for the borrower in times of economic downturns.

Findings from Cole et al (2004), presented in figure 4, mark differences in both the demand by small businesses in choosing either a large or small bank for funds and the supply of funds to small businesses on the basis of a number of variables. Focusing on the fourth column of firm and owner characteristics, it can be observed which factors hold significant difference in whether an owner chooses a large or small bank. I will go through the list and explain what each result may entail starting with firm size. The significant difference in means between large bank and small bank subsamples show that larger small businesses prefer to acquire loans from large banks. The difference in cash-to-assets signals that more liquid firms tend to use large banks for loans which is not shocking knowing large banks actually prefer financially strong firms. Cole et al (2004) does not explicitly offer an interpretation for the significance found in female ownership, but female ownership may be correlated with more accurate or perhaps better organized paperwork or stronger financials than male-ownership firms. The significance in owner's age could be explained through longer relationships established between owners and small banks. It may be safe to assume in relation to this, small banks are more comfortable with loaning to more experienced business

owners and trust the judgment of these individuals more so than large banks (i.e., lending more on characteristic attributes).

Shifting the focus to loan and relationship characteristics, which discuss loan supply, small banks approve significantly more loans than large banks do; but large banks approve loans of greater value. Small banks significantly lend more to small businesses based on relationship characteristics with the exception of distance between borrower and lender. Small banks are more inclined to approve loans with borrowers who already use the bank for deposits or for other loan sources. Longer relationships and whether the borrower banks in person, as previously established, are more important to small banks that also incorporate soft-information into loan monitoring. Knowing one of SBCS technology's objectives is to increase lending for large banks over greater distances, the significantly greater mean in large banks over small banks to lend to customers farther away comes as no surprise. The last essential element in whether a small business chooses a large or small bank is whether the business is located in a Metropolitan Statistical Area.[5]

[5] A single county may be defined as a MSA if it has either (a) a city or a Census Bureau-defined urbanized area with a population of at least 50,000, or (b) a total Metropolitan Area population of at least 100,000 (Disalvo, 1999, p. 3).

Figure 4. Supply and Demand Factors for Loans

Variable	Large Bank Subsample ($n = 517$) Mean	S.E.	Small Bank Subsample ($n = 585$) Mean	S.E.	Diff. in Large and Small Bank Means Diff.	*t*-Stat.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm and Owner Characteristics						
Financial Records	0.54	0.02	0.50	0.02	0.04	1.41
Firm Size (annual sales, $000)	1,181	78	861	58	321	3.31***
Firm Age (years)	13.06	0.42	13.22	0.44	−0.16	−0.26
ROA	0.71	0.07	0.60	0.05	0.11	1.07
Debt-to-Assets	0.58	0.02	0.61	0.02	−0.03	−1.19
Cash-to-Assets	0.19	0.01	0.15	0.01	0.04	2.53**
Firm Delinquencies	0.62	0.05	0.61	0.05	0.01	0.07
Owner's Delinquencies	0.31	0.04	0.30	0.04	0.01	0.13
African-Am Owner	0.01	0.01	0.02	0.01	−0.01	−1.39
Female Owner	0.21	0.02	0.15	0.01	0.06	2.65**
Owner's Age	47.50	0.44	48.49	0.41	−0.99	−1.65*
Loan Characteristics						
Loan Approved	0.76	0.02	0.89	0.01	−0.13	−5.59***
Loan Amount ($000)	244	28	104	10	140	4.67***
Loan-Size-to-Assets	1.05	0.08	0.77	0.06	0.28	2.65***
Collateralized Loan	0.64	0.02	0.68	0.02	−0.05	−3.32***
Relationship Characteristics						
Deposit Relationship	0.79	0.02	0.84	0.02	−0.05	−2.08**
Loan Relationship	0.33	0.02	0.49	0.02	−0.16	−5.47***
Financial Service Relationship	0.33	0.02	0.29	0.02	0.04	1.34
Length of Relationship (years)	7.00	0.30	8.40	0.32	−1.40	−3.19***
Number of Sources	1.48	0.06	1.38	0.06	0.10	1.17
Distance (miles/100)	0.28	0.05	0.11	0.02	0.17	3.00***
Bank in Person	0.78	0.02	0.84	0.01	−0.06	−2.53**
Bank Characteristics						
Bank Assets ($millions)	15,027	1,091	225	9	14,802	13.57**
SIC Dummy Variables	Yes		Yes			
Additional Variables for Choice-of-Bank Regressions						
Regional Dummy Variables	Yes		Yes			
MSA	0.85	0.02	0.61	0.02	0.24	9.56***
Line of Credit	0.60	0.02	0.55	0.02	0.04	1.37
Equipment	0.07	0.01	0.08	0.01	−0.01	−0.86
Mortgage	0.08	0.01	0.11	0.01	−0.03	−1.59
Motor Vehicle	0.07	0.01	0.08	0.01	0.00	−0.24
Lease	0.01	0.01	0.01	0.00	0.00	−0.15

For each variable in column (1), columns (2) and (3) ((4) and (5)) present the mean and standard error based upon the large (small) bank subsamples. In column (6) are the differences in the large bank and small bank means and in column (7) are the results of *t*-tests for statistically significant differences in the large and small bank means. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

3.2.2 Geographical Considerations

This section attempts to bridge a connection between changes in SBL and changes in geographical locations of remaining banks following the ongoing trend of mergers since 1984. Due to the tendency for large banks to operate in Metropolitan Statistical Areas coupled with the fact that increasingly more small banks are being absorbed into large, non-community banks, banks operating in non-metro areas are diminishing and the result is a strain on relationship lending (e.g., between primary banks and small businesses). This means that distance between demanding small businesses and fund suppliers increases and fewer small business loans are underwritten by relationship lenders causing even more small business dependency on SBCS technology as more businesses rely on large banks to provide loans. As

mergers continue, a cause for concern is created in that as the number of banks decreases and as distance grows between commercial banks and small businesses, in addition to the effects of merger themselves, certain small business borrowers may be negatively affected. In essence, as distance between borrowers increases less information is held by large institutions concerning borrowers. Possessing less information over borrowers gives no other option than to heavily rely on SBCS technology to rate the businesses.

Certain businesses that look marginal on paper will be one of the most impacted groups within the small business pool. It is possible these businesses would have still received loans from small banks based on character criteria, but increased distance between borrowers and lenders has created a shift away from character based lending which makes it more difficult for these businesses to receive funds. There are also fundamental differences between large and small banks and where there is a tendency to operate offices. Large banks gravitate to metro areas while small banks tend to have significantly more offices in non-metro areas (FDIC, 2012, pp. 3-5-3-6). Due to the nature for large banks to gravitate to these areas, many small businesses operating in rural areas will be greatly affected by consolidation. According to the 2012 FDIC Community Banking Study, in 2011, "there were 629 U.S. counties, with just over 6 million in population, where community banks operated offices, but where no non-community banking offices were present" (p. 3-5). Three-quarters of this area was rural and 14% was in metro areas. Including areas that had fewer than three non-community banking offices present, a total of 1,200 U.S. counties (out of 3,238) encompassing 16.3 million people would have had limited access to funds without the presence of community banks.

Putting this together, small businesses in rural areas (and even some metropolitan areas) that have a higher propensity to demand loans other than for commercial and industrial purposes may take a hit. As the number of community banks declines and as there is a shift

from rural to metropolitan areas, it appears the businesses that stand the most to lose are marginally-risked businesses in need of funds for farm and other agricultural purposes. Therefore, it is essential that community banks remain active in these areas so all types of small business owners can acquire capital to run their businesses. In 2011, community banks still own more than 70% of both offices and deposits in rural areas. Another point of consideration is how population may be changing relative to community bank presence in areas of change. As noted, small banks tend to specialize in rural areas. According to Census data cited in the FDIC's 2012 Community Banking Study, 50% of U.S. rural counties lost population between 1980 and 2010 (p. 3-8). Where there has been a decline in population within rural areas, metro areas have experienced increases in population within the same time period. This means that small banks will face more challenge in expansion and replacing key personnel to remain competitive.

The shift in geographic location within the banking sector is also greatly associated with changes in the monitoring process for small business loans. Small bank officers have more subjective discretion in adjusting a borrower's score by including elements such as the impression of management quality, personal assessments of collateral value, own views of firm prospects etc. (Agarwal & Hauswald, 2010, p. 2763). As mentioned, however, large bank loan officers do not have this type of discretion and borrowers are subject to inflexible statistical ratings that large banks tend to overuse in order to speed up the lending process and increase volume.

Large banks typically have more branches that are more geographically dispersed than do smaller banks. As an organization increases in size and geographic extent, it becomes more difficult for the top management to monitor the behavior of employees, and agency problems arise. To maintain control over the whole organization, large banks must establish procedures that will be followed throughout the whole organization (Cole et al, 2004, p. 229).

This has led to cut-and-dry lending methods that have strict procedures in accepting or rejection a loan. In other words, if a small business owner does not conform to the bank's rigid monitoring regime, it simply will not be approved for the loan. Having strict cut-offs will increase the chances for type II errors. Notwithstanding, large banks can in fact use the technology to increase the supply of cheaper SBL at a faster rate than small banks. Agarwal and Hauswald (2010) find that as distance increases between borrowers and lenders, the rate charged on loans decrease but the availability of credit tends to decrease as well (p. 2758). It is through this channel distance plays a significant role in increasing loans to small businesses but this may exclude loans to marginally-risked businesses or certain SBL demanders.

3.3 Expectations

Ongoing consolidation has created a paradigm shift in the sense of supply vs. demand for small business loans. Not all consolidation is homogenous, however. As pointed out in previous sections, most mergers occur between two small banks but a significant portion of these mergers are accredited to large banks between $1 billion and $10 billion in assets. As established, there are vast differences in certain variables in monitoring for SBL between large and small banks. Consequently, I expect there to be significant differences in the changes in SBL between the two forms of mergers.

Hypothesis (1): The magnitude of changes in small business lending (including 30-89 day delinquencies) between large bank and small bank acquirers following a merger significantly differs.

SBCS-technology enables large banks to lend more to marginally-risked businesses compared to what would be lent in absence of the technology because assigned ratings allow for risk-based lending. Other objectives also encourage increased lending to these businesses such as lower transaction costs and faster approvals. With faster loan acceptance comes

higher loan volume. The increase in lending spurred by these objectives should create diversity in the SBL portfolio which could hedge against possible risk exposure. Succinctly, in theory, SBCS objectives work harmoniously to increase SBL to all types of borrowers. It is important to study the effect of mergers in relation to SBCS objectives, however. If mergers do not exhibit counteractive tendencies to these objectives, small business lending among all categories and value ranges, as well as delinquencies should increase following mergers involving large bank acquirers. This should be especially true if the acquired small banks' lending portfolios presented relatively higher numbers in these areas.

Credit scoring systems are designed to more accurately predict serious delinquencies (>89 days) and make lending to opaque businesses more efficient because of lower transaction costs associated with the monitoring process and the enhanced ability to lend more to marginally-risked small businesses (Hasumi et al, 2012, p. 9). If large banks truly use SBCS technology to lend more to marginally-risked small businesses, under the ontological assumption that these businesses will face difficulty in always making timely payments, we should observe an increase in post-merger 30-89 day delinquencies if large banks do not drop these businesses from the former small bank's portfolio following the change in ownership. Despite this, however, as large banks continue to gain market share and in light of recent findings such as in Quittner (2013) that may suggest increases in SBL may not be equally distributed, I expect after merger delinquencies to decrease following a merger with a large bank acquirer.

Small banks are keen to take extra steps to extend loans to "spotty" applicants if key concepts are strong (Moran, 2011). Especially compared to large banks that are known for their strict lending practices, small banks specialize in a more customer-focused fashion and are more willing to lend the extra dollar to relatively marginally-risked small businesses because they do not rely on such a fine-line system to accept or reject loans. Comparatively, I

expect small banks to have higher average delinquencies than large banks before the merger. Following a merger, however, even though I anticipate that small bank 30-89 day delinquencies will rise and large bank delinquencies will fall (hypotheses 2 & 3), I cannot predict the direction or significance of change in 30-89 day delinquencies in jointly comparing the differences between the two subgroups (hypothesis 1).

Hypothesis (2): 30-89 day delinquencies experience a significant decrease when a large bank acquires a small bank.

