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Potential downside effects of Basel III : lessons from previous Accords.

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Table of Contents

Introduction 4

Methodology 8
Limitations 10

Section 1: History of the Basel Accords 12
Regulation prior to Basel 12
Basel I 16
Basel II 20
Basel III 27
Three Buffers and Higher Capital Requirements *28*
Changes to the Type of Capital used for Reserves *30*
Introduction of Liquidity Requirements *31*
Introduction of a Leverage Ratio *33*
Benefits of Basel III 34
Costs of Basel III 36
Macroeconomic costs of Basel III *36*
Risk-weighted Assets and Lending to Vulnerable Groups *38*
The South African Context *39*

Section 2: Increased Capital Costs 41
Theoretical Effects 41
Modigliani-Miller *41*
Restrictions on Modigliani-Miller *43*
The Low Risk Anomaly *45*
Maturity Transformation *47*
The Bank Capital Channel *48*
Empirical Evidence 48
The 1990s Capital Crunch in the US *48*
The 1990s Capital Crunch around the World *53*
Further Studies *55*
Key Findings 56
Impact on South African Banks 59
Higher Capital Ratios *59*
Expensive Equity *64*

Section 3: Greater Risk Aversion 70
Theoretical Effects 72
Risk Aversion and Capital *72*
Risk Aversion and Risk-Weighting *78*
Empirical Evidence 79
Basel I *79*
Basel II *85*
Key Findings 87
Impact on South African Banks 88
Risk Aversion and Capital *89*
Risk Aversion and Risk-Weighting *91*

Conclusion 94

Table of Figures

Figure 1: Basel I risk-weights (Tarullo, 2008: e823-833) 19
Figure 2: Percentage change in capital requirements under Basel II (BCBS, 2006: 10,14) 25
Figure 3: Comparison of Capital Requirements under Basel Accords (BCBS, 1988; BCBS, 2005; BCBS, 2011) 31
Figure 4: Long-run economic benefits of increases in capital and liquidity (BCBS 2010) 35
Figure 5: Selected studies on macroeconomic cost of Basel III (Pagliari, 2011) .. 37
Figure 6: The Growth of Lending over Sex Recessions, by Year of Cyclical Peak (Bernanke & Lown, 1991) 49
Figure 7: Largest Five South African bank's Regulatory Capital Ratios, June 2013 (Bankscope data) 61
Figure 8: Other South African bank's Unweighted Capital Ratios, most recent reported figures 2013 (Bankscope data) 62
Figure 9: Total Regulatory Capital of large South African banks, 2005-2013 (Bankscope data) 63
Figure 10: Tier 1 Regulatory Capital of large South African banks, 2005-2013 (Bankscope data) 63
Figure 11: Largest five South African banks, Profits before tax 66
Figure 12: Largest five South African banks, JSE stock price as of December of each year 66
Figure 13: Deposit Insurance Expenses per Dollar of Deposits, and Bank Failures (Keeley, 1990) 74
Figure 14: Share of Commercial and Industrial loans, and Government Securities, as a proportion of bank portfolios (Furfine, 2001: 34) 80

Introduction

In the aftermath of the financial crisis of 2007/08, politicians and public figures around the globe turned sharply against big banks and the broader financial sector. President Obama slammed "fat cat bankers", while a host of figures as diverse as the Pope and Bruce Springsteen decried the reckless greed of the financial sector (Lee, 2009). As recently as 2012, the South African finance minister Pravin Gordham described bankers as "greedy monsters", and argued that the crisis and ensuing controversies illustrated "dishonesty, manipulation of prices and information, profiteering at any cost and little regard to the ordinary people and the cost to them. People think they can play games and be the only ones who benefit" (Khumalo & Naidoo, 2012).

This unprecedented vitriol highlights political conditions that were primed for major reforms of financial regulation. Much of the blame for the crisis was directed at inadequate regulation, and a broad array of interests called for substantial changes to the regulatory safety net that keeps banks from assuming excessive risk. The central global reform was the release of updated capital adequacy regulations by the Basel Committee on Banking Supervision, or BCBS. The BCBS began work on reforms while the crisis was still ongoing, and in 2010 released "Basel III: A global regulatory framework for more resilient banks and banking systems", generally referred to as the Basel III accord (BCBS, 2011). The accord greatly expanded the regulatory requirements placed on banks, requiring more and better quality capital to be used to finance bank's operations.

Basel III built off two previous accords released by the BCBS, and like those previous versions, it is a product of the political conditions in which it was crafted. Basel I was released in 1988, following a spate of financial volatility,

including the failure of major American banks such as Continental Illinois. As a result, it was robust and required major effort for banks to achieve compliance. Basel II, on the other hand, was released in 2004, during a boom period spurred on by deep deregulation of the financial sector. While the accord was technically an adjustment on Basel I that should not have involved major changes to the strength of the regulation, it was nevertheless widely viewed as a weakening of regulatory requirements, and most banks found Basel II capital requirements easy to meet.

