

Basel III Agreement:

Will Higher & More Strictly Defined Capital Standards Impede on the Growth of Small and
Medium-Sized Enterprises?

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Quantitative Methods in the Social Sciences

May 2013

Abstract

In the wake of the global Financial Crisis of 2007-09, Central Bankers and regulators from across the globe called for banks to face higher and more strictly defined capital standards. The product of this call was the Basel III Agreement, which among other things, says that banks need to maintain a tier one risk-based capital ratio of 6% of risk-weighted assets and a tier one common ratio of 4.5% of risk-weighted assets. The concern about higher capital standards is that it will depress bank lending to businesses. This paper hypothesizes that such a negative relationship does exist. To examine the relationship, thirty banks from across the United States divided into three categories based on asset size: universal, regional, and community-based banks, is used. Utilizing a first-differences regression model, a negative relationship is found across all three-bank categories in the period after the Basel III Agreement was agreed to. The results for the community-based banks, which are the predominant lenders to small and medium-sized enterprises, shows that fears over the Agreement adversely impacting such firms may be unrealistic.

1. Introduction

Later this year, we will mark the five-year anniversary of the bankruptcy filing by Lehman Brothers Holdings. The bankruptcy filing by Lehman Brothers has been regarded as the apex, or the pinnacle moment of the recent financial crisis. Lehman's bankruptcy was such a large domino in the crisis because it brought about a run on money market funds¹, a market in which firms such as General Electric sell commercial paper to funds operated by firms such as Fidelity and Vanguard. GE issues commercial paper², to do such things as meeting payroll demands and other day-to-day business expenses. Thus, it was Lehman's bankruptcy that nearly brought about a complete meltdown of the financial system that would have almost certainly brought about another Great Depression. Given that five years have nearly passed since the depths of the crisis, we can say in hindsight that the banks and other major financial institutions in the United States were not adequately prepared for the economic and financial turmoil they were confronted with starting in late summer 2007.

One contributing factor into this lack of preparedness among these institutions was the insufficient levels of capital they were armed with to act as a buffer against losses on the asset side of their respective balance sheets (Fratianni & Marchionne, 2009).³ With insufficient levels of capital, banks were forced to contract credit extension and accept capital injections

¹ Money market funds are investment funds whose objective is to earn interest for the holders of the fund while maintaining a net asset value of \$1 per share. They have been widely viewed as safe as a bank account but provide a higher rate of interest, though such a view may not be accurate. Lehman's bankruptcy caused one of these funds, Reserve Primary, to break the buck, that is the value of its assets fell below \$1 per share, an event that triggered extensive withdrawals from a number of money market funds. These funds responded to the redemption demands by attempting to reduce their holdings of commercial paper and large certificates of deposits issued by banks (Bernanke, 2008).

² Commercial Paper is a short-term unsecured promissory note with an eligible maturity of up to 270 days in the United States. Being unsecured, it means that the note is only backed up by the issuer's promise to pay the face amount on the maturity date. Since it is not backed by collateral, only firms with strong credit ratings from a recognized credit rating firm can issue commercial paper at a practical price. As a result of a run in money markets, firms like GE had trouble rolling-over their commercial paper and faced the possibility of it becoming too costly to issue new commercial paper.

³ Bank capital is the equity portion of a bank's balance sheet and includes items such as common equity, and retained earnings. When the value of the assets on a bank's balance sheet declines, the bank's capital position absorbs the loss. This allows the balance sheet to remain balanced; meaning assets are equal to liabilities plus equity. When a bank's capital position is wiped out, we say the bank is insolvent as its assets are worth less than its liabilities.

from the federal government (Blundell-Wignell, Atkinson, & Lee, 2008). The combination of capital injections by the Treasury and stress tests conducted by the Federal Reserve helped stabilize the banking system (Tarullo, 2010).⁴

To prevent a repeat performance in the future, regulators, government officials, finance, and economic experts called for banks both in the United States and around the globe to hold higher and more strictly defined levels of capital. There have been two concrete measures taken to address this issue. One measure was the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act which focuses on the United States, and the other was a more global measure, which this paper will focus solely on, the agreement by the Basel Committee on Banking Supervision to implement a new global bank capital regulatory regime called Basel III. While this should help banks be better prepared should another crisis erupt, an important question to consider is what impact this will have on the core purpose of banks, which is to be a financial intermediary by lending out funds provided to banks by savers, to the firms that need these funds to operate and grow their businesses.

Specifically, this paper addresses the fear that a negative relationship will emerge between the higher bank capital ratios that banks will be required to have and the funds banks will lend to businesses. It might not seem possible to answer such a question because the new capital standards that Basel III calls for will not be fully implemented until the end of this decade, and only phased in over the next several years. Continued economic turmoil over the last few years has led many banks however to come into or close to compliance with the new capital standards for tier one risk-based and tier one common capital ratios, which are measures

⁴ While many policy actions with respect to the banks were taken by February 2009, a good deal of uncertainty still existed about future bank losses and solvency as macroeconomic conditions continued to deteriorate early that year. The Treasury Department determined that making additional capital available to banks unable to raise it from private sources to allow them to remain effective financial intermediaries could restore confidence. To determine how much capital would be needed, the Federal Reserve and other bank regulators undertook a stringent, forward-looking assessment of losses and revenues, a stress test, for the 19 largest U.S. banks (Tarullo, 2010).

of financial stability for banks (Yang, 2012).⁵ Banks have done this as a way to show shareholders and financial markets that they can handle any crisis that may occur before Basel III takes full effect, such as the Euro-Zone Debt Crisis. Therefore, we are in a position to begin to evaluate the relationship between new bank capital requirements and bank lending to businesses.

The answer to this question matters so much because even though the recession triggered by the financial crisis has long since been declared over by the National Bureau of Economic Research, the organization that tracks and dates the business cycle, Gross Domestic Product⁶ continues to grow at a suboptimal rate and job creation has been meager to moderate at best (Reinhart & Rogoff, 2012). Despite the fact that banks holding higher levels of capital may allay fears about another financial crisis, they may not be in the best interests of the economy in the near to mid-term. If banks reduce their lending, it could make it more difficult for the economic recovery to reach escape velocity, which is growth without the help of stimulus measures.

A general consensus exists among economists and elected officials that existing and new small-sized enterprises are the main engines of job creation in the U.S. economy (Bernanke, 2010).⁷ Small enterprises rely predominately on loans from banks to grow their businesses and expand payrolls. For the most part these firms can not access the capital markets because they are not publicly traded entities that are required to file quarterly and annual reports with the SEC allowing investors to analyze the health of these firms and their creditworthiness. Thus small and even medium-sized enterprises are much more opaque than publicly traded entities and need an ongoing relationship with a bank to evaluate their credit worthiness (Berger & Udell, 2002).

⁵ Since the financial crisis, banks have made a great deal of progress in repairing their balance sheets and building capital. Risk-based capital and leverage ratios for banks of all sizes have materially improved and are above their previous highs by a significant amount (Bernanke, 2012).

⁶ All the goods and services produced by a country within the country's borders within a particular period of time.

⁷ In a speech in 2010, Federal Reserve Chairman Ben Bernanke said that small businesses are central to creating jobs in our economy; they employ roughly half of all Americans and account for roughly 60% of gross job creation. He also emphasized the importance of new small businesses, those less than two years old, as over the last twenty years these firms have accounted for about 25% of gross job creation even though they account for only 10% of the workforce (Bernanke, 2010).

Banks help reduce information asymmetries that arise from small and medium-sized enterprises and other non-publicly traded enterprises (Jackson, 1999). With stricter capital standards the concern is that banks may be forced to reduce their lending to businesses because such loans are more capital intensive⁸ than other assets. This would disproportionately impact small and medium-sized enterprises due to their strong reliance on loans from banks.

It is imperative, therefore, to investigate how bank capital requirements are related to their loan behavior. The hypothesis of this paper is that a negative relationship does exist between bank capital ratios and bank lending to businesses. This could possibly leave some firms, especially small and medium-sized ones; having to find a different source of funding.

2. The Basel Agreements: A Deeper Background

There have been two previous Basel Agreements issued by the Basel Committee on Banking Supervision called Basel I & II, both of which addressed regulatory capital and risk management standards. Basel I was introduced in 1988 and Basel II was introduced in June 2004.⁹ The goal of the new Basel Agreement, Basel III, is to improve the banking sector's ability to absorb shocks from financial and economic stress, whatever the source of this stress may be, thereby reducing the risk of spillover to the real economy (Basel Committee on Banking Supervision, 2010, p. 1). Basel III also improves risk management and governance, and strengthens bank's transparency and disclosures. In their introduction to the new agreement, the Basel Committee on Banking Supervision (2010) states that, "A strong and resilient banking

⁸ This simply means that banks have to set aside more capital against such loans compared to other assets on their balance sheet like mortgage loans and Treasury securities.

⁹ The United States never actually fully implemented Basel II. They were preparing banks to adopt it in late 2007 and early 2008, but the financial crisis altered those plans.

system is the foundation for solid economic growth, as banks are at the center of the credit intermediation process between savers and investors. Moreover, banks provide critical services to consumers, small and medium-sized enterprises, large corporate firms, and governments who rely on them to conduct their daily business, both at a domestic and international level” (p.1).

The new agreement not only increases the amount of regulatory capital banks must hold, but also the quality of that capital. It also enhances the risk coverage of the capital framework. The reforms are underpinned by a leverage ratio that serves as a backstop to the risk capital measures. The goal of this leverage ratio is to place a constraint on excess leverage in the banking system and provide an additional layer of protection from measurement and model error (Basel Committee on Banking Supervision, 2010, p. 4). The Committee has also introduced some macro-prudential¹⁰ measurements in the new capital framework as to way to help contain systemic risks arising from pro-cyclicality¹¹ and from the interconnectedness of financial institutions.

2.1 What Does the Basel III Agreement Actually Do?

Most importantly the Basel III Agreement as mentioned above increases both the quantity and the quality of capital that banks must hold. Banks will now have to have a minimum common equity tier one capital ratio of 4.5% of risk-weighted assets¹² up from 2% of risk-weighted assets. Tier one risk-based capital,¹³ which includes common equity and other

¹⁰ When the term macro-prudential is used, we are talking about measurements that look across the entire banking system, not just at banks on an individual level.

¹¹ This refers to the issue that when the economy is in an expansion phase, banks will let capital ratios decrease and when the economy enters a recession, banks will then increase their capital ratios. It would be wiser if banks built up capital levels in good economic times to provide them with a buffer when the economy does enter into a recession.

¹² When referring to risk-weighted assets, it means that banks are applying weights to their assets based on their credit riskiness. So assets such as U.S. Treasury Securities which are perceived to be risk-free have a zero risk-weight and therefore do not need any capital set aside against them. Assets such as loans are much more riskier and can have a risk-weight of 100%.

