

The Effectiveness of Basel II

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Abstract

The New Capital Accord, Basel II, was published in 2004. It features updated capital requirements and new ways to measure bank risk; however, the validity of these new standards was called into question during the financial crisis that began in 2008. The measures that intend to stabilize our banking system did not appear sufficient. Doubt was cast upon capital requirements, and the advantages of another system, such as contingent liability, can be seen. This thesis aims to test the effectiveness of Basel II, specifically its capital requirements, in reducing bank risk. After running a fixed effects model, one can clearly see that Basel II is insignificant in reducing bank risk, as measured by the percentage of non-performing loans to total gross loans.

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Introduction

Beginning in 1974, the Basel Committee on Banking Supervision has striven to be the standard setter for international banking regulations. It publishes recommendations such as capital requirements and disclosure policies for banks, to support stability in a world of increasingly interconnected financial systems. While banking has become a business that crosses the borders of countries instantaneously, its regulation is largely limited to national governing bodies. The BCBS was created as an initiative to improve the issues caused by competitive disadvantages between internationally active banks from different national-level banking regulations, such as lower capital requirements in some countries. It also addresses the lack of supervision of international banks because of discrepancies between home/host legislation and responsibilities. The committee is constantly publishing, revising, and updating its recommendations. For example, the New Capital Accord (Basel II) was a revised and updated version of the capital accord, Basel I, published in 1988. The New Capital Accord (Basel II) was published in 2004 to address the changing global banking environment and the ways banks have increasingly discovered how to understate their risks. This understatement allows banks to decrease the interest rates they pay and the required amount of non-borrowed funds they must possess, which lead to a riskier banking environment.

Basel II consists of recommendations to improve supervisory knowledge, market discipline, and most notably the capital to risk-weighted asset ratios required of banks. The Basel II recommendations hope to improve the quality of individual banking systems and supervision, increase transparency and in turn self-discipline in risk taking, and decrease the probability of bank failures through increased capital requirements. The

Committee hopes that these requirements and improvements will reduce the amount of risk inherent in the banking business, making it more stable.

My thesis focuses on the effectiveness of Basel II in its ability to stabilize the world financial system by reducing risk. I will analyze financial indicators from six countries: Canada, the Netherlands, Portugal, Spain, the United Kingdom, and the United States. By analyzing the indicators, such as the percentage of non-performing loans from total gross loans, from a range of years I will be able to determine the effectiveness of Basel II in reducing risk. Basel II is adapted on a voluntary basis; therefore, countries adapt the requirements in differing ways. They have also chosen to implement the requirements on different timelines.

The financial crisis of 2008, just four years after the capital requirements were published, spurred my interest in Basel II. I view Basel II as a skeptic because it is evident that even after its implementation, the international financial system was not stable enough to resist a collapse, beginning with the failure of banks such as Lehman Brothers. It should be noted that capital requirements have not been the only way to manage risk taking in banking. Several other methods have been used, including contingent liability in the United States between the Civil War and the New Deal. However, this method has given way to capital requirements and new regulatory authorities. The financial crisis also provides a preexisting framework to evaluate Basel II. The financial indicators before the crisis provide a benchmark to measure their success in stabilizing specific countries through the collapse. It allows a unique perspective by which to analyze the risk that banks experienced through such difficult financial times.

This thesis begins with an explanation of what capital and debt are and how they both are used to fund banks. It will highlight the importance of capital in absorbing bank losses and the importance of debt in leveraging bank funding. A basic understanding of capital is necessary to comprehend capital requirements and how they should stabilize banks. Capital requirements are the focus of Basel II, but the publication also includes recommendations for improving the supervision and transparency of banks. All of these suggestions on bank regulation have been adopted in the countries that I examine in the final section of my thesis. However, before the implementation of capital requirements, countries used other methods of promoting bank safety, such as contingent liability. Contingent liability is a system that allows shareholders to be liable for losses if a bank fails. I will discuss that further as an alternative to capital requirements in promoting bank safety. It allows for skepticism in the usage of Basel II, rather than other methods of reducing bank risk, to stabilize our financial system. My final section evaluates the effectiveness of the current method, Basel II, through the analysis of data from six countries.

The Funding of Banks: A Mix of Debt and Capital

To understand the arguments surrounding minimum capital requirements, the pillar of Basel II that this thesis will focus on, one must understand the concept of capital and have a basic knowledge of how banks are financed. The initial discussion will contain a definition of capital and an explanation of how and why banks are financed with a mix of debt and capital. Following, I will discuss the use of capital requirements such as Basel II to stabilize banking, and I will argue for other alternatives such as contingent liability for banks. Historically, both of these methods have been used to stabilize our international banking system.

