

ABSTRACT

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The Effect of the Basel III Capital Requirements on the Profitability and Lending of
Global Systemically Important Banks
(Under the direction of Professor Alexander Arapoglou)

The global financial crisis prompted a period of widespread regulatory changes geared towards creating a safer financial system. The Basel III regulation emerged post-crisis and adjusted the minimum capital requirements for banks, attempting to ensure that they would be better equipped to absorb losses in the case of the next potential crisis. Advocates of this regulation believe that our financial system is far safer when these higher capital requirements are in place, and some advocates believe these requirements should be even higher. On the other hand, critics of this regulation argue that as a result of these requirements, banks profit less and their lending behaviors are impacted negatively. The research question of this thesis was formed as a response to these critics and asks: What effect do the Basel III capital requirements have on bank profitability and lending behavior. This thesis uses a regression analysis to determine whether these capital requirements have had an impact on the profitability and lending behaviors of global systemically important banks.

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I. INTRODUCTION

“Starting with the banking system, the good news is that it is better capitalized. The quantity and quality of capital required relative to risk-weighted assets have been increased substantially and capital requirements are higher for the largest, most systemic firms. This lowers the risk of distress at such firms and encourages them to limit activities that could threaten financial stability.” — Janet Yellen, Chair of the Federal Reserve from 2014-2018 (Yellen, 2018)

“One of the lessons of the 2008-09 experience...was the fact that every company in the United States was a domino, and those dominoes were placed right next to each other...so when they started toppling, everything was in line.” —Warren Buffett, CEO of Berkshire Hathaway (Friedman, 2018)

Ten years after the financial crisis, the economy seems to be booming and the banking sector appears to have recovered. The period of time that followed the 2007-2009 financial crisis was defined by large changes in the regulatory environment of the financial services sector. The laissez-faire economic policy that reigned in the 1970's and 80's proved ineffective, and regulators stepped in to promote economic stability and improve the safety of the banking sector. Two of the regulations that emerged from this post-crisis period were the Dodd-Frank Wall Street Reform and Consumer Protection Act (also known as “Dodd-Frank”) and Basel III, which is the third installment of the Basel Accords. These two pieces of regulation were created in order to improve the stability of the financial sector and to prevent future crises.

The focus of this paper will be on Basel III, which addresses the issue of bank capital structure from a regulatory standpoint after the financial crisis of 2008. The goal of the legislation is, put simply, to safeguard banks that are “too big to fail” by regulating their capital requirements. This paper will assess whether the capital requirements given in this regulation are promoting stability at the cost of profitability and lending capabilities. The literature review will provide a historical account of the financial crisis,

give an overview of the regulatory response to the crisis, and will delve into the literature surrounding the Basel III regulation. In the research methodology section of this paper, I will explain my methods, define my sample, justify the reasoning behind the metrics I chose, and highlight the limitations of my research. Finally, in my research analysis and discussion sections, I will discuss the findings of my research and conclude that Basel III has had no effect on bank profitability and little effect on bank lending behaviors, except in the case of select banks. I will conclude this paper by suggesting to other scholars in this field how my findings could be built upon or improved upon in future research.

Research Question

Scholars and regulators agree that capital requirements in the financial system have successfully increased the stability of our largest banks at both the individual level and the systemic level. However, a debate persists on whether this stability has come at a cost. The research questions I am determined to address is: *Have the Basel III capital requirements, aimed at improving the stability of the financial system, negatively impacted the profitability and lending behaviors of global systemically important banks in the United States?* I will divide this question into two parts by analyzing first the effect, if any, these capital requirements have had on bank profitability, and secondly, the effect, if any, these capital requirements have had on the lending capabilities of banks. Through my research, I hope to determine the extent to which this regulation may have impacted the profitability and lending behaviors of global systemically important banks in the United States. Based on my findings, I will also provide recommendations for

potential future regulations that attempt to promote stability in the financial sector.

Finally, I hope to reach a conclusion that future scholars can build upon in their research.

II. LITERATURE REVIEW

In my literature review, I will give a brief overview of the financial crisis of 2007 and 2008, focusing on the role that highly leveraged banks played in the collapse. Next, I will discuss the regulatory response to the crisis, focusing on the Basel III Accord, while also briefly differentiating between the Dodd-Frank Act as well as Basel I and Basel II. In addition, I will give a high-level overview of the Basel III capital requirements and provide a review of the current literature relating to the Basel III capital requirements, including material from scholars both in favor of stricter capital requirements as well as those who argue the capital requirements are too stringent already. Since this field is relatively saturated in terms of research, I tried to focus on several key studies or papers that I found valuable and most closely related to this topic. The debate surrounding the Basel III capital structure regulation will serve as a segue into my research methodology, in which I will discuss the selection of my sample data, my research design, and the metrics I will use to analyze bank profitability and lending behaviors.

Introduction to the Financial Crisis

The occurrence of financial crises can be explained a variety of ways by different scholars. The modern economy is thought to operate through cycles of “booms” and “busts,” where the most severe busts take the form of financial crises. Hyman Minsky, an Austrian economist, argued in 1977 that the finance industry is plagued by “systemic fragility,” meaning “that the development of a fragile financial structure results from the normal functioning of our economy; financial fragility and thus the susceptibility of our economy to disruption is not due to either accidents or policy errors” (Minsky, 1977).

While Minsky believed that financial crises are an inherent part of our economy, other economists believe that crises are spurred on by the mistakes of the actors in the economic system, such as banks or governments. Two prevailing schools of thought in modern economics are Keynesian economics, named for the work of macroeconomist John Maynard Keynes, and neoclassical economics. The Keynesian approach “emphasizes that capitalist market economies have a built-in tendency to instability” (Hansen, 2014). Alternatively, the neo-classical approach asserts “that the market creates equilibrium by itself unless distorted by harmful state or bank intervention” (Hansen, 2014). Recognizing the discrepancies in beliefs pertaining to why financial crises happen is important because these scholars also disagree on how to fix such crises.

In the case of the 2008 global financial crisis, subprime mortgage bonds held by large financial institutions failed as a result of the housing bubble. As borrowers were no longer able to pay back their mortgages, the mortgage bonds held by the banks rapidly declined in value. When Lehman Brothers filed for bankruptcy in September of 2008, President George W. Bush assured tax payers that there would not be a bailout. At the time, the general public had such confidence in the market that they assumed no bank was “too big to fail.” In his book, *The Shifts and the Shocks: What We’ve Learned—And Have Still to Learn—From the Financial Crisis*, Martin Wolf, the chief economics commentator at the Financial Times, cites financial liberalization as a reason for fragility within the finance sector (Wolf, 2014). Wolf states that this liberalization could be traced back to the 1980’s, citing the politics of Ronald Reagan and Margaret Thatcher, a decline of confidence in Keynesianism, and a growth in the belief of the free market (Wolf, 2014). During this time, Wolf states that there occurred a “shift towards trust in markets

over governments... [stating that] the rise of the liberal financial markets was inevitable” (Wolf, 2014). Wolf reasons that this liberalization arose since “the passage of time and the experience of a long period of financial stability had robbed the Western world of the terror of financial instability born in the 1930s” (Wolf, 2014). As trust in the markets wavered and with the financial system teetering on a collapse, the government therefore pushed for a taxpayer bailout of the largest financial institutions.

With the government acting as a “lender of last resort,” or LLR, many banks were able to recover quickly (Bordo, 2014). Historically, the LLR would intervene in order to prevent default for an illiquid, but solvent, bank. However, in the United States, the lender of last resort, a responsibility undertaken by the Federal Reserve, has moved far beyond the original LLR function (Bordo, 2014). In the early 1930’s the Federal Reserve failed to intervene and prevent several banking panics, which eventually led to the Great Depression. However, leading up to the crisis of 2008, a new culture had taken over in which financial institutions and the government maintained a closer relationship, in part due to the frequency of lobbying activities by financial institutions. Freddie Mac and Fannie May provide one of the best examples of financial institutions turned lobbyists (Wallison and Calomiris, 2008). In the mid-2000’s, these institutions lobbied to Congress for affordable housing, which allowed them to invest heavily in riskier mortgages between 2005 and 2007 (Wallison & Calomiris, 2008). As a result of these investments, Fannie May and Freddie Mac, which suffered over \$1 trillion in losses during the financial crisis, were eventually taken over by the government (Wallison & Calomiris, 2008).