Hypothesis (3): 30-89 day delinquencies experience a significant increase when a small bank acquires another small bank.

In regards to the fourth hypothesis, large banks not involved in a merger should experience no significant change in small business lending.

Hypothesis (4): There will be no significant changes in small business lending among similar non-acquirer banks within the same time frame as acquirer banks.

The stated hypotheses above will be tested by implementing two different approaches: (1) comparing the post-merger acquirer to itself before a merger (single-entity perspective); and (2) using the separate-entity perspective in comparing changes between the two acquiring bank subsets. In addition, concerning hypotheses 1 & 4, each category (e.g., CRE, C&I, farm and agriculture) as well as each loan value range (e.g., <$100K, $100K-$250K, and $250K-$1,000K) will be tested for marked differences. For delinquencies, since very few banks in my data sets reported delinquencies for other agricultural loans only CRE, C&I, and Farm loans will be represented.

III. METHODOLOGY

1. Description of Research Design and Sources of Data

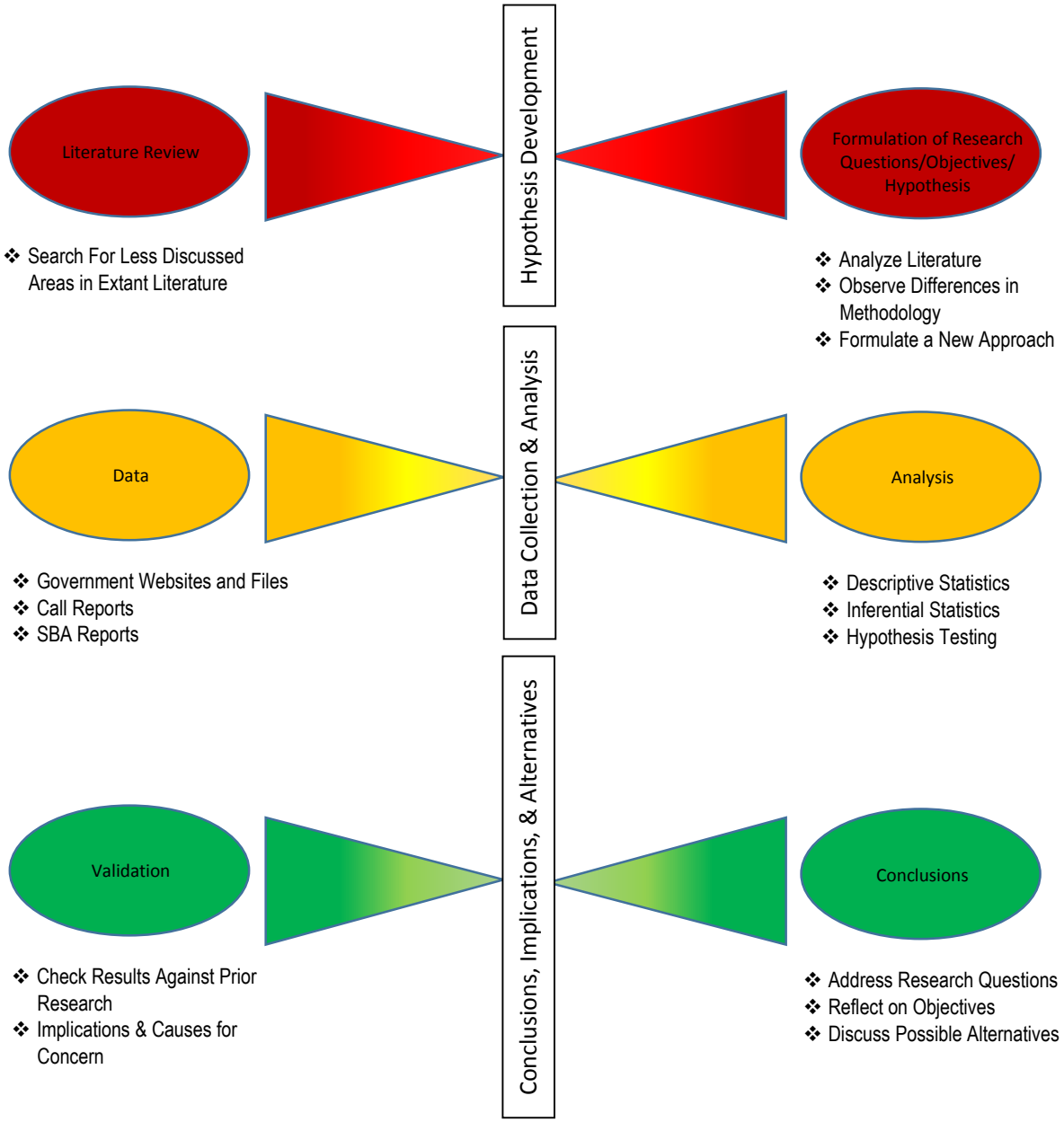
The backbone diagram in figure 5 illustrates the process flow of this research. I first surveyed existing literature for possible areas that could be discussed further by presenting more detail dealing with small businesses and loans. After less explored areas were discovered I then moved on to analyze literature covering this topic to gain more insight into existing methodologies and to search for possible distinguishing areas to which I could create a new approach. Once this was established, I collected data from governmental sources and analyzed the data sets with both descriptive and inferential statistics. After the analysis I checked the results against my hypotheses and results of past literature to discuss possible public policy concerns. Lastly, in the conclusion, I reflect on objectives and offer a possible way to address the issues.

Large commercial banks generally have greater capacity to quickly monitor for the risks associated with loans at relatively lower costs. The continued pressure makes it increasingly difficult for smaller banks to compete. Many advocates for bank consolidation and proponents of decreasing the number of banks contend that these mergers do not negatively impact small business lending. They go even further to proclaim that mergers increase post-consolidation lending. These standpoints may be stemmed from the assertions that large banks can tailor to small business needs more so than small banks. Comfort has also been created due to other research claiming that even if small businesses were dropped as a result of a merger these businesses would be scooped up by other small banks or alternative lenders in the community. The latter assertion was partially discussed in *Trends and Performance in the Banking Sector* in discussion of bank approval rates. Other studies such as Peek and Rosengren (1996, 1998) find that, unlike in small bank mergers, when a

large bank acquires a small bank, the target's small business lending tends to decline. Empirical research covering whether remaining small banks pick up potentially dropped marginally-risked small businesses is out of the scope of this research, but insight on this topic as well as empirical analysis on other effects of mergers will be covered. The methodology used to accomplish this is described in this chapter. This work challenges previous findings from existing literature by implementing data sets that will account for the possible shift in distributions of lenders (as discussed in the *Pitfalls* section), by using recent mergers (2010-2012) following the 2007-08 economic recession. Using a data set that includes both large and small acquirers, I compare the possible aggregate effects on small businesses that have different borrowing needs and financial positions. By covering mergers over a three year time span I will be able to confirm which findings have more dominance following recent mergers. More so than past studies, recent data will also account for fuller SBCS market saturation as it is used more dominantly by larger banks in assessing small businesses. Mergers that have taken place were retrieved from merger records presented in the FDIC's annual report to congress regarding merger decisions.

Figure 5. Description of Research

Design and Sources of data



This study starts from 2010 due to new regulations requiring all banks to disclose SBL loan data in Schedule RC-C Part II Loans to Small Businesses and Small Farms for each quarter. Prior to 2010, banks with total assets less than $1 billion were not required to disclose this information making it difficult to observe effects on small business lending following a merger. Having 2010 as a starting point allows me to use the most recent bank data preceding the merger and to more accurately create a time frame for study. The FDIC's annual report to congress shows the records of regular mergers, corporate reorganizations and failed banks. The reports also include important information regarding the merger such as the name and total assets of the acquirer and acquired bank, the value of assets acquired, date of acquisition, and location of the acquired bank and respective FDIC numbers. In all three sections the report includes all mergers that occurred within the year regardless of the size of the acquirer or acquiree. In each year, the starting number of listed mergers were quite high but were narrowed down to only viable observations.

Many listed mergers on the report were not full mergers and several banks remained active. Certain patterns were established for the elimination of these instances. For large bank acquirers, if the acquired bank listed had $60 million or lower in assets the bank was considered still active. For small bank acquirers, if listed assets acquired were $30 million or less the bank was considered still active. This process of elimination was used to omit unqualified observations because of practicality reasons regarding time. I did, however, randomly check several of these to verify the assumption and that the pattern remained viable. Among the three reports there were 283, 267, and 270 originally listed mergers for a total of 820. This number, however, was inflated due to the fact that many of these institutions remained active and were not fully merged.

The next step was to consolidate these mergers to account for mergers that involved a bank that acquired more than one bank in the same year. Each instance fitting this criteria

were compiled into a single observation. If a merger involved acquiring two or more different banks on different dates, call report data on the acquiring bank for the dates would be averaged together to create a single acquiring entity. Further exploration of these cases for violations pertaining to the study reduced this number further. Examples of such violations include: cases of acquiring multiple banks with at least one having more than $1 billion in assets; cases involving the absence of a SBL portfolio for either the acquirer, acquired, or both; and perhaps the strictest condition was cases involving a bank acquiring institutions that created an overlap within a one-year time frame.

The last condition was the most influential in decreasing the sample size. In order to account for the effects of mergers using a one year time allotment from the date the merger occurred, cases including a prior year merger that would overlap into the current time frame of a merger have to be controlled for and therefore were not included. Likewise, observations involving a future year merger that would also have some overlap in the same time frame were omitted. Only cases that involved acquiring small banks isolated within a one-year time frame and had no overlap were used in the study. For simplicity, it was important to have this restriction to allow for easier comparison of pre-merger SBL and post-merger SBL and to observe real effects in one year following the merger. If this restriction were not in place, it would be difficult to measure this effect because overlap would make my methodology invalid.[6] Most mergers that take place involve acquisition of 1-3 banks and accordingly cases in my data samples limit one-year mergers to three for a single bank in a given year. After combining mergers into cases, the possible sample size was 194, 168, and 172 for a total of 534 cases. Of this 534, approximately 199 involved large bank acquirers, 299 involved small bank acquirers and the rest involved acquired large banks. Finally, as a result of estimating and omitting the mergers including active institutions and combining multiple mergers into a

[6] Support for a one-year window is given in Peek and Rosengran (1998, p. 803).

single case[7] and confirming cases met all the conditions, the final sample size for large-small acquisitions was 57 acquirers and 72 acquirees.

In order to compare the effects of mergers involving large bank acquirers and small bank acquirers using statistical procedures that work best with similar sample sizes, I collected a similar sample size for small-small acquisitions. In this subset there were 64 acquirers and 69 acquirees. Also, in order to make comparison reliable as possible, I collected the same amount of cases from the different sections with particular importance in the failed bank section for both data sets. It is important to note that in some other SBL studies, failed banks are not included in the data sets. In this study, however, these cases were included on the grounds that both large and small banks bid on these banks. With differences in monitoring and SBL policies, if the size of the acquirer really matters SBEs will also be affected depending on the size of the winning bidder for failed banks. Studies regarding bank performances have reasonable grounds for not including these institutions but for the sake of measuring changes in SBL, I have warranted it is important to also include these in the data set.

Since the determination of the sample size has been established, the latter sections will cover more details in the methodology. Using the FDIC website's summary of deposits, I first looked up listed acquisitions' acquiring banks' information to confirm all acquisition information such as the date, whether it is no longer active, and to ensure the existence of pre-merger lending to small businesses for both the acquirer and the acquiree. Next, I would go through each one of the conditions to ensure its validity. Once validated, I would download the latest call report preceding the merger for the acquired institution as well as the call report for the acquiring institution for the same date. If there were multiple acquired banks those banks' same date call reports were also downloaded. Then for the same quarter

[7] Combining multiple mergers into one case is observed in Peek and Rosengran (1998, p. 806).

of the following year the call report for the acquiring institution would be downloaded to allow observation of possible changes in lending and delinquencies by utilizing both descriptive and inferential statistics using IBM's SPSS®. Call reports were collected from the Federal Financial Institutions Examination Council's (FFIEC) website.