Born out of one of the worst financial crisis in recent history, Basel III strengthens existing regulation and introduces a raft of new measures. The Accord clearly errs on the side of financial stability over efficiency, and could prove challenging and costly for banks to implement. But the Basel III accord is still an evolving document, not due for implementation until 2019, and there is evidence that momentum towards robust regulation is weakening. In January 2013, just five years after the onset of a system-wide liquidity crisis, the BCBS released a major revision of Basel III liquidity requirements. The move was widely viewed a retreat for regulators, with the Financial Times (Masters, 2013) proclaiming "Banks win more flexible Basel rules", and American Banker (Valladares, 2013) taking an even stronger line of "You Call That Liquid? New Basel III Liquidity Rules Ineffectual". More recently, in January 2014, the Basel Committee weakened rules on the unweighted leverage ratio[1], despite continued concerns over the incredibly leveraged nature of most banks, again spurring commentators to proclaim "Banks win Basel concessions on debt rules" (Fleming & Chon, 2014).

[1] See pages 31-33 for explanation of liquidity and leverage ratio.

There are many reasons for this growing momentum against regulation, but perhaps the biggest driver is concern over the unintended effects of the regulation on economic growth. Capital adequacy requirements of the type introduced under Basel III come at a cost to the real economy: as lending costs rise, banks ration loans or increase spreads, and consumers and businesses face tougher credit conditions. The slow pace of post-crisis growth has left regulators wary of enacting regulation that could hinder the recovery, and global financial interests have grown increasingly more assertive in leveraging these concerns to drive opposition to reforms. The Institute of International Finance, which represents large global banks, has warned that reforms will lead to substantial contractions in GDP, huge job loses, and the potential to trigger a double-dip recession (IIF, 2011). Jamie Dimon, the CEO of JPMorgan Chase, went so far as to argue that the United States should withdraw from global reform efforts, stating that "any American president, secretary of treasury, regulator or other leader would want strong, healthy global financial firms and not think that somehow we should give up that position in the world and that would be good for our country" (Braithwaite & Jenkins, 2011). Royal Bank of Scotland's Riccardo Rebonato sums up the view of many bankers on Basel III, arguing "(w)hat is at stake here is GDP and massive unemployment, so it would take a courageous politician or regulator to risk that" (Clark, 2010).

In the face of this debate, and given the complexity of the topic, it is difficult to distinguish between genuine concerns and the lobbying efforts of banks to avoid further regulatory scrutiny. Thankfully, there is substantial evidence with which to assess the claims made by the financial industry. The implementation of similar reforms in Basel I and Basel II created a large pool of theoretical and

empirical research on the effects of bank capital requirements on the real economy. This paper will attempt to identify to what extent Basel III capital adequacy requirements pose a legitimate threat to bank lending and the real economy, by examining the costs of the previous Basel Accords. It will examine whether there is adequate empirical and theoretical basis to the claims being made of a pending regulatory crunch on the still fragile global economy.

In general, the paper will conclude that, despite all the doom and gloom, the real economy will not be substantially adversely affected by the introduction of Basel III. However, it will argue that the Accord complicates future efforts to change preexisting patters of finance in South Africa, particularly hindering efforts to improve financial inclusion of risky groups such as small and medium enterprises. And in a country in which actors like these small businesses are already chronically excluded from the financial system, these restrictions could enforce a long-term cap on the speed of growth and development in South Africa.

Methodology

The primary methodology used in this research report will be a comprehensive literature review of work on the first two Basel Accords. The core contribution will be to critically assess whether claims made in the public debate on Basel III are supported by the finance literature on the topic.

The Basel Accords are unique in that they are largely the product of a technocratic process of rulemaking, with very little basis in hard theory. Perhaps because of this, debate over the Accords tends to be dominated by regulators and the financial industry, with a relatively small role for academic research. This paper will attempt to examine the academic perspective in the debate, as a means to problematize some of the public predictions being made about the effects of Basel III. A comprehensive analysis of all possible effects is well beyond the scope of this research report, and as such the focus will be on South Africa and the possible negative effects of capital regulation only. There are two channels by which capital regulation could harm the economy.

The first is the Bank Capital Channel. Proponents of this channel argue that requiring banks to make use of greater capital, particularly equity, in their activities results in higher costs of capital and a subsequent increase in lending costs or, under certain circumstances, a rationing of loans. Much of the literature on this topic arose in the early 1990s, immediately following the Basel I accord. At the time, it was observed that banks recovering from the financial instability of the late 1980s were not extending as much credit as was expected. This credit crunch was sharpest in the North-East United States, but was evident around the developed world, and was at least partially blamed on a capital crunch resulting

from the implementation of Basel I. This produced a broad pool of research on the subject, which will be the primary focus of Section 2 of this paper.