¹³ Tier one risk-based capital includes common equity and retained earnings; the portion of net income not distributed to shareholders, and preferred shares of stock.

qualified financial instruments, must now be 6% of risk-weighted assets up from 4% of risk-weighted assets. These new capital levels will be phased in by 2015. The agreement also introduces a common equity tier one capital conservation buffer in excess of the minimum regulatory level. This must be 2.5% of risk-weighted assets and consist of common equity. A conservation buffer is being introduced so that when banks do run into times of financial and economic stress, they will have a buffer of capital that can be used to absorb losses. The full 2.5% buffer takes effect on January 1, 2019. Basel III also introduces a countercyclical buffer of up to 2.5% of risk-weighted assets consisting of common equity that will be implemented according to national circumstances. For any individual country, this buffer will only be in effect when there is excess credit growth that is leading to a build up of risk system-wide.

The purpose of a countercyclical buffer is to help protect the banking system from periods of excess credit growth. Typically we have seen bank capital levels fall during times of economic expansion as banks want to hold as little capital as possible to make more loans and earn a higher return on common equity.¹⁴ The only problem is that when the economy enters a recession or a crisis arises, banks are under-capitalized, leading to bank failures and prolonged recessionary conditions. A counter-cyclical buffer could help prevent such things from happening in the future. While everything mentioned above is what Basel III calls for, the reality is that the timeline for implementation has changed since first looking at this topic. So I will now give an update of where we are at with respect to the implementation of Basel III in the United States.

¹⁴ Return on Common Equity is net income divided by total common equity, so the less capital banks held, the less common equity they would have to issue thus a higher return on equity.

2.2 Status of Basel III as of January 2013

Many of the Basel III Agreement initiatives were scheduled to start taking effect on January 1, 2013. However in early November 2012, the Board of Governors of the Federal Reserve announced in a joint press release with the FDIC and Comptroller of the Currency that in light of the volume of comments they had received concerning the three notices of proposed rulemaking (NPRs) that were issued back in June of 2012 during the comment period, they did not expect that any of the proposed rules would become effective on January 1, 2013. The first NPR is the one this paper is most interested in. This NPR called for the implementation of the new capital rules as dictated by the Basel III Agreement with respect to tier one risk-based and tier one common capital. It would also implement the common equity tier one capital conservation buffer introduced in the Basel III Agreement. The new capital rules would be phased in over time and applied to all depository institutions, bank holding companies with consolidated assets in excess of \$500 million, and savings and loan holding companies. Indeed the failure of all three NPRs to become effective has become a reality. The Board of Governors has said that they are working as expeditiously as possible to complete the rulemaking process.

On January 1, 2013 the rules concerning capital levels that were to have begun their phase-in process stated that a bank's minimum common equity capital level was to be 3.5% of risk-weighted assets up from 2%, and their minimum tier one risk-based capital level was to be 4.5% of risk-weighted assets up from 4%. Total capital was to be 8% of risk-weighted assets. The Fed had not anticipated the backlash they received from banks, most especially community banks, concerning the NPRs. While the proposed rules will likely all eventually take effect, some will either have new implementation timelines or will become less stringent to accommodate the concerns that have been expressed by the banks. For this paper however, the

operating premise is that the new capital ratios will remain the same, as the reality is banks will have to hold higher capital levels than before the financial crisis. Also, banks have been trying to reach compliance with the new capital regulations ahead of time as a way to promote the strength of their balance sheets, so an analysis of what impact on lending this has had can still be made (Williams, 2013).

3. Literature Review

With the Basel III Agreement still being phased in over the rest of this decade, literature on its impacts on banks and lending to small and medium-sized enterprises is still evolving. However, a great deal of research has been done on the previous Basel Agreements. The aims of the past research that has been conducted using the Basel I Agreement are similar to the aims of this paper, which is to examine what impact stricter capital standards have on banking lending, if any. The research discussed in this review covers three themes: (1) what impact changing a bank's capital ratios has on its overall lending behavior (2) how banks went about complying with the Basel I Agreement, and (3) what impact an increase in capital ratios has on lending to small and medium-sized enterprises. Lastly, we look at two studies that do analyze the Basel III Agreement and see what impacts they found from the agreement.

3.1 Basel I's Impact on the Relationship between Bank Capital & Lending

The first study this paper looks at involves the implementation of the Basel I Agreement, which created risk-based capital standards.¹⁵ Furlong (1992) used cross-sectional time series

¹⁵Under risk-based capital standards, banks assign weights to their assets based on their credit risk. The more riskier the asset, the higher the weight and thus the more capital that has to be set aside to back up the asset. The highest risk category includes most

data for individual banks from across the United States,¹⁶ and examined the extent to which bank capital regulation changed in the 1990s and the effect this change had on the relationship between bank capital and lending. Furlong's analysis (1992) showed that bank loan growth rates are positively and significantly related to capital-to-asset¹⁷ ratios and that the sensitivity of bank lending to capital positions appeared to have increased in the early 1990s. He also found that the overall sensitivity of lending to capital positions was more pronounced for large banks.¹⁸ When Furlong was looking at capital-to-asset ratios, he was focusing on the spread between the bank's actual ratio and the level where regulators said their capital ratios had to be.

3.2 How Banks Went about Complying with Basel I & its Impact on Bank Lending

Researchers have investigated how banks went about coming into compliance with the Basel I risk-based capital standards and its impacts on lending. Hancock & Wilcox (1994) and Berger & Udell (1994), both show that the introduction of risk-based capital standards associated with the Basel I Agreement did not adversely impact lending to businesses. In a study design similar to Furlong (1992), Hancock & Wilcox (1994) calculated the extent to which banks' capital at the end of 1991 fell short of regulator's un-weighted and weighted capital standards.¹⁹ However, they used these results to estimate whether banks altered either the total amount of credit they had outstanding or the composition of that credit in response to pressures on their capital positions. Their findings suggested that a bank's portfolio shrank when a capital shortfall existed for the un-weighted standard. Hancock & Wilcox found that bank credit declined \$4.50

loans to private entities and has a weight of 100%. The lowest risk category is for U.S. Treasury Securities, which have as 0 risk-weight as they are viewed as risk-free assets.

¹⁶Banks that had acquired other banks in particular years were excluded from the sample for those years.

¹⁷The percent of total assets and total risk-weighted assets that capital funds. For example tier one common ratio would be common equity divided by total risk-weighted assets. The higher the ratio the more capitalized the bank is.

¹⁸At the time the consensus was that capital regulation tended to be more binding for the large banks than for smaller banks.

¹⁹Un-weighted capital standards look at capital as a percentage of total assets while risk-weighted standards look at capital as a percentage of risk-weighted assets, which are assets after risk-weights have been applied to them.

for every \$1 un-weighted capital shortfall.²⁰ With regards to the implementation of risk-weighted capital standards, it appeared that banks shifted their portfolios away from high-weighted assets.²¹ Overall, they concluded that while there was a shift in the composition of risk-weighted assets, there was a lack of evidence to suggest that the impact on lending to businesses was an adverse one as a result of the imposition of risk-based capital standards.

Hancock & Wilcox (1994) only focused on large banks, banks whose total assets exceeded \$300 million, whereas Furlong (1992) took a sample containing all U.S. banks. My study will look at banks across various asset size classes, as the new capital accord will impact all banks, while the Basel I Agreement which as Furlong had mentioned, was applied more aggressively to large banks than to small banks.

Berger & Udell (1994) also examined whether the Basel I Agreement led to a reallocation of credit from loans to securities, (a.k.a. high-weighted assets to low-weighted assets). However unlike Hancock & Wilcox's study, which looked at bank data from 1990-91, Berger & Udell looked at data on virtually all U.S. banks from the years 1979-1992. They used this vast dataset to examine how banks' portfolios reacted to capital and other performance measures over time. To perform their study they implemented a difference in differences approach in which the years 1979-1989 served as a control period and the years 1990-92 were what they called the "crunch" period. Berger & Udell's tests related the growth rates of a bank's asset categories to several measures of perceived bank risk including tier one and total risk-based capital ratios.²²

The results of their tests showed that the effects of risk-based capital ratios on lending did not get consistently stronger in the early 1990s, in line with Hancock & Wilcox's conclusions,

²⁰What was surprising about this result is that the shortfalls led to greater declines in a bank's securities portfolio than their portfolio of business loans, contrary to widely held perceptions.

²¹ Again high-weighted assets are assets that have a higher credit risk and as a result need more capital to be set against them. Such assets are loans to private enterprises. Low-weighted assets are instruments such as government bonds.

²² Total risk-based capital is the combination of tier one and tier two capital as a percentage of risk-weighted assets.

that the imposition of risk-based capital standards did not adversely affect bank lending. Berger and Udell also found that the tier one and total risk-based capital ratios generally acted to counteract each other in their effects on credit allocation.

The next two studies found that the Basel I capital requirements did impact bank lending and also examined the role the economy has in bank's lending decisions. The available research that Jackson (1999) analyzed suggested that when it is too costly to raise new capital, banks would opt to cut back on lending to meet the more stringent requirements. When banks are facing difficulty maintaining the fixed capital requirements associated with the Basel I Agreement due to an economic downturn, they may find raising capital to be too costly and instead reduce lending.²³ If the market knows they are close to being under-capitalized, it will demand a higher price for a common or preferred stock issuance, potentially making a capital raise unattractive. Thus, the business cycle and financial markets also play a role in how banks adjust capital ratios. Berrospide & Edge (2010), using different panel-regression techniques in the following of Hancock & Wilcox (1994) studied the lending behaviors of 300 large bank holding companies. They found that the long-run impact of a capital surplus (shortfall) on both total loans and commercial and industrial loan growth rates is 0.25% when capital exceeds (falls short of) its target level by one percent.

Berrospide and Edge (2010) also discovered that factors such as economic activity and an increase in risk perception by banks play an important role in lending decisions. One way to interpret this result is that banks on a relative scale do not place a central focus on their own

²³For a reduction in bank lending to affect the real economy, the reduction would have to not be offset by increased lending by credit markets or other financial intermediaries. One such scenario is in which the nature of the loan is unique. A loan to a small business is one example of a unique loan. Due to information asymmetries in financial markets, banks are needed to step in to minimize this asymmetry. The absence of banks to do so would result in a disruption of the flow of credit to the borrower.

capital position when making a lending decision; instead they look at loan demand and risk.²⁴

This could be why Hancock & Wilcox (1994), and Berger & Udell (1994) found that the imposition of risk-based capital standards did not adversely impact lending to businesses.

Jackson (1999) also showed that the possibility of small firms losing access to credit because of stricter capital requirements does exist. Therefore we should look at research that has focused on small and medium-sized enterprises and see how the Basel Agreements affected them.

3.3 The Basel Agreements & Bank Lending to Small and Medium-Sized Enterprises

Some scholars have also focused on small and medium-sized enterprises and examined the dynamics behind lending to these firms, with Riportella (2011) examining the costs to these firms stemming from the new Basel Agreement. Berger and Udell (2002), looked at the availability of credit to small enterprises and the importance of relationship lending in getting credit to them. They stated that small businesses are informationally opaque from a bank's perspective, hindering the availability of credit to them. For banks to extend credit to them, banks employ a technology called relationship lending.²⁵ The information obtained is called safe data, which consists of information such as the character of the firm's owner. Relationship lending thus allows firms without strong collateral or strong financial ratios to obtain credit by substituting hard information that is relatively weak with soft data that is collected over time. Berger and Udell's (2002) research could provide a possible recommendation to overcoming the stricter capital standards should this paper find that they do depress lending to businesses in particular lending by small banks. Riportella (2011) looked at small to medium-sized enterprises

²⁴This could help explain the decrease in loan growth during 2009 despite the fact there were capital injections in the fall of 2008 under the U.S. Treasury's Capital Purchase Program.