Scholars have remained divided on whether or not the government should have played such an active role as the lender of last resort in facilitating the recovery of the US financial system after the 2008 crisis. Some scholars believe that when banks can count on a bailout, financial institutions will act irresponsibly due to moral hazard, which is the lack of incentive to guard against risk knowing that another party will absorb the cost of one's actions (Bordo, 1990). The close relationship between the government and the financial sector has ensured that in the event of a crisis, banks can count on the government to bail them out. In a government bailout of large financial institutions, the public pays the cost for the transgressions of the banking system. On the other hand, without a bailout, the economy risks a bank run and a full-blown banking panic (Bordo, 1990). However, the middle ground may be found by scholars like Michael Bordo, who posits that the actions of the lender of last resort need to be rules-based rather than discretionary, so as not to create further confusion in the markets during a time of financial crisis (Bordo, 2014). The financial crisis of 2008 and the fragility of many of the largest banks further bolstered this idea that more regulation would be needed in order to protect the economy and prevent future financial crises of this magnitude. As a result, two sweeping pieces of bank regulation emerged post-crisis: The Dodd-Frank Wall Street Reform and Consumer Protection Act and Basel III.

The Regulatory Response to the Crisis

After the bailout, the 2008 financial crisis called for new financial regulations to improve the stability of a system that many thought was completely secure. This regulatory response included the Dodd Frank Wall Street Reform and Consumer

Protection Act, signed into effect by President Barack Obama on July 21, 2010, and Basel III, the third installment of the Basel Accord, which was fully implemented by January 1, 2019. Both of these regulations include adjustments made to the minimum capital requirements of financial institutions. Since many of these financial institutions were heavily leveraged, or financed by debt, the government had to provide a bailout in order that these institutions could remain solvent. Changing the capital structure of banks through these regulations would, in theory, substantially lower the responsibilities of the government as a lender of last resort. That is, if banks are financed by less debt, and in turn, have more common equity to act as a buffer for their losses, there is less need for a bailout from a LLR in the case of a financial crisis.

The ultimate goal of these two regulations is to strengthen the financial system by mitigating risks and promoting stability. While many scholars believe that increasing the capital requirements for financial institutions will successfully satisfy that goal, there are also challengers who support the deregulation of the financial industry. One of the main differences between the two regulations is that Basel III has been adopted to different extents and according to different timelines in comparison to Dodd-Frank. In addition, the question of whether these minimum capital requirements are enough to eliminate the existence of a “too big to fail” financial institution still persists. Since the main regulatory changes in capital structure came through Basel III, this regulation will be the primary focus of this paper. I will attempt to address whether these US banks have suffered in terms of their profitability or their ability to lend as a result of the new capital requirements put forth by the Basel III regulation.

Basel I and Basel II

The Basel Accord is comprised of Basel I, Basel II, and Basel III. In 1988, the Basel Committee on Banking Supervision (BCBS), a committee within the Bank for International Settlements (BIS), published Basel I. Basel I, the first of the three installments within the Basel Accord, focused primarily on capital adequacy at a time when the Latin American debt crisis elevated concerns in regards to the capital ratios of international banks (“History of the Basel Committee,” 2014). According to Martin Wolf, Basel I’s main contribution to the regulatory environment was the risk-weighting of assets, organized into five different categories. Wolf writes that in Basel I, “Ironically, and dangerously, these weights treated government debt as riskless and put triple-A rated mortgage-backed securities into the next least risky category” (Wolf, 2014). For this reason, among others, the regulation had to be amended, which resulted in Basel II. The BCBS passed Basel II in 2004, expanding upon the minimum capital requirements proposed in Basel I and adjusting for technological advancements made within the banking sector (“History of the Basel Committee,” 2014). The 2008 financial crisis occurred during the period that banks were still implementing the changes made in Basel II. As a result, Basel III emerged as a response to the 2008 financial crisis. Wolf contends that Basel III “is very much the progeny of the two earlier accords. It still relies on risk-weighting...even though that approach failed in the run-up to the crisis” (Wolf, 2014). Therefore, although the new amendments made in Basel III built upon and corrected the two earlier installments, certain aspects of this approach, such as the risk-weighting of assets, may have faults that have yet to be addressed since the financial crisis.

Basel III

While scholars continue to disagree on the causes of the financial crisis and the solutions that were adopted as a way of preventing future crises of this magnitude, a general consensus exists that if banks had more capital on reserve at the time of the crisis, the repercussions may not have been quite so severe. The 2008 financial crisis spurred various regulatory changes across the world, primarily the Dodd-Frank Act in the United States and Basel III in Europe. While Dodd-Frank was signed by President Barack Obama, Basel III was the product of the Basel Committee of Banking Supervision (established in 1974), and experienced a longer implementation period. The BCBS worked towards improving the stability of the financial system by establishing three pillars of focus in the law (Miu, Ozdemir & Giesinger, 2010). The first pillar of Basel III will be the main focus of this paper since it raises the minimum capital requirements for financial institutions.

Pillar I of Basel III, which focuses on enhancing minimum capital and liquidity requirements, aims to reduce risk in the financial system. Through tax-benefits associated with debt financing, the government has historically subsidized debt for banks. The Basel III regulation states that “The build up of leverage also has been a feature of previous financial crises,” therefore acknowledging the role that highly leveraged financial institutions have played in financial crises (Basel Committee on Banking Supervision, 2011). In addition, Basel III identifies a lack of quality capital as a contributor to the severity of the financial crisis. The regulation provides a new definition for capital, stating that “A key element of the new definition of capital is the greater focus on common equity, the highest quality component of a bank’s capital” (Basel III, 2010).

Basel III divides capital into two types: Tier 1 Capital and Tier 2 Capital. The definitions for these two types are as follows:

- **Tier 1 Capital:** Tier 1 Capital can be further divided into two types of Tier 1

Capital: Common Equity Tier 1 Capital (CET1) and Additional Tier 1 Capital.

- **Common Equity Tier 1 Capital:** The Federal Deposit Insurance

Corporation (FDIC) defines common equity tier 1 capital as follows:

“includes qualifying common stock and related surplus net of treasury stock; retained earnings; certain accumulated other comprehensive income (AOCI) elements if the institution does not make an AOCI opt-out election (refer to opt-out election discussion in next paragraph), plus or minus regulatory deductions or adjustments as appropriate; and qualifying common equity tier 1 minority interests” (Federal Deposit Insurance Corporation, n.d.).

The FDIC also refers to common equity tier 1 capital as “the most loss-absorbing form of capital,” thereby explaining why this kind of capital has been such a central focus in Basel III (Federal Deposit Insurance Corporation, n.d.)

- **Additional Tier 1 Capital:** The FDIC also lists the components for additional tier 1 capital, which “includes qualifying noncumulative perpetual preferred stock, bank-issued Small Business Lending Fund and Troubled Asset Relief Program instruments that previously qualified for tier 1 capital, and qualifying tier 1 minority interests” (Federal Deposit Insurance Corporation, n.d.).

- **Tier 2 Capital:** The components of tier 2 capital, as listed by the FDIC, are “the allowance for loan and lease losses up to 1.25 percent of risk-weighted assets, qualifying preferred stock, subordinated debt, and qualifying tier 2 minority

interests, less any deductions in the tier 2 instruments of an unconsolidated financial institution” (Federal Deposit Insurance Corporation, n.d.).

Few changes were made between Basel I and Basel II, but after the financial crisis, regulators saw Basel III as a chance to change the financial system. Table 1 highlights the key changes made between Basel I, Basel II, and Basel III in regards to the capital requirements.

Table 1: Basel III Capital Requirements Compared with Basel I and Basel II

Capital Requirements

	Basel I	Basel II	Basel III
Quantity of Capital			
Minimum Total Capital	8.0	8.0	8.0
Capital Conservation Buffer 2/	n/a 3/	n/a	2.5
Minimum Total Capital Plus Conservation Buffer	n/a	n/a	n/a
Countercyclical Buffer 2/	n/a	n/a	0-2.5
Global Systemically Important Banks (G-SIB) Surcharge 2/	n/a	n/a	1-2.5
Minimum Total Capital Plus Conservation Buffer, Countercyclical Buffer, and G-SIB Charge	8.0	8.0	11.5-15.5
Leverage Ratio 4/	n/a	n/a	3.0
Quality of Capital			
Minimum Common Equity Capital 5/	n/a	n/a	4.5
Minimum Tier 1 Capital	4.0	4.0	6.0
Hybrid Capital Instruments with Incentive to Redeem 6/	Eligible	Eligible	Not eligible

Source: (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016)

Basel II made no changes to the respective minimums of quantity and quality of capital required in Basel I. However, with the newest installment of Basel III, a capital conservation buffer of 2.5% was added to the 8% minimum capital requirement of the earlier two installments, bringing the minimum total capital required to 10.5%. The capital conservation buffer “is designed to strengthen an institution’s financial resilience during economic cycles” (Federal Deposit Insurance Corporation, n.d.). The countercyclical buffer acts similarly, aiming “to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk” (“Countercyclical capital buffer (CCyB),” 2015). A countercyclical buffer of between 0 and 2.5% was also imposed in Basel III and added to the total minimum capital requirements for banks. Global systemically important banks (G-SIBs) are also subject to more capital requirements, in addition to the capital conservation buffer and countercyclical buffer, under the Basel III regulation. The G-SIBs identified were placed into one of four buckets, with the lowest bucket adding an additional 1% to the minimum total capital requirement and the highest bucket adding up to 2.5% to the minimum total capital requirement. To see the list of G-SIBs sorted according to their additional capital requirements, refer to Table 2 in the research methodology. In total, Basel III has raised the minimum total capital requirements for all of the G-SIBs in the United States to between 11.5% and 15.5%, up from the 8% minimum in Basel II.