The second channel is the Risk Aversion Channel. The Basel Accords require more capital to be used for riskier assets, in an attempt to encourage banks to hold a conservative level of risk. The concern of this approach is that certain risky loans to socially important actors, notably SMEs, could be complicated by the additional costs posed by Basel risk-weights. This channel has been extensively studied in the context of Basel I and Basel II. Another explanation for the credit crunch mentioned above was the marked shift in bank portfolios towards government securities and away from corporate loans. This fits well with Basel risk-weights and was roundly blamed on the introduction of the accord. In Basel II, the concern of risk-aversion was even greater. The Accord introduced a far more sensitive system of calculating risk, which was able to discriminate between similar counterparties of divergent risk. This posed a problem for small businesses in particular, which had high-risk profiles and a habit of borrowing countercyclical, and thus stood to face a sharply more restrictive credit environment. Concerns were particularly pronounced in Germany and Austria, which led a concerted lobbying effort against Basel II reforms, and won some concessions, but only after a wide-range of studies on the topic were completed. These studies, and those on the early 1990s credit crunch, will be the focus of Section 3.

For each channel, this paper will explore the theory and empirical work available. It will then apply the findings to the case of South Africa. The South African financial sector is interestingly placed within the context of the Basel Accords. Banks are traditionally very conservative by international standards,

holding high capital ratios that have made meeting previous iterations of the Basel Accords a relatively painless process. Basel III is the first of the Accords to pose a substantial challenge to South African banks, and as such it is important to review the challenges faced and lessons learnt in other financial sectors around the world.

Limitations

There are numerous limitations to the methodology employed here.

The first is that there is limited capacity to reveal new findings based on original investigation or analysis. While this would be preferable, the ability to conduct such a study is limited by the lack of availability of relevant data. This would include data on the internal capital structure of banks, the make-up of their portfolios, and the nature of their quantitative risk assessment methodologies. These are often closed sets of information that are closely guarded by banks, and are not publicly available.

A second limitation, resulting from the reliance on literature review, is that this paper makes use of the theoretical direction of the literature it reviews. Broadly speaking, this theoretical direction is grounded in conservative, orthodox economic theory. This means that the contributions of other schools of economic thought, including heterodox economists, are sometimes missing from the analysis. While the contribution of these other schools of thought is vitally important, the aim of this paper is to test the internal validity of Basel III. In other words, this paper will ask whether, given the assumptions and methodology employed in the production of Basel III, the impact of the new rules will be positive or negative. The paper will therefore tap into the debate within the orthodox school over the balance of positive (improving stability) and

negative (limiting growth and access to credit) effects, and as such grappling with the issues in an orthodox manner seems most appropriate.

Third, much of the literature focuses on certain geographical areas. In particular, a disproportionately large number of the studies used focus on the United States. This reflects the dominance of the US in the academic space on the Basel accords. While international research, and particularly work from the developing world, will be used whenever possible, it is not possible to create a balanced share of work from multiple regions, without excluding vitally important research from the United States.

Fourth, due to space limitations, it was not possible to examine the liquidity or leverage ratios that are also introduced under Basel III. These are extremely important measures, and could pose a greater challenge to the South African financial sector than any other part of Basel III. While these new innovations are definitely in need of further study, this research will concentrate on the reforms to capital adequacy requirements.

Finally, the methodology risks creating a misleading picture of the balance of effects in Basel III, between positive effects on financial stability and negative effects on the real economy and the availability of credit. This is due to the fact that most sets of literature reviewed focus on the potential downside effects of restricted access to capital. Wherever possible, information on the stability improving effects will be noted, but this study is not aimed at exploring these positive impacts. As a generalized disclaimer, it should be noted that any critiques of Basel III must be considered within the broader context of an accord that can prevent severe financial crises.

Section 1: History of the Basel Accords

Regulation prior to Basel

Capital adequacy requirements have a long and complex history. The concept of formalizing such requirements dates back to at least 1864, when the American National Banking Act set capital requirements based on the population of the area the bank served (Burhouse, et al, 2003). For most of their history, capital regulations were seen as an additional safeguard over and above the more important reserve requirement. Capital requirements can protect bank solvency, but before efficient capital and wholesale banking markets, solvent banks could still fail if they lacked sufficient reserves to meet their requirements.

Bank regulators generally applied capital requirements on an ad hoc basis, with no universal numerical formula. This system of bank-by-bank judgment calls seemed to deliver results, most noticeably a period of post-war economic growth that featured remarkably few financial crises. This changed with the global slowdown of the 1970s, and various leading powers began adopting formal requirements as the decade came to an end. France, the United Kingdom and West Germany applied risk-based capital standards as early as 1979, 1980, and 1985 respectively; while the United States introduced an unweighted leverage requirement in 1981, before later moving to risk-weighting in 1986 (Ibid).

By 1985 domestic capital adequacy regimes were at work in all but two of the countries that would go on to form the Basel Committee (Tarullo, 2008: e627). These uncoordinated domestic regimes were, however, becoming increasingly problematic in an ever more globalized and interconnected world, with cross-border competition and global shared risks.