²⁵ Relationship lending is based on the accumulation of information over time through contact with the firm, its owner, and its local community.

(SMEs) and how their cost of borrowing is impacted by the bank capital requirements set by the Basel II and III Agreements.

Riportella (2011) also looked at the impact on financial intermediaries that provide guarantees on loans to SMEs called Loan Guarantee Associations (LGAs). They particularly concentrated on the credit risk premium that banks charge on loans to SMEs that have guarantees from a LGA. Under the new agreement, those loans with a guarantee will require less regulatory capital backing them. Under both agreements, SMEs have to pay a premium to obtain a loan from a bank; but the new agreement will increase this premium. The increase though will be dependent upon the riskiness of the entity and the strength of the guarantor.²⁶ What we can take from their study is that loans to small and medium-sized enterprises may become more expensive due to the new agreement for both lender and borrower. While this study looks at small and medium-sized enterprises explicitly, my study will also include large firms since commercial and industrial loans consist of loans to all types of businesses.

3.4 Basel III Agreement Impact

Two studies actually already look at the new Basel III Agreement and find that lending rates will likely increase under the new agreement. Cosimano & Hakura (2011) performed a cross-country analysis among developed countries to see the impact Basel III will have on bank lending rates and loan growth. Based on data covering the years 2001-2009, they found that on average banks would have to increase their capital ratios by 1.3%.²⁷ This increase will lead large

²⁶It should be noted that these LGAs are prevalent in the European Union, so these results have greater importance to small to medium enterprises in the E.U. than for U.S. firms.

²⁷ The banks in this dataset are put into three separate groups. The first grouping has the largest 100 commercial banks and BHCs in the sample as measured by their total assets in 2006. The second grouping includes the commercial banks or BHCs in developed economies that experienced a banking crisis between 2007 and 2009. The third grouping includes the commercial banks or BHCs in developed economies that did not experience a banking crisis between 2007 and 2009.

banks to increase their lending rates by sixteen basis points, causing loan growth to decline 1.3% in the long run. They pointed out that the impact varies from country to country. In the U.S. they found that the new regulation would have a relatively low impact on loan growth rates compared to Japan and Denmark, as the elasticity for loan demand is lower in the U.S. In their study they implemented a generalized method of moment (GMM) estimation procedure, which captures banks' simultaneous decisions on how much capital to hold, at what level to set the loan rate, and the size of their loan portfolio. While this study looks at data across different countries, it has goals similar to this paper and can be a good reference for conducting data analysis.

Allen, Chan, Milne, and Thomas (2011), sought to answer the question of whether the new agreement will leave us worse off and force us to make tradeoffs with respect to economic growth. They focused on the impact the regulatory changes will have on the balance sheets and loan assets of U.K. banks. When analyzing to see if there is any tradeoff between output and financial stability, Allen et al. found that in the long run, one does not necessarily exist. In fact they suggest that higher capital and liquidity requirements could reduce the costs of financial intermediation and actually increase output.²⁸ However, Allen et al. argued that those customers at the riskiest end of the borrowing spectrum will likely find their borrowing costs to be much higher or be denied access to credit altogether as banks shift the composition of their loan portfolios towards less risky ventures.²⁹

Overall, Allen et al. found that Basel III does have two main costs. One is that smaller firms are dependent on bank funding, so if credit is limited to large firms who can already access capital markets, demand for labor will be reduced, leading to higher unemployment. This

²⁸ Expectation is the new capital agreement will force banks to allocate their credit more efficiently.

²⁹ The less risky the loan, the lower the risk-weight the bank has to assign to the loan.

dependency on bank credit by small firms was discussed in great detail in Berger and Udell (2002). Another cost is that since small firms also play a large role in innovation and productivity, a lack of access to credit can have a large negative impact on the long-term growth rate of output. The authors feel that not enough attention has been placed on the negative impact of access to credit for riskier customers. They suggest the re-establishment of securitization vehicles for risky loan ventures, as this would help bring investors funds to riskier borrowers off the bank balance sheet.³⁰

3.5 Summary of Review of Literature

A variety of research has been conducted on the Basel Agreements, reaching various conclusions. Several studies have suggested that the impact of the Basel I Agreement was limited, because banks in general look at other factors besides capital ratios, such as economic conditions when making loans. However, some of the more recent research that looks at Basel III does suggest that the new capital standards will impact lending but that the impact will be concentrated on small and medium-sized enterprises. These are the enterprises this paper is interested in to use as a lens to analyze the impact of the Basel III Agreement on bank lending.

4. Data

Data examined in this paper come from two separate sources being merged to create one large panel dataset. All the data related to the banks comes from SNL Financial, a financial

³⁰ The idea behind securitization is that the risk associated with the loan is being transferred to investors and no longer is counted towards the bank's risk-weighted assets, as it is no longer housed on its balance sheet. In the years leading up to the financial crisis banks ramped up the amount of off-balance sheet assets they had via securitization vehicles. When the securities underpinning the securitization vehicle starting experiencing large defaults, banks had to bring these assets back onto their balance sheets causing capital ratios to fall and a credit crunch as banks tried to boost capital ratios.

database that contains regulatory data and financial statements on banking and financial institutions. The variables coming from this database are tier one risk-based capital ratio, tier one common capital ratio, commercial & industrial loans, non-performing loan rate, and loan charge-off rates. Time series data, which is made up of the control variables, comes from the Federal Reserve Bank of St. Louis's FRED database and were appended to the SNL dataset. These data include the unemployment rate, real GDP, and lending standards on loans to small and medium-sized enterprises. The panel dataset contains quarterly observations from the fourth quarter of 2006 to the third quarter of 2012. In total, the panel dataset has 702 observations.

4.1 Bank-Level Data

The bank-level dataset consists of thirty banking institutions from across the U.S. that are grouped by total balance sheet assets into one of three possible categories. One group consists of banks whose total balance sheet assets exceed \$500 billion, with six banks falling within this grouping. These banks are generally viewed as universal banks; as their operations span national borders and their diverse business lines cover both investment and commercial banking. The second group consists of banks whose total balance sheet assets are between \$100 and \$499 billion. This group consists of ten banks, commonly referred to as regional banks, as they usually focus their business footprint in one particular region of the country and are the dominant player in that region. However, as a result of consolidation in the banking system, some of these banks are now stretching their business to other regions and are considered super-regionals. Since they lack the scale universal banks have, meaning the universal banks are dominant across many business lines and have large investment banking divisions, we still keep them in the regionals category.

The last group consists of banks that have total balance sheet assets of less than \$100 billion. This group is the largest, consisting of fourteen banks randomly selected from various regions of the country to account for the fact that economic conditions vary from region to region. This category also is the most diverse as the banks in this category range from having less than \$9 billion in total assets to in excess of \$85 billion in total assets. For the purposes of this study, this group of banks will be called community-based banks as these institutions' business footprint is generally localized to a particular state. Typically, when looking at banks classified as community-based, we mean banks with much lower total assets,³¹ but there is a great deal of consolidation occurring among these institutions, rendering data more limited. As a result, banks with larger assets are looked at, but these banks still have a localized business footprint in the United States.

4.2 Dependent Variable: Commercial & Industrial Loans

The dependent variable that this paper will focus on is the commercial and industrial portion of a bank's loan book. A commercial & industrial loan according to SNL Financial, are loans for commercial and industrial purposes to sole proprietorships, partnerships, corporations, and other business enterprises, whether secured (other than by real estate) or unsecured, single-payment or installment, and in the form of either direct or purchased loans. Such loans include loans to individuals for commercial, industrial, and professional purposes; such as loans to corporations, companies, and other enterprises; loans for the purpose of financing capital

³¹ According to the FDIC (2012), community banks have traditionally been defined as banks whose total assets are \$1 billion or less. However last year the FDIC began a study to improve the definition to look beyond asset size. Other factors that the FDIC says should be considered in determining a community bank are geographic scope as community banks generally have a limited geographic footprint. In their research definition, the FDIC is also considering banks that have in excess of \$1 billion in assets, have loan to asset ratios in excess of 33% and have main offices in less than four states to be community banks. In a speech in 2010, Federal Reserve Governor Daniel Tarullo said that convention at the Fed is to define a community bank as an institution with \$10 billion or less in total assets (Tarullo 2010). So there is a bit of diversion in terms of asset size what a community bank looks like.

expenditures and current operations; and loans to business enterprises guaranteed by the Small Business Administration.³² The data for this variable is in absolute dollar terms, but since we are interested in what impact a change in a bank's capital ratios have on this variable, a log transformation is performed so it can be discussed it in terms of percentage change.³³

4.3 Main Independent Variables: Tier One Common & Tier One Capital Ratio

Tier one capital is the core measure of bank's financial standing from a regulator's point of view. Tier one capital consists of stock issued by banks that meet the requirements of common shares and earnings that are retained by banks on their balance sheets as a percentage of their total risk-weighted assets. Tier one common capital is the portion of tier one risk-based capital that consists solely of common shares as a percentage of risk-weighted assets. What is interesting about these two variables are how they can change. Banks can change their capital ratios by simply changing the denominator, meaning they reduce the number of risk-weighted assets on their balance sheets. In doing so, they bolster their capital ratios. The other way they can change these two ratios is organically, raising more equity by selling more common shares or increasing the amount of retained earnings they have. The story we are trying to tell here is that when banks increase these ratios independent of how they increase them, what impact does this have on the total commercial and industrial loans they make.

³² While the preference would be to look at loans to small and medium-sized enterprises explicitly, such data is not available, so commercial and industrial loans will be used as a proxy, as loans to small and medium-sized enterprises are picked up under this category. This is why it was stated in the review of literature that this study will be looking at all types of firms not just small and medium-sized ones that previous studies have focused solely on.

³³ Instead of saying a one percent increase in bank capital leads to say a \$500 million decrease in commercial & industrial loans, we can say that the one percent increase in bank capital leads to a 0.50 percent decrease in commercial & industrial loans. Also in general economists like to talk in terms of percentages since they like to look at elasticity's, or how much Y changes because of a one unit change in X.