Not only did Basel III call for changes in regards to the quantity of capital, but the regulation also made changes in regards to the quality of capital. Basel III requires that all banks now hold a minimum of 6% in Tier 1 Capital as opposed to the earlier 4%. In

addition, Basel III added a new requirement that common equity capital must be at least 4.5% of risk-weighted assets. The risk-weighting of assets was developed in Basel I, and, as stated earlier, some scholars, such as Martin Wolf, have called into question the effectiveness of this procedure.

Advocates for Capital Requirements

In this section, I will provide the theories of scholars who believe that capital requirements are an important part of regulating the financial system. An ideal starting point for the discussion on capital requirements is with one of the most important works in capital structure theory, the Modigliani-Miller theorem. In a perfect world, with perfect markets, and rational actors, Modigliani and Miller concluded that “no such optimal structure exists-all structures being equivalent from the point of view of the cost of capital” (Modigliani and Miller, 1958). Modigliani and Miller therefore dispel the idea of an optimal capital structure, stating instead that there is little difference in the financing decisions of a firm, that is, whether they choose to finance themselves with debt or with equity. According to the theorem, neither leveraged firms or unleveraged firms are more or less optimal than the other, assuming perfect markets. The Modigliani-Miller theorem also posits that the capital structure of a firm does not actually impact the risk of the firm’s return on assets (ROA) or the overall funding costs (Gersbach Haller, & Müller, 2015). Rather, the theorem suggests that the risk is merely redistributed among those who are providing funding to the firm (Gersbach Haller, & Müller, 2015). Even if Modigliani and Miller’s work on the irrelevance of capital structure does not always pertain to real

markets, which are imperfect, it provides a strong theoretical foundation that has been built upon by countless more scholars.

Since the actors in the financial markets do not always act rationally, financial crises are a reality, and the Basel III capital requirements aim to lessen the severity of these crises by increasing the stability of both individual financial institutions as well as the overall financial system. The financial crisis of 2008 showed that in such a global, interconnected world, crises can easily extend to other countries or regions through a spillover effect. In this way, bank default risk may have become systemic, meaning that if a bank defaults, that is, if a bank is unable to pay off its debts, this default will also impact other financial and non-financial institutions (Fiordelisi & Marqués-Ibañez, 2013). A study by Fiordelisi and Marqués-Ibañez found that securitization among banks also increases the risk of failure across several banks, or even a whole industry (Fiordelisi & Marqués-Ibañez, 2013). The default risk of individual banks therefore increases systematic risk, which supports such regulations as Basel III, which place a heightened focus on global systemically important financial institutions.

The theoretical background on capital structure therefore suggests that capital requirements are needed in order to regulate the financial services industry. The question, therefore, that many scholars, regulators, and bankers, are still plagued with, is whether there is an optimal capital structure for banks to have. At the time of the financial crisis, Basel II only required that banks hold a minimum capital ratio of 8%. In a study called “Benefits and Costs of Bank Capital,” the International Monetary Fund (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016) came to the conclusion that “a capital ratio of 15 percent in 2007 would have avoided the need for capital injection in almost 55

percent of cases in the United States and 75 percent of cases in Europe” (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016). In addition, the IMF found that injection could have been avoided in almost all cases with a capital ratio of 23 percent (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016). Given these findings by the IMF, the new Basel III capital requirements, which require banks to hold a minimum capital ratio of between 11.5% and 15.5%, seem to have successfully bolstered the financial system against suffering another crisis of the same magnitude as the 2008 financial crisis.

Many scholars still seem to believe that the Basel III requirements could be higher. Anat Admati and Martin Hellwig are two of these such scholars who make a case for higher bank equity in their book *The Bankers' New Clothes: What's Wrong with Banking and What to Do About It*. Admati and Hellwig call on the work of Modigliani and Miller, remembering their conclusion that the change in funding mix did not increase/decrease the amount of risk present, but rather distributed differently the risk from one party to another (Admati and Hellwig, 2014). Admati and Hellwig also call into question the risk-weighting of assets, which is central to the Basel III capital requirements. The two scholars state that the process of risk-weighting is neither scientifically sound nor ensures that an institution is better equipped to deal with a financial crisis (Admati and Hellwig, 2014). Instead, the scholars state:

“Empirical research on the financial crisis has actually shown that a high ratio of equity relative to risk-weighted assets did not mean that a bank was safe. By contrast, a high ratio of equity relative to total assets, without risk weights, meant that the bank was in a better position to deal with the crisis” (Admati and Hellwig, 2014).

These findings would suggest that not only did the BCBS need to change the minimum capital requirements when they published the Basel III regulation, but they may have needed to change the process through which they determined the capital requirements. Admati and Hellwig are not the only scholars who have found fault with these current capital ratios. In his book, Martin Wolf cites the rise of Eugene Fama's efficient market hypothesis as an example of evidence of market liberalization (Wolf, 2014). However, even Fama, the Nobel Prize winning economist, admits that capital requirements may not be high enough still to curb the existence of "too big to fail" banks. In an interview with the American Enterprise Institute, Eugene Fama states that "One way to take that off the table is to increase the equity requirements. Not like they've been talking about them, though. They have to go up to maybe 20, 25% equity financing of these too-big-to-fail banks" (Pethokoukis, 2014). Fama continues in this interview to reference the Modigliani-Miller theorem, discussed earlier, stating:

"Miller got the Nobel Prize for the Modigliani-Miller theorem, which basically says the way you finance yourself is irrelevant. And the banks will scream and say, 'We need all this debt-financing because otherwise it will be idle money.' Well, look at mutual funds, they're 100% equity-financed. No problem there" (Pethokoukis, 2014).

The fear of idle money, which Fama references above, stems from the theories of critics who believe that higher capital requirements have a negative impact on bank lending, and therefore, economic growth. Fama addressed these concerns in the interview, stating that, "First you have to calculate whether it would hurt economic growth more than a continuation of America's serial financial crises" (Pethokoukis, 2014). To conclude, while many critics and banks bemoan the "cost" of capital, scholars like Fama, Admati,

and Hellwig will respond that the cost of capital requirements is negligible if you count the cost that the overall economy pays in the case of financial crises.

Scholars like Admati, Hellwig, Fama, Miller, and Modigliani are in agreement with regulators that capital requirements, like those suggested in Basel III, are needed to protect banks from default and to protect the overall financial system from future crises. In addition, some of these scholars, such as Fama, believe that the current requirements may not even be enough to protect these banks as much as we might need. The higher capital requirements that are currently in place from Basel III, while they have made the system more stable, may not have made them stable enough to completely dispel the reality of “too big to fail” financial institutions. In the next section, I will discuss the theories of those who have criticized these capital requirements and believe that even at their current levels, our capital requirements may be too high.

Critics of the Basel III Requirements

It may seem intuitive that these higher capital requirements proposed by Basel III are a needed measure to further protect the banking system against “too big to fail” financial institutions. However, many people disagree with the opinions of the scholars cited in the section above. This section will provide some of the opinions of the politicians, bankers, and scholars who have criticized the Basel III capital requirements and its potential costs. Different opinions and theories exist on why financial crises occur in the first place, whether the fault lies with regulators or with the banks, or whether these crises are inevitable in a fragile financial system, as Minsky believed. Many people therefore believe that the government can do more harm than good when they over-

regulate. In a 2018 speech, Randal Quarles, the Vice Chair for Supervision of the Federal Reserve's Board of Governors, stated that he counted 24 requirements in the Basel III framework (Quarles, 2018). In this speech, Quarles states "While I do not know precisely the socially optimal number of loss absorbency requirements for large banking firms, I am reasonably certain that 24 is too many" (Quarles, 2018). In this statement, Quarles speaks in agreement with many who believe that while regulations are essential in the financial sector, the amount of regulation since the 2008 financial crisis has gone beyond what is necessary.