In banking, simply put, capital is equity. It is the amount of funds put up by shareholders in public banks or by owners in private banks. Banks operate with money from both their owners and creditors (debt). Capital is the money given to an organization, rather than the money borrowed. Shareholder or owners do not recover the money they gave to a bank as capital (rather than lent as debt) until every other debt obligation has been met if a bank fails.

A common misconception is that capital reduces the money available for lending; that is not the case. Capital is money that can be used in the same way as debt, to carry out all the same operations such as lending and investments. Many bankers and politicians use the phrase “to set aside” capital when discussing banking, implying that the money put up as capital cannot be touched or inferring that it is a rainy day fund. However, capital requirements are not the same as reserve requirements. Holding more capital or “setting aside capital” simply means that banks must have more cash given to them by their owners (in proportion to the amount of investments or assets they have, i.e.

capital requirements). Capital requirements do not restrict the use of the cash they hold. Going further, capital regulation does not dictate the amount of money a bank must have, rather it dictates how much can be funded by borrowed money rather than capital (Admati and Hellwig 6).

Banks like to fund their operations through debt for many reasons. One such reason is debt acts as a lever of risk and reward. When banks borrow money, they increase their spending capabilities; however, they are also increasing their liabilities. If the opportunities taken with borrowed money go well, on the positive side, the debtor's profits will be greater. On the other hand, if investments fail or do not provide sufficient funds, the losses of the debtor are extremely magnified. Debt is leverage for both risk and reward. The greater the risk, the greater the profits or the losses are.

Banks fund their activities through a debt and equity mixture. Equity can be seen as the difference between the assets of a corporation and its liabilities, the money it owes its creditors. If a corporation has more equity, it can sustain a greater amount of losses before it fails to repay its debt.

Consider this simple balance sheet as an example:

Balance Sheet
12/31/2013

Assets:

Cash	38,000,000	
Loans and Leases	65,000,000	
Other Assets	150,000,000	
Total Assets		<u>253,000,000</u>

Liabilities and Owners' Equity:

Liabilities:

Notes Payable	63,000,000	
Deposits	100,000,000	
Total Liabilities		<u>163,000,000</u>

Equity:

Retained Earnings	30,000,000	
Common Stock	60,000,000	
Total Equity		<u>90,000,000</u>
Total Liabilities and Equity		<u>253,000,000</u>

Equity is the amount that remains after the payables and deposits have been subtracted from the assets. In this example, equity is equal to \$90,000,000 [\$253,000,000 - 163,000,000]. The firm can experience a loss of \$90,000,000 before it cannot pay its liabilities.

Balance Sheet
12/31/13

Assets:

Cash	38,000,000	
Loans and Leases	65,000,000	
Other Assets	150,000,000	
Total Assets		<u>253,000,000</u>

Liabilities and Owners' Equity:

Liabilities:

Notes Payable	100,000,000	
Deposits	100,000,000	
Total Liabilities		<u>200,000,000</u>

Equity:

Retained Earnings	3,000,000	
Common Stock	50,000,000	
Total Equity		<u>53,000,000</u>
Total Liabilities and Equity		<u>253,000,000</u>

This firm can only experience a loss of \$53,000,000 and still pay back all of its creditors. The less equity a firm has, the less room it has to experience losses without failing. The first firm is in a better condition to handle risk, because it can handle substantially larger losses before failing.

This concept can also be illustrated by a mortgage on a house, and the same idea applies to a corporation. Debt acts as a lever for both gains and losses. If a homeowner cannot afford a house, he/she often borrows the money to purchase one. The house

symbolizes a corporation's assets, the down payment symbolizes equity, and the mortgage is debt. If a house was valued at \$500,000, and the purchaser paid a \$50,000 down payment, he has a mortgage valued at \$450,000. For this example, the purchaser will sell his house at the end of the year. He has made no payments besides interest on the mortgage.

Consider first that the value of the house has increased by \$25,000. The owner's equity and assets have increased by 5%, and the value of his mortgage has remained the same. When selling the house, he will receive \$525,000, meaning he can easily pay his mortgage with the money he receives and completely recovers the cost of his down payment. Now, assume that the value of the house has decreased by \$25,000. The owner's equity and assets have both decreased by 5% while the value of the mortgage is constant. The owner must pay off the mortgage, but the value of the house (\$475,000) is lower than the amount of the debt (\$500,000). The money from selling the house will no longer cover the mortgage, and the owner will have to forfeit money in excess of the profits from the house, not completely recovering the value of the down payment. In an even more drastic case, if the value of the house decreased by \$75,000 (15%), he will lose more than the down payment, or the initial value of the investment, when he repays the mortgage. Many times, when investments fall in value, owners are not able to pay the debts related to them. These losses would be magnified if the down payment (equity) was even less because, it would take a much smaller drop in the value of a house to deplete the initial investment. This example illustrates the importance of equity. Banks that hold less debt (more capital) are safer.