4.4 Control Variable: Economic Conditions

Overall there is one element that has to be controlled for and that is the economy. This can be accomplished by looking at loan charge-offs and delinquencies on a bank-level basis, the unemployment rate, real GDP, and lending standards to small and medium-sized enterprises. The delinquency rate is the percent of loans in a bank's loan portfolio in which a borrower has failed to meet the loan's repayment schedule. The charge-off rate is the percentage of loans in the bank's loan portfolio that they write-off their respective balance sheets, as they expect the borrowers on these loans will never pay back the loan. The unemployment rate is defined as the percentage of the work force that does not currently have a job but has actively searched for one within the last four weeks. Real gross domestic product is the total amount of good and services produced in the U.S. during a specified time period adjusted for inflation. Lending standards to small and medium-sized enterprises comes from the Federal Reserve's Senior Loan Officer Survey. This variable is calculated by asking randomly selected loan officers from various banks across the country if they are increasing the cost of loans to small and medium-sized enterprises. The data is reported as a percent; with a positive number meaning standards are being tightened and a negative one meaning they are loosening standards.

Why Control for Economic Conditions?

When banks are experiencing higher than normal charge-offs and delinquencies on their loan book due to economic conditions, they are more likely to pull back on making new loans until the performance of their loan book and economic conditions improves. However by writing off these assets, their total risk-weighted assets decreases, resulting in improved capital ratios. This may lead people to say the increase in bank capital ratios caused the change in

commercial & industrial loans. Hence, controlling for the economy, any bias that could be present if we just looked solely at the relationship between bank capital and loans is removed.

5. Methods

To reiterate, the hypothesis of this paper is that a negative relationship exists between bank capital and bank lending. Consequently, when banks increase their capital ratios, tier one risk-based capital and tier one common respectively, this leads to a decline in bank lending, which is measured by commercial and industrial loans. With this in mind; we will now look at how well this hypothesis stands up based on the data at hand via descriptive statistics and a bit of regression analysis.

5.1 Trends & Analysis of Data

Figure One (p.41) which looks at the trend across time for both banks' average tier one risk-based capital ratio and their average commercial and industrial (C&I) loan book, displays an interesting picture. It is particularly interesting around the fourth quarter of 2008. At this time there is a large spike in the average tier one risk-based capital ratio of roughly 1.50% and a \$4 billion increase in C&I loans. During this time, the U.S. was at the apex of the financial crisis and in Q4 2008, the United States Treasury implemented its Troubled Asset Relief Program (TARP).³⁴ The most probable reason for the spike in average C&I loans is that banks brought back onto their respective balance sheets off-balance sheet loans that had been placed into

³⁴ On October 14, 2008, the Treasury announced revisions to TARP whereby the Treasury would purchase senior preferred stock and warrants from the nine largest U.S banks to boost their capital ratios. Initially the intention of the program was to buy up toxic assets from the banks but the issues of what price to pay for the assets made this become a less attractive option to direct capital purchases.

securitization vehicles,³⁵ boosting their average C&I loans. Following this, the tier one risk-based capital ratio continues to experience a steady rise, while average C&I loans declines sharply. Hence, a negative relationship is observed whereby when tier one risk-based capital ratio increases, the average size of the C&I loan book declines. Even though economic conditions are not controlled for in this graph, it would be reasonable to assume that a portion of this decline in average C&I loans is a result of banks writing-off bad loans from their balance sheets as more loans became seriously delinquent.

Another interesting point in this graph is Q3 2010. In late July 2010, the Basel III Agreement was agreed to, even though some of the overall parameters of the future agreement had already become public dating back to December 2009.³⁶ During that quarter, there is roughly a 0.50% increase in the tier one risk-based capital ratio, as banks could have already been increasing their capital ratios based on their expectations for what the final new capital rules would impose. In addition it is also at this point where average C&I loans hits a trough. Since then, capital ratios have fluctuated, with C&I loans seeing steady growth and increasing that rate of growth of late. What this can be telling us is that once the Basel III Agreement was agreed to and the elements of it became publicly released, banks saw that their capital levels were not too far off from what the agreement calls for and combined with an improving economy, started to increase the size of their C&I loan book. Overall, the picture for tier one common (Figure 2 p.41) is similar to one for the overall tier one risk-based capital ratio.³⁷

³⁵This was a popular strategy during the credit boom as banks would pool assets together and sell them to a Special Purpose Vehicle or Structured Investment Vehicle they created as a way to transfer the assets and associated risk off their balance sheet. This would reduce risk-weighted assets and thus the amount of capital banks needed to hold, allowing banks to lend more. The SPV or SIV would issue commercial paper to fund the purchases of these assets.

³⁶After a meeting on December 8-9, 2009, the Basel Committee on Banking Supervision approved for consultation a group of proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking system (Basel Committee on Banking Supervision, 2009).

³⁷For tier one common, the spike in the tier one common ratio associated with the financial crisis time period is more gradual and starts one quarter later, during Q1 2009 and is most noticeable between Q2 and Q3. The best explanation as to why, is that the Treasury initially owned preferred shares, which counted towards overall tier one capital, but not tier one common. However

5.2 Data Challenges

After analyzing the graphs for tier one risk-based capital & tier one common alongside C&I loans, the overall takeaway is that there is no one clear trend in the data. The data are very discontinuous, with capital ratios and loans rising in some time periods and declining in others. Thus, it would be useful to focus on a specific time period in the data. Since this paper is focused on the Basel III Agreement, the focus will be on Q3 2010, when the Basel III agreement was agreed to. By concentrating on this particular time period we look at the means and standard deviations for the main variables of interest and then a simple OLS regression to check for coefficient signs and statistical significance among relationships during this period.

6. Descriptive Statistics Analysis: Basel III Period

Analyzing the Basel III Period, we look at a comparison between the period from Q1 2009 to the end of Q2 2010 and the period from Q3 2010 to the end of Q3 2011 (See Tables 4 & 5 p.44, 45). The Basel III Agreement was agreed to in July 2010 or the first month of Q3 2010. For the tier one risk-based capital ratio, the average ratio between the two periods increased approximately one percent from 11.68% to 12.57%. With respect to the tier one common ratio, the increase is more sizable, with tier one going from 8.69% in the period before the Basel III Agreement was agreed to, to 10.09% in the period after it. The comparatively more substantial increase in tier one common is not surprising, as the Basel III Agreement places an emphasis on the most basic form of capital, which is common equity.

following their purchases, they converted the preferred shares into common shares, which do count towards tier one common capital. Lastly, in Q4 2007 and early 2008, we can see that tier one common capital was declining, while C&I loans was increasing. This was the time when the last business cycle was reaching its peak and recessionary conditions were just starting to take hold. At the peak of the business cycle, banks were trying to hold as little capital as possible so they could capitalize on as many business opportunities as possible and maximize their return on common equity.

Turning our attention to commercial and industrial loans, there has been a decline in average C&I loans between the two time periods, declining from \$21.23 billion to \$20.61 billion in the period after the Basel III Agreement was agreed to. While less than \$1 billion, in terms of volume of loans, that number can be significant depending on the loan amount. Thus in this period, there is a negative relationship between bank capital and lending as capital has increased and average C&I loans has declined. Notice that while there is a negative relationship here, if we were to look at the tables for the financial crisis period analysis (Tables 2 & 3 p.44) there is not one. This shows the need exists to look at banks on a categorical level to get a clearer picture of the underlying story.

The standard deviations among the capital variables and C&I loans declined between the two time periods. This shows that as more time has passed since the financial crisis, banks that once lagged in capital levels have now had the time to build up those levels and close the capital and lending gap they may have had with their peers. Focusing a bit closer on the standard deviation for C&I loans, the large deviation does not surprise us as we are looking at banks who have total assets in excess of one trillion dollars and some with as little as ten billion dollars in total assets. Thus, their C&I loan books can vary greatly. Regarding the control variables, they all paint a picture of an improving economy after the Basel III agreement was agreed to, which is reasonable as the rate of real GDP growth increased between the two time periods.

Overall with the descriptive statistics, in one time period there was a negative relationship between capital and lending, while in the other there was a positive one. This reinforces what was stated earlier that any trend in the data is discontinuous. Thus, particular time periods in the data need to be analyzed as each particular period has a story behind it to explain why the data is

moving the way it was at that point. In addition the need exists to look at a particular period by bank category.

6.1 Regression Analysis for Basel III Agreement Period by Bank Category

$$1) \ln loanbook_i = b_0 + b_1 tierone\ risk\ based / tierone\ capital + v_i$$

Analyzing the Basel III period using equation one, in the period before the agreement was agreed to regressing C&I loans on tier one risk-based capital, a one percent increase in a bank's tier one risk-based capital ratio for universal banks leads to a 0.82% decline in C&I loans. Following the agreement, a one percent increase in the tier one risk-based capital ratio leads to a 0.94% decline in C&I loans. Both periods are statistically significant at the 95% confidence level with t-statistics of -11.61 and -9.44 respectively.³⁸ For tier one common, the results are similar with an increase in the decline in C&I loans between the two periods (See Model 1 p.46). These results suggest the negative relationship strengthened for universal banks in the period after Basel III was agreed to.

Looking at regional banks, regressing C&I loans on tier one risk-based capital, a one percent increase in a bank's tier one risk-based capital ratio leads to a .03% increase in C&I loans both before and after Basel III was agreed to. However in both periods the relationship is not statistically significant with t-statistics of 1.78 and 1.08 respectively (See Model 2 p.46). With respect to tier one common, we find a negative but not statistically significant relationship. For the community-based banks, a one percent increase in the tier one risk-based capital ratio leads to a 0.20% increase in C&I loans in the period before Basel III was agreed to (See Model 3 p.46). Following the agreement, a one percent increase in the tier one risk-based capital ratio

³⁸ To have statistical significance at the 95% confidence level, we need a t-statistic of 1.96 or greater for a two-tailed test. A 95% confidence level means that we are 95% confident that the interval estimates obtained via this sample contains the true population parameter.

leads to a 0.23% increase in C&I loans. Both periods are statistically significant with t-statistics of 4.53 and 4.26 respectively. Similar results are obtained for the tier one common ratio.

Therefore, for universal and community banks it is clear the Basel III agreement reinforces the existing relationship between capital and lending. By breaking out the Basel III period by bank category, we derived results that support the notion that the relationship between capital and loans is dependent on bank size. To get a more robust analysis on the relationship however, controls are introduced and a first-differences model is implemented.

7. Results

7.1 Issues with OLS Model

Modeling time series data in their levels with OLS regression is often inappropriate because time series data is frequently auto-correlated and non-stationary. Both of these issues appear to affect this dataset too. After running a simple OLS test, the Wooldridge test for autocorrelation in panel data finds that there are issues with autocorrelation.³⁹ The null hypothesis of this test assumes that there is no first-order autocorrelation. In order to not reject the null hypothesis a p-value greater than .05 is needed. The p-value obtained here is zero, meaning we can reject the null hypothesis and that there is first-order autocorrelation.

In addition, there are issues with stationarity due to the presence of unit roots in the variables.⁴⁰ After performing a Dickey-Fuller Generalized Least Squares test to test for unit roots

³⁹ First-order autocorrelation means that the error term in the t-1 time period strongly predicts the error in time period t. After the first lag (t-1) there is a smooth drop off in the correlation of the errors.