While scholars seem to be mostly in agreement about the need for higher capital requirements after the 2008 crisis, some of the greatest pushback has come from the executives of major banks. In an interview with Barron's, the Morgan Stanley CEO, James Gorman, acknowledged that overall, the regulation that came out of the 2008 financial crisis has benefitted the financial system and, as a whole, has made it safer. However, Gorman offered few adjustments that he would prefer to the regulation. One of these adjustments Gorman touched upon was the issue of capital requirements, stating that he believes banks may be required to hold too much liquid capital, which he stated "dampens the ability of banks to generate returns" and "potentially dampens their impact on economic growth" (Strauss, 2017). Admati and Hellwig also acknowledged the resistance of some major bank executives to the regulation of their industry, pointing to the harmful language that CEO's use to suggest that banks are not fragile institutions (Admati and Hellwig, 2014). In J.P. Morgan's April 2018 Letter to Shareholders, CEO Jamie Dimon lists "transparency, financial discipline, and a fortress balance sheet" as a few of J.P. Morgan's business strategies (Dimon, 2017). Referring to a "fortress balance

sheet” suggests that the bank has the strength to protect itself in the case of a financial crisis, and that its assets are sufficient to provide liquidity if needed.

In addition, the IMF listed some of the potential unintended costs of these capital requirements, as noted by their earlier cited report, “Benefits and Costs of Bank Capital.” In this report, the IMF found that “tighter requirements on banks may provide stronger incentives for regulatory arbitrage” (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016). The risk of regulatory arbitrage means that as a result of the tighter requirements imposed by the Basel III regulation, banks might engage in even more “risky” activities in order to make up for a potential loss in profit. This regulatory arbitrage could also be a potential cost of the higher capital requirements imposed by Basel III.

When politicians or bankers criticize these regulations, one must ask why it is they disagree with this measure of safety. Reflecting on the fate of Fannie Mae and Freddie Mac after the 2008 financial crisis, financial institutions who lobby for certain regulations may find themselves worse off as a result of these actions (Wallison & Calomiris, 2008). Even after the 2008 financial crisis, however, some scholars still make the case that the government should not regulate the financial industry to the extent that it does. The primary concerns of the above critics are that these regulations may be negatively impacting bank profitability and lending behavior, which is the claim that I will attempt to address in the remainder of this paper.

Conclusion

The above literature suggests that many parties have come to the overall consensus that the Basel III capital requirements effectively lower the risk of bank

failure, therefore lowering the overall risk of the market. If banks are less likely to fail, the government is therefore less likely to need to fulfill the role of lender of last resort. While these actors and decision-makers agree that capital requirements are needed to control the risk levels within our banks, there is greater disagreement over the level at which these capital requirements should be set. In addition, there are still many critics who believe that these capital requirements may be negatively impacting the functioning of our banks. In my research, I hope to contribute to the conversation surrounding the Basel III capital requirements by either confirming or refuting the theory that these capital requirements have had a negative impact on bank profitability and lending behavior.

III. RESEARCH METHODOLOGY

In this section of my paper, I will explain the methodology that I used to address my research questions and to conduct my research. First, I will formulate my hypotheses in response to the two research questions posed earlier in this paper. I will then describe the sample that I have chosen for my analyses, and I will provide my reasoning for why I have chosen this sample. Next, I will explain the research design of this paper and define the three metrics that I chose for my regression analysis. Finally, I will discuss the limitations of this data and of this study before discussing my findings in the following section.

Hypotheses

In response to the two parts of my research question, I have formulated two hypotheses that I intend to prove or disprove through my research.

The first research question I will be addressing in this paper is: Are the eight global systemically important banks in the United States less profitable as a result of the Basel III capital requirements? In response to this first question, I have formulated the following hypothesis:

- Hypothesis 1: The eight G-SIBs in the sample are not less profitable as a result of the Basel III capital requirements.

The second research question I intend to address in this paper is as follows: Have the Basel III capital requirements negatively impacted the lending behaviors of the eight global systemically important banks in the United States? I have formulated the hypothesis below in response to my second research question:

- Hypothesis 2: Bank lending will have little, if any, change as a result of these capital requirements.

I will further discuss my methods in testing these hypotheses in the research design section below. First, I will justify the data sample that I chose for this analysis.

Sample Data

The Basel III capital requirements are very important to the operations of large, systemically important financial institutions. I choose to focus on global systemically important banks, because these banks are those which would pose the most threat to the financial industry and to the economy in the event of another crisis. Global systemically important banks are those which are so large that their failure could cause the failure of the entire financial system. In other words, these are the banks that the government must bailout in the case of default during a financial crisis, making them “too big to fail.”

I selected these global systemically important banks (G-SIBs) for my sample from a report published by the financial stability board (FSB) in conjunction with the Basel Committee on Banking Supervision (BCBS). In this report, the FSB determines a list of globally systemically important banks (G-SIBs) based upon 2017 year-end data. These twenty-nine G-SIBs have been placed into one of four buckets according to the additional capital buffer they are subject to under the Basel III capital requirements. Refer to Table 2 below for the most recently published list of G-SIBs, as of November 2018. The eight bolded banks (JP Morgan Chase, Citigroup, Bank of America, Goldman Sachs, Wells Fargo, Bank of New York Mellon, Morgan Stanley, and State Street) are those within the United States, which will be used in my sample.

Table 2: Global Systemically Important Banks (G-SIBs)

Additional Capital Buffer	G-SIBs (organized alphabetically by bucket)
3.5%	<i>(Empty)</i>
2.5%	JP Morgan Chase
2.0%	Citigroup Deutsche Bank HSBC
1.5%	Bank of America Bank of China Barclays BNP Paribas Goldman Sachs Industrial and Commercial Bank of China Limited Mitsubishi UFJ FG Wells Fargo
1.0%	Agricultural Bank of China Bank of New York Mellon China Construction Bank Credit Suisse Groupe BPCE Groupe Crédit Agricole ING Bank Mizuho FG Morgan Stanley Royal Bank of Canada Santander Société Générale Standard Chartered State Street Sumitomo Mitsui FG UBS Unicredit Group

Source: (Financial Stability Board, 2018)

Research Design

In order to determine the effect of the Basel III capital requirements on bank profitability and lending behaviors, I ran two regressions using data from the eight global

systemically important banks listed in Table 2. The first regression focused on the regulation's potential impact on bank profitability, focusing on the total risk-based capital ratio of each bank and the return on asset (ROA) values of each bank on a yearly basis. The purpose of this regression was to ascertain whether these two values were correlated and whether the findings were significant. I ran a similar regression to determine the possible effect that the Basel III capital requirements may have had upon the lending behaviors of each of these eight banks. This second regression tested for a correlation between the loans-to-deposits ratio (LDR) of each of these eight G-SIBs and the total risk-based capital ratio of each bank.

Finally, I calculated the Pearson correlation coefficient for ROA and total risk-based capital ratio and LDR and total risk-based capital ratio for each of these banks. A Pearson correlation is a number between -1 and 1 that reveals the nature of a relationship (positive or negative) and the strength of a relationship between two variables. A Pearson correlation coefficient with a value close to -1 or 1 reveals a stronger correlation between two variables, while a Pearson correlation with a value close to 0 reveals a low correlation between two variables. In my analysis, I display the values of the two Pearson correlations I calculated for each bank in one table for ease of comparison.

Metrics

In order to run the regression analysis, I had to select three metrics: one representing bank capital ratios, another representing bank profitability, and the last one signifying bank lending behavior. The three metrics that I chose for each of the eight G-

SIBs in my sample are: (1) total risk-based capital ratio, (2) return on assets, and (3) loans-to-deposits ratio.

First, I will be using the total risk-based capital ratio, also known as the capital adequacy ratio, of each bank to represent the yearly value for each of the G-SIBs' capital ratios. The equation used to calculate total risk-based capital ratio is as follows:

$$\text{Total Risk – Based Capital Ratio} = \frac{\text{Tier 1 Capital} + \text{Tier 2 Capital}}{\text{Risk Weighted Assets}}$$

Next, in order to measure the profitability of each bank, I will use return on assets (ROA). ROA is generally calculated after finding the total assets and net income values on the balance sheet in a firm's 10k, an annual report public companies publish to provide information on their financial performance throughout the year. In order to calculate ROA, the following equation can be used:

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

It may be helpful to keep in mind that an ROA close to a value of 1 is a good indicator that a bank is highly profitable.