Bankers often downplay the rewards of equity by speaking of funding their business through capital rather than debt as “expensive.” However, many corporations, such as Apple and Bed Bath and Beyond, have found ways to fund their business without much debt at all (Admati and Hellwig 30). The majority of corporations in the United States are funded by less than 50% debt; in contrast, banks are often funded with over 90% debt (Admati and Hellwig 7). Public banks, like any other publicly held corporation, can increase their capital at any time by increasing the amount of issued shares. Private banks can increase contributions from their owners and find new ways to invest their profits to create more capital. Many times, people speak of banks as something more complex and different than other corporations; however, they are funded in much the same way. From the perspective of investors, there is little difference between holding stock in a non-bank corporation than holding stock in a bank. Each investment can be sold for cash, and each has the ability to pay dividends.

In fact, bank stock commonly looks more attractive than other investments because the government has a history of bailing out huge, failing banks. They consider them “too big to fail.” One unforgettable example of a big bank failure serves as the reason that there are several examples of government bailouts. In September 2008, Lehman Brothers, a large bank in the United States, filed for bankruptcy. Its failure began a domino effect, just like any other default on debt. Defaulting causes a chain reaction: borrowers cannot pay creditors, and in turn, the creditors cannot pay their lenders, and so on. When the financial system experienced such a huge case of bankruptcy, it severely damaged the global financial system. Banks tried to sell their assets, which made prices drop even further. Stock prices dropped incredibly fast. Investors withdrew from their

money market funds, and banks and investors did not renew their loans. Many banks were extraordinarily close to default, which would send the financial system into an even further downward spiral. At this time, Hypo Real Estate in Germany, UBS in Switzerland, and Dexia in Belgium and France all began to fail. The biggest difference in the situations: their governments bailed them out (Admati and Hellwig 11). After such turmoil from the failure of one big bank, Lehman Brothers, the government has been promptly bailing out key banks such as JPMorgan Chase and Bank of America. Many banks have truly become “too big to fail” to prevent bank runs, defaults that build on each other, and another financial crisis.

Capital appears expensive to bankers because debt is so cheap considering the behavior of government bailouts. With debt, there are no dividends or expected returns to be paid, only interest rates. However, these interest rates do not accurately reflect the risk that creditors are taking because they expect that default will never occur because of bailouts. Low interest rates are paid rather than interest rates that illustrate the actual risk of the investment. From a bank’s perspective, it is cheaper to pay interest on a debt security than it is to pay dividends and other expenses to stockholders. Capital becomes expensive, but only relative to extraordinarily cheap debt.

Because of the leveraging power and low cost of debt, banks prefer to finance themselves with as much debt as possible. However, the government issues capital requirements, such as those suggested in Basel II, so that banks will hold a certain amount of capital. They hope this amount of capital will absorb the potential losses of a bank. The following section discusses capital requirements and their desired effects on bank safety.

Capital Requirements: An Explanation

Banks operate on a mixture of debt and equity. Their debt is often 90% of their funding in the United States, and in Europe it is often above 97%. When so much debt in relation to equity funds a corporation, its risks of default and failure are greater. For that reason, Basel II suggests a capital to risk-weighted asset ratio of 8%. Simply put, internationally active banks would be required to hold an amount of capital equal to 8% of their risk-weighted assets.

If capital requirements are established and upheld, theoretically, less risk will be taken and banking will be safer. If banks fund their risks, such as loans and mortgages, with only capital, they bear all of the risk with their own funds. When banks begin funding their risks with a mix of debt and equity, they begin backing their investments with funds from their creditors. The idea that more capital is necessary is significant for two reasons. First, we have discussed that more capital in relation with debt is safer because it provides a cushion of equity for losses. Secondly, when more capital is used, theoretically, firms may choose safer paths because its owners' money is directly at risk rather than money from creditors. One factor that is misleading in the debate for capital requirements is federal deposit insurance. The FDIC is thought to improve bank safety; however, it is possible that it actually increases the amount of risks banks take. Banks may take further risk because they can rely on the safety net of deposit insurance in the same way they can rely on the safety of government bailouts. For a small insurance payment, banks can ensure that their depositors are paid if they fail, thus eliminating the risk of being responsible for even more loss when their investments fail and they can no longer pay.

However, even though deposit insurance may incentivize risk, capital requirements should still function to reduce bank failures. The increased capital requirements allow for more loss absorption and, to an extent, incentivize less risk taking. Therefore, the Basel Committee on Banking Supervision continually recommends capital requirements as shown in the next section.

Summary of Basel Committee on Banking Supervision

Originally named the Committee on Banking Regulations and Supervisory Practices, the Basel Committee on Banking Supervision was created in 1974 as a forum for member countries to discuss global banking supervision. Its goal is to advance the quality and know-how of banking supervisors worldwide and to be a global standard setter for financial institutions. It aims to facilitate global economic stability through common banking standards. Many of these standards focus on capital adequacy requirements.