⁴⁰ Stationarity in the data means that the mean and variance of the independent variables are constant across the dataset. This is usually violated when there are variables with unit roots. Unit roots are highly persistent autocorrelations in the data that do not

on each variable, the test shows that there are unit roots for each variable. The results for the main variables of interest are that for C&I loans, the dfgls test statistic is -2.61, which is not less than the 5% critical value of -3.52. For tier one risk-based capital, the test statistic is -1.17, which is not less than the 5% critical value, and for tier one common capital, the test statistic is -3.26, which also is not less than the 5% critical value. The most typical solution to correct for these issues is to first difference the data (Wooldridge, 2008).

7.2 First-Differences Model

$$y_i = \Delta b_0 + b_1 \Delta \text{tierone riskbased} / \Delta \text{tierone common}_i + b_2 \Delta \text{nppls}_i + b_3 \Delta \text{chargeoffs}_i + B_4 \Delta \text{rgdp}_i + B_5 \Delta \text{unemp}_i + B_6 \Delta \text{smallfirmstandards}_i + B_7 \Delta \text{mediumfirmstandards}_i + v_i$$

Looking at the entire time period of data by bank category using the above equation, for both the tier one risk-based capital ratio and tier one common capital ratio, there is a negative and statistically significant relationship with C&I loans for regional and community-based banks. However, the size of the coefficients is very small, with the decline in commercial and industrial loans for regional banks from a one percent increase in tier one risk-based capital and tier one common capital of .02% and .03% respectively. As mentioned, this is statistically significant with t-statistics of -3.56 and -7.02 respectively. The community-based banks see a .01% decline in C&I loans from a one percent increase in either capital ratio, with t-statistics of -4.75 and -4.64 respectively. The universal banks show a decline in C&I loans of .06% and .05% for tier one risk-based ratio and tier one common respectively, but it is not statistically significant with t-statistics of -1.52 and -1.69 respectively (See Models 8 & 9, p.49).

disappear as time passes. The coefficients we obtain in future time periods are affected by the initial coefficients at the start of the process. This can cause spurious correlation.

Basel III Agreement Period

In the period after the Basel III Agreement was agreed to⁴¹, there is a negative relationship between bank capital and C&I loans across all three-bank categories. However in terms of statistical significance, only community-based banks exhibit statistical significance. For the regional and community-based banks in the post-Basel III period, the decline in C&I loans from a one percent increase in tier one risk-based capital ratio is .002% and .012% respectively with t-statistics of -0.37 and -4.76. The declines in C&I loans for both of these bank categories are pretty marginal compared to universal banks that see a 0.27% decline in C&I loans from a one percent increase in the tier one risk-based capital ratio. However the relationship for universal banks is not statistically significant with a t-statistic of -1.28 (See Model 11, p.50).

The surprising elements from this model besides the negative relationship only being statistically significant for the community-based banks are the sign on the coefficient for real GDP, and the statistical significance for the control variables. Surprisingly, the coefficient for real GDP in general is negative and often times statistically significant. The expectation was to see a positive coefficient, as one would expect when real GDP increases, banks would increase their lending to businesses as an expanding economy would entice banks to lend more. An expanding economy also should lead to a better performing loan book with declines in loan delinquencies and charge-offs. With respect to the other control variables, for the large part they lack statistical significance. This is surprising as in the post-Basel III Period; only community banks demonstrate a negative and statistically significant relationship. Furthermore for all the banks, the impact from a one percent change in the capital ratios is not all that impressive. So we would expect to see some statistical significance on the economic control variables, as

⁴¹ As mentioned earlier in the paper, the Basel III Period is broken into two periods, the period before Basel III was agreed to, which goes from Q1 2009 to Q2 2010, and the period after Basel III was agreed to, which goes from Q3 2010 to Q3 2011.

Berrospeide & Edge (2010) did find that the economy plays a large role in lending decisions and bank capital factors are not the central focus.

After running a Wooldridge test for auto-correlation on the first-differences model, the test shows autocorrelation is no longer present. The p-values obtained from the test with tier one risk-based capital and tier one common capital in the models are 0.58 and 0.33 respectively. Thus the null hypothesis of no first-order auto correlation cannot be rejected. In addition, after re-running the Dickey-Fuller Generalized Least Squares test for unit roots in the variables, for the most part unit roots are no longer present in the variables as the dfgls statistics are near or less than the 95% critical value of -3.52. As a result we can be more comfortable about the data displaying stationarity qualities.

7.3 Results Summary

After looking at the various iterations of regression models, the best model to use is the first-differences model. The first-differences model allows us to isolate the impact arising from the Basel III Agreement since we control for factors that make each bank unique such as their culture, which can influence their lending decisions. The model also allows us to correct for issues with auto-correlation and stationarity that arise in the OLS Model. With the first-differences model, for the most part a negative relationship exists between bank capital ratios and C&I loans across all bank categories. Thus the hypothesized negative relationship between bank capital and commercial and industrial loans holds true.

While the negative relationship does hold for regional and community-based banks, the impact on C&I loans is minimal. We are only talking about a decline of .01% to .02% in a bank's C&I loan book, which runs in the hundreds of millions to several billion dollars. While

not statistically significant, the universal banks experience the largest impact on C&I loans from a one percent increase in the tier one-risk based capital ratio. An important point to highlight and keep in mind is that when looking at these models, we are always talking in terms of a one-percentage point increase in the capital ratios. For banks that is a large increase in capital over just a quarter and such an increase would be more likely to occur over several quarters.

7.4 Policy Implications

In the introduction of the paper, it was stated how small and medium-sized enterprises are dependent upon banks to obtain funding, and how the new stricter capital guidelines could hurt these firms if there was a negative relationship between bank capital and lending. After looking at the first-differences model, we see that the size of the negative coefficients on the capital variables in the post-Basel III period show rather small declines in commercial and industrial loans for community-based banks, which are the predominant lending source to small enterprises. The declines are small when talking in the context of loan portfolios that total in the hundreds of millions in dollars. The likely reason why community-based banks do not feel that much of an impact from an increase in capital levels in the post-Basel III period is that they are already strongly capitalized and any further increase will not impact their lending behavior all that much.⁴² The results for community-based banks should bring some sense of relief to those small and medium-sized enterprise owners fearful that the Basel III Agreement will reduce the amount of lending these banks do with them. However this should not be an all-clear signal.

⁴² According to the FDIC, on average community banks have traditionally held more capital than other banks.

The reason why that this should not be an all-clear signal is that these small community-based banks have been seeing a lot of consolidation in recent decades.⁴³ Through consolidation we see banks with larger asset sizes and as we see with the universal banks, the impact from a higher tier one risk-based capital ratio is more substantial for these banks. With universal banks while not statistically significant, we see a 0.27% decline in C&I loans. While this is only a quarter of one percent, we are talking about loan books in the billions of dollars. A quarter of one percent is still a significant dollar amount and can translate into a sizable volume of loans. With interest rates being so low leaving banks with less interest income⁴⁴, when banks acquire other banks, they will look to cut costs. This means the number of bank branches that bank has may be reduced.⁴⁵ If small and medium-sized business owners have to do more business with these universal banks in the future as opposed to a local community bank who they already have a relationship with, then the Basel III Agreement may have more of an impact on them than my models show. Berger & Udell (2002), showed the importance of relationship lending for small and medium-sized businesses in obtaining credit. The local community bank can reduce information asymmetries between borrower and lender better than universal banks as universal banks have a more transactions based business model than a relationship based one. This could explain why they generally lend less to small and medium-sized enterprises.

Another reason why universal banks are the most impacted from a one-percent increase in the tier one risk-based capital ratio may be that universal banks are not as well capitalized as

⁴³ In 1984, banks classified as community banks according to the FDIC's definition, made up 38 percent of total bank assets. As of 2011, these same banks only made up 14% with non-community banks holding 86%.

⁴⁴ Banks make money on the spread between the rate it costs to obtain funds and the rate at which they lend these funds out, a.k.a. the net interest margin. With interest rates so low currently, the rate they obtain on their assets has declined. While their cost of funding has also declined, the decline in the rate they lend at has exceeded it, lowering their net interest margin.

⁴⁵ In fact according to SNL Financial, U.S. banks and thrifts shut 2,267 branches in 2012. This left 93,000 U.S. bank branches the lowest since 2007 according to AlixPartners, a consulting firm. Banks say they are closing branches because they are becoming too expensive to operate. Many industry executives and analysts expect the trend to gain steam in the coming years, hitting smaller communities especially hard. Nearly 20% of branch shutdowns last year were in towns outside the most populated areas of the U.S. according to SNL data (Stein 2013).

they look. This goes back to what was discussed in the data section on how the tier one risk-based capital ratio can change. A bank's risk-weighted assets determine the capital adequacy ratios.⁴⁶ These universal banks have large loan portfolios but they also have large derivative and securities portfolios that they hold for trading that they also place risk-weights on. Unlike loan assets in which regulators provide the weights they have to apply, for these assets, banks use their own internal risk models to determine the weights. These banks can thus apply lower risk-weights to these assets than what they probably should apply. By having a lower number of risk-weighted assets, they need less capital to achieve capital asset ratios in compliance with regulatory guidelines. So in times of a crisis, they would have to re-adjust their risk-weights and have to increase capital levels to maintain capital asset ratios that meet regulatory guidelines. One way to do that is to reduce lending, especially lending to businesses, as these loans have high risk-weights. This could be a reason why we see the largest impact on C&I loans from a one percent increase in capital from universal banks. Thus in the years ahead regulators need to stay focused on these banks, especially if small enterprises need to rely on them for credit more, as they are the most likely candidates to reduce lending to such enterprises.

8. Limitations of My Research

The main limitation of this study is that data looking at loans to small and medium-sized enterprises explicitly was unavailable. Instead commercial and industrial loans, which include loans to small and medium-sized enterprises had to be used as a proxy. If data on just loans to

⁴⁶ In a recent op-ed article in the Wall Street Journal, former FDIC Chairwoman Sheila Bair states that on average, the three big universal banking companies (J.P. Morgan Chase, Bank of America, and Citigroup) risk-weight their assets at only 55% of their total assets. So for every trillion dollars in accounting assets, these banks calculate their capital ratio as if the assets represented only \$550 billion of risk.

small and medium-sized enterprises had been available, the analysis would have been more robust. Also while the impact on C&I loans for community-based banks has been minimal in the period after Basel III was agreed to, it does not mean that these banks won't raise the interest rates on loans to small and medium-sized enterprises. Allen et al. (2011) did say that borrowers at the riskiest end of the borrowing spectrum could see their borrowing costs rise as a result of the agreement. Small and medium-size enterprises thus may still face adverse effects from the agreement. Another limitation is that the Basel III Agreement has not fully been implemented, and the Federal Reserve delayed the parts of the agreement that were supposed to take effect on January 1, 2013. Thus it would be interesting to look at this topic again in two years time when the rules should be in effect and more data on the Post-Basel III period is in existence.