The final metric I will be using in my analysis is the loans-to-deposits ratio (LDR). This ratio can be used to measure the liquidity of a bank, by comparing the total loans made by the bank with the total deposits received by the bank in the same period. A LDR of 100% would mean that a bank lent out \$1 for every dollar that was deposited in a given period. A LDR over 100% would indicate a bank was lending out more than it was receiving in deposits. The following equation is used to calculate a bank's loans-to-deposits ratio:

$$\text{Loans – to – Deposits Ratio} = \frac{\text{Total Loans}}{\text{Total Deposits}}$$

Similarly to ROA, the components of this equation can also be found on a bank's balance sheet.

For consistency, I decided to use one source when gathering this data. Therefore, I used a Bloomberg terminal to obtain the values of these metrics on an annual basis for each of the eight G-SIBs that I identified in my sample.

Limitations

My analysis is limited in scope as well as in the availability of some of the data. First, I chose to limit my sample to the United States because of the differences that exist between the US banking system and other global banking systems, such as the European banking system. In addition, I selected the global systemically important banks within the United States because these are the banks that pose the greatest potential risk to the financial system in the event of a crisis. In terms of the time period from which I collected my data, I limited the study from January of 2007 to December of 2018. I chose this range in order to capture the peak of the financial crisis as well as the implementation of the post-crisis regulation. It is also important to note that the Basel III capital requirements did not have to be fully phased in until January 2019. However, since this study was conducted in early 2019, I did not use data from the current year.

In addition to the limitations that I chose to narrow the scope of my research, some limitations in this study resulted from a lack of available data. I attempted to collect data from the three selected metrics for each of the eight G-SIBs on an annual basis between the years 2007 and 2018. For all of these banks, Bloomberg provided data for yearly ROA and LDR for all twelve years that I selected. However, Bloomberg did not

provide the data for the total risk-based capital ratio for certain years for three of these banks (Citigroup, Goldman Sachs, and Morgan Stanley). I have been unable to determine the reason that this data is not reported on Bloomberg for these banks. In order to maintain the consistency of my analysis in the regressions for these banks, I analyzed the ROA and LDR with the total risk-based capital ratio of Citigroup, Goldman Sachs, and Morgan Stanley for fewer years than I did with the other five G-SIBs. Goldman Sachs provided the full data between the years 2009 and 2018, so I limited my analysis for this bank to a shorter time range. For Citigroup and Morgan Stanley, I analyzed an even shorter time period than with Goldman Sachs, focusing on the time period between the year 2013 and the year 2018. The difference in the availability of data for these eight banks must be kept at the front of mind throughout this analysis.

Conclusion

In conclusion, by running two regression analyses between bank ROA and total risk-based capital ratios and LDR and total risk-based capital ratios, I hope to either accept or reject my two hypotheses. If the regressions do not prove significant, then it may be difficult to draw conclusions one way or the other. However, in this case, I will turn to the Pearson correlation coefficient analysis between each of these banks, which aims to provide a consistent basis through which I can compare the strength in correlation between values at each of these banks and look for trends within this data. In the next section, I will report the findings from my research.

IV. RESEARCH FINDINGS

In this section, I will explain my research analysis and reveal my findings. I will begin by addressing the first regression I ran in order to test my first hypothesis. I will then explain the results of the second regression I ran in order to test my second hypothesis. In addition, I will compare the Pearson correlation coefficient values that I found for each of the eight G-SIBs in my sample. I will not discuss these findings or relate them back to the current literature until the following section.

Hypothesis 1 Regression Results

The first hypothesis that I tested was: The eight G-SIBs in the sample are not less profitable as a result of the Basel III capital requirements. In order to test this hypothesis, I used Bloomberg to gather the yearly ROA values and total risk-based capital ratios for each of the eight G-SIBs in the United States (Refer to the Appendix to see this data). In Table 3, I provide a brief summary for the regression that I ran for each of the eight G-SIBs in the United States:

Table 3: ROA and Total Risk-Based Capital Ratio Regression Values for All Eight GSIBs

Bank	R ²	B (SE)	P Value	95 % CI Lower Bound	95 % CI Upper Bound
JP Morgan Chase	0.015	0.033 (0.085)	0.706	-0.157	0.224
Citigroup	0.460	0.191 (0.104)	0.139	-0.096	0.568
Bank of America	0.043	-0.052 (0.077)	0.517	-0.224	0.120
Goldman Sachs	0.015	0.0274 (0.079)	0.737	-0.154	0.209
Wells Fargo	0.069	0.045 (0.052)	0.409	-0.071	0.161
Bank of New York Mellon	0.075	-0.071 (0.078)	0.388	-0.246	0.104
Morgan Stanley*	0.713	0.074 (0.023)	0.035	0.009	0.140
State Street	0.002	-0.011 (0.069)	0.878	-0.164	0.143

* signifies $p < 0.05$

This table displays the results from the regressions run between ROA and total risk-based capital ratios for each of the eight G-SIBs in my sample. As shown above, significance in this study is measured by a p value less than 0.05, and only the findings for Morgan Stanley proved to be significant. However, as discussed earlier, Morgan Stanley is one of the banks in which Bloomberg did not provide the data for all years selected in this study. The regression for Morgan Stanley was therefore run on six years of data, as opposed to twelve, like most of the other banks. Table 3 shows an R^2 value of 0.713 for Morgan Stanley, meaning that about 71.3% of the variance in profit for Morgan Stanley over these years can be explained by the change in total risk-based capital ratios. It seems unlikely that the capital requirements could have affected only one of these banks so strongly. Since banking profit is impacted by far more variables besides bank capital ratios, it is likely that another variable that I did not control for in my regression may be affecting this finding. I will delve into these results more fully in the discussion section for my research findings.

Hypothesis 2 Regression Results

The second hypothesis I tested was: Bank lending will have little, if any, change as a result of these capital requirements. In order to test this hypothesis, I ran a regression between the loans-to-deposits ratio for each of these banks and the total risk-based capital ratios.

Table 4: LDR and Total Risk-Based Capital Ratio Regression Values for All Eight GSIBs

Bank	R²	B (SE)	P Value	95% CI Upper Bound	95% CI Upper Bound
JP Morgan Chase	0.008	-0.571 (1.984)	0.779	-4.994	3.851
Citigroup	0.313	-0.537 (0.398)	0.249	-1.642	0.568
Bank of America*	0.478	-5.859 (1.938)	0.013	-10.177	-1.541
Goldman Sachs	0.083	-1.279 (1.499)	0.419	-4.736	2.179
Wells Fargo*	0.919	-8.528 (0.800)	8.864E-07	-10.311	-6.745
Bank of New York Mellon	0.143	-1.338 (1.034)	0.225	-3.641	0.966
Morgan Stanley*	0.673	1.234 (0.430)	0.046	0.039	2.428
State Street*	0.445	-0.735 (0.260)	0.018	-1.314	-0.156

* signifies $p < 0.05$

The findings for Bank of America, Wells Fargo, Morgan Stanley, and State Street are all significant since these regressions all had p values below 0.05. Of these four banks, Wells Fargo's capital ratios had by far the greatest impact on their loans-to-deposits ratios, displayed by the R^2 of 0.919. Morgan Stanley's total risk-based capital ratios seemed to have had the second greatest impact on the company's lending behavior, followed by Bank of America and finally, State Street. Table 4 also displays the beta values for each of the banks, and as seen above, all of the banks, even those that do not have significant results, have negative beta values, except for Morgan Stanley. The positive beta value for Morgan Stanley, displayed in Table 4, seems counterintuitive because one would expect the capital requirements to have a negative effect on the loans-to-deposits ratio of the banks. Morgan Stanley's positive beta value suggests that with every 1 point increase in total risk-based capital ratios, the loans-to-deposit ratio would

increase by a value of 1.234, signifying an increase in bank lending or a decrease in deposits received by the bank. This seemingly contradictory finding will be discussed in greater detail in the following section, which provides a discussion of these findings.

The other banks with significant findings, Wells Fargo, Bank of America, and State Street, all have negative Beta values, which indicates a negative correlation between total risk-based capital ratios and loans-to-deposits ratio. This finding is in keeping with the theories of the critics of the Basel III regulation. Based on these beta values, the capital requirements appear to have had an overall slight impact on bank lending behavior, with a larger impact observed in the case of a select few banks. The exception to this overall small effect, is primarily observable in the case of Wells Fargo, a bank whose lending behavior seems to have been strongly impacted by the Basel III capital requirements. These findings will be discussed in more detail and will be placed within the context of the literature reviewed earlier in the discussion section of this paper.