Basel, Switzerland, is home to the Bank for International Settlements (BIS) where the interconnected groups of the BCBS and the Group of Ten (G-10) governors meet. The G-10 consists of eight European countries, Belgium, France, Germany, Italy, Netherlands, Sweden, Switzerland, and the United Kingdom. In addition, Canada, Japan, and the United States are members. In actuality, there are eleven member countries in the G-10. They cooperate on global economic issues and have signed the General Agreement to Borrow, which allows the International Monetary Fund to draw from their resources when needed. The central bank governors of the G-10 became increasingly concerned with financial regulation with the onset of the Eurodollar in the 1960s. The Eurodollar market, which allowed US dollars to be deposited in foreign banks, created a huge gap in the regulation of deposits because banks were not subject to the scrutiny of the Federal Reserve. The G-10 decided to create the Euro-currency Standing Committee in 1971 to monitor the ever-changing financial system. This committee focuses on macro-economic scenarios and general policies for the G-10; that being said, there was still a need for micro-economic regulation in the early 1970s.

The need for a more regulatory and supervisory focused committee was spurred by the collapse of the Bretton Woods system of pegged exchange rates, the Arab/Israeli Yom Kippur Fourth War, and the failure of Bankhaus Herstatt. Bretton Woods had created a system of exchange rates where currencies were freely convertible at fixed, adjustable rates. This system required intense international cooperation, which brought about more BIS oversight, but after the financially prosperous 1960s and 1970s, markets, rather than the Bretton Woods system, established the value of currencies. The dollar could no longer be at a fixed, adjustable rate. Instead, it joined the era of floating currencies (Postwar and Bretton Woods). The end of the Bretton Woods fixed exchange rates brought large amounts of uncertainty and a need for international cooperation, because there was virtually no control over the floating currencies and the rapidly globalizing financial system.

The concerns from the collapse of the Bretton Woods system only increased with the Arab/Israeli Yom Kippur Fourth War in 1973. The conflict led to a major decrease in oil production and a jump in oil prices. When the price of oil quadrupled, it created financial imbalances, and no one knew how the international banking system was going to effectively cycle money from the oil producers to the oil importers. In 1974, a year after the Arab/Israeli Yom Kippur Fourth War, Bankhaus Herstatt, a relatively small German bank, collapsed. The bank, although small, had many foreign exchange operations. When its operations were closed in Germany, it had not yet ended all of its foreign exchange operations in New York. Herstatt then refused to settle its payments in the US market. This event caused panic in the foreign exchange market, almost causing it to temporarily close. Just as international banks were coming under major scrutiny

because of their role in the oil market, the failure of Herstatt questioned the stability of the global financial system. The collapse of Bretton Woods and Herstatt made more micro-economic regulation and supervision inevitable, and the Basel Committee on Banking Supervision was created.

The Committee now has twenty-seven member countries, and it reports to the Group of Central Bank Governors and Heads of Supervision, which encompasses representatives from member countries. Although each country has representation from its supervisory authority on banking, members do not automatically accept the Committee's publications and recommendations into law. While each member is expected to eventually adhere to the standards, they are applied at different times and often have country-specific adaptations. One of the first pronouncements, Basel I, is one such standard that countries applied sometime in the late 1980s.

The need for Basel I was made visible by the Latin American debt crisis in the 1980s, when many developing countries in Latin America could no longer repay their debt to foreign investors. Between 1975 and 1983 debt in Latin America increased from \$75 billion to \$315 billion (Auerbach). Banks that were thriving from the growing Eurodollar market and increase in oil money in the early 1970s were eager to lend. Not only did they have an excess of funds, the newly industrialized economies of Latin America, and their authoritarian governments, offered seemingly low-risk loans. Rather than borrow from the traditional international development lenders, such as the IMF, the growing Latin American countries could avoid the regulations of such a strict loan and use private funding to back their government-led import-substituting industrialization (ISI). The later stages of ISI, in which most countries were partaking, required huge

amounts of capital to facilitate manufacturing. Inflation caused so much imbalance, that some banks were even paying Latin American countries to take on loans. When the second oil crisis on 1979 occurred, the US Federal Reserve raised interest rates to reduce inflation. High oil prices, loan commitments with increasing interest rates, and recession led to disaster for Latin America. Lenders became more resistant to freely giving loans that could increase the credit lines of debtors as conditions worsened. Many banks during this time took excessive risk in Third World environments, said Arthur Burns, the chairman of the Federal Reserve in 1977. In 1982, nine of the largest money-center US banks possessed debt at 176% of their capital in Latin America (Sims and Romero).

The BCBS recognized a lack of adequate capital in the global banking industry, and capital requirements became the main focus of the Committee. It saw the need to focus on stronger capital ratios to increase financial stability and decrease competitive inequality stemming from different national capital requirements. The BCBS began working on an international accord to promote international convergence of capital to risk-weighted asset requirements.