9. Conclusion

Following the financial crisis, bank regulators around the globe quickly realized that banks inadequate levels of capital played a large role in why the crisis became as severe as it did. They knew moving forward banks and financial institutions needed to arm themselves with higher and more strictly defined levels of capital. The product of these conclusions on a global scale was the Basel III Agreement, which came into existence in July 2010. The agreement placed an emphasis on banks holding higher levels of tier one common capital, which consists of common stock, and made the criteria for what is considered tier one risk-based capital stricter. As one might expect, there has been a backlash against the new rules from banks in the United States, most especially community-based banks. Community banks, which are the predominant funding source for loans to small and medium-sized enterprises, worry the new rules will force

them to cut back on lending to such enterprises. Small and medium-sized enterprises are key to the job creation engine in the U.S. economy, so a decrease in lending to these firms would have negative implications on U.S. economic growth in both the short and long run. Thus, this paper wanted to see if the new capital standards were indeed having any negative impacts on bank lending to small and medium-sized enterprises.

This paper hypothesized that a negative relationship existed between bank capital ratios and bank lending. Commercial and industrial loans were used as a proxy for bank lending, as commercial and industrial loans include loans to such enterprises. To conduct the study, data on thirty banks from across the U.S. was used focusing around a bank's tier one risk-based capital ratio, tier one common ratio, and commercial and industrial loans. Since some literature suggested economic factors impact bank lending decisions more than capital levels, several variables to control for the economy were included in the dataset. After looking at some basic descriptive statistics and regressions for particular time periods, it became clear that it was a wise idea to look at the banks on a categorical basis focusing on the Basel III Agreement time period. Three categories were created based on the total size of bank's assets: universal, regional and community-based banks. Doing so showed that a negative and statistically significant relationship between bank capital and lending existed only for the universal banks.

However to make more robust findings, control variables were introduced into the regression model and a first-differences model was utilized. A first-differences model was implemented to correct for estimation biases that arose in the OLS model and as a way to control for what made each bank the unique institution they are. All thirty banks in the dataset have a culture uniquely associated with them that could influence their lending decisions when it comes

to business lending. By controlling for such factors, we isolated the impact changes in bank capital ratios have on bank lending.

The first-differences model showed that a negative relationship for the most part existed between bank capital ratios and C&I loans across all bank categories for the period after the Basel III Agreement was agreed to, with statistical significance for community-based banks only. Overall while not statistically significant, universal banks saw the biggest impact from the Basel III Agreement with a -0.27% decline in C&I loans from a one percent increase in the tier one risk-based capital ratio. The impact on community-based banks while statistically significant is marginal at best with a negative .01% decline in C&I loans from a one percent increase in either capital ratio.

This finding should bring a bit of relief to small and medium-sized enterprises fearful that the Basel III Agreement's new capital rules will adversely impact lending to them and the growth of their businesses. The reason it should only be a bit is that over the last several decades there has been a lot of consolidation going on in the banking system. Previous research (Berger & Udell, 2002, Jackson, 1999) has found that larger banks do less lending to small and medium-sized enterprises, and the results from the universal banks show that an increase in capital ratios have a greater impact on C&I loans for them compared to community-based banks. The concern here is that if banks continue to merge, combined with a continued low interest rate environment, and new regulation including the Basel III Agreement, local community-based bank branches will disappear, forcing small enterprises in particular to have to do business with one of the universal banks. So while the results from the model this paper used shows little impact on lending to small and medium-sized enterprises from the higher capital ratios in the period after

the Basel III Agreement was agreed to, a watchful eye should be kept on the changing banking landscape in the United States.

Another reason why the findings in this study should not be the end-all be-all to fears of lending to small and medium-sized enterprises declining as a result of the Basel III Agreement is that the new capital rules have not been implemented yet. Thus the impacts of the agreement are most certainly still evolving. It could be that banks are not reducing the overall level of loans to such firms, but as a result of the new capital rules are charging a higher rate on such loans. This could still force small and medium-sized enterprises to have to find a new source for funds and reduce the amount of capital being invested into their businesses due to higher borrowing costs. The findings will become more concrete once the Federal Reserve releases the new timetable for banks to start coming into compliance with the new capital rules, generating more data to look at.

In the meanwhile, regulators and the Federal Reserve in particular should really focus on the universal banks to see why their commercial and industrial loan portfolios are the most sensitive to increases in capital ratios. They should also analyze these institutions balance sheets to check that they are portraying an accurate picture of their risk-weighted assets, which in turn dictates their capital ratios. Should small and medium-sized enterprises need to rely more on these banks for loans, an inaccurate portrayal of capital levels would make it harder for these banks to maintain the Basel III capital rules in a time of financial crisis. This very well could force banks to cut lending to small and medium-sized enterprises to maintain compliance. For now though, small and medium-sized enterprises can breath a little easier as the impact from the Basel III Agreement on community-based banks, who predominantly supply them with loans to fund and grow their businesses has been minimal at best so far. Time will only tell if this remains to be the case.

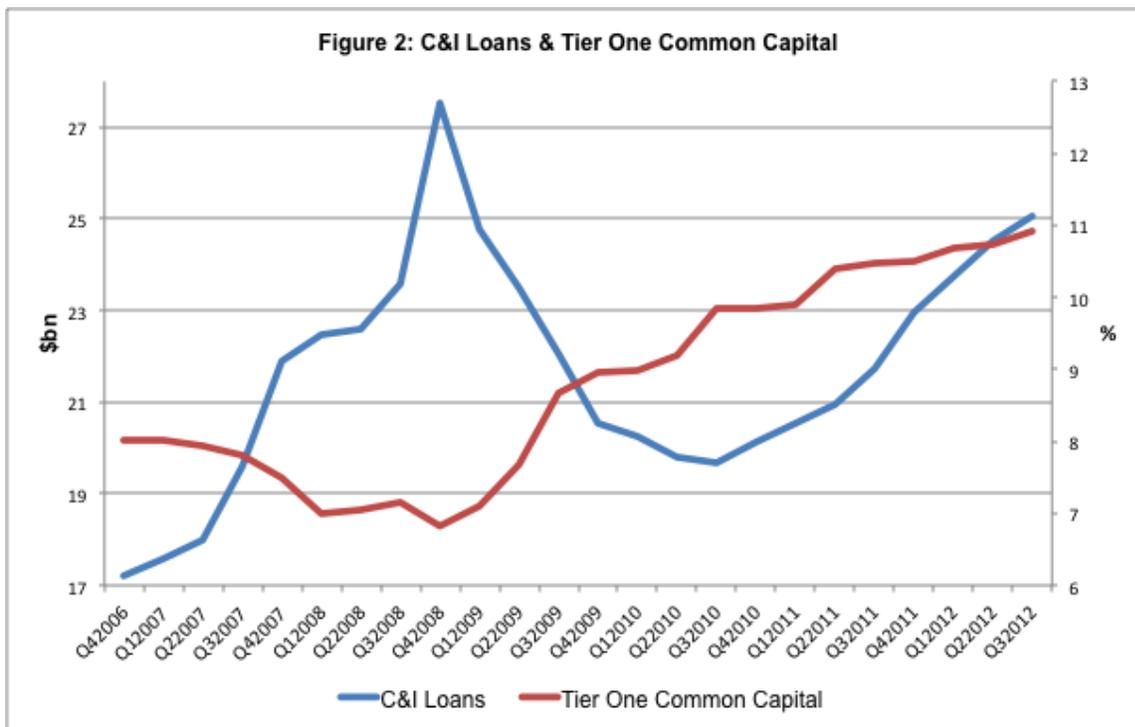
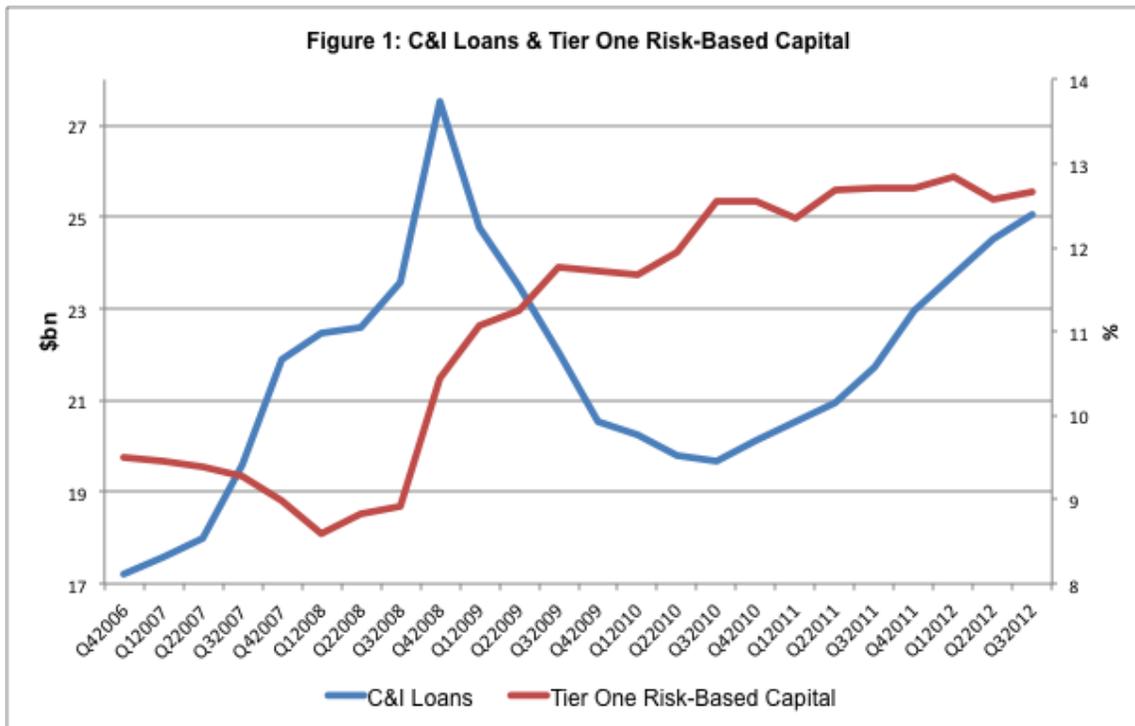
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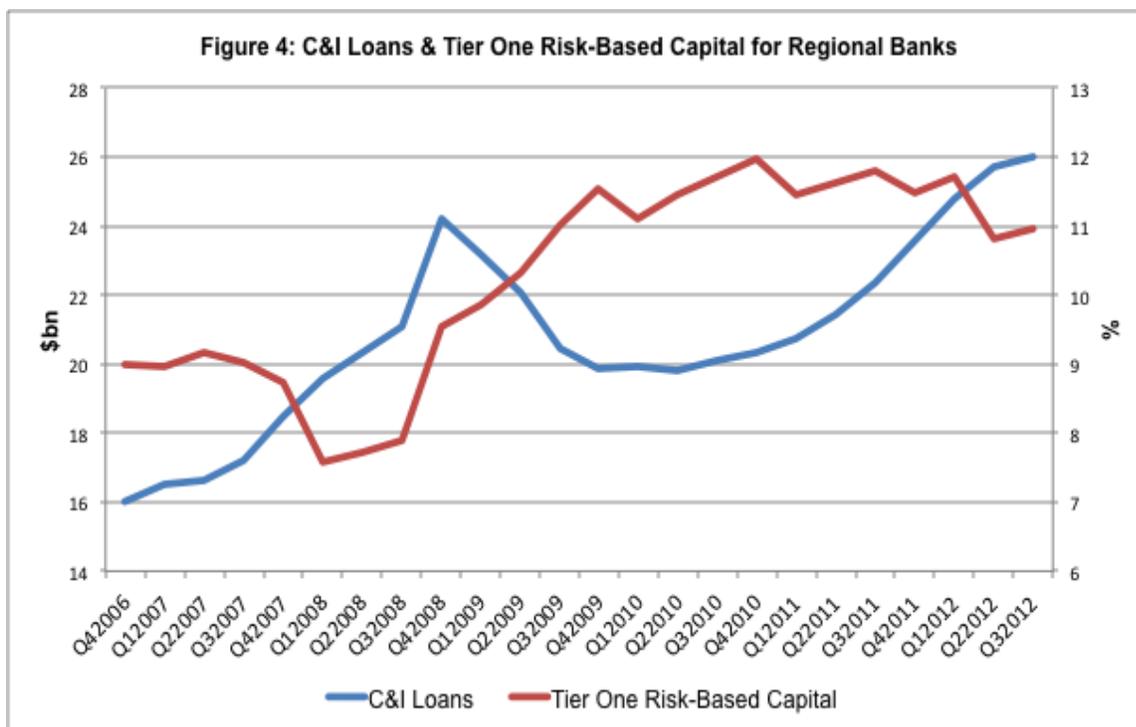
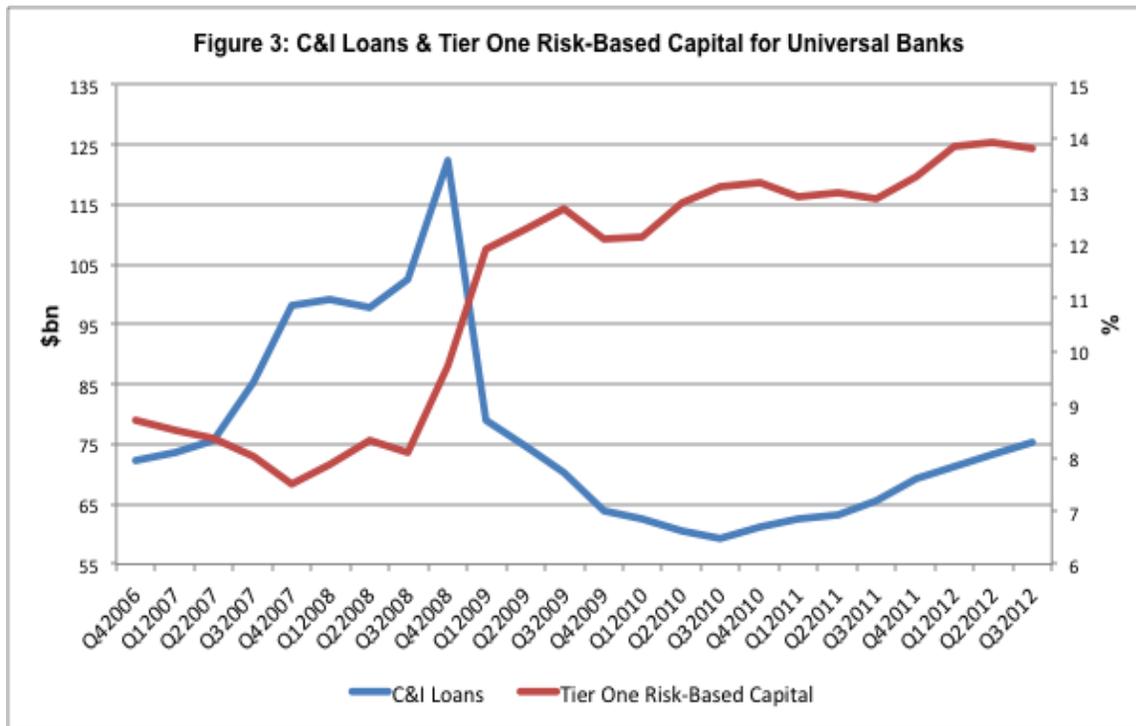
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Figures