Pearson Correlation Results

As stated in my Research Methodology, a Pearson correlation coefficient can be used to discover a linear or nonlinear correlation between two variables. A Pearson correlation coefficient can be any number between -1 and 1, while a Pearson correlation coefficient of 0 indicates a completely nonlinear relationship between two variables. The signage of each Pearson correlation coefficient signifies either a negative correlation or a positive correlation between variables, and the closer this value is to 1 or -1, the more closely these two variables are correlated. The Pearson correlation coefficients that I calculated for each of these eight G-SIBs provide a basis for understanding how each of

these variables is correlated differently between banks. Refer to Table 5 to compare the Pearson correlation coefficient values between each of the eight G-SIBs in my sample.

Table 5: Pearson Correlation Values for All Eight G-SIBs

Bank	ROA and Risk-Based Capital Ratio Pearson Correlation	L2D and Risk-Based Capital Ratio Pearson Correlation
JP Morgan	0.122	-0.091
Citigroup	0.678	-0.559
Bank of America	-0.208	-0.691
Goldman Sachs	0.122	-0.289
Wells Fargo	0.263	-0.959
Bank of New York Mellon	-0.275	-0.379
Morgan Stanley	0.844	0.820
State Street	-0.050	-0.667
Average	0.187	-0.352

In order to better show the strength of the correlations, I highlighted those correlations that I deemed “very strong” red, “strong” orange, and “moderately strong” yellow. Very strong correlations are those that are above a value of 0.80, and moderately strong correlations are those that are greater than 0.50. In addition, moderately strong correlations are above a value of 0.30, and any correlations below 0.30 were deemed weak. From Table 5, it is evident that ROA and total risk-based capital ratio are most closely correlated for Morgan Stanley, followed by Citigroup, and are least closely correlated in State Street, followed by JP Morgan Chase. Loans-to-deposits ratios and total risk-based capital ratios, on the other hand, are most closely correlated in Wells Fargo and Morgan Stanley and least closely correlated in JP Morgan Chase, followed by Goldman Sachs. It is important to notice, that Morgan Stanley is the only bank that has a positive value as its Pearson correlation coefficient between its loans-to-deposits ratio

and its total risk-based capital ratio, which also seems to run counter to the theoretical logic discussed earlier in this paper.

Overall, more banks saw a stronger correlation between their LDR and their total risk-based capital ratio than with their ROA and total risk-based capital ratio. Wells Fargo exhibits by far the strongest relationship between lending behavior, represented by the variable LDR, and the Basel III capital requirements, represented by the total risk-based capital ratio. Wells Fargo's Pearson correlation coefficient value of -0.959 means that there was a negative relationship between the total risk-based capital ratio and the loans-to-deposits ratio, that is, with every increase in the total risk-based capital ratio value, there is an almost equal decrease in the loans-to-deposits ratio at Wells Fargo between the years 2007 and 2018. In the next section, I will discuss in-depth, why I believe the results for Wells Fargo were significant and provide reasoning behind these differences.

V. DISCUSSION OF FINDINGS

I will use this section to explain in more detail the findings that I introduced in the above section on my research findings. In this section, I will discuss the most significant findings of my research, relating them back to the greater context provided in the literature review. Based on my findings, I will provide recommendations that I believe would add clarity and/or stability in the financial system and in the regulatory sphere.

Discussion of Findings on Bank Profitability

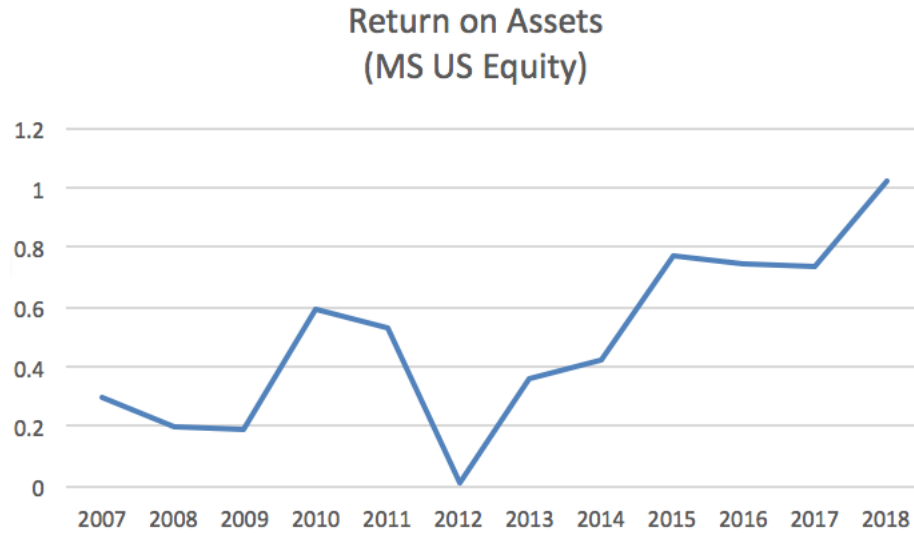
Since none of the p values in my first regression were significant, with the exception of Morgan Stanley, it is difficult to either reject or accept my first hypothesis. At the bottom of Table 5 in the research findings section of this paper, I calculated the average Pearson correlation coefficient values for each of the eight G-SIBs. Although no conclusion could be reached from the regression that I ran between ROA and total risk-based capital ratios since the p values were not significant (except in the case of Morgan Stanley), Table 5 shows that the average Pearson correlation coefficient for all of these banks is 0.187. Since this number is positive, it would suggest that the impact this regulation has had on bank profitability has actually been a positive one. It is important to note that this average is skewed strongly by Morgan Stanley, which has a Pearson correlation coefficient of 0.844, as shown in Table 5. However, even after removing the value for Morgan Stanley, which seems to be an outlier or otherwise influenced by other factors that I could not control for, the new Pearson correlation coefficient for the remaining seven G-SIBs is 0.093. This value is far lower, suggesting that there is very little correlation between bank profitability and capital ratios. In addition, the positive

signage of the value signifies a positive relationship, meaning that if anything, banks with higher capital ratios may actually be more profitable as a result, as opposed to less profitable. This further weakens the claims that bank profitability would suffer if banks were subjected to higher capital requirements. This conclusion fits best with the newer literature released by Admati and Hellwig, who have argued that regulation can create a safer financial system without compromising on profit or bank function in their book *The Bankers' New Clothes*.

Since Morgan Stanley was the only bank in the first regression that had values deemed to be significant by its p value that was less than 0.05, I will analyze this bank more closely before moving on to the second hypothesis. Table 3 in the Research Findings section indicates that Morgan Stanley had an R^2 value of 0.713. This value would mean that 71.3% of the variance in Morgan Stanley's ROA could be explained by the change in its total risk-based capital ratios between 2013 and 2018. As stated earlier, this finding seems unlikely because bank profitability is affected by a number of factors to a greater extent than it would be affected by bank capital structure. Most importantly, the positive beta value of 0.074 in this regression, as seen in Table 3, means that Morgan Stanley's ROA would have been increasing as its capital ratios increased. Figure 1, below, shows that Morgan Stanley's ROA has been increasing over time. In addition, the bank has had capital ratios hovering above 20% since 2015, according to the data displayed in Appendix G. These findings therefore run counter to the logic of the critics of Basel III, since these findings suggest that Morgan Stanley's high capital ratios could have actually increased the profitability of the bank. While it still seems unlikely that Morgan Stanley's high capital ratios may have had such a positive impact on the bank's

profitability, I cannot determine the exact reasoning behind this finding, and I hope that a future scholar may be able to look into this in more detail.