There are three major directions of this research. The first is to note key differences in lending between banks with less than $1 billion in assets compared to commercial banks with assets between $1 billion and $10 billion. My data sets will allow comparison analysis for both small and large bank SBL. Comparison will cover how each one tends to lend to small businesses as well as differences in delinquencies. The second major direction will compare the different merger effects as a result of large acquirers to those of small acquirers. Doing so will make it possible to confirm whether findings from large acquirers are unique and actually present a possible policy issue; especially since these mergers accounted for nearly 40% of the mergers from 2010 to 2012. The final direction will compare changes in small business lending for large acquirers to those of similar large banks that were not involved in a merger in the same time frame as the matching acquiring banks. In this data set, I was only able to find 32 cases of similar large banks conforming to the necessary conditions. Due to this dataset being half the size, certain findings may vary from the larger large-small acquisition dataset. However, findings should be approximately the same and meaningful information can still be drawn from the comparison to other similar large banks that were not active in acquiring other institutions.

2. Description of Data Analysis

The first direction of this research is quite straightforward and will be accomplished through several tables highlighting descriptives of the data set. The remaining directions to reach established objectives will use a different approach as well as include empirical analysis. To my knowledge, extant literature mainly discusses effects on small businesses as a whole

without placing much emphasis on differences that may arise in different value and volume ranges of lending within each loan type and how these changes may collectively affect different demands for small business loans. There is not much evidence to support that moderately-risked small businesses have also experienced easier access to funds. It is key to note here that like other research this research too implements a single-entity approach where the pre-merger acquiring bank's SBL is compared to the same bank's SBL following the merger but this research also includes comparison using a separate-entity basis[8] where two separate entities exist prior to the merger in explaining the difference in effects between large-small acquisitions and small-small acquisitions. As illustrated in Chapter II, much existing literature already finds that commercial banks are often able to increase their SBL portfolio after acquiring small banks. After reading several journals noting this I wanted to analyze the SBL environment from a slightly different angle taking into consideration the small business lending occupied by the target bank. In order to accomplish this, I used an average lending approach to account for the average lending both the acquirer and the acquired (separate entities) were lending together compared to the average lending of the acquirer post-merger. Both volume and value figures were often highly positively skewed. Skewness makes it more difficult to represent the population when using an average approach so to deal with the extreme values I transformed the data. For loan volume I used the square-root transformation—a common technique to handle positively skewed count data. For loan value, I used the log transformation—another well-known tool for positively skewed monetary variables such as sales. After transformation I used SPSS® to process the data. After the means were generated for SBL from both entities before the merger and SBL from the single entity after the merger, I back-transformed the data to original numbers to then calculate the differences in lending based on the sum of the averages for both entities

[8] A similar separate-entity method was used in Strahan and Weston (1996, p. 3) in assessing SBL before and after a merger.

compared to the averages of the post-merger entity. These changes were broken down into four loan categories (CRE, C&I, Farm, and other Agricultural) as well as changes on a total basis. In each category, volume and value changes in raw numbers along with percentages are presented for easy comparison between the two merger types. In terms of inferential statistics, non-parametric t-tests[9] were used to assess whether significant changes exist comparing acquiring institutions before the merger to itself after the merger as well a t-test testing for major differences between the two merger types on the separate entity basis. This way allows for more insight into possible public policy concerns.

The final avenue will also be mainly accomplished through inferential analysis. By pooling commercial banks that have engaged in an acquisition together with similar banks that were not, I expect to be able to assess whether a merger significantly impacts post-merger SBL compared to other large banks. Commercial banks that acquired a small bank will be paired with similar commercial banks that were not involved in a merger but nonetheless operate in the same state and are fairly the same size. By using the FDIC bank lookup feature I was able to view all the banks operating in a given state. I have paired these banks based on pre-merger total assets due to a high correlation between assets and business loans (including SBL). Similar-sized banks with main operations in the same state should make it possible to isolate and analyze the impact of mergers with greater efficiency. Tables illustrating descriptives, correlations, and p-values will be presented in the Results chapter when necessary.

[9] The two statistical tests that were used in this research was the Mann-Whitney U-test and the Wilcoxon Signed Ranks test, both for non-parametric data. For comparison between small banks and large banks, the Mann-Whitney U-test was used. When comparing changes in one data set over a one-year time horizon, the Wilcoxon Signed Ranks test was used. To calculate correlations, I used Spearman's Rho for n-par data.

3. Limitations

Certain limitations exist within the methodology. The first limitation is that bank information from call reports is on a consolidated basis which makes it impossible to narrow the focus to the specific location where small banks were acquired. Nonetheless, capturing information on a consolidated basis still enables discussion on small business lending on an aggregate scale which effects all small businesses regardless of location. The overall tone of this research is to study the effects of mergers on an aggregate basis so consolidated data is fitting. The next limitation deals with delinquency data. It is necessary to consider other possible explanations for the outcomes spurred by data being on a consolidated basis. It is possible at locations where small banks were acquired marginally-risked loans and therefore the delinquency ratio increased but elsewhere there was an offset due to lower delinquencies. However, this problem too should not present a significant issue because even on an aggregate basis if large banks have not changed its small business lending policies the ratio of 30-89 day delinquencies to total loans before the merger and after the merger should remain relatively unchanged. In addition, delinquencies presented in Call Reports are not divided into SBL and other business loans. Therefore, it is possible that certain observed changes are not entirely owed to small businesses, but other studies have also been conducted under this limitation. It should be safe to assume that changes in these figures could still be partially associated with small business loans as given figures include delinquencies from SBL. Another limitation deals with the time period over which SBL is being measured. I have chosen a one-year time window based on past literature and because of the choice to use recent data. Using recent data only allows me to measure changes over a one-year period because a two-year period would push some 2012 mergers into December of 2014 making it impossible to measure changes. The final limitation deals with whether banks in the sample are in fact using SBCS technology. Berger et al (2011) wrote that "today…anecdotal evidence suggests that the vast

majority of large banks use SBCS" (p. 2). Mergers included in my data set start from 2010 and run until 2012; thus, it is reasonable to assume large banks in my data set—albeit they are not the largest large banks—are implementing the technology especially since they are active in SBL.

IV. RESULTS

Table 2 shows average loan volume and value, as well as the average total assets and loans for the small banks acquired by large banks and table 3 shows the same for small banks acquired by other small banks. It is easily observed that small banks have less volume and value of SBL in terms of absolute values, but as a percent of total assets and loans, they lend more. Referring to table 2 and table 4, acquired small banks lend 13% and 20%--which are approximately the same as acquiring small banks; whereas, pre-merger large banks lend around 10% of assets and 15.5% of business loans to small businesses. There is not much difference in these figures, however. I expected acquired small bank percentages to be significantly higher than acquiring large banks. This shows that large banks between $1 billion and $10 billion still lend quite a bit to small businesses.

Larger percentages are observed when a small bank is acquired by another small bank. These banks are around half the size of the small banks acquired by large banks and lend more in terms of assets and total business loans accordingly with nearly 15.6% of assets and 24.6% of business loans going out to small businesses. These tables are also broken down into each loan type where absolute numbers and percentages are shown. For both acquired small bank data sets CRE loans have the same level of volume which was around 28%. The other three sections of lending however vary between the two, which illustrates that among all banks, regardless of initial size, SBL has a tendency to change as banks become larger. Major differences exist in C&I loans and Other Agricultural loans. C&I loans for larger small banks acquired by large banks assumed slightly over 50% of the total volume of loans while at smaller small banks acquired by other small banks C&I loans accounted for approximately 37%. In the opposite direction, smaller small banks lent out a quarter of its volume to Other Agricultural loans while the larger small banks had around 12% designated to this loan type. However, from table 6, acquiring small banks also had a high percentage of loans for Other

Agricultural purposes, which suggests although there is a tendency to shift away from certain loan types to others, it is not guaranteed. Interestingly, in both large-small acquisitions and small-small acquisitions it appears to be important to acquire banks that are similar in both volume and value structure (i.e., similar lending policy as to which type of loans are being extended). At any rate, consistent with existing knowledge concerning small banks and large banks, tables 2, 3, and 6 show that small banks lend out a larger portion of their assets and total business loans than large banks. In terms of actual volume and value, however, large banks have more resources and a larger customer base which allows them to lend more. Comparing figures in table 4 and table 6, large acquirers in my data set tend to lend relatively more CRE and C&I loans where small acquirers tend to lend relatively more for Farm and Other Agricultural purposes. This is consistent with the geographical differences discussed in Section 3.2.3 *Geographical Considerations* that small banks have a tendency to operate branches in rural areas and large banks tend to operate branches in metro areas.

Table 2. Acquired Small Bank (Large Bank Acquirer)

	Average Volume			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate	17	25	44	28.25%
Commercial & Industrial	111	24	19	51.10%
Farm	14	8	3	8.23%
Other Agricultural	22	9	6	12.42%
Total SBL	**165**	**66**	**73**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$466.30	$2,766.48	$16,060.81	8.91%	13.86%		
Commercial & Industrial	$1,671.62	$1,707.74	$2,346.19	2.64%	4.11%	**$216,473.56**	**$139,186.55**
Farm	$306.92	$595.46	$506.93	0.65%	1.01%		
Other Agricultural	$200.97	$659.06	$767.81	0.75%	1.17%		
Total SBL	**$2,645.81**	**$5,728.73**	**$19,681.74**	**12.96%**	**20.16%**		

Table 3. Acquired Small Bank (Small Bank

	Average Volume			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate	19	20	23	28.33%
Commercial & Industrial	56	15	10	36.75%
Farm	12	8	5	11.11%
Other Agricultural	36	9	7	23.81%
Total SBL	**123**	**52**	**44**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$463.31	$1,978.19	$5,779.03	8.31%	13.06%		
Commercial & Industrial	$1,003.63	$1,073.32	$1,322.98	3.44%	5.40%	**$98,872.58**	**$62,923.06**
Farm	$303.69	$657.69	$876.42	1.86%	2.92%		
Other Agricultural	$466.45	$593.84	$933.11	2.02%	3.17%		
Total SBL	**$2,237.08**	**$4,303.04**	**$8,911.54**	**15.63%**	**24.56%**		

Table 4. Pre-Merger Large Bank

	Average Volume (,000s)			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate	143	205	313	30.07%
Commercial & Industrial	773	207	191	53.21%
Farm	66	47	25	6.31%
Other Agricultural	146	50	34	10.41%
Total SBL	**1,128**	**509**	**563**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$4,526.90	$23,079.69	$112,724.73	6.38%	9.59%		
Commercial & Industrial	$14,551.17	$16,494.44	$40,606.09	3.26%	4.89%	**$2,200,082.71**	**$1,463,782.23**
Farm	$1,348.00	$2,988.50	$3,772.50	0.37%	0.55%		
Other Agricultural	$1,390.76	$2,402.09	$2,972.51	0.31%	0.46%		
Total SBL	**$21,816.83**	**$44,964.72**	**$160,075.83**	**10.31%**	**15.50%**		

Table 5. Post-Merger Large Bank

	Average Volume (,000s)			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate loans	156 **	230 ***	365 ***	30.00%
Commercial & Industrial Loans	924 ***	235 ***	224 ***	55.23%
Farm	68	52 ***	26 *	5.81%
Other Agricultural	143	47	35	8.95%
Total SBL	**1,291**	**563**	**651**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$5,242.31 **	$26,328.98 ***	$133,899.92 ***	6.49%	9.79%		
Commercial & Industrial	$16,419.49 **	$19,255.94 ***	$48,409.44 ***	3.30%	4.97%	**$2,549,461.04**	**$1,690,398.12**
Farm	$1,398.34	$3,165.95	$3,648.50	0.32%	0.49%		
Other Agricultural	$1,216.94	$2,201.29	$3,011.76	0.25%	0.38%		
Total SBL	**$24,277.08**	**$50,952.15**	**$188,969.62**	**10.36%**	**15.63%**		

*, **, *** Indicates significance at .05, .01, .001, respectively.