The competitive effects of a diverse set of capital regulations rose to prominence during the hey-day decade of globalization of finance in the 1980s. Capital adequacy requirements, as will be analyzed in detail later, arguably come at a cost to the growth and competitiveness of banks and the real economy, as raising capital imposes additional costs on banks for every asset they invest in. In a domestic environment in which all banks play by the same rules, this cost is borne equally by all banks, and is not compounded by competitive loses due to unbalanced regulation. This is not true for a global financial market of multinational banks, where divergent capital regimes mean banks face very different regulatory burdens. The competitive advantage offered by lax capital controls is best illustrated by the amazing growth of Japanese banks during the 1980s. In 1981 Japan's banks controlled just over 25% of the assets of the world's 20 largest banks, and had only one bank amongst the top ten in the world (Ibid: e693). However, they were operating in a booming economy with extremely high savings rates and, crucially, a regulatory environment that only demanded capital ratios of 2.5%. During the decade American banks, also working in a booming economy but facing capital requirements of between 5% and 6%, would triple their assets (Burhouse, et al, 2003). The assets of Japan's banks, however, grew by a factor of thirteen (Tarullo, 2008: e687). And in 1988 nine of the top ten largest banks worldwide were Japanese, with the country's banks controlled 70% of big-bank assets (Ibid: e693). As Japanese banks grew, they expanded into foreign markets, particularly in to the already anxious US market. Japanese banks grew from holding a 5% share of US bank assets in 1982, to a 9% share in 1986, prompting the Chairman of the New York Fed, Gerald Corrigan, to testify to Congress that "the single item on which I place greatest

emphasis relates to bank capital adequacy standards and specifically the goal of moving Japanese bank capital standards into closer alignment with emerging international standards" (Hall, 1993: 409).

This is not to say weak capital regulation was a good strategy in the long-run, particularly considering that by 1997 Japanese banks would face ¥27.9 trillion in non-performing loans, leaving the country in a quagmire of stagnation from which it is still struggling to emerge (Owualah, 1999: 659). However, in good times, these long-term costs are abstract and uncertain, whereas the immediate costs are plainly evident on balance sheets and in the hard competitive environment of the finance sector. The short-term losses placed significant political pressure on countries with stricter capital regulation, and left them with the choice of either engaging in a dangerous race-to-the-regulatory-bottom, or attempting some level of global coordination that would harmonize regulation[2]. For banks in countries with weaker regulation, such as Japan, there remained substantial pressure to keep the preferential regulatory climate. In the end, it was only the threat by American regulators to unilaterally apply capital rules to Japanese bank operating in America that forced the Japanese government to buy into what would become the first Basel Accord.

The core-motivating factor behind the Basel process was, however, the risk posed by the increasingly interconnected nature of the global financial system. Bank balance sheets no longer consisted of domestic assets and domestic liabilities, they also included large exposures to foreign counterparties. The

[2] Recently, competition considerations have once again become an issue, as different regulators apply Basel III capital rules in different ways. See, for example: http://www.ft.com/intl/cms/s/0/d95f379c-ace4-11e2-9454-00144feabdc0.html?siteedition=intl#axzz2kQ6mtRCo

internationally connected nature of banks was brought home by the collapse of Germany's Herstatt Bank. Herstatt, a large German bank, declared bankruptcy on 26 June 1974 (Tarullo, 2008: e545-565). At that time, the bank held millions of dollars in outstanding foreign exchange payments, which simultaneously disappeared from the balance sheets of banks around the world: an effective instantaneous run on banks that resulted in huge write-downs. Shaken by Herstatt and related crises, and unsettled by increasingly competitive and unmanageable international financial markets, the central banks of the world's thirteen leading financial centers committed to improve cooperation on regulatory matters. The result was the founding of the Committee on Regulation and Supervisory Practices, the direct predecessor to the Basel Committee on Banking Supervision, or BCBS.

While the committee was founded in 1974, it would only release its first major work – the Basel I Accord – in 1988, following a raft of further crises in the 1980s. The fallout from the collapse of the relatively small Penn State bank typified the instability of that time. The bank had grown exponentially on the wave of the energy bubble, betting big on loans to local oil and gas producers. When OPEC released their excess quotas into the global market in 1981, the boom came to an abrupt halt, and prices began falling (FDIC, 1998: 527-542). Although this was clearly devastating to Penn State, a larger concern was that the bank had sold off participations to a range of other large banks, including to Continental Illinois, at the time the seventh largest bank in the United States. The write-downs from Penn State coincided with even larger losses from sovereign loans to LDCs, notably Mexico, which would default in 1982. The combination sparked an electronic run on the bank, which was largely driven by foreign

depositors in Japan, the Netherlands, West Germany, and Switzerland (Ibid: 545-565). The Federal Reserve and Federal Deposit Insurance Corporation (FDIC) eventually bailed out Continental Illinois, classifying it by the now infamous moniker of "too big to fail" (Tarullo, 2008: e569). The collapse highlighted both the danger of systemic risk and the growing importance of foreign depositors, and reinvigorated global regulatory coordination efforts in Basel.

Basel I

The rebranded Basel Committee on Banking Supervision was housed within the structures of the Bank of International Settlements (BIS) in Basel, Switzerland. Initially founded to facilitate reparation payments after World War I, the BIS had since become a forum for collaboration and research on improving monetary policy and global financial stability, a role it continues to play today (BIS, 2005). The BIS also offers financial services to central banks, playing a role that resembles that of a central bank for the world's central banks. This is very much a secondary role for the organization, and these services are mostly limited to providing currency accounts, forex and gold trade services, and some asset management assistance. All these activities are only available to central banks, and result in the BIS holding SDR192,966 million ($296,000 million) in liabilities in 2013 (BIS, 2013).