The Basel Capital Accord, also referred to as the 1988 Accord or Basel I, became the international capital measurement system in July 1988. It established a minimum capital to risk-weighted asset ratio of 8% for all internationally active banks. All institutions must measure the amount of risk their assets are susceptible to by agreed upon standards. The amount of risk-weighted assets a firm has necessitates a prescribed amount of capital. In this case, firms must fund 8% of their dealings through equity. The 1988 Accord expected that every member country implement the measures it set forth by

1992. All members and most other internationally active banks fulfilled this recommendation in a timely manner.

Basel I was revised several times. The last revision addressed market risk and foreshadowed Basel II, the New Capital Accord that follows Basel I. It was supposed to take effect at the end of 1997. Market risk deals with the volatility that goes along with foreign exchange rates, debt securities, equities, and other risky dealings. Each of these assets reacts to changes in the market, and assigning risk to assets based solely on credit was not sufficient. Banking regulations needed to account for the risk inherent to market changes. They also allowed banks to use their own internal methods to measure risk adhering to quantitative and qualitative standards.

The original Basel Accord was always meant to be revised and adapted; however, in 1999 the BCBS decided to begin creating a new, updated framework. The ever-changing banking industry was actively inventing methods of understating its risks and overstating its assets, and the BCBS saw the need to confront the new innovations. In June 2004 the Revised Capital Framework was published. It was created with an even greater emphasis on measuring risk, and is formatted into three pillars: minimum capital requirements, supervisory review, and market discipline.

The first pillar of Basel II, minimum capital requirements, kept the 8% capital ratio from Basel I. However, it addressed new ways to measure risk. Basel II incorporates market, credit, and operational risk by using these characteristics to weight the assets of the bank. The capital requirements are then applied to this weighted measure of assets. Put simply, the more risk a firm has, the more capital it is required to carry, and the requirements account for three different types of risk. In comparison to its predecessor,

Basel II is much more sensitive to risk when it calculates the amount of necessary capital. It brings a new focus to operational risk, which is defined as the risk brought about by the complex infrastructure of banks (Dedu and Nechif 116). There are two ways set up to calculate the required capital for operational risk: the standard approach and the approach stemming from internal ratings. The internal rating based approach allows banks to create and use their own, approved method to calculate required capital. The new requirements based on credit risk require more capital to be held by institutions with lower credit ratings. The requirements from market risk largely depend on factors external to banks. Market risk accounts for some external influences such as foreign exchange rates or changes in government policies.

The second pillar, supervisory review, focuses on the knowledge of supervisors and the ways in which internal assessment is carried out. Risk assessment and oversight of systems are the responsibilities of the firm. Capital adequacy techniques can only effectively be carried out if the management of institutions is constantly communicating and overseeing risk management processes. The internal approaches should be monitored and changed as appropriate in accordance with the requirements of regulators and to promote a balance between capital and assets. Capital-to-asset ratios have a required minimum, but supervisors can establish that more capital should be held if they find it necessary (Chavez).

The third pillar, market discipline, involves disclosure practices that allow the market to encourage safe risk management and transparency. Transparency of bank actions, for example, ensuring that shareholders have access to financial information of the firm, will increase market discipline. Investors or creditors can use such information

to require banks to hold certain interest rates. With transparency, banks are forced to maintain competitive, fair interest rates that are dependent on their financial information and that of the market. They cannot survive if they do not function at the market standards. One example in which market discipline can be seen is when investors have no desire to fund a firm that is performing under excessive risk.

Basel II showed an enormous improvement from Basel I in its methods of risk-weighting capital, monitoring supervision, and increasing market discipline. One important difference between Basel I and Basel II is the difference in the applications of each. Basel I was quickly and widely adopted. Basel II was adopted starting in 2007 by the European Union, but its global application was somewhat slow and countries began upholding the new framework on very different timelines. Canada also implemented its policies later in 2007, but the United States lagged behind by a year. The requirements adapted in the United States were finally put into law in 2008, after much deliberation.

The wide adoption of these requirements shows that they have become the preferred method of promoting stability in banking. However, before capital requirements, other methods were employed to curb bank risk taking. Among these methods was contingent liability, the focus of the following section. The existence of other bank safety measures simply provides healthy skepticism of the choice to use capital requirements to stabilize banking rather than other methods.

Banking History and Incentives Toward Risk

Although today capital requirements are the preferred way to prevent bank failures through providing a more secure asset backing, there are other alternatives. One such alternative is contingent liability, a system that was used in many countries and the United States from the Civil War until the New Deal. This system removes the limited liability of shareholders and replaces it with unlimited, double, or triple liability in such a way that, in the event of insolvency, shareholders lose money greater than just the par value of their investment.