Table 6. Pre-Merger Small Bank Acquirer

	Average Volume			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate	35	40	54	23.62%
Commercial & Industrial	167	38	32	43.16%
Farm	24	18	10	9.65%
Other Agricultural	95	21	13	23.57%
Total SBL	**321**	**117**	**109**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$852.01	$4,053.65	$14,804.95	6.40%	9.98%		
Commercial & Industrial	$2,846.12	$3,115.30	$7,094.53	4.24%	6.61%	**$308,052.81**	**$197,430.06**
Farm	$600.44	$1,369.64	$2,132.16	1.33%	2.08%		
Other Agricultural	$1,099.51	$1,365.07	$2,181.90	1.51%	2.35%		
Total SBL	**$5,398.08**	**$9,903.67**	**$26,213.54**	**13.48%**	**21.03%**		

Table 4 and table 5 show the averages relating to the acquiring large banks and SBL. Comparing the two illustrates the average changes that occur one year post merger among large acquirers. Average assets grew by $349,378.33 and total loans grew by $226,615.89, or 15.48%. Average SBL grew by $37,341.47, or 16.46%. Since growth in SBL is greater than the overall growth in business loans, large banks in my data set appear to utilize the growth in assets to increase their lending to small businesses rather than shift to large business lending. Overall, however, average loan growth (including SBL) and the ratio of SBL-to-total loans percent-change for small banks was higher. The small acquirers' average loan growth, average SBL growth, and SBL-to-total loans percent-change was $77,944.10 (39.48%), $22,200.64 (53.48%), and 28.48%, respectively. As these figures show, small acquirers utilize the acquisition at a higher magnitude to benefit small businesses compared to large bank acquirers. Furthermore, even though the small banks acquired by small banks are smaller in size, small acquirers' increase in SBL does not lag much behind the increases for large bank acquirers. Table 7 reiterates the changes in SBL relative to total loans among large and small acquirers discussed above. The following sections will discuss changes in each loan type more in detail with a combination of descriptive and inferential statistics.

Table 7. SBL Growth vs. TL Growth

Bank	Avg. Loan Growth	Average SBL Growth	SBL/TL
Commercial	$226,615.89 15.48%	$37,341.47 16.46%	16.48%
Community	$77,944.10 39.48%	$22,200.64 53.48%	28.48%

1. Commercial Real Estate Loans

Comparing figures from table 4 and 5, average large bank loan volume in the first value range increased from 143 to 156, the second value range 205 to 230, and the largest value range 313 to 365. Average loan values for the first range increased from $4.5 million to $5.2 million, loans in the second value range increased from $23.1 million to $26.3 million, and loans in the highest range increased from $112.7 million to $133.9 million.[10]Table 5 also shows from a statistical standpoint whether changes in volume and value using the single-entity approach were significant. There were significant changes in all value ranges for both volume and value of SBL for large bank acquirers. In the less than $100K value range both volume and value change was significant at the .01 level. The other two value ranges for both volume and value were significant at the .001 level.

Results for post-merger small bank acquirers are found in table 8. Change in average loan volume in the first value range was from 35 to 54, the second range 40 to 60, and the largest range 54 to 80. Change in loan value for the ranges was from $852,000 to $1.6 million, $4.1 million to $6.7 million, and $14.8 million to $23.9 million, respectively. Statistically speaking, at the .001 confidence level increases in both volume and value for all value ranges were significant.

[10] These figures are approximate. See appropriate tables for exact values.

Table 9 shows before and after amounts for SBL volume and value and the percent change from the pre-merger period to the post-merger period for both large and small bank acquirers. This table, however, also shows how the effects differ between the two merger types from a statistical standpoint. The most obvious finding is that SBL for small banks, in terms of percentage, increases much more than large bank SBL. This is perhaps explained by the lower amount of SBL before the merger as the new assets from acquired small banks represent a higher percentage of the small bank SBL portfolio than it does for the large banks in the data set. One of the key changes observed from this within CRE loans was the magnitude of increase for each value range for each merger type. Among large-small bank mergers, the highest increases in terms of percent was for the largest value loans for both volume and value. Among small-small mergers, however, the highest increase in terms of percent was for the smallest value loans. Statistically, the only significant differences found for CRE loans between the two data sets were in the uppermost value ranges for both volume ($p = -.001$) and value ($p = -.007$) where large banks' SBL experience higher increases. Therefore, it appears that large banks may have a tendency to increase lending to lenders who demand higher value loans within this loan category.

When using the separate-entity approach percent-increases vary from the single-entity approach, but changes in percent were similar for both acquirers following this approach. For large bank acquirers, in terms of volume, only the largest value range experienced increases above 1%. In terms of value, surprisingly the greatest increase was observed in the lowest value range. For small bank acquirers, in terms of volume, the largest value range was the only range that experienced an increase above 1%. In terms of value, small banks too experienced the largest increase in the first value range. Table 10 shows these findings along with how the effects differ from a statistical standpoint while using the separate-entity approach. Increases in SBL are not as drastic when using the separate-entity approach

because the measures take into account both banks' lending before the merger. The degree of change is much less and is more accurate in determining true increases in lending. Value increases in terms of percent are still higher for small banks but from the t-test column differences in increase between the two data sets in all size ranges are not significant even at the .10 level. There was a significant difference (p = .05) found in the middle value range of lending in terms of volume, however.

Under the single-entity approach, I had to accept the null hypothesis that differences were not significant for the first two value ranges for both volume and value. For the third value range, I rejected the null and accepted the alternative. Under the separate-entity approach, I could only reject the null for the middle value range for changes in volume.

Table 8. Post-Merger Small Bank Acquirer

	Average Volume			
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Total
Commercial Real Estate loans	54 ***	60 ***	80 ***	26.18%
Commercial & Industrial Loans	226 ***	57 ***	45 ***	44.22%
Farm	32 ***	25 ***	13 ***	9.36%
Other Agricultural	111 ***	24 ***	16 ***	20.23%
Total SBL	**422**	**166**	**153**	**100%**

	Average Value (,000s)					*(,000s)*	
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	% Assets	% Loans	*Average Assets*	*Average Loans*
Commercial Real Estate	$1,605.25 ***	$6,654.32 ***	$23,897.78 ***	7.54%	11.68%		
Commercial & Industrial	$4,647.62 ***	$5,232.11 ***	$11,087.39 ***	4.92%	7.61%	**$426,357.48**	**$275,374.16**
Farm	$806.26 ***	$1,944.94 ***	$2,816.35 ***	1.31%	2.02%		
Other Agricultural	$1,280.18 **	$1,307.45 ***	$2,436.28 *	1.18%	1.82%		
Total SBL	**$8,339.31**	**$15,138.82**	**$40,237.80**	**14.94%**	**23.14%**		

*, **, *** Indicates significance at .05, .01, .001, respectively.

Table 9. CRE Loans Single-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM SBL	AM SBL	% Change	BM SBL	AM SBL	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	143	156	8.91%	35	54	55.87%	0.294
$100K-$250K	205	230	12.15%	40	60	49.29%	0.722
$250K-$1,000K	313	365	16.76%	54	80	46.95%	-0.001****
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$4,526.90	$5,242.31	15.80%	$852.01	$1,605.25	88.41%	0.919
$100K-$250K	$23,079.69	$26,328.98	14.08%	$4,053.65	$6,654.32	64.16%	0.676
$250K-$1,000K	$112,724.73	$133,899.92	18.78%	$14,804.95	$23,897.78	61.42%	-0.007***

, * Significant at .01, .001, respectively.

Table 10. CRE Loans Separate-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM Sep. Entity	AM Large	% Change	BM Sep. Entity	AM Small	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	160	156	-2.64%	54	54	0.62%	0.454
$100K-$250K	230	230	0.01%	60	60	0.49%	0.040**
$250K-$1,000K	357	365	2.43%	78	80	2.53%	0.448
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$4,993.20	$5,242.31	4.99%	$1,315.32	$1,605.25	22.04%	0.366
$100K-$250K	$25,846.17	$26,328.98	1.87%	$6,031.85	$6,654.32	10.32%	0.112
$250K-$1,000K	$128,785.54	$133,899.92	3.97%	$20,583.98	$23,897.78	16.10%	0.207

** Significant at .05

2. Commercial and Industrial Loans

Comparing figures from table 4 and table 5, average large bank loan volume in the first value range increased from 773 to 924, the second value range 207 to 235, and the largest value range 191 to 224. Average loan values for the first range increased from $14.6 million to $16.4 million, loans in the second value range increased from $16.5 million to $19.3 million, and loans in the highest range increased from $40.6 million to $48.4 million.[11] Table 5 also shows from a statistical standpoint whether changes in volume and value using the single-entity approach were significant. There were significant changes in all value ranges for both volume and value of SBL for large bank acquirers. Changes in volume were significant at

[11] These figures are approximate. See appropriate tables for exact values.

the .001 level for all value ranges. In the less than $100K value range, value change was significant at the .01 level, but the other value ranges were significant at the .001 level.

Results for post-merger small bank acquirers are found in table 8. Change in average loan volume in the first value range was from 167 to 226, the second range 38 to 57, and the largest range 32 to 45. Change in loan value for the ranges was from $2.8 million to $4.6 million, $3.1 million to $5.2 million, and $7.1 million to $11.1 million, respectively. Statistically speaking, as with CRE loans, at the .001 confidence level increases in both volume and value for all value ranges were significant.

Table 11 shows the results from using the single-entity approach to compare the changes in SBL between the two merger types. As with CRE loans, increases in terms of percent are much higher for small bank acquirers. However, percent-increases differ from CRE loan findings. Among large bank acquirers, the largest increase in volume was for loans less than $100K and in terms of value, loans between $250K and $1,000K experienced the largest increase. For small bank acquirers, the largest increase in volume and value was for the middle value range of lending. Statistically, like in CRE loans, a significant difference in effects was found between the two data sets in the largest value range at the .01 level for volume and the .10 level for value where large banks increase their lending more.

The separate-entity approach yields slightly different results again. These changes are shown in table 12. Overall increases for both banks are higher in this section of lending. In terms of both volume and value, large bank acquirers increase their lending the most in the largest value range. For small banks, in terms of volume, the largest increase was observed in the middle value range, but in terms of value the highest increase was observed in loans in the largest value range. Statistically, there was a significant difference in the change in volume

for the middle value range and significant difference in the first value range for changes in value. In the other value ranges, no significant differences were observed.

Under the single-entity approach, I could only reject the null hypothesis and accept the alternative that there was a significant difference in the magnitude of SBL changes for the largest value range for both volume and value. Other value ranges experienced no significant differences between the two subsets. Under the separate-entity approach, I rejected the null hypothesis for the middle value range for volume changes and the first value range for value changes. Other ranges showed no significant changes.

Table 11. C&I Loans Single-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM SBL	AM SBL	% Change	BM SBL	AM SBL	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	773	924	19.61%	167	226	35.07%	0.349
$100K-$250K	207	235	13.44%	38	57	52.53%	0.382
$250K-$1,000K	191	224	17.66%	32	45	41.42%	-0.005***
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$14,551.17	$16,419.49	12.84%	$2,846.12	$4,647.62	63.30%	0.763
$100K-$250K	$16,494.44	$19,255.94	16.74%	$3,115.30	$5,232.11	67.95%	0.319
$250K-$1,000K	$40,606.09	$48,409.44	19.22%	$7,094.53	$11,087.39	56.28%	-0.058*

*, *** Significant at .10, .01, respectively.

Table 12. C&I Loans Separate-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM Sep. Entity	AM Large	% Change	BM Sep. Entity	AM Small	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	884	924	4.54%	223	226	1.13%	0.110
$100K-$250K	231	235	1.51%	52	57	9.58%	0.005***
$250K-$1,000K	210	224	6.88%	41	45	7.93%	0.536
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$16,222.78	$16,419.49	1.21%	$3,849.75	$4,647.62	20.73%	0.024**
$100K-$250K	$18,202.18	$19,255.94	5.79%	$4,188.62	$5,232.11	24.91%	0.189
$250K-$1,000K	$42,952.28	$48,409.44	12.71%	$8,417.51	$11,087.39	31.72%	0.724

, * Significant at .05, .01, respectively.

3. Farm Loans

SBL changes in this category are quite different from the above sections. Comparing figures from table 4 and table 5, average large bank loan volume in the first value range increased from 66 to 68, the second value range 47 to 52, and the largest value range 25 to 26. Average loan values for the first range increased from $1.3 million to $1.4 million, loans in the second value range increased from $3 million to $3.2 million, and loans in the highest range decreased to $3.6 million from $3.8 million.[12] Table 5 also shows from a statistical standpoint whether changes in volume and value using the single-entity approach were significant. There was no significant change in lending volume in the first value range, but there were significant changes in volume for the middle and uppermost value ranges at levels of .001 and .05, respectively. In terms of changes in value, however, there were no significant changes.