While the organization has a board of directors and secretariat, it is primarily a space for cooperation between independent central banks, and as such many decisions are made on an ad-hoc basis. This informal structure makes for a diffuse and uncertain distribution of power, with influence often based on 'soft power' considerations, such as personal credibility. Indeed, South Africa's influence in the committee has sometimes come from unlikely sources, with the

previous Registrar of Banks Mr. Wiese attributing his appointment to the Bank Supervision Liaison Committee to a bond he formed with the Secretary General of the Basel Committee while stranded together after a trip down the Danube during a conference in Vienna (Hawkins, 2007: 12-13). The independent status of each central banker is reflected in the fact that all BIS directives are non-binding on members, and are purely the responsibility of individual central banks.

Below the central structures are a number of subcommittees, including the Basel Committee on Banking Supervision (BIS, 2005: 19). The Committee follows in the BIS tradition of providing a forum for discussion between Central Bankers, with these focused on the subject of Bank Regulation. Although the committee is open to work on all aspects of the subject, their most prominent role has been their attempt to establish a global capital measurement system and regulatory standard, a project that is represented by a series of core documents known as the Basel Accords.

Negotiations on a global regulatory standard began in the late 1980s, with a number of bi- and multilateral agreements on the subject predating more formal Basel Committee negotiations between representatives from 13 countries (the G10[3] plus Switzerland, Luxembourg and Spain), and concluding in 1988 with the release of *International Convergence of Capital Measurement and Capital Standards*, commonly known as Basel I (Tarullo, 2008: e730-738; BCBS, 1988). Basel I would spur global implementation of the type of instruments that the Basel Committee would continue to use in later iterations, and reactions to the

[3] Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

first Accord would form a prime motivator for the reforms that eventually lead to the questionable Basel II accord, and the current Basel III accord. As such, the historical legacy of the first Accord remains very influential today.

Basel I's primary component was the introduction of a system of risk-weighted capital adequacy requirements. Banks can fund their activities with either their own wealth (capital), or with some form of debt, such as loans from other banks or money from customer's deposits. Capital is loss-absorbing, meaning that a loss on an investment (say, a loan default) is able to be written off as a loss of the bank's own money. This protects debtors and deposit holders, and prevents losses to an individual bank from spilling over to the broader financial system. It also protects the bank, since so long as they have adequate capital to cover their losses, they will be able to access credit from the wholesale banking market, and continue their operations.

Capital adequacy requirements set a minimum level of capital that must be held by banks. The Basel I ratio was set at 8% of risk-weighted assets. Risk-weighted assets refer to the total value of all bank assets, but with safe assets counted as being lower than their real value, and thus requiring less capital. Assets weighted at 100% accrue the maximum capital requirement of 8% of the value of the asset, while assets rated at 50% would require a capital ratio of 8% of half the value of the asset. Basel I weightings were based on the assumed risk of the counterparties, rather than on any calculated economic risk. Meaning, for example, that a loan to two companies with different probability of default would require equal amounts of capital, since all that mattered was that both counterparties were private companies. Table 1 shows the risk weightings for a sample of assets under Basel I.

Category	Risk-Weight
Cash	0%
Claims on domestic central government	0%
Claim on OECD Country	0%
Claims on domestic public sector entities	0%, 10%, 20% or 50% (at national discretion)
Claims on multilateral development banks	20%
Claims on OECD banks	20%
Claims with maturity of less than one year, on non-OECD banks	20%
Claims on OECD public sector entities	20%
Residential mortgage loans	50%
Claims on private sector	100%
Claims with maturity of greater than one year, on non-OECD banks	100%
Claims on non-OECD governments	100%
Fixed Assets, real estate and other investments	100%

Figure 1: Basel I risk-weights (Tarullo, 2008: e823-833)

Although the regulations were not technically binding, they were adopted by all the Basel Committee members, and quickly spread to countries outside the committee, finally being adopted in over 100 additional regulatory areas outside of the Committee's membership (Tarullo, 2008: e914). At the time, South Africa was not a member of the Basel Committee and was still regarded as an international pariah state, but was nevertheless an early and enthusiastic participant in the Basel process, having completed application of the rules soon after the release of the final Accord (Hawkins, 2007: 12- 13). The Basel Accord was formally institutionalized into South African law in a number of ways, the

most prominent being changes made to the Banks Act of 1990 (SARB, 2005: 17-18).