In general, corporations are unique because they run on a system of limited liability. Shareholders invest money into a company, and if the company fails, they cannot lose more than their initial investment. They are not responsible for losses. Many states passed laws by the 1830s that did not allow extensive liability for shareholders in corporations other than in the banking industry; however, until around one hundred years later, limited liability was still not the norm (Mitchener and Richardson 3). In fact in 1875, the National Banking Act mandated a double liability requirement for all national banks. That is to say, shareholders of national banks would be held individually liable, equally and ratably, for the debt of a bank in an amount equal to the par value of their stock and the amount invested in the shares (Michener and Richardson 4). Restated, if the assets of a bank were not sufficient to pay its creditors, not only would shareholders lose their investment because of insolvency, but they would also have to pay an amount, no larger than their investment, in an effort to pay the banks liabilities. During this period of double liability, between 1865 and 1934, federal enforcement of the system recovered

28.3% of total losses to creditors, much more than other systems recovered (Mitchener and Richardson 4).

Shareholders in most corporations only bargained to lose up to the par value of the stock they invested. Then why, one may wonder, did banks continue to use contingent liability? By maintaining liability for shareholders the incentives of profit making and investment safety were aligned. The top executives at banks, the president and cashier, or now, the chief executive officer and chief financial officer, were members of the board of directors. Every member of the board was required by federal law to hold \$1,000 in stock (at par value). Most states followed suit and required state-banks' directors to maintain the same amount as national banks, and some even made directors maintain more stock (Michtener and Richardson 4). Because so many executives held stock, they understood that excessive risk would hurt their shareholders if failure occurred. Their incentives were aligned with that of the other risk-bearing stockholders in the contingent liability system. Banks would supposedly take less risk because the managers' personal assets were on the line influencing their judgment.

The idea that risk-taking would decline with the system of contingent liability proved to be true. Voluntary liquidations, meaning that banks closed in order to lessen their losses in the future, were nearly three times as numerous as involuntary liquidations from 1913 to 1928. This is evidence that banks began to act more cautiously. These early liquidations provided for the banks to close their firms without having to pay for costly insolvency situations and before their liabilities were greater than their assets. These situations allowed creditors and depositors to be paid in full. Also, the recovery rates from creditors were higher in double liability banks over limited liability banks. The

recovery rate of national banks was almost 51%. The average annual loss to depositors, in national banks, for the years 1865 and 1934 was only forty-four cents for every thousand dollars. During the difficult financial years of 1930 to 1934, the loss was only seventy-seven cents per thousand dollars. The success of this rate is bolstered by the fact that many managers were personally insolvent with the failure of the bank. This rate remained stable through the years of the depression in 1930 through 1934 (Macey and Miller 34).

The positive results of contingent liability beg the question of why it failed. There are several factors, the most obvious of which are evidenced in the depression of the 1930s. It became extraordinarily unpopular with shareholders, it did not prevent a financial crisis, and it was ousted by the onset of federal deposit insurance (Macey and Miller 32). Contingent liability became very unpopular for a number of reasons. Initially, many shareholders had a close relationship to their bank and bank management, meaning they had direct knowledge of the business. However, those relationships diminished. During the equities boom of the 1920s, many owners bought shares in banks that they had no relationship with. As the years passed, shares were passed between family members and sold to different parties. The insider knowledge that shareholders possessed was lost. Now, their impact in daily operations was lessened, and banks functioned without much shareholder influence. Because the relationship between shareholders and their banks became more and more distant, many owners began to resent contingent liability because they had no method of direct control. That, coupled with the rising number of assessments placed on shareholders, led to a political fight against contingent liability in the 1930s.

The obvious failure of the banking system aided the argument against contingent liability. When the entire banking system collapsed in 1933 after failures and bank runs, there was little evidence that contingent liability was able to stabilize the financial system. In addition to its inadequacy in prevention, contingent liability was unable to recover all the losses of depositors. The onset of the depression caused great financial difficulty for everyone, including bank shareholders. With so much personal insolvency effecting shareholders, the public no longer had confidence that the system could assess and return their losses. Only 49.8% of national bank shareholders received assessments; many depositors did not attempt to make claims against shareholders during the depression because the likelihood that they would be successful was low (Mitchener and Richardson 6). During times of long, severe macroeconomic shock, reducing risk through contingent liability does not serve to protect the interests of shareholders. In addition, contingent liability was depressing the prices of shares, and investments in banks became very unattractive during a time when the system needed new capital. The final factor in the downfall of contingent liability was the creation of federal deposit insurance in the Banking Act of 1933 (Macey and Miller 38). Not only did this act form deposit insurance, but it also began increasing capital requirements.

While contingent liability attempts to incentivize responsible risk-taking, new banking regulation attempts to mandate bank safety through regulatory pressures. However, without the incentives of executives and shareholders being aligned, huge risk is still taken, and furthermore it is encouraged by the existence of deposit insurance. It is ironic that contingent liability met its demise in the loss of public confidence and the

failure to protect creditors, because years later, the banking industry is facing the same problems with the new system.