Figure 1: Morgan Stanley ROA between 2007 and 2018



Data Received from Bloomberg

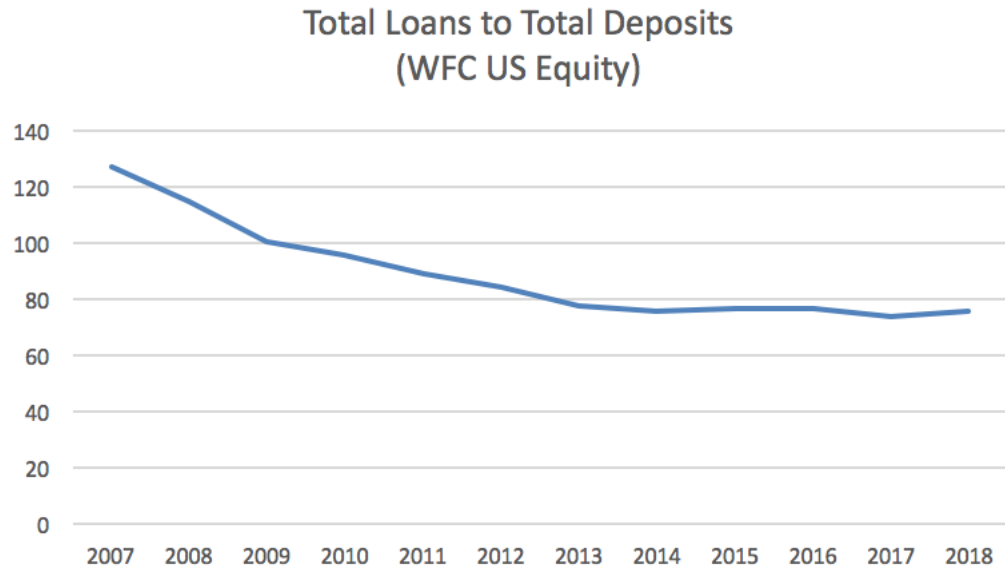
Discussion of Findings on Bank Lending Behavior

I tested my second hypothesis in the set of regressions displayed in Table 4, which used the metrics of LDR and total risk-based capital ratios to determine the effect that Basel III may have had on bank lending behavior. Table 4 shows that Wells Fargo, Morgan Stanley, Bank of America, and State Street all had significant findings since they had p values less than 0.05. The most significant finding of this analysis was that Wells Fargo's lending behaviors seem to have been strongly impacted by the changes made in the Basel III capital requirements, which is signified by its R^2 of 0.919. Morgan Stanley had an its R^2 of 0.673, which is also very high in comparison to the other banks. Finally, Table 4 shows that Bank of America had the next highest R^2 of 0.478, and State Street followed with an R^2 of 0.445. The Pearson correlation coefficient values displayed in

Table 5 show similar strengths in correlation, with Citigroup also showing a strong correlation between LDR and total risk-based capital ratios, and Bank of New York Mellon exhibiting a moderately strong correlation. Table 5 also shows that the over all of the eight G-SIBs, the average Pearson correlation coefficient, where one variable is LDR and the other is total risk-based capital ratios, is -0.352. This value suggests that the Basel III capital requirements may have had a negative effect on the lending behavior of banks. Again, however, this value is skewed to the left by Wells Fargo and Bank of America, on which the regulation seems to have had the strongest impact. Still, it is important to notice that the only bank with a positive Pearson correlation coefficient value, when comparing LDR with total risk-based capital ratios, is Morgan Stanley, which had a value of 0.820. This runs counter to the impact that this regulation seems to have had on these other banks, and suggests that higher capital ratios has a positive effect on the lending behavior of Morgan Stanley alone. I urge future researchers to delve into what factor could have potentially created this finding, since I was unable to control for any outside variables in my analyses.

In addition, it is important to note that Wells Fargo's loans-to-deposits ratios show that at the time of the crisis, the bank was loaning more than it was receiving in deposits, as shown in Figure 2 below.

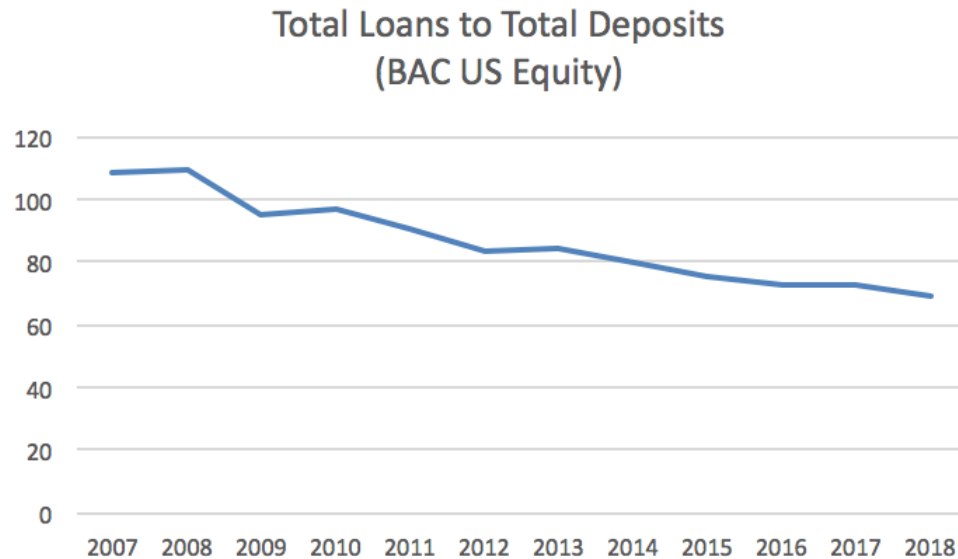
Figure 2: Wells Fargo Total Loans to Total Deposits Between 2007 and 2018



Data Received from Bloomberg (Refer to Appendix E)

In addition, Bank of America, which had the second strongest negative Pearson correlation coefficient value, was the only other bank according to my data (given in full Appendices A-H), with the exception of Citigroup in 2007, that was lending more than it was receiving in deposits, as shown in Figure 3 below.

Figure 3: Bank of America Total Loans to Total Deposits Between 2007 and 2018



Data Received from Bloomberg (Refer to Appendix F)

Given the rate at which Wells Fargo and Bank of America were lending during the 2008 financial crisis, it is not surprising that these banks were affected more heavily by the Basel III capital requirements. As stated in my research methodology, a loans-to-deposits ratio over 100 means that a bank is lending out more than they are receiving in deposits. In the literature review, I discuss the possibility of bank runs in the most severe cases of financial crisis (Bordo, 1990). If either of these banks had experienced a bank run after the 2008 financial crisis, they would have likely been insolvent since they may not have had sufficient cash on hand to pay back the consumers who would have been making withdrawals. Given these risks, it may be a positive impact that the Basel III capital requirements has restored the loans-to-deposits ratios for both of these banks to less risky levels, thereby making the individual banks and the overall financial system safer.

Finally, I have been unable to determine the differences in the strength of correlation between each of these banks, although I believe it could potentially be explained by the different operations of each of these banks. For example, these differences may be explained by looking at the types of risk-weighted assets that each bank has on its balance sheet, or by the amount of lending that each of these banks has done historically. I urge future researches to look more closely into the differences in the lending behaviors between each of these eight G-SIBs.

Recommendations

Based upon these findings, I will provide a few recommendations that I believe may be needed to better regulate the financial sector and to change the way that we think and talk about regulation. First, I recommend that we better acknowledge the intertwined relationship between bankers, politicians, and regulators. Until this relationship is questioned, regulations cannot be accepted as totally unbiased, or uninfluenced pieces of legislation. Until society better understands the relationship between our banks and our government, regulation will ultimately not be done in a way that puts society's interests before those of the banks that have the ability to influence the politicians who eventually elect the regulators. The current system of regulation is inherently flawed so long as the government strives for the approval of the banks in bank regulation, given that the government relies on the lobbying that banks can provide politically.

My second recommendation, is that we shift the conversation from discussing only the "cost of capital" as opposed to also discussing the "cost of debt." In *The Bankers' New Clothes*, Admati and Hellwig wisely note, "When bankers complain that

banking regulation is expensive, they typically do not take into account the costs of their harming the rest of the financial system and the overall economy with the risks that they take” (Admati and Hellwig, 2014). If the overall cost of the financial crisis suffered by society was acknowledged as a potential effect of not having higher capital requirements, then these capital requirements would perhaps seem a smaller price to pay to avoid the massive costs imposed on society in the event of a crisis. To refer again to the IMF report discussed in the literature review, “Benefits and Costs of Bank Capital,” a bank capital ratio of 15% in 2007 would have meant that over half of the cases of capital injection in the United States could have been avoided (Dagher, Dell’Ariccia, Laeven, Ratnovski, & Tong, 2016). If one could calculate the total cost of the financial crisis that might have been avoided in the case of higher capital requirements, this could be counted as a potential benefit of higher capital ratios, which would likely outweigh any costs. In addition, one of the costs that critics attributed to the Basel III capital requirements was a negative impact on bank lending behavior. While these capital requirements did seem to have a negative impact on bank lending behaviors, as seen in the above sections, it also may have brought the loans-to-deposits ratios of banks such as Wells Fargo and Bank of America to safer levels.

Although my main recommendations for this paper are qualitative, relating to the way we as a society fail to recognize the relationship between the government, regulators, and bankers and to the way we perceive the “cost” of capital, there are several ideas for future research in this sphere that are more quantitative in nature. I believe more research must be done to determine the socially optimal capital structure for financial institutions since we do not live in a perfect world with perfect markets, as the work of Modigliani

and Miller assumes. I also believe that it could prove interesting to look more in-depth into the lobbying behaviors of banks both in the United States and in Europe, in order to better understand how the close relationship between these institutions and major governing bodies might influence regulatory decisions.