While the theoretical work on the Basel Accords will be thoroughly analyzed in Section 3, it should be noted that the initial Accord had remarkably little basis in pure economic theory. While multiple theoretical works emerged in response to the Accords, there is no ideal-type model of capital regulation, nor any clear market failure that they are meant to correct. A number of prominent economists (albeit writing before the financial crisis) still maintain that banks will choose the most social effective capital ratios without regulation. The most prominent of these critics is perhaps Douglas Gale, who maintains that markets allocate risk more efficiently in the absence of capital regulation, and that regulation can actually spark a move to more risky bank behavior to offset the costs of the regulation (see Allen & Gale, 2003; Gale & Orguz, 2004; Gale, 2010). The lack of theory reflects the fundamentally technocratic, and often responsive, nature of the development of the accords and of capital adequacy requirements more generally. Regulators tended to cite market conditions, particularly the rising leverage levels of the 1970s and 1980s, as the motivating force for their interventions. Others go further, identifying moral hazard issues like the existence of deposit insurance or too big to fail, but in general Basel I was driven more by the evolving financial conditions of the time, rather than by any theoretical concerns.

Basel II

Despite the widespread application of Basel I, the Accord came under increasing criticism on a number of grounds, of which three are particularly important.

The first was over the inaccurate blanket categories used to determine the risk of any given asset. The 'risk-buckets' were inaccurate on two levels. The first was that they often didn't reflect reality, with many wealthy developing world states and blue-chip corporations still bracketed at the maximum 100% risk level. But the second and more important was that they missed the extreme diversity within each category, weighting two counterparties of divergent risk at the same level. This is particularly problematic since much of the information that could distinguish between, for example, a safe multinational and a risky start-up, was readily available. Banks are effectively risk-calculating machines, and every loan would have required an extensive risk profile of the counterparty. The risk system used under Basel I was therefore widely regarded as attractive in its simplicity, but unnecessarily inaccurate.

The risk brackets contributed to the second critique, which argued that bank risk might have actually increased under Basel I. The risk-weighting system of Basel I required that banks hold higher capital levels for riskier assets, imposing a capital cost on these risky assets, and thus driving a move to investment in safer assets. However there was great diversity of assets within each risk band. Riskier investments within any given risk band should offer higher returns, and therefore there was an incentive to invest in the riskiest item within each band. Banks could therefore have taken on more risk even while moving towards greater investment in safer asset categories, because they invested in the highest risk assets within each risk band. While empirical research on this was mixed, studies such as Koehn & Santomero (1990) and Gennotte & Pyle (1990) support the claim that banks actually got riskier under Basel I.

Finally, banks had increasingly responded to the Basel Accord by means of regulatory arbitrage, using loopholes and unregulated areas to move risk off their balance sheets, and thus avoiding additional capital charges. Securitization was a particularly powerful way for banks to weaken their capital requirements, since the Shadow Banking industry – the collection of non-financial intermediaries that are closely intertwined with mainstream commercial banks - remained largely free of capital regulation. In 1998 American banks held non-mortgage securities that were worth more than 25% of their risk-weighted loans, summing up to $200 billion that lay beyond the reach of Basel I capital requirements (Jackson, et al, 1999). Regulatory arbitrage didn't just threaten the Basel Accords, but rather threatened capital requirements more fundamentally, as banks were able to hide substantial assets in structured finance that wasn't adequately regulated.

The Basel Committee's response to these criticisms was an updated set of regulation named *International convergence of Capital Measurement and Capital Standards: A Revised Framework*, and commonly known as Basel II (BCBS, 2004). Perhaps the core reform introduced in Basel II, and a direct response to the criticisms leveled against Basel I, was the move to a more complicated and responsive system of risk calculation. Risk buckets were eliminated and replaced with a choice between two systems: the Internal Ratings Based, or IRB approach, and the Standardized Approach.

The IRB approach came in two varieties, the Fundamental Approach and the Advanced Approach, both of which made use of bank's internal risk assessment models to calculate the risk attached to an asset, and the subsequent capital levels required. The reasoning behind this move was that banks were best

equipped to make judgments on risk: with the most information, more sophisticated systems, and most experience in calculating risk. There were some regulatory checks and balances on this mechanism, including initial checks on the model used and later checks on the validity of results. At the start of each day, banks were required to declare their calculated estimates of Value-At-Risk (VaR) to monetary authorities, which then applied a back-test that compared the VaR estimated to the subsequent realized returns (McAleer, et al, 2009). Failure to meet standards within this back-test would then lead to the imposition of the models used under the Standardized approach.

The Standardized approach was primarily designed for smaller banks that couldn't bear the strain of taking on complex IRB calculations. This was a more simple system that kept some risk buckets, only in a largely updated and more responsive form, and only made use of them when lending to unrated counterparties. The Standardized approach made heavy use of rating agencies, which also played a role in the IRB approach, offering calculations of risk for sovereign debt and certain securities. These agencies – such as Moody's, Standard and Poor's, and Fitch – aimed to provide information similar to the internal risk model within banks, only for assets that required knowledge and monitoring beyond simple risk profiles of single counterparties. Often vilified, and sometimes rightly so, the rating agencies nevertheless filled a major hole in the Basel II reforms. Designating risk calculations to banks is based on the principle of giving these calculations to those best placed to make informed decisions. And yet banks are badly placed to calculate the risk associated with sovereign debt or specialized securities that make uses of information scattered across numerous financial instructions (Tarullo, 1616). The lack of information

and coordination needed to accurately gauge the risk of these assets required a specialized rating agency, that would, at very least, make better decisions than if risk calculations were left to banks or unresponsive government-set risk buckets. Where both banks and rating agencies were badly placed to make these decisions, monetary authorities would measure risk through a highly complex regulatory formula

Overall, Basel II was a big step towards much more responsive and individually measured calculations of risk. It also was a step towards much greater complexity, with the core of the risk-weighting moving away from a predetermined list of a risk-buckets, to an array of incredibly complex mathematical models, understood by few and accountable to even fewer. It also broke off any chance of divergent risk opinions between regulators and those in the private sector. The regulations were now based on the calculations of the private sector, and their thinking was therefore the core determinant reflected in regulation.