One reason is that banks are fundamentally different than other corporations because of federal deposit insurance. The FDIC removes the necessity to monitor risk. Depositors and creditors do not need to control the amount of risk banks take as much as other corporations because their investments are continually backed by deposit insurance. Essentially, if deposit insurance did not exist, depositors would be more active in demanding that banks take less risk to protect their investments or that they receive higher interest rates for heightened risk. New regulatory measures do not align the incentives of executives and depositors like contingent liability; rather they increase capital and provide safety nets for excessive risk taking.

Contingent liability is a very obvious method to align shareholders and manager's incentives. The managers, as required by law, must have a monetary stake in the success of the institution. That stake ensures that they do not take excessive risk by putting their personal solvency on the line. On the other hand, limited liability rids the banking system's management of some of the personal incentive they have to ensure the success of investors and safety of depositors. Essentially, capital requirements attempt to gain the same results as contingent liability. They both aim to increase bank capital, one by requirements and one by providing incentives to bank management. The argument favoring contingent liability is not meant to suggest capital requirements are not an appropriate response to lessen bank risk, but rather that aligning incentives may be necessary to produce effective results, rather than just increase capital.

The system of limited liability does not require bank management and shareholders to be directly responsible for the losses of an institution. In the current banking system, the incentive to take less risk is removed. Shareholders can only lose their initial investment, meaning that if banks fail, the only potential loss would be with the depositors. Furthermore, this potential loss to the depositors is removed by deposit insurance. For a fee, banks insure their deposits, making it improbable that ordinary depositors will experience large losses. With both limited liability and deposit insurance, neither the shareholders nor the depositors have an incentive to actively monitor a bank's risk.

Shareholders and depositors lack the motivation to monitor risk and the stability of banks, so capital requirements are the regulatory attempt to secure banking. However, capital adequacy requirements do not necessarily make banks take less risk; they simply give them more money to lose before they fail. Other issues with capital requirements stem from the fact that banks are capable of understating their assets. If a bank can manipulate its balance sheet by changing the classification of an asset, it will not be required to hold as much capital. In theory, capital requirements would protect the banking system from failure, but in practice there are many issues, such as understating assets and becoming dependent on deposit insurance. Simply holding more capital cannot solve those issues. It is possible that the problems that arise might only be solved when the incentives of banks are aligned with less risk and a more stable financial system. In the next section of my thesis, I will test whether the standards of Basel II, which focus almost exclusively on raising capital requirements, have had success in reducing bank risk.

Methodology

The question this thesis aims to answer is whether or not the capital requirements of Basel II are an effective way to reduce bank risk and stabilize the international banking system. To tackle such a big question, I have chosen to analyze the impacts of Basel II on a group of countries that adopted the standards at different times: Canada, the Netherlands, Portugal, Spain, the United Kingdom, and the United States. By analyzing financial indicators of risk and controlling for country specific differences before and after the application of the standards, I intend to come to a conclusion on the effectiveness of the accord.

To examine this question I estimate the following fixed effects model:

$$\gamma_{it} = \alpha + \beta x_{it} + \delta d_{it} + a_i + t + e_{it}$$

This model measures the marginal effects of the application of Basel II where γ is bank risk in country i at year t . The measure of bank risk used is the ratio of non-performing bank loans to total gross loans. α is the intercept parameter of bank risk if all other dependent variables are equal to zero. The dependent variables include x_{it} , d_{it} , a_i , and t . x_{it} is a set of control variables for factors such as the size of the financial sector of a country and the size of the economy of a country. For the purposes of this model, we will use real GDP, domestic credit provided by the banking sector, and inflation as control variables to explain differences in countries. δd_{it} is a dummy variable representing whether or not a country had adopted Basel II for a specific year. This variable will equal zero if Basel II was not adopted, and it will equal 1 if Basel II was adopted. a_i and t are country and time effects. a_i is an unobserved effect which accounts for country specific

differences that do not vary over time. t controls for deterministic time trends in the variables. e_{it} is the error term that deals with all variation that the model cannot explain.

This model will show the marginal effects of Basel II and whether or not those effects are significant, both economically and statistically. Essentially, the presence of a dummy variable will show the added effects of Basel II when it has been adopted along with the effects, controlling for changes in the other independent variables. The resulting γ_{it} is the bank risk estimated from the controls and application of the banking standards. Specifically, bank risk will have decreased as a result of Basel II if the coefficient of Basel II is negative and statistically different from zero.