Results for post-merger small bank acquirers are found in table 8 and vary from the results found from large bank acquirers. Change in average loan volume in the first value range was from 24 to 32, the second range 18 to 25, and the largest range 10 to 13. Change in loan value for the ranges was from $600,000 to $806,000, $1.4 million to $1.9 million, and

[12] These figures are approximate. See appropriate tables for exact values.

$2.1 million to $2.8 million, respectively. Statistically speaking, as with CRE and C&I loans, at the .001 confidence level increases in both volume and value for all value ranges were significant.

Table 13 shows percent-increases for each section using the single-entity approach for comparison. Again, increases for small bank acquirers are much higher than large bank acquirers. For large banks, the highest increases was observed in the middle section for both volume and value. Unlike the CRE and C&I loans, there was a decrease in the highest value of lending in terms of value. For small banks, the highest increases in volume and value were also observed in the middle section. When comparing the changes between the two subgroups, significant differences in volume was found for the lowest value range where small bank acquirers increase lending more than large bank acquirers. In terms of marginal increases over large bank acquirers in value, small banks increased lending to the lowest and middle sections significantly more at the .05 level.

The next table, table 14, shows results using the separate-entity approach which yields completely different results compared to the single-entity approach. For both large and small bank acquirers, SBL decreases in terms of both volume and value. For both large bank and small bank acquirers, smallest decreases in volume and value were in the middle section of lending. Statistically, in almost every section of lending the negative effects to farm loan demanders are smallest when the acquirer of their banks is another small bank. Specifically, differences in volume were significant at .05 and .10 for the lowest and middle value range, respectively. In terms of value, significance was found at the .05, .05, and .10 level for the value ranges in ascending order.

Under the single-entity approach, I could reject the null hypothesis and accept the alternative that there was a significant difference in the magnitude of SBL changes for the

first value range for volume changes and the first two value ranges for value changes. Under the separate-entity approach, except for the largest value range for volume changes, I could reject the null hypothesis for all ranges for both volume and value.

Table 13. Farm Loans Single-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM SBL	AM SBL	% Change	BM SBL	AM SBL	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	66	68	2.56%	24	32	29.58%	0.031**
$100K-$250K	47	52	8.63%	18	25	38.05%	0.193
$250K-$1,000K	25	26	4.55%	10	13	23.70%	0.561
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$1,348.00	$1,398.34	3.73%	$600.44	$806.26	34.28%	0.040**
$100K-$250K	$2,988.50	$3,165.95	5.94%	$1,369.64	$1,944.94	42.00%	0.028**
$250K-$1,000K	$3,772.50	$3,648.50	-3.29%	$2,132.16	$2,816.35	32.09%	0.163

** Significant at .05

Table 14. Farm Loans Separate-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM Sep. Entity	AM Large	% Change	BM Sep. Entity	AM Small	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	80	68	-15.64%	36	32	-12.69%	0.018**
$100K-$250K	55	52	-6.41%	26	25	-4.36%	0.071*
$250K-$1,000K	28	26	-6.87%	15	13	-13.94%	0.527
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$1,654.92	$1,398.34	-15.50%	$904.13	$806.26	-10.82%	0.016**
$100K-$250K	$3,583.96	$3,165.95	-11.66%	$2,027.33	$1,944.94	-4.06%	0.011**
$250K-$1,000K	$4,279.43	$3,648.50	-14.74%	$3,008.58	$2,816.35	-6.39%	0.086*

*, ** Significant at .10, .05, respectively.

4. Other Agricultural Loans

Comparing figures from table 4 and table 5 average large bank loan volume in the first and second value range decreased to 143 from 146 and to 47 from 50, but the largest value range increased from 34 to 35. Average loan values for the first range decreased to $1.2 million from $1.4 million, loans in the second value range decreased to $2.2 million from $2.4 million, and loans in the highest range only slightly increased from $2.97 million to $3.01

million.[13] Table 5 also shows from a statistical standpoint whether changes in volume and value using the single-entity approach were significant. Large banks did not have any significant changes in any value range in either volume or value.

Results for post-merger small bank acquirers are found in table 8. Change in average loan volume in the first value range was from 95 to 111, the second range 21 to 24, and the largest range 13 to 16. Change in loan value for the ranges was from $1.1 million to $1.3 million, $1.4 million to $1.3 million, and $2.2 million to $2.4 million, respectively. Statistically speaking, as with the other sections of lending, at the .001 confidence level increase in volume for all value ranges were significant. In terms of value, all value ranges experienced significant increases, but at levels .01, .001, and .10 for the first, second, and third value ranges, respectively.

Table 15 shows the results from using the single-entity approach. As with all other sections, in terms of percent small bank acquirers increase their lending compared to what they were lending one year before. For large bank acquirers, the only increases in volume and value was in the largest value range (2.1% and 1.3%). For small bank acquirers, increase in volume for all ranges increased with the highest being to the largest loans. In terms of value, the first and third value range increased with the largest increase in the lowest value loans. Statistically, changes in all value ranges between the two data sets varied significantly. Small banks increase their lending more significant at levels .05, .01, and .10, for the three value ranges respectively. In terms of volume, however, considering percent-differences in changes of average values, the only significant difference ($p = .001$) between the two data sets was in the middle value range.

Table 16 shows the results using the separate-entity approach. There were large decreases for both large and small bank acquirers with the highest decreases for both volume and value

[13] These figures are approximate. See appropriate tables for exact values.

being in the middle section for both acquirers. Small bank significant marginal volume increases over large bank increases were observed for each value range at the .05, .01, and .10 levels for the ranges in ascending order. In terms of value, only the middle section experienced significant difference (p = .01).

Under the single-entity approach, I could reject the null hypothesis and accept the alternative that there was a significant difference in the magnitude of SBL changes among every value range for volume changes and the middle and largest value range for value changes. Under the separate-entity approach, I could reject the null for the middle and largest value range for volume changes and only the middle value range for value changes.

Table 15. Other Agricultural Loans Single-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
	BM	AM	%	BM	AM	%	
Loan Value	SBL	SBL	Change	SBL	SBL	Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	146	143	-1.84%	95	111	17.10%	0.036**
$100K-$250K	50	47	-5.71%	21	24	10.46%	0.002***
$250K-$1,000K	34	35	2.10%	13	16	19.53%	0.056*
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$1,390.76	$1,216.94	-12.50%	$1,099.51	$1,280.18	16.43%	0.114
$100K-$250K	$2,402.09	$2,201.29	-8.36%	$1,365.07	$1,307.45	-4.22%	0.001****
$250K-$1,000K	$2,972.51	$3,011.76	1.32%	$2,181.90	$2,436.28	11.66%	0.135

*, **, ***, **** Significant at .10, .05, .01, .001, respectively.

Table 16. Other Agricultural Loans Separate-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
	BM	AM	%	BM	AM	%	
Loan Value	Sep. Entity	Large	Change	Sep. Entity	Small	Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	168	143	-14.83%	131	111	-15.37%	0.308
$100K-$250K	59	47	-20.21%	31	24	-23.28%	0.015**
$250K-$1,000K	40	35	-14.24%	20	16	-20.39%	0.079*
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$1,591.73	$1,216.94	-23.55%	$1,565.96	$1,280.18	-18.25%	0.766
$100K-$250K	$3,061.15	$2,201.29	-28.09%	$1,958.91	$1,307.45	-33.26%	0.006***
$250K-$1,000K	$3,740.32	$3,011.76	-19.48%	$3,115.01	$2,436.28	-21.79%	0.126

*, **, *** Significant at .05, .01, respectively.

5. Total SBL

Table 17-1 shows before merger and after merger SBL lending of small banks as a percentage of SBL lending by large banks. This table also illustrates the faster rate of growth in SBL among small acquirers compared to large acquirers following a merger. In every category, the proportion of SBL by small banks relative to the SBL by large banks increased following the merger. This also illustrates the propensity for small banks to use newly acquired assets of other small banks more efficiently in increasing small business lending. I also tested the significance of these results by designating the pre-merger proportion levels (i.e., small bank SBL/large bank SBL) as the post-merger expected proportion following the merger. In theory, if both large bank acquirers and small bank acquirers utilized new assets for SBL similarly there should have been no significant difference between the pre-merger proportion and the post-merger proportion. Table 17-2 and table 17-3 show the over (under) of actual proportion change relative to the expected change. I did not run the test for each loan category, but collectively the post-merger proportion significantly differs ($p = .05$) from the expected proportion assuming the proportion stays the same.

Table 17-1. Small Bank Lending as a Percent of Large Banks (by loan type and category)

Before Merger

	Volume			Value		
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	<$100K	$100K-$250K	$250K-$1,000K
CRE	24.28%	19.67%	17.30%	18.82%	17.56%	13.13%
C&I	21.61%	18.22%	16.57%	19.56%	18.89%	17.47%
FARM	37.12%	37.77%	41.27%	44.54%	45.83%	56.52%
AGRICULTURAL	64.97%	42.98%	38.69%	79.06%	56.83%	73.40%

After Merger

	Volume			Value		
Loan Type	<$100K	$100K-$250K	$250K-$1,000K	<$100K	$100K-$250K	$250K-$1,000K
CRE	34.75%	26.19%	21.77%	30.62%	25.27%	17.85%
C&I	24.40%	24.50%	19.91%	28.31%	27.17%	22.90%
FARM	46.90%	48.00%	48.83%	57.66%	61.43%	77.19%
AGRICULTURAL	77.50%	50.34%	45.30%	105.20%	59.39%	80.89%

Table 17-2. Small Bank Expected Changes vs. Actual Changes

CRE LOANS

	Change in Volume			
Size	Large Bank Actual	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	13	*3*	19	16
$100K-$250K	25	*5*	20	15
$250K-$1,000K	52	*9*	25	16

	Value $ (,000s)			
Size	Large Bank	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	715	*202*	753	551
$100K-$250K	3,249	*764*	2,601	1,837
$250K-$1,000K	21,175	*4,242*	9,093	4,851

C&I LOANS

	Volume			
Size	Large Bank Actual	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	152	*33*	59	26
$100K-$250K	28	*5*	20	15
$250K-$1,000K	34	*6*	13	8

	Value $ (,000s)			
Size	Large Bank	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	1,868	*456*	1,802	1,345
$100K-$250K	2,761	*495*	2,117	1,622
$250K-$1,000K	7,803	*2,130*	3,993	1,863

Table 17-3. Small Bank Expected Changes vs. Actual Changes (Cont.)

FARM LOANS

	Volume			
Size	Large Bank Actual	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	2	*1*	7	7
$100K-$250K	4	*2*	7	5
$250K-$1,000K	1	*0*	2	2

	Value $ (,000s)			
Size	Large Bank	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	50	*20*	206	186
$100K-$250K	177	*83*	575	492
$250K-$1,000K	(124)	*(53)*	684	738

AGRICULTURAL LOANS

	Volume			
Size	Large Bank Actual	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	(3)	*(2)*	16	18
$100K-$250K	(3)	*(1)*	2	3
$250K-$1,000K	1	*0*	3	2

	Value $ (,000s)			
Size	Large Bank	Small Bank Expected	Small Bank Actual	Over (Under)
<$100K	(174)	*(162)*	181	342
$100K-$250K	(201)	*(187)*	(58)	130
$250K-$1,000K	39	*21*	254	234

Significance of over (under) was calculated using a nonparametric t-test by grouping all expected changes together and comparing them against the actual changes using the Wilcoxon Signed Ranks Test. Z-score = -2.165, p-value (2-tailed) = .03

The above test assumed a 1-for-1 change in SBL between large acquirers and small acquirers and then tested for a significant difference between actual change and expected change. The next table, table 18, shows the total differences in lending before merger and after merger for both data sets. It also tests for significant differences in changes in SBL between the two sub-groups as it was for each category separately using the single-entity approach. It is important to also execute the same analysis on a total basis to see overall differences in changes. For large bank acquirers, the highest increases were observed in the largest value range for both volume and value. For small bank acquirers, the highest increase in volume was in the second value range. In terms of value, percent-increases were quite close but the lowest value range experienced the highest increase. Statistically, in terms of true-number changes in volume and value, large bank acquirers' increase in lending for loans between $250 million and $1 million was significantly higher than small bank acquirers' increase to this value range at the .001 and .01 level for volume and value, respectively.