The changes to the calculation of risk-weighted assets meant that even though the minimum capital requirement of 8% of risk-weighed assets remained the same, the real amount of capital banks were required to hold would change significantly. Because the changes brought about by Basel II are based on specific sets of information, particularly the nature of models used and the specific make-up of a given bank's balance sheet, it is not possible to say with certainty whether the rules constituted an increase or decrease in the amount of capital banks were required to hold. In South Africa, for example, Basel II had relatively little impact, since conservative South African banks tended to avoid risk and held capital levels well in excess of the regulatory minimum. Other banks saw a substantial

increase in capital requirements. Smaller banks in non-G10 countries, for example, which were exposed to large increases in their capital requirements for sovereign exposures under Basel II, faced the prospect of capital requirements increasing by just below 20%. Overwhelmingly however, these increases were outliers, and the general trend under Basel II was a decrease in capital requirements. Table 2 highlights the changes in capital requirements estimated by the Basel Committee's fifth and final Quantitative Impact Study (QIS) for Basel II.

	STD	FIRB	AIRB	Most Likely approach	
G10 Group 1	1,70	-1,30	-7,10	-6,80	Total
	1,80	-4,00	-11,00	-10,60	Tier 1
G10 Group 2	-1,30	-12,30	-26,70	-11,30	Total
	-1,20	-14,00	-26,20	-12,90	Tier 1
CEBS Group 1	-0,90	-3,20	-8,30	-7,70	Total
	-0,50	-4,70	-9,50	-8,90	Tier 1
CEBS Group 2	-3,00	-16,60	-26,60	-15,40	Total
	-2,60	-16,40	-26,10	-15,10	Tier 1
Other non-G10 Group 1	1,80	-16,20	-29,00	-20,70	Total
	1,80	-17,90	-27,70	-21,00	Tier 1
Other non-G10 Group 2	38,20	-11,40	-1,00	19,50	Total
	34,50	11,00	-1,10	17,90	Tier 1

Figure 2: Percentage change in capital requirements under Basel II (BCBS, 2006: 10,14)

Given that the BCBS's own calculations have demonstrated that Basel II would, on balance, decrease capital requirements, some have interpreted the second accord as a loosening of bank regulation which, given the hindsight offered by the financial crisis, seems a serious mistake. This characterization, however, is perhaps unfair. Decreasing capital requirements make sense given the logic of

the problem Basel II was trying to correct: risk-buckets were inaccurate, and erred too far on the side of caution. Therefore more accurate calculations wouldn't overshoot the 'true-risk' measure as drastically, and unnecessarily high capital requirements would decrease. This overshoot is potentially damaging because of the cost imposed by capital adequacy requirements, which can encourage banks to reduce lending or increase borrowing costs. Holding the minimum amount of capital necessary to assure stability is therefore the optimal structure for capital regulation. More accurate measurement of risk should be able to achieve this, and therefore in an ideal world the decrease in reserves seen under Basel II should not have made banking more risky, it just should have made credit cheaper and more readily available.

Changes were also made to the type of capital that could be used to meet reserve requirements. Basel II introduced a three-tiered system of capital. The first tier consisted of the most high quality and most liquid assets, which included equity, cash, and highly-rated government bonds. Tier 2 consisted of less sound assets but which were generally assumed to be of good quality, including undisclosed reserves and hybrid debt-capital instruments. Finally, Tier 3 assets were of low quality, and included items like subordinated and unsecured debt. Banks were required to hold 4% of their reserves in Tier 1 Capital, 3.5% in Tier 2 capital, and 0.5% in Tier 3 capital (although they were of course permitted to hold capital in excess of any of these limits).

Basel II was first released in 2001, with the final revised draft released in 2005, and implementation around the world progressed at different rates. When the financial crisis hit, many countries were still in the process of implementing reforms. But the Accord was warmly received by regulators around the world,

and implementation was planned in at least 88 regulatory areas beyond the core Basel Committee Members (FSI, 2004). This included 16 African regulatory areas, encompassing at least 28 African countries (Ibid: 3,14). South Africa formally implemented Basel II on the 1st of January 2008.

Basel III

When the 2007/2008 financial crisis hit the assumptions underlying the safety of Basel II risk calculations were thrown into serious doubt. The crisis highlighted that capital levels were inadequate relative to banks' enormous levels of (often off-balance sheet) leverage, and unable to cushion the blow from the collapse of major, systemically important institutions such as Lehman Brothers. The crisis also demonstrated that even if capital regulation had been adequate, capital positions could be quickly eroded as banks were forced to write-down the value of lower quality capital. Finally, the crisis made clear that even solvent banks could struggle to gain access to the liquidity needed to keep operating efficiently, in light of an interbank loan market that froze over uncertainty of how large banks' exposures were relative to their capital.