Two models were used to help measure the effectiveness of Basel II. Both models came from a data set, which contained seventy observations with nine groups. The averages of each financial indicator for each country are shown in Table 1. The data originated from the World Bank Data Catalog and is from the years 2000 to 2012. It includes financial indicators from Canada, the Netherlands, Portugal, Spain, the United Kingdom, and the United States. The data set was complete for every indicator besides the domestic credit provided by the banking sector for Canada for the years 2009-2012; however, the model accounts for that inadequacy. In 2007, all of the countries except the United States had adopted Basel II and contained a 1 for the dummy variable. The dummy variable for adoption changes to 1 for every country, including the United States, in 2008. The difference between the baseline model and the second model used is a secular time trend. The baseline model accounts for the data without considering the secular time trend, and the second model accounts for those secular changes each year.

Table 1

Country	Average Value of Variable (2000-2012)		
	GDP Growth	Inflation (%)	Domestic Credit Provided by the Bank Sector (%)
Canada	2.18	2.65	184.05
Netherlands	1.32	2.12	183.91
Portugal	.50	2.10	163.77
Spain	1.86	2.65	177.19
United Kingdom	1.72	2.29	175.56
United States	1.94	2.11	214.73

Results

Table 2

Dependent Variable	Results without Time Trend	Results with Time Trend
GDP Growth	-0.16 (.05)	-0.20 (.07)
Inflation	-0.57 (.00)	-0.32 (.01)
Domestic Credit Provided by the Bank Sector	-0.01 (.39)	-0.01 (.44)
Basel II Dummy Variable	1.18 (.00)	-0.27 (.78)

The results from each regression are shown in Table 2. The coefficients of the control variables for the baseline model all reflect the intuitive results. GDP growth has a coefficient of -0.16 without the time trend and a coefficient of -0.20 with the time trend. It is not statistically significant for either model. One would expect risk to lessen with an increase in GDP growth, meaning the size of the financial system became larger. Inflation has a coefficient of -0.57 in the first model and -0.32 with the time trend. Both are statistically significant. This result is intuitive. As the value of a currency decreases with inflation, it becomes easier to settle debt that remains at the original value. Domestic credit provided by the bank sector has a coefficient of -0.01 for each model. Neither result is statistically significant; however, bank risk is shown to reduce with an increase in domestic credit provided by the banking sector. It is intuitive that banks would continue to loan money only when debtors are able to pay for their loans.

The results from the baseline model show that the coefficient for the adoption for Basel II, 1.18, is positive and significant. It has a p-value of .00. Those results imply that Basel II actually increased the percentage of non-performing loans, bank risk. The results

are very different from what we expected. Basel II, at its worst, should only be completely ineffective. There have never been expectations that it would actually increase bank risk.

One reason that the results for the baseline model could show an increase in bank risk is the onset of the financial crisis in 2008. The percentage of non-performing bank loans as a percentage of total gross loans increases in large part because, over the years observed, the world-wide financial crisis heavily increased risk in every financial system. The increase in risk due to the crisis coincided with the adoption of Basel II in most countries. When a time trend is used to account for the secular changes (the financial crisis) in each year, the results for the effects of Basel II become less significant; however, bank risk does decrease. The time trend accounts for the crisis and allows the results to show their effects excluding the inherent increase in risk from the growing instability that was present. Essentially, the results from the model without the time trend were drastically affected by the financial crisis. The model with the time trend rids itself of the effects of the financial crisis and allows us to see the slight, insignificant decrease in non-performing loans, our measure of risk in an environment without the crisis.

When all possible variables are controlled for, the results are intuitive: capital requirements decrease risk. The coefficient of Basel II becomes $-.27$. However, these results are not statistically significant to show that Basel II is truly effective. The p-value is $.78$.

It is also interesting to note that between the two models, the coefficients of the controls did not change much. Only the coefficient of Basel II experienced drastic changes between the models, not the control variables. From that evidence we can

conclude that there was omitted variable bias in the first model. The dummy variable for Basel II, which changes over time, is extremely correlated with the timing of the financial crisis. Once a time trend was included, the omitted variable bias was decreased and an unbiased estimate of Basel II is seen. From these results, the true effectiveness of Basel II is severely doubted. Capital requirements in the form of Basel II, without incentive alignment, are statistically ineffective in decreasing risk.

Conclusion

Basel II, the New Capital Accord set forth in 2004, aims to stabilize the global banking system. It tries to achieve this goal by establishing suggested standards for banks. One such standard is capital requirements. They are set forth in an effort to increase the ability of banks to absorb losses, making them less susceptible to failure. The more capital a bank holds in relation to debt, the more it can lose before it defaults on its own obligations. However, as contingent liability suggests, there may be a need for banks to not only hold more capital to ensure success, but to also align their incentives with less risk taking. To test the effectiveness of Basel II, the financial indicators of six countries were analyzed to measure their marginal effects on bank risk. After analysis of the data, the results of my study show that Basel II is statistically insignificant in decreasing bank risk, which was measured as non-performing loans as a percentage of total gross loans. That statistical insignificance points to the ineffectiveness of the New Capital Accord at lowering bank risk and stabilizing the international economy.

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