Table 19 presents average total loan volume and value for each value range using the separate-entity approach. This table combines all loan categories into one and then runs the test using a single data set for both large and small acquirers. *BM Sep. Entity* represents the average total lending both the acquiree and the acquirer were lending before the merger by summing each bank's lending together. *AM Large* represents average post-merger lending by large acquirers and *AM Small* represents average post-merger lending by small acquirers. *The % Change* column represents the percent change in lending by setting the difference in lending as a fraction of what both entities were lending before the merger as it was calculated for each category on an individual basis. As it was for each separate category, percent-increase was highest for small bank acquirers. Statistically, in the lowest and middle value range on a separate entity basis,

Table 18. Total SBL Single-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM SBL	AM SBL	% Change	BM SBL	AM SBL	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	1,128	1,291	14.49%	321	422	31.61%	0.595
$100K-$250K	509	563	10.60%	117	166	41.55%	0.791
$250K-$1,000K	563	651	15.63%	109	153	39.85%	-0.000****
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$21,816.83	$24,277.08	11.28%	$5,398.08	$8,339.31	54.49%	0.992
$100K-$250K	$44,964.72	$50,952.15	13.32%	$9,903.67	$15,138.82	52.86%	0.827
$250K-$1,000K	$160,075.83	$188,969.62	18.05%	$26,213.54	$40,237.80	53.50%	-0.003***

, * Significant at .01, .001, respectively.

Table 19. Total SBL Separate-Entity Changes Comparison

	Large-Small Merger Type			Small-Small Merger Type			
Loan Value	BM Sep. Entity	AM Large	% Change	BM Sep. Entity	AM Small	% Change	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test
<$100K	1,293	1,291	-0.12%	444	422	-4.93%	0.069*
$100K-$250K	575	563	-2.07%	169	166	-1.75%	0.003***
$250K-$1,000K	635	651	2.43%	154	153	-0.55%	0.159
Value	*Average*	*Average*		*Average*	*Average*		
<$100K	$24,462.64	$24,277.08	-0.76%	$7,635.16	$8,339.31	9.22%	0.052*
$100K-$250K	$50,693.45	$50,952.15	0.51%	$14,206.71	$15,138.82	6.56%	0.051*
$250K-$1,000K	$179,757.57	$188,969.62	5.12%	$35,125.08	$40,237.80	14.56%	0.217

*, *** Significant at .10, .01, respectively.

there were significantly higher increases in lending when the acquirer is another small bank. In the largest value range where large bank acquirer increases over separate-entity SBL may be expected to be significantly higher than small bank acquirer increases over separate-entity SBL there was no such significant difference in either volume ($p = 0.159$) or value ($p = 0.217$). The total number of loans decreased in all three value ranges for small banks while loan value increased for all ranges which may signal a shift in policy where fewer loans are extended but are of greater value. From the table it appears there is a shift in policy for large banks toward uppermost value lending. In terms of both volume and value, only the third section increased while the first two sections remained roughly stagnant.

Under the single-entity approach, I could only reject the null hypothesis and accept the alternative that there was a significant difference in the magnitude of SBL changes for the largest value ranges for volume and value changes. Under the separate-entity approach, I could reject the null for the first and second value ranges for both volume and value changes.

6. Delinquencies

In almost half of the cases (47%) involving a large bank acquirer, total 30-89 day delinquencies decreased following a merger comparing pre-merger acquirer amounts to post-merger amounts. In small bank acquirer cases, only 30% decreased total delinquencies following the merger. It is important to consider what the delinquencies were for acquiring banks preceding mergers and compare these figures to post-merger delinquency amounts a year later to get a sense of whether these banks cleanse the acquired portfolio of riskier borrowers.[14] In theory, if delinquencies significantly drop following a merger it could represent a situation where the acquirer essentially scoops the better performing loans from the acquired bank and drops the rest. The assumption is that in a one year time span and since the acquiring bank increases its assets and total business lending (including SBL), delinquencies should not be consistently lower if marginally-risked small business borrowers are retained in the lending portfolio. In contrast, since large banks acquire the smaller banks' loans too as a result of a merger, delinquencies, should actually increase.

Table 20 highlights the increase or decrease in delinquencies for each loan type for mergers with a large bank acquirer. On average, in each section, acquired small banks had consistently higher delinquencies than large banks as a percent of total business loans. This

[14] As it has been mentioned in *Limitations*, there was no way to isolate specific lending and delinquencies to a single bank due to the consolidated source of data. Nonetheless, it still appears that the consolidation between the two banks one year later results in fewer loans to moderately-risked businesses, hence fewer delinquencies spurred by lending to the more financially sound.

supports my expectation that small banks take greater steps to lend more to marginally-risked SBEs and is also consistent with extant literature discussing commercial banks' inclination to use SBCS technology strictly in approving loan applicants. In terms of the ratio of delinquencies to total business loans, on average these mergers show a slight drop in commercial real estate loans and stagnation in both commercial and industrial loans and farm loans. From a statistical standpoint using the single-entity approach, there were no significant differences in after merger large bank delinquencies compared to before merger large bank numbers for large banks. Table 21 shows the results for small bank acquirers. CRE loan delinquencies showed an 11% increase, C&I loans showed an 8% decrease, and Farm loans remained approximately stagnant. Statistically, only the increase in CRE loans was significant (p = .001). Comparing the differences in differences between the two subgroups, small bank acquirers experience higher increases in delinquencies in CRE loans (p = .044) while large bank acquirers experience higher increases in delinquencies in C&I loans (p = .047).

Table 20. Changes in 30-89 Day Delinquencies (Large Acquirer)

											Before Merger		After Merger	
Bank		30-89 DELBM1	30-89 DELAM1	30-89 DELBM2	30-89 DELAM2	30-89 DELBM3	30-89 DELAM3	Avg. Business Loans		Type	Del-BL Ratio	Total	Del-BL Ratio	Total
Small Acquiree	Mean	**758.58**		**517.70**		**22.23**		Before Merger	After Merger	(1) CRE	0.55%			
	N	69		69		69		**$139,186.55**		(2) C&I	0.37%			
	Std. Deviation	1563.99		1196.70		120.36				(3) Farm	0.02%	**0.93%**		
Large Acquirer	Mean	**1,716.12**	**1,763.52**	**1,386.66**	**1,513.99**	**192.08**	**184.68**			(1) CRE	0.12%		0.10%	
	N	57	57	57	57	57	57	**$1,463,782.23**	**$1,690,398.12**	(2) C&I	0.09%		0.09%	
	Std. Deviation	2364.39	1955.26	1553.00	1382.25	377.74	442.09			(3) Farm	0.01%	**0.23%**	0.01%	**0.20%**

Table 21. Changes in 30-89 Day Delinquencies (Small Acquirer)

Bank		30-89 DELBM1	30-89 DELAM1	30-89 DELBM2	30-89 DELAM2	30-89 DELBM3	30-89 DELAM3	Avg. Business Loans		Type	Before Merger Del-BL Ratio	Before Merger Total	After Merger Del-BL Ratio		After Merger Total
Small Acquiree	Mean	**461.29**		**303.91**		**38.43**		Before Merger	After Merger	(1) CRE	0.73%				
	N	69		69		69				(2) C&I	0.48%				
	Std. Deviation	942.72		625.46		148.78		**$62,923.06**		(3) Farm	0.06%	**1.28%**			
Small Acquirer	Mean	**378.44**	**838.80**	**332.55**	**261.38**	**56.83**	**98.98**			(1) CRE	0.19%		0.30%	**	
	N	64	64	64	64	64	64	**$197,430.06**	**$275,374.16**	(2) C&I	0.17%		0.09%		
	Std. Deviation	845.82	1310.14	689.66	308.90	142.42	207.58			(3) Farm	0.03%	**0.39%**	0.04%		**0.44%**

Table 22. Change in 30-89 Day Delinquencies Comparison

	Large Acquirer		%	Difference	**Small Acquirer**		%	Difference	Diff-Diff
Loan Type	BM DEL	AM DEL	Change	t-test	BM DEL	AM DEL	Change	t-test	t-test
CRE	$1,716.12	$1,763.52	2.76%	**0.968**	$378.44	$838.80	121.65%	**0.000******	**0.044****
C&I	$1,386.66	$1,513.99	9.18%	**0.172**	$332.55	$261.38	-21.40%	**0.386**	**-0.047****
FARM	$192.08	$184.68	-3.85%	**0.405**	$56.83	$98.98	74.18%	**0.178**	**0.203**

, ** Significant at .05, .001, respectively.

These results are shown in table 22. Changes in delinquencies for no-merger large banks were also not significantly different at the end of the one-year period.

I failed to reject the null hypothesis that large bank delinquencies do not significantly differ after the merger. As mentioned, there were no significant changes in any of the loan categories. For small banks, I could reject the null hypothesis and accept the alternative that there were major increases in 30-89 day delinquencies following the merger only for CRE loans. Comparing the differences in differences between the two subsets, I could reject the null and accept the alternative that there were major differences between the changes in 30-89 day delinquencies between the two merger types. It turned out that for CRE 30-89 day delinquencies small banks had significant marginal increases over large banks. It was the opposite for C&I loans, however, where large banks had the higher increases.

7. Similar Large Banks

The following table shows correlations between SBL—broken down into each value range for both volume and value—and total assets and total loans. A bank's SBL and its total assets

are significantly correlated and therefore justify total assets as a criterion in comparing changes in SBL to similar banks operating in the same state. It was not possible to find exact matches, but I was able to select similar banks. Descriptives of these selections are shown in table 23. Also, there is very high correlation between total loans and total assets. Since total assets is already the main criterion in selecting similar large banks, due to the high collinearity between the two variables total loans was eliminated as a criterion in looking for other similar banks.

Table 23. Large Merger Bank Correlations

			BMAssets	BMLoans	TotBMSBL #	TotBMSBL $	BMSBL#1	BMSBL#2	BMSBL#3	BMSBL$1	BMSBL$2	BMSBL$3
Spearman 's rho	BMAssets	Correlation	**1.00**	**.949****	**.591****	**.704****	**.457****	**.614****	**.743****	**.434****	**.592****	**.744****
		Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.001	.000	.000
		N	57	57	57	57	57	57	57	57	57	57
	BMLoans	Correlation	**.949****	**1.00**	**.588****	**.708****	**.454****	**.597****	**.746****	**.432****	**.577****	**.759****
		Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.001	.000	.000
		N	57	57	57	57	57	57	57	57	57	57

**, Correlation is significant at the .001 level (2-tailed)

Table 24. Merger vs. No-Merger Bank Size

Bank	BM Total Assets	BM Total Loans	AM Total Assets	AM Total Loans
Merger Bank	$1,579,802.25	$1,066,016.42	$1,885,588.64	$1,240,047.65
No-Merger Bank	$1,553,944.53	$991,894.85	$1,558,329.13	$961,384.71

From the table above, there is only a 2% difference in before merger total assets and a 7% difference in before merger total loans. There was no significant difference found between the two subgroups (p = .747 and p = .390). After the merger, however, significant differences were found (p = .008 and p = .003). The relatively insignificant differences between the two data sets before the merger should also help to enable the association of changes in SBL to mergers. Table 25 highlights changes using the separate-entity approach. Using the singe-entity approach would not be very useful. The separate-entity approach provides more insight into how SBL changes since I am comparing merger banks to similar no-merger banks, if the single-entity were used essentially it would not be possible to

compare only the changes by the merger bank and the no-merger bank. The large banks that were involved in a merger only experienced increases in the uppermost value range while the no-merger banks experienced decreases in every value range for both volume and value. Statistically, similar no-merger banks experienced significant decreases in the first and second value range in terms of both volume and value. Changes in the first value range for volume was significant at the .05 level and the second value range was significant at the .01 level. Changes in value for both the first and second value ranges were significant at the .01 level. Comparing the differences in differences between the two subsets, however, show that large banks involved in an acquisition and no-merger large similar banks had no significant differences.

Reflecting on my results, against my hypothesis that no-merger similar banks' 30-89 day delinquencies do not significantly differ, I failed to accept the null hypothesis that there were no changes for the first two value ranges for both volume and value. However, I could accept the null hypothesis that there were no significant changes in the third value range for both volume and value. Referring to differences in differences in regards to my first hypothesis, I could not reject the null hypothesis that there were no significant changes under the more useful separate-entity approach.