VI. CONCLUSION

In this paper, I considered the following two research questions and formulated a respective hypothesis for each question:

- Are the eight global systemically important banks in the United States less profitable as a result of the Basel III capital requirements?
- Have the Basel III capital requirements negatively impacted the lending behaviors of the eight global systemically important banks in the United States?

Though I could not reach a definitive conclusion on the first question, since my regressions did not prove significant in all cases but one, the Pearson correlation coefficient values that were calculated suggest a trend that shows very little correlation between capital requirements and bank profitability. The second set of regressions had more significant results and indicated that capital requirements had primarily negative effects on bank lending behaviors, with the exception of Morgan Stanley, which seemed to have a positive correlation between LDR and total risk-based capital ratios. However, as noted in my discussion, this may have proved beneficial for banks like Wells Fargo and Bank of America, which were lending at a higher rate than they were receiving deposits at the time of the 2008 financial crisis.

Future Research

In addition, I will discuss what future research could be done to build upon the research that I have completed in this paper as well as the research of the scholars I discussed in my literature review. My research does not conclude whether capital requirements for global systemically important banks should be higher, as postulated by Eugene Fama in my literature review (Pethokoukis, 2014). The capital requirements for

these eight global systemically important banks currently ranges between 15.1% (Bank of New York Mellon) and 21.8% for Morgan Stanley (as seen in Appendices A-H). In future research, it may be valuable to determine how profitability and bank lending behaviors might change if capital requirements are increased to 20-25%, as suggested by Fama (Pethokoukis, 2014). While I concluded that bank profitability was largely unaffected by the Basel III capital requirements, I cannot ascertain whether profitability would remain unaffected if capital requirements for banks increased to levels of 20-25%. In addition, I cannot determine whether substantially higher capital requirements would drastically impact lending in the banking industry, although it appears that in the case of Wells Fargo, Bank of America, State Street, and Morgan Stanley a strong correlation exists between higher capital requirements and bank lending behavior. My research can also be improved upon over time as more data becomes available after these capital requirements have experienced implementation for a longer period of time. The effect of these requirements may not be immediate and may change depending on the cycle of the economy.

Most importantly, perhaps, future research could attempt to determine the socially optimal level of capital requirements for global systemically important banks. Ideally, these capital requirements would not have a negative impact on the ability of a bank to profit or on bank lending behavior, but would still protect banks, and therefore, the greater economy, from high levels of systemic risk.

APPENDIX

APPENDIX A: Data Used in JP Morgan Chase Regressions

JP Morgan Chase

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.259626402	66.94613189	15.5
12/31/2017	0.972858982	64.45350427	15.9
12/31/2016	1.021461301	65.06534786	15.5
12/31/2015	0.992604	65.42855245	16
12/31/2014	0.871750105	55.54650157	15
12/31/2013	0.749178505	57.34105213	14.3
12/31/2012	0.920402523	61.47790746	15.3
12/31/2011	0.865812519	64.1706109	15.4
12/31/2010	0.837190337	74.47872833	15.5
12/31/2009	0.557541512	67.50642339	14.8
12/31/2008	0.299957267	73.80510999	14.8
12/31/2007	1.054684698	70.11669601	12.6

Data received from Bloomberg

APPENDIX B: Data Used in Citigroup Regressions

Citigroup

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	0.959879229	71.02914615	16.64
12/31/2017	-0.374077394	73.4946688	14.54
12/31/2016	0.846482276	70.28747393	19.08
12/31/2015	0.96502174	71.07712744	18.54
12/31/2014	0.392740163	74.83932519	16.32
12/31/2013	0.729444423	71.37924945	15.01
12/31/2012	0.403419733	72.85441025	
12/31/2011	0.58435284	77.95252767	
12/31/2010	0.562358575	80.47724884	
12/31/2009	-0.084635094	71.26800545	
12/31/2008	-1.341945491	92.54764688	
12/31/2007	0.177661073	101.1040509	10.7

Data received from Bloomberg

Highlighted cells signify missing data

APPENDIX C: Data Used in Bank of America Regressions

Bank of America

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.214347393	69.29269853	15.4
12/31/2017	0.815877024	72.40522472	15.9
12/31/2016	0.822739785	72.6246576	16.3
12/31/2015	0.745430321	75.54221768	15.7
12/31/2014	0.229770465	79.91761817	14.6
12/31/2013	0.530164436	83.94705125	15.44
12/31/2012	0.193038981	83.89258284	16.31
12/31/2011	0.065817697	90.98980583	16.75
12/31/2010	-0.099574185	96.54285799	15.77
12/31/2009	0.310065647	95.19882293	14.66
12/31/2008	0.22684509	109.0490681	13
12/31/2007	0.943604485	108.8386777	11.02

Data received from Bloomberg

APPENDIX D: Data Used in Goldman Sachs Regressions

Goldman Sachs

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.131576157	47.55533366	17.5
12/31/2017	0.482402061	47.83362218	16.8
12/31/2016	0.859453054	37.64355041	17.8
12/31/2015	0.708299493	38.91362923	19.1
12/31/2014	0.959073895	42.64444169	16
12/31/2013	0.869160061	41.73404929	19.9
12/31/2012	0.802994983	35.2274743	20.1
12/31/2011	0.484258598	30.93248149	16.9
12/31/2010	0.949170413	34.59986982	19.1
12/31/2009	1.544284388	30.89031436	18.2
12/31/2008	0.23169687	33.18566073	
12/31/2007	1.184782203	45.52640958	

Data received from Bloomberg

Highlighted cells signify missing data

APPENDIX E: Data Used in Wells Fargo Regressions

Wells Fargo

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.163986236	75.43924987	16.6
12/31/2017	1.142902187	73.12534291	17.46
12/31/2016	1.180177134	76.10512075	16.08
12/31/2015	1.317721057	76.54964555	15.77
12/31/2014	1.436279241	75.56290711	15.53
12/31/2013	1.485031241	77.76129402	15.43
12/31/2012	1.380938201	84.44390154	14.63
12/31/2011	1.233983736	89.05039834	14.76
12/31/2010	0.988258732	95.56313993	15.01
12/31/2009	0.961506451	100.4343352	13.26
12/31/2008	0.281685508	114.0444995	11.83
12/31/2007	1.523871849	126.9691691	10.68

Data received from Bloomberg

APPENDIX F: Data Used in Bank of New York Mellon Regressions

Bank of New York Mellon

Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.161399396	23.68894957	15.1
12/31/2017	1.159910213	25.18807148	15.1
12/31/2016	0.975456824	29.10199106	13
12/31/2015	0.810696678	22.78280462	12.5
12/31/2014	0.675687236	22.24102848	12.5
12/31/2013	0.573683106	19.78217663	17
12/31/2012	0.712306505	18.9475609	16.4
12/31/2011	0.878913585	20.0731193	17
12/31/2010	1.096014434	26.0136646	16.3
12/31/2009	-0.482060587	27.16697519	16
12/31/2008	0.652161924	27.17679257	17.1
12/31/2007	1.355438706	43.11619048	13.25

Data received from Bloomberg

APPENDIX G: Data Used in Morgan Stanley Regressions

Morgan Stanley			
Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.025999493	46.03284347	21.8
12/31/2017	0.733313254	45.74407459	22.9
12/31/2016	0.746249097	40.70201169	22
12/31/2015	0.771188974	38.34442304	20.7
12/31/2014	0.424302355	36.7712078	16.4
12/31/2013	0.363397043	37.15492163	16.9
12/31/2012	0.008883907	26.01090347	
12/31/2011	0.527736332	21.44579367	
12/31/2010	0.595633121	23.71418949	
12/31/2009	0.188215685	18.58227396	
12/31/2008	0.200326131	24.40372199	
12/31/2007	0.296224362	39.36504825	

Data received from Bloomberg

Highlighted cells signify missing data

APPENDIX H: Data Used in State Street Regressions

State Street			
Date	Return on Assets	Total Loans to Total Deposits	Total Risk-Based Capital Ratio
12/31/2018	1.076076853	14.29862497	16
12/31/2017	0.90496609	12.59843371	16.5
12/31/2016	0.878543332	10.55603939	16
12/31/2015	0.762603173	9.810204199	17.4
12/31/2014	0.787383313	8.705989284	16.6
12/31/2013	0.916988106	7.398994887	19.7
12/31/2012	0.938078191	7.495995274	20.6
12/31/2011	1.017671441	6.391500887	20.5
12/31/2010	0.977230406	12.15821852	22
12/31/2009	-1.134578092	12.00062179	19.1
12/31/2008	1.145571742	8.136333259	21.6
12/31/2007	1.009219835	16.49667498	12.7

Data received from Bloomberg

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