Descriptive Statistic & Regression Coefficient⁴⁷ Tables

Table 1: Overall Statistics for All Banks (N=702 observations)		
	Mean	Std. Deviation
Commercial & Industrial Loans (\$bn)	21.7	34.8
Tier 1 Capital Ratio %	11.2	2.9
Tier 1 Common Capital Ratio %	8.8	3.0
Non-Performing Loans %	2.4	2.1
Net Charge-Offs %	1.5	1.8
Real GDP %	0.8	2.2
Unemployment %	7.6	2.0
Small Firms Lending Standards %	14.2	26.3
Medium Firms Lending Standards %	11.8	28.2

⁴⁷ For Tables Six and Seven, bold values mean coefficient demonstrates statistical significance at 95% confidence level.

Table 2: Before 3/31/09 All Banks (N=252 Observations)		
	Mean	Std. Deviation
Commercial & Industrial Loans (\$bn)	21.2	33.0
Tier 1 Capital Ratio %	9.3	2.6
Tier 1 Common Capital Ratio %	7.5	2.5
Non-Performing Loans %	0.9	1.0
Net Charge-Offs %	1.0	1.3
Real GDP %	0.2	2.3
Unemployment %	5.1	0.8
Small Firms Lending Standards %	35.1	28.6
Medium Firms Lending Standards %	35.1	29.6

Table 3: 3/31/09 Onward All Banks (N=450 Observations)		
	Mean	Std. Deviation
Commercial & Industrial Loans (\$bn)	22.0	35.8
Tier 1 Capital Ratio %	12.2	2.6
Tier 1 Common Capital Ratio %	9.6	2.9
Non-Performing Loans %	3.2	2.2
Net Charge-Offs %	1.8	2.0
Real GDP %	1.2	2.1
Unemployment %	9.1	0.6
Small Firms Lending Standards %	2.5	15.6
Medium Firms Lending Standards %	-1.3	16.6

Table 4: Between 3/31/09 & 6/30/10 All Banks (N=150 Observations)		
	Mean	Std. Deviation
Commercial & Industrial Loans (\$bn)	21.3	35.7
Tier 1 Capital Ratio %	11.7	2.9
Tier 1 Common Capital Ratio %	8.7	3.2
Non-Performing Loans %	3.6	2.4
Net Charge-Offs %	2.5	2.2
Real GDP %	0.8	2.3
Unemployment %	9.6	0.2
Small Firms Lending Standards %	8.9	15.0
Medium Firms Lending Standards %	4.8	15.7

Table 5: Between 9/30/10 & 9/30/11 All Banks (N=150 Observations)		
	Mean	Std. Deviation
Commercial & Industrial Loans (\$bn)	20.6	33.2
Tier 1 Capital Ratio %	12.6	2.3
Tier 1 Common Capital Ratio %	10.1	2.6
Non-Performing Loans %	3.3	2.1
Net Charge-Offs %	1.8	2.3
Real GDP %	1.9	0.3
Unemployment %	9.2	0.3
Small Firms Lending Standards %	-7.3	3.7
Medium Firms Lending Standards %	-13.0	5.5

Table 6: Overall Regression Models with Control Variables by Independent Variables

Variables by Bank Category	Coefficient	T-Statistic	Coefficient	T-Statistic
	OLS		First-Differences	
Universal Banks				
Tier One Risk-Based Capital	0.47	-8.22	-0.63	-1.52
Tier One Common Capital	0.29	-5.71	-0.51	-1.69
Regional Banks				
Tier One Risk-Based Capital	0.03	2.89	-0.19	-3.56
Tier One Common Capital	0.13	1.07	-0.27	-7.02
Community-Based Banks				
Tier One Risk-Based Capital	0.19	4.89	-0.11	-4.75
Tier One Common Capital	0.16	4.48	-0.10	-4.64

Table 7: First-Differences Model with Control Variables by Independent Variables for Basel III Period

Variables	Pre-Basel III	T-Statistic	Post-Basel III	T-Statistic
Universal Banks				
Tier One Risk-Based Capital	0.02	0.53	-0.27	-1.28
Tier One Common Capital	-0.01	-0.42	-0.001	-0.04
Regional Banks				
Tier One Risk-Based Capital	-0.02	-1.30	-0.002	-0.37
Tier One Common Capital	-0.02	-1.04	0.005	0.77
Community-Based				
Tier One Risk-Based Capital	-0.01	-1.25	-0.01	-4.76
Tier One Common Capital	-0.002	-0.33	-0.01	-5.51

Model 1: Universal Banks for Basel III Period with OLS

Variables	Pre-Basel III	Post-Basel III	Pre Basel III	Post Basel III
	C&I Loans	C&I Loans	C&I Loans	C&I Loans
Tier 1 Risk-Based Capital	-0.82*** (0.070)	-0.94*** (0.099)		
Tier 1 Common Capital			-0.61*** (0.099)	-0.97*** (0.099)
Constant	27.10*** (0.884)	29.27*** (1.303)	22.45*** (0.871)	27.09*** (1.028)
Observations	30	30	26	29
R-squared	0.828	0.761	0.610	0.780
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Model 2: Regional Banks for Basel III Period with OLS

VARIABLES	Pre-Basel III	Post- Basel III	Pre Basel III	Post Basel III
	C&I Loans	C&I Loans	C&I Loans	C&I Loans
Tier 1 Risk-Based Capital	0.03* (0.019)	0.03 (0.028)		
Tier 1 Common Capital			-0.003 (0.019)	-0.001 (0.029)
Constant	16.35*** (0.219)	16.41*** (0.329)	16.73*** (0.167)	16.77*** (0.273)
Observations	50	50	49	50
R-squared	0.062	0.024	0.001	0.000
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Model 3: Community Banks for Basel III Period with OLS

VARIABLES	Pre-Basel III	Post-Basel III	Pre Basel III	Post Basel III
	C&I Loans	C&I Loans	C&I Loans	C&I Loans
Tier 1 Risk-Based Capital	0.20*** (0.045)	0.23*** (0.054)		
Tier 1 Common Capital			0.09*** (0.034)	0.16*** (0.043)
Constant	11.81*** (0.542)	11.15*** (0.719)	13.50*** (0.335)	12.49*** (0.476)
Observations	70	70	66	69
R-squared	0.232	0.211	0.108	0.174
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Model 4: Pre-Basel III Agreement with Control Variables by Bank Category for Tier One Risk-Based Capital with OLS

Variables	Universal	Regional	Community-Based
	C&I Loans	C&I Loans	C&I Loans
Tier One Risk-Based Ratio	-0.72***	0.05*	0.22***
	(0.065)	(0.023)	(0.052)
Non-Performing Loans	0.24**	0.05	0.13
	(0.095)	(0.043)	(0.090)
Loan Charge-offs	0.05	-0.04	-0.13
	(0.157)	(0.043)	(0.119)
Real GDP	-0.004	0.02	-0.31
	(0.572)	(0.406)	(0.781)
Unemployment	0.80	-0.36	1.30
	(2.888)	(1.791)	(3.527)
Small Firm Lending Standards	-0.09	0.01	-0.04
	(0.109)	(0.074)	(0.138)
Medium Firm Lending Standards	0.10	-0.01	0.01
	(0.109)	(0.050)	(0.100)
Constant	17.49	19.49	-0.61
	(27.392)	(16.606)	(32.895)
Observations	30	50	70
R-squared	0.914	0.163	0.265
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 5: Post-Basel III Agreement with Control Variables by Bank Category for Tier One Risk-Based Capital with OLS