Table 25. Merger & No-Merger Bank Separate-Entity Changes Comparison

	Merger Large Banks			No Merger Large Banks				
Loan Value	BM SBL	AM SBL	% Change	BM SBL	AM SBL	% Change	Diff	Diff-Diff
Volume	*Average*	*Average*		*Average*	*Average*		t-test	t-test
<$100K	1,189	1,083	-8.91%	639	602	-5.64%	0.042*	0.289
$100K-$250K	455	447	-1.86%	259	248	-4.02%	0.006**	0.672
$250K-$1,000K	495	512	3.35%	341	312	-8.50%	0.290	0.752
Value	*Average*	*Average*		*Average*	*Average*			
<$100K	$24,132.32	$21,951.94	-9.04%	$12,906.05	$11,815.67	-8.45%	0.010**	0.376
$100K-$250K	$48,054.90	$46,172.99	-3.92%	$26,442.26	$24,796.40	-6.22%	0.010**	0.485
$250K-$1,000K	$169,758.56	$171,507.16	1.03%	$105,664.28	$103,406.48	-2.14%	0.350	0.989

*, ** Significant at .05, .01, respectively.

V. CONCLUSIONS, IMPLICATIONS, AND ALTERNATIVES

1. Possible Implications on Public Policy Issues

The findings in the previous sections raise a few concerns regarding the availability of credit to certain small businesses. It was established there are differences in the way large and small banks monitor for loans. Large banks focus on financial factors by primarily using SBCS technology and small banks are more apt to use CCS in conjunction with soft-information dealing with prospective borrowers. In terms of dollar amount and volume number, large banks lend more to small businesses because of their larger sizes, but in terms of assets and total business loans small banks are more devoted to lending small business loans. Since small banks are more in number these differences in raw lending are not really a cause for concern. However, in the wake of the ongoing merger trend there may be a shift in small business lending. The point of this research was to tie the differences in lending to the changes that occur in lending subsequent to mergers to study the possible impact on certain borrowers and whether some bias may be created as more mergers occur.

The first part of the data analysis (*Results*) chapter marked the differences in pre-merger and post-merger small business lending. It was found that by using the separate-entity approach in no value ranges either for changes in volume or value, large banks significantly increased lending over small bank acquirers following a merger. For CRE loans, small business loan demanders of more $100K-$250K loan opportunities were better off with small bank acquirers. For C&I loans, demanders of more $100K-$250K loan opportunities as well as higher valued <$100K loans were better off with small bank acquirers. For Farm loans, where there is the most difference between small bank and large bank nature to lend, loans less than $100K and up to $250K, in terms of numbers, increase more when there is a small bank acquirer. In terms of the actual value of loans, in all value ranges small business owners

are better off with a small bank acquirer. For other Agricultural loans, in terms of volume, small businesses that demand more loans in the middle and uppermost value range benefit more from small bank acquirers. In terms of value, small business demanders for higher value loans in the middle value range are better off with a small bank acquirer.

Comparison using the single-entity approach yielded different, but expected results. Using this method failed to take into account which bank actually makes better use of an acquired bank because it ignores the size of the acquired bank in comparison. Large banks typically acquire larger small banks than small bank acquirers do for obvious reasons. As a result, I expected larger differences in differences in the increases of lending between the two data sets. For CRE loans, this was only true for the largest value range for both volume and value changes. Other value ranges showed no significant differences between large and small bank acquirers. The same results were found for C&I loans where there were only significant differences in the uppermost value range. Farm loans and Other Agricultural loans, however, were very different. Even using the single-entity approach, small banks increase lending more to these loan categories than large banks do. Small bank increases over large bank acquirers in volume for Farm loans were significant for the first value range and the first two value ranges for changes in the total dollar amount. For Other Agricultural loans, increases in terms of volume for all value ranges were significant and the middle section of lending in terms of value increases were significant.

Findings from extant literature positing small businesses are not negatively affected by large bank acquirers does not show much ground in my results. Focusing on the resulting lending environment after mergers using the single-entity approach shows that large banks have an inclination to only substantially increase lending in the largest value range compared to small bank acquirers. Increases in other value ranges are not much different from increases by small bank acquirers. By using the separate-entity approach and taking into consideration

lending from both the acquirer and the acquiree prior to the merger, it can be seen that small business owners are better off with small bank acquirers. These findings are against certain SBCS technology objectives.

According to survey results from Berger & Frame (2007), all large banks in their survey utilized SBCS for loans less than $100K and 74% of surveyed large banks used the technology for loans less than $250K (p. 6). This suggests that large banks do have the ability to use the expansion from the merger to also increase lending in other value ranges other than the largest value loans because the technology is widely used for rating these loan demanders. Notwithstanding, the SBCS technology objective regarding the increased ability for large banks to absorb losses due to lower transaction costs and the subsequent ability to shift away from their large value loan specialty is in contrast to the effects of mergers. Also, one of the objectives, as noted in *SBCS Objectives*, is "[to]…allow for equal assessment of potential borrowers". This includes lending to smaller value borrowers, but it would also extend to other loan categories (other than the standard C&I loan). But the results showed that large banks tend to shift away from these types of loans as a result of the merger. As mentioned, small bank acquirers in most cases significantly lend more to these borrowers than large banks do. These findings, in effect, show the tendency for the effects of mergers to influence large banks to shift away from SBCS technology objectives. Even large banks that were not involved in a merger decreased their lending in all value ranges in terms of both volume and value. Decreases were only significant for the first two ranges, however, which reinforces the assertion that large banks are more reliable in lending the largest small business loans when even without the effects of mergers large banks did not show significant changes while the other ranges significantly dropped. After comparing the separate-entity changes of large merger banks to the changes by similar no-merger banks it was found that there were no significant differences. Therefore, in my data set using recent mergers—including similar

banks to those that acquired banks in a one-year time frame—it does not appear large banks between 2010 and 2012 have seriously increased lending to the small business community.

Another SBCS technology objective is "[to]…increase small business lending to marginally-risked borrowers". Findings in the *Delinquencies* section also cast doubt on this objective following a merger. Large bank average 30-89 day delinquencies as a percent of total business loans decreased following a merger while small bank average 30-89 day delinquencies increased. From a statistical standpoint, there were no significant increases for large banks in any value range which leads me to believe large banks may retain only the less-risky SBEs from the acquired bank portfolio. For small bank acquirers, however, there was at least a significant increase in CRE 30-89 day delinquencies. In jointly comparing the two subsets together, small bank CRE loan delinquencies are significantly marginally higher following a merger while C&I loan delinquencies are significantly marginally higher for large bank acquirers. This suggests that this objective, comparing the results to small bank acquirers, is apparently accomplished for C&I loan demanders but not for CRE loan demanders. Combining the implications mentioned above, it is possible marginally-risked small businesses that demand large value C&I loans are actually better off when a large bank acquires their bank. But for other loan demanders, a small bank acquirer provides the best benefit.

The differences in the small business lending nature between large and small banks already affects supply and demand, but results from this study also imply that the size of acquirers in times of mergers is also of importance. The significance of this finding is that financially strong small businesses and marginally-risked small businesses do not demand the same types of loans. Financially sound firms would be capable to demand—and make timely payments for—larger loans in order to expand and make more expensive investments in light of these firms' optimism. However, less financially fit firms may not have the capacity to

expand and are therefore more characteristic to demand lower value loans for longer durations. It is in this regard that there is a potential public policy concern for certain small businesses as mergers continue and the effects of these mergers clash against SBCS Technology objectives.

2. Possible Alternatives in SBCS Implementation

SBCS technology is not without its demerits. Besides the fact that the models are developed through predictive regression analysis models based on a study of past loans and as previously described to potentially be exposed to both type I and type II errors, the way these technologies are implemented in itself also leads to inefficiency. It can be observed that in at least two ways this is true: (1) the way in which large lenders may overuse SBCS (e.g., as the most significant factor in acceptance of the loans in ways of automatic acceptance or rejection) and (2) the lack of transparency for small businesses who wish to know the reasons for acceptance or rejection. In the American banking sector covering small business loans, after banks directly purchase ratings externally and then use these ratings to assess small businesses, they provide no information to small businesses that could be used to either increase their attractiveness to potential fund suppliers (banks, angel investors, etc.) or that can be used by managers to direct attention to the weak areas that were most likely the cause for rejection. By means of comparison, some characteristics of the implementation of SBCS seem to be more informative in India and could very well result in a Pareto Improvement in SBL if imitated in America.

To further explain, India's SME market is very well established and is a major contributor to India's GDP. Knowing how to supply funds for growth in this sector is of high concern for India. Therefore, we can expect that major studies have been undertaken to ensure their current system is capable of doing just this. It is outside of the current research scope to

collect data in comparison of the two different types of implementation by the U.S. and India, but I do at least offer some details of India's implementation of SBCS technology that may very well go to address potential issues found in the *Results* chapter.

A basic principle in finance is that the cost of capital is lower in short-term borrowings compared to longer maturity loans. A rating system dealing with small businesses which can assess risks and assign a rating gives considerably more flexibility in the lending terms between the bank and firm. Historically, without the presence of such a system and in the shadow of the asymmetric information problem, small businesses had to typically negotiate on a longer basis because businesses tried to avoid loan rejection probability by limiting the number of times they applied for loans. This meant that businesses typically locked in higher value loans with longer terms which called for higher interest rates as a product of higher uncertainty in the business to pay back its obligations over a longer time horizon. In other words, SBEs had trouble maintaining an aggressive financial policy because of the lending complications that arose; acquiring repeated short-term loans was very difficult and even a single rejection could hurt further borrowing attempts (Kassar & Bernstein, 2011). According to the same study, around 73% of smaller business owners do not even bother to apply for a loan because of the transaction costs they would have to endure in the process or fear of rejection, or both. Rejections on business loans will increasingly make it more difficult to obtain funds from banks due to the banks' nature to view past rejections as a higher exposure to risk. Therefore, SBEs tended to undertake longer-term debt contracts that are costly to both lenders and borrowers.

The SBCS model possesses merit by resulting in lower associated transaction costs in the lending process. Lower transaction costs should not be limited to transactional lending institutions. It is possible for community banks to also benefit from lower transaction costs that would allow for a more efficient lending process to small businesses. It was established

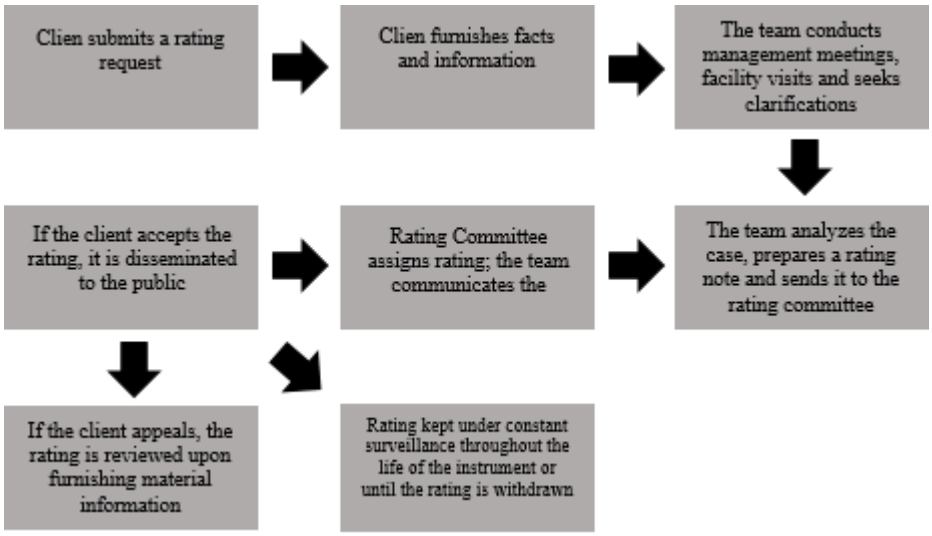
that by a landslide small banks use CCS as the primary risk-assessment method. CCS is used in conjunction with personal characteristics of the borrower gathered from existing relationships which can still be observed today. With the declining market power for small banks, however, I contend CCS is not the small bank's optimal option. If there was a system which America could imitate that may enable SBCS technology immersion among small banks, small banks may again become competitive against large banks and small businesses could also be benefited. The next section turns to India for answers.