Variables	Universal	Regional	Community-Based
	C&I Loans	C&I Loans	C&I Loans
Tier One Risk-Based Ratio	-0.67***	0.02	0.31***
	(0.058)	(0.021)	(0.074)
Non-Performing Loans	0.48***	0.09**	-0.16***
	(0.111)	(0.034)	(0.053)
Loan Charge-offs	-0.26***	0.01	0.01
	(0.089)	(0.029)	(0.030)
Real GDP	-0.37	0.03	-0.43
	(0.838)	(0.602)	(1.182)
Unemployment	0.64	-0.28	0.98
	(1.202)	(0.605)	(1.326)
Small Firm Lending Standards	0.01	0.01	-0.04
	(0.080)	(0.040)	(0.090)
Medium Firm Lending Standards	-0.001	0.000	0.02
	(0.045)	(0.024)	(0.051)
Constant	19.17*	18.82***	2.37
	(10.193)	(4.714)	(10.557)
Observations	30	50	70
R-squared	0.902	0.134	0.288
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 6: Pre-Basel III Agreement with Control Variables by Bank Category for Tier One Common Capital with OLS

Variables	Universal	Regional	Community-Based
	C&I Loans	C&I Loans	C&I Loans
Tier One Common Capital	-0.53***	0.01	0.11
	(0.099)	(0.022)	(0.069)
Non-Performing Loans	-0.31	0.11***	0.04
	(0.203)	(0.034)	(0.094)
Loan Charge-offs	0.82***	0.02	-0.04
	(0.269)	(0.027)	(0.094)
Real GDP	-0.309	-0.097	-0.025
	(0.80)	(0.41)	(0.69)
Unemployment	3.044	-0.564	0.904
	(3.86)	(1.80)	(3.15)
Small Firm Lending Standards	-0.138	0.013	-0.024
	(0.16)	(0.07)	(0.12)
Medium Firm Lending Standards	0.09	-0.03	0.03
	(0.111)	(0.047)	(0.088)
Constant	-7.71	21.73	4.67
	(36.432)	(16.612)	(29.487)
Observations	26	49	66
R-squared	0.821	0.135	0.112
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 7: Post-Basel III Agreement with Control Variables by Bank Category for Tier One Common Capital with OLS

Variables	Universal	Regional	Community-Based
	C&I Loans	C&I Loans	C&I Loans
Tier One Common Capital	-0.69***	0.03	0.18***
	(0.060)	(0.027)	(0.065)
Non-Performing Loans	0.31***	0.11***	-0.05
	(0.078)	(0.033)	(0.067)
Loan Charge-offs	0.13	0.002	0.04
	(0.088)	(0.033)	(0.049)
Real GDP	0.64	0.023	0.35
	(0.641)	(0.599)	(1.240)
Unemployment	-1.67*	-0.21	0.12
	(0.955)	(0.610)	(1.394)
Small Firm Lending Standards	0.10	0.01	0.004
	(0.059)	(0.040)	(0.095)
Medium Firm Lending Standards	-0.03	0.000	-0.01
	(0.034)	(0.024)	(0.053)
Constant	37.28***	18.05***	10.49
	(8.317)	(4.870)	(10.869)
Observations	29	50	69
R-squared	0.944	0.141	0.191
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 8: First-Differences Model with Control Variables by Bank Category for Tier One Risk Based Capital

Variables	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Risk-Based Capital	-0.06	-0.02***	-0.01***
	(0.041)	(0.005)	(0.002)
D.Non-Performing Loans	0.04	-0.03	-0.004
	(0.057)	(0.022)	(0.009)
D.Loan Charge-offs	0.002	0.01	-0.003*
	(0.051)	(0.005)	(0.002)
D.Real GDP	-0.02	-0.01***	-0.004
	(0.021)	(0.004)	(0.003)
D.Unemployment	-0.08	0.01	-0.01*
	(0.062)	(0.019)	(0.007)
D.Small Firm Lending Standards	0.01*	0.002***	0.001
	(0.003)	(0.001)	(0.001)
D. Medium Firm Lending Standards	-0.002	-0.001	0.000
	(0.003)	(0.001)	(0.000)
Constant	0.05*	0.03***	0.01***
	(0.026)	(0.004)	(0.004)
Observations	120	230	322
R-squared	0.089	0.278	0.112
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 9: First-Differences Model with Control Variables By Bank Category for Tier One Common Capital

Variables	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Common Capital	-0.05*	-0.03***	-0.01***
	(0.030)	(0.004)	(0.002)
D.Non-Performing Loans	0.002	-0.03	-0.004
	(0.038)	(0.022)	(0.009)
D.Loan Charge-offs	0.05	0.001	-0.004**
	(0.034)	(0.006)	(0.002)
D.Real GDP	-0.003	-0.01***	-0.003
	(0.018)	(0.004)	(0.003)
D.Unemployment	-0.08	0.001	-0.02**
	(0.052)	(0.019)	(0.007)
D.Small Firm Lending Standards	0.002	0.002**	0.001
	(0.002)	(0.001)	(0.001)
D.Medium Firm Lending Standards	0.000	-0.001	0.000
	(0.002)	(0.001)	(0.000)
Constant	0.04	0.03***	0.01***
	(0.022)	(0.004)	(0.004)
Observations	113	226	314
R-squared	0.117	0.332	0.115
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 10: First-Differences Model Pre-Basel III Agreement with Control Variables for Tier One Risk-Based Capital

VARIABLES	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Risk-Based Capital	0.02	-0.02	-0.01
	(0.042)	(0.014)	(0.007)
D.Non-Performing Loans	-0.02	-0.01	-0.03**
	(0.067)	(0.029)	(0.012)
D.Loan Charge-offs	-0.02	0.03	0.003
	(0.073)	(0.025)	(0.004)
D.Real GDP	0.003	-0.03	0.003
	(0.056)	(0.018)	(0.018)
D.Unemployment	-0.14	-0.03	0.01
	(0.143)	(0.026)	(0.015)
D.Small Firm Lending Standards	0.001	0.001	0.001
	(0.010)	(0.003)	(0.003)
D. Medium Firm Lending Standards	-0.004	-0.001	0.001
	(0.010)	(0.002)	(0.002)
Constant	-0.08	0.01	-0.004
	(0.063)	(0.024)	(0.017)
Observations	30	50	70
R-squared	0.191	0.358	0.101
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 11: First-Differences Model Post-Basel III Agreement with Control Variables for Tier One Risk-Based Capital

VARIABLES	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Risk-Based Capital	-0.27	-0.002	-0.01***
	(0.207)	(0.006)	(0.003)
D.Non-Performing Loans	0.20	0.01	0.02**
	(0.144)	(0.015)	(0.011)
D.Loan Charge-offs	0.10	0.02**	-0.002
	(0.124)	(0.006)	(0.002)
D.Real GDP	-1.07	-0.07	0.14
	(1.400)	(0.200)	(0.172)
D.Unemployment	18.91	2.65	-2.59
	(27.846)	(4.749)	(3.756)
D.Small Firm Lending Standards	-0.55	-0.08	0.08
	(0.830)	(0.141)	(0.112)
D. Medium Firm Lending Standards	-0.08	-0.01	0.01
	(0.117)	(0.021)	(0.016)
Constant	2.52	0.39	-0.32
	(3.677)	(0.627)	(0.497)
Observations	30	50	70
R-squared	0.360	0.215	0.231
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 12: First-Differences Model Pre-Basel III Agreement with Control Variables for Tier One Common Capital

VARIABLES	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Common Capital	-0.01	-0.02	-0.002
	(0.016)	(0.016)	(0.006)
D.Non-Performing Loans	0.06	-0.03	-0.02
	(0.063)	(0.037)	(0.013)
D.Loan Charge-offs	0.13	0.03	0.003
	(0.077)	(0.027)	(0.004)
D.Real GDP	-0.06	-0.02	-0.004
	(0.058)	(0.020)	(0.017)
D.Unemployment	-0.19	-0.02	0.003
	(0.118)	(0.032)	(0.015)
D.Small Firm Lending Standards	-0.01	0.002	0.002
	(0.010)	(0.003)	(0.003)
D. Medium Firm Lending Standards	0.000	-0.001	-0.000
	(0.005)	(0.002)	(0.001)
Constant	-0.06	0.02	0.000
	(0.070)	(0.027)	(0.019)
Observations	25	47	65
R-squared	0.420	0.350	0.093
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Model 13: First-Differences Model Post-Basel III Agreement with Control Variables for Tier One Common Capital

VARIABLES	Universal	Regional	Community-Based
	D.C&I Loans	D.C&I Loans	D.C&I Loans
D.Tier One Common Capital	-0.001	0.01	-0.01***
	(0.021)	(0.006)	(0.002)
D.Non-Performing Loans	0.02	0.01	0.02**
	(0.018)	(0.017)	(0.011)
D.Loan Charge-offs	0.01	0.02**	-0.002
	(0.049)	(0.006)	(0.002)
D.Real GDP	0.10	-0.07	0.11
	(0.311)	(0.206)	(0.190)
D.Unemployment	1.06	2.52	-1.97
	(6.105)	(4.896)	(4.119)
D.Small Firm Lending Standards	-0.03	-0.07	0.06
	(0.182)	(0.146)	(0.123)
D. Medium Firm Lending Standards	-0.01	-0.01	0.01
	(0.026)	(0.022)	(0.018)
Constant	0.16	0.37	-0.24
	(0.805)	(0.648)	(0.545)
Observations	28	50	68
R-squared	0.111	0.219	0.207
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Tier One Risk-Based Capital Ratio (n. s. = not significant at 95% Confidence Level)

Category	Model	Expected Coefficient Sign	Sign for Entire Time Period	Sign for Pre-Basel III Time Period	Sign for Post-Basel III Time Period
Universal	OLS	-	-	-	-
	First Differences	-	- (n.s.)	+	- (n.s.)
Regional	OLS	-	+	+	+
	First Differences	-	-	- (n.s.)	- (n.s.)
Community	OLS	-	+	+	+
	First Differences	-	-	- (n.s.)	-

Tier One Common Capital Ratio (n. s. = not significant at 95% Confidence Level)

Category	Model	Expected Coefficient Sign	Sign for Entire Time Period	Sign for Pre-Basel III Time Period	Sign for Post-Basel III Time Period
Universal	OLS	-	-	-	-
	First Differences	-	- (n.s.)	- (n.s.)	- (n.s.)
Regional	OLS	-	+	+	+
	First Differences	-	-	- (n.s.)	+
Community	OLS	-	+	+	+
	First Differences	-	-	- (n.s.)	-