2.1 India's CRISIL® and SMERA®

India's CRISIL® and SMERA®, two major rating agencies and the latter being a rating agency whose only business is directed toward rating SMEs, have a different method compared to America in establishing ratings for businesses.[15] If adopted in America there is a chance it could lead to a Pareto Improvement in the sense that all parties involved with small business lending would be provided a positive incentive. These companies are backed by Dun & Bradstreet, as are the existing U.S. rating agencies, but ratings also include information about the business itself as well as the "relationship" factor developed through interviews with key personnel whereas America's small business rating agencies generally do not. The following figure illustrates the process by which small business owners receive the ratings using these companies.

[15] More information on these rating agencies can be found on their websites. CRISIL: http://www.crisil.com/ratings/crisil-sme-ratings.html. SMERA: http://www.smera.in/ratings/sme-ratings.aspx.

Figure 6. Rating Flowchart



(Source: SMERA's Website[16])

After a business that is interested in obtaining a rating contacts the rating agency and submits the necessary inquiry reports and other appropriate documents and pays the related fees, a team of analysts is dispatched for an on-site visit. Subsequently, a series of meetings with management will commence. The rating agency will then, after receiving all relevant and applicable information, assign a rating to the business. The businesses are informed of this rating and have to accept it before it is publicized. Businesses even have the authority to challenge the rating and once the rating is established and accepted it stays under constant surveillance for the life of the instrument.

The following points were gathered from a SMERA® brochure[16] which depicts a few characteristics of the rating agency's framework:

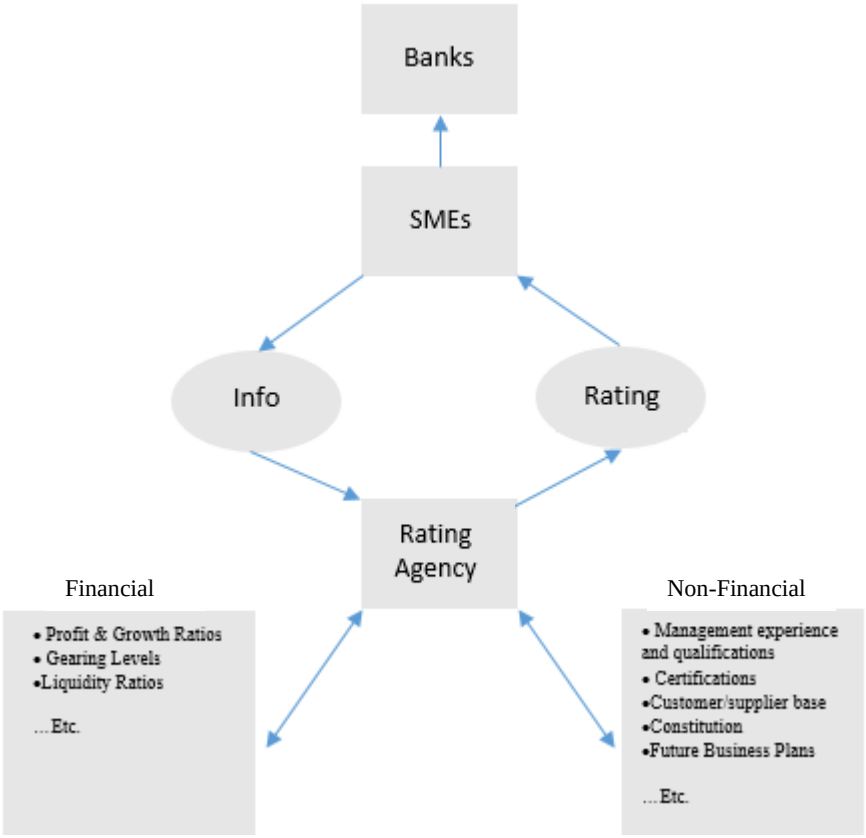
- Every rating is assigned based on a rating request by the issuer; no unsolicited ratings are undertaken.
- The rating criteria are clearly and transparently spelled out and consistently applied.

[16] http://www.scribd.com/doc/64657746/SMERA.

- All ratings are assigned based on written information provided by the issuer, information obtained from reliable sources and very important interviews with the management of the issuer. The discussions cover critical issues, future plans and strategies. This helps factor in non-public information.
- All ratings are assigned by a committee consisting of experienced professionals and not by a single individual.
- The rating assigned is communicated to the issuer along with a rating rationale.

These points are similar with CRISIL® which also rates many SMEs in India. It is important to note the efficiency and fairness within these companies' framework. First, they only provide ratings contingent upon the desire of the small business owner to do so. Second, a consistent methodology is applied. Third, financial and non-financial factors are integrated to factor in non-public information including the future plans of the company. Fourth, an experienced committee assigns the ratings. Lastly, the business owner has the right to accept or challenge the rating before it is publicized. The next figure shows an overview of the flow of information along with more detail in the following paragraphs.

Figure 7. Information Flowchart



The whole process starts with small businesses. Small businesses that are in need of funds can pull their information together and start the rating process with CRISIL® or SMERA®. These companies pull loads of information from the SBE and breaks this information down into two distinct categories: Financial and Non-financial blocks. Financial information is then broken down into specifics such as profit and growth, gearing levels, and liquidity ratios just to name a few. On the non-financial side, information and rating criteria is divided into management experience and qualifications, certifications, customer/supplier base the overall constitution of the firm and includes firm-specific information such as future business plans that may not be public knowledge. Furthermore, all data is analyzed in accordance to only the industry in which the company operates. By doing so, banks can truly trust that "apples" are getting compared to other "apples". After these criteria for ratings are integrated and a rating is established, the rating is presented to the business and the business

can then decide if they want the information to be published and used. The function of choice residing with the SBE, coupled with the fact that no unsolicited ratings are performed, facilitates trust between businesses and rating agencies. This trust enables the smooth flow of the process without the fear of any negative consequences for small business owners. After the process is complete, the business possesses a rating with which it is able to use to assess its operations and isolate areas for improvement, as well as utilize when wanting to obtain funds from a bank. Naturally, if the rating is excellent then banks are able to establish the same risk-based loans commercial banks already enjoy and SBEs will enjoy lower borrowing terms. In the instance the rating is not satisfactory, the banks can make a better informed decision on whether to lend and modify the loan conditions to compensate for the degree of risk it is undertaking. In this case, it is important to note that efficiency in the lending process has still increased. The existence of the rating provides more symmetric information that can be used by both parties in multiple, beneficial ways.

Perhaps the most important element is the fact that this type of system would make it entirely possible for small banks to adopt SBCS technology. Due to the rating agencies' extensive small business client-base, costs are minimized for both small businesses and small banks. Through this venue, the rating agencies have two sources of income. The full-cost burden lies neither with small business owners nor small banks, yet more efficiency prevails as the technology can be implemented and small banks have access to more information in implementing risk-based lending which could lower the cost of capital for small businesses. The significance of the ability to use SBCS technology is that most of the large bank's competitive edge funnels through this technology as transaction costs are managed and the speed to assess small businesses is facilitated. If small banks too could implement the technology while still conjunctively using soft-information dealing with both the owner and the business they would undoubtedly be able to recapture lost market share and regain some

of their once held competitive edge. Small businesses, especially firms that look lesser on paper, would also be benefitted because there would be less reliance on financial aspects and more qualitative features would be integrated into the rating. In addition, knowledge of their weak points allows them to strengthen themselves in order to better their business and maximize their chance for loan approvals.

The difference in implementation exhibited by India could also be used to modify the existing system within large banks. I raise the possibility that the presence of a similar structure could not only maintain low transaction costs for commercial banks but also provide more information to small businesses. Increasing information to small businesses whether they receive loans from large or small banks increases chances of capital acquisition that will inhibit project funding and allow for more positive net present value projects to be undertaken. This would provide more jobs and increase supply and demand for local economies. As this happens across the country, over time the economy would gradually be boosted by a more efficient lending system involving small businesses that would raise morale and confidence among small business borrowers. This, in turn, could abolish the "hope and pray" approach of obtaining a loan from the bank and would hopefully lead to a decrease in the number of firms that Kassar & Bernstein (2011) pointed out do not even bother with starting the process.

This all may become possible by imitating the system underway in India's SME market whereby SMEs purchase the ratings and are able to use them to self-assess performance in order to make improvements and make their businesses more financially appealing. Furthermore, the business then has the option of taking the rating to the bank that enables the bank to assess the risk involved with lending just like American banks. The differences are, first, a more equal distribution of the cost burden and, second, increased transparency in the rating itself. This system provides a Pareto Improvement; wherein, small

businesses are made better off without providing any foreseeable drawbacks to the other parties (lenders) involved. Lastly, imitating India's implementation would also indirectly address some issues found following mergers. It was established small business owners are mainly better off with small bank acquirers compared to banks between $1 billion and $10 billion in assets. The presence of stronger small bank competitiveness will decrease the number of cases involving large bank acquirers and increase either the chance less mergers will happen in general or increase the number of cases the acquiring bank is another small bank. Doing this will likely prevent shifts in monitoring and enable increases in SBL to all value range and loan type demanders.

3. Closing Statement

The changes marked in this research deal mostly with comparing large bank ($1 billion-$10 billion in assets) to small banks with less than $1 billion in assets. The changes marked in the results section focus on what occurs when these different sized banks merge. It is also crucial to consider these effects may be multiplied if later these large banks are acquired by even larger banks in excess of $10 billion assets. According to Jagtiani (2008) from 1990 to 2006, the same time period there was a drastic drop in the number of small banks, 70% of the acquisitions of these banks were by very large banks (p. 46). It is meaningful to consider not only the immediate effects marked in this study as a result of these mergers, but to also consider the increase in likelihood that these once small banks end up as part of a very large bank through later acquisitions and the effect it will have on SBL. Very large banks are the only banks from 1989 to 2006 that increased its share of assets (p. 31). In fact, in a 27-year period from 1984 to 2011, 2,774 banks which accounted for 20% of all institutions that started out with total assets less than $100 million ended up in one of the largest asset categories (FDIC, 2012). This and other statistics covering the merger trend from the FDIC's 2012 bank study casts doubt on the ability for small banks to stay competitive. Especially

since there is a strong tendency for small banks, even newly chartered Denovo banks, to eventually end up being owned by very large banks, some findings found from this research dealing with negative effects to small businesses will increase in magnitude. Some positive effects may deteriorate due to even greater reliance on SBCS technology and as distance, as well as other factors that influence SBL, drastically change. As mergers continue to increase the percent of assets held by the largest institutions, either directly or indirectly, there is a weaker propensity to lend to small businesses.

Any statistical models, including both SBCS and CCS are prone to errors. There is always a possibility pertinent information is not publicly known making it difficult to distinguish between a good borrower and a bad one. Therefore, I cannot state that one is in fact better than the other. What I can conclude with, however, is it is important to know small banks too may have the option to implement the same technology as large banks which could make small banks more competitive and remediate some of the negative effects produced by mergers. Slowing the rate at which large banks acquire small banks and by increasing the likelihood two small banks merge would seem to provide positive effects more evenly to small businesses. Also, imitating India's system in order to get SBCS in the hands of community banks would lead to a Pareto Improvement opportunity. In closing, there is a research opportunity to dive more into detail concerning this area. It would be interesting to collect data pertaining to SBL and delinquencies from India and compare findings and analyze more accurately if it would actually address the issues at hand and, if so, to what extent.

Large banks will continue using SBCS technology to give them an edge over small banks. Michael McHugh, a regional manager for Norwest Corporation, says "Our strategy is to take market share from the community banks" (Zuckerman, 1996 as cited by Longenecker, 1998, p. 8). Surely, other large banks alike have had similar strategies to take market share away

from small banks leading to the great decline in the number of community banks. In order to stay competitive, it would also be advantageous for small banks to implement the technology. Small banks could use the technology for the advantages it provides to large banks, but conjunctively use soft-information regarding small businesses. The disadvantages of SBCS such as favoring businesses that are able to show strengths better on paper or having adverse effects on certain lenders could be overcome if community banks could integrate the use of soft-information and the technology. Achieving this may place the edge for small business lending back into the hands of small banks and consequently all types of small businesses regardless of loan type, loan size, or borrower would have more access to funds on a fairer basis.

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