Basel III: A global regulatory framework for more resilient banks and banking systems (BCBS, 2011) responds to these failures by introducing a raft of major changes to the Basel II accord, of which eight are particularly important

1. Introduction of a Capital Conservation Buffer
2. Introduction of a Countercyclical buffer
3. Introduction of a buffer for SIFIs
4. Changes to the type of capital eligible for use in meeting regulatory requirements
5. Expansion of assets that require capital reserves

6. The introduction of short-term liquidity rules, particularly the Liquidity Credit Ratio
7. The introduction of long-term liquidity rules, particularly the Net Stable Funding Ratio
8. Introduction of an unweighted Leverage Ratio

Three Buffers and Higher Capital Requirements

The most direct change is to increase the quantity of capital required relative to Basel II. Despite this, the core amount of capital required for a 100% risk weighted item remains the same, sitting at 8%. The change is achieved through the introduction of three additional buffers that will result in capital levels of between 10.5% and 15.5%. The first buffer, which will be universally applied to all banks at all times, is the Capital Conservation Buffer. The CCB requires an additional 2.5% high quality Tier 1 capital to be held. Aside from simply increasing the level of capital required, the CCB also aims to correct the regulatory contradiction around capital reserves. In times of crisis, capitals should absorb shocks, but doing so runs the risk of eroding capital levels to below the regulatory minimum. Crisis hit banks could therefore possibly face punishment for using capital for its intended purpose. In practice, it seems hard to believe that regulators would punish firms that make use of capital reserves. But nevertheless, the CCB offers a clearer means to manage this. It provides a first layer of capital that can absorb shocks without banks dropping below their core regulatory requirements. Although banks are required to keep the CCB above 2.5%, failure to do so only activates a leeway period in which they cannot pay dividends or bonus payments.

The second buffer is the countercyclical buffer. There has been substantial debate throughout the history of the Basel Accords over the potentially procyclical nature of capital regulation. In good times, the high returns on offer to banks make it easy to raise capital, and thus the cost of managing capital reserves decreases, leading to an expansion of credit that could overheat the economy. Conversely, in bad times, banks may struggle to retain adequate levels of capital, making banks more vulnerable when they most need protection, and making them less likely to extend the type of credit needed to fuel a recovery. The countercyclical buffer offers a means to smooth the swings associated with the procycliality of capital regulation. It ranges between 0% and 2.5%, with the level set depending on macroeconomic conditions, and the ratio being higher in good times. This helps correct some of the countercyclical swings, but also incentivizes banks to accumulate extra capital in the good times, when doing so is cheapest and easiest, in preparation for downturns.

The third and final buffer is yet to be confirmed, but would apply only to Systematically Important Financial Institutions, or SIFIs. The SIFI buffer is an acknowledgement that some institutions stand to cause far greater damage than others if they were to fail. SIFIs are banks that are 'too big to fail', and the buffer is a recognition that these firms must be treated with extra caution, and require additional regulation to account for the moral hazard of their systemic importance. While the buffer is still being debated, the proposed range is between 1% and 2.5%, with domestic regulatory authorities able to ascribe which institutions would be required to hold how much, within the given range. A sub-category of SIFIs, Global Systemically Important Banks, or G-SIBs, could face a further expanded set of rules, although these remain uncertain.

In total, the maximum possible capital level, which would be leveled on a systematically important bank during an economic boom, would be 15,5% of risk-weighted assets, almost double the level required under Basel II.

Changes to the Type of Capital used for Reserves

While the increasing overall level of capital required appears as the clearest and most prominent change, shifts in the type of capital required are as important. Basel III requires banks to hold higher quality capital. Capital under the Basel regime comes in four types (Accenture, 2011). The first is core Tier 1 capital, or CET1, which is composed entirely of common equity. This makes up the bulk of the first tier, with the remainder made up of Additional Tier 1 capital, composed of lower quality equity such as noncumulative perpetual preferred stock. Together these two form total Tier 1 capital, the highest quality category in the Basel Accords. Tier 1 capital is going-concern capital, meaning it would primarily be used to protect the bank from insolvency in times of crisis. In contrast, lower quality Tier 2 capital is gone-concern capital, which would be used to repay debtors in the case of a failure of the bank, thus preventing contagion. Tier 2 includes undisclosed reserves and hybrid debt-capital instruments. Finally, the lowest level was Tier 3 capital, comprised of newer instruments, such as subordinated debt. Under Basel III, Tier 3 capital is eliminated altogether, while Tier 2 capital requirements are reduced, from 3.5% to 2%. Additional Tier 1 Capital is reduced from 2% to 1.5%, while core CET1 capital increases from 2% to 4.5%. In additional, all three buffers mentioned above must be comprised of CET1 capital. Figure 1 below described the changes in capital requirements across the three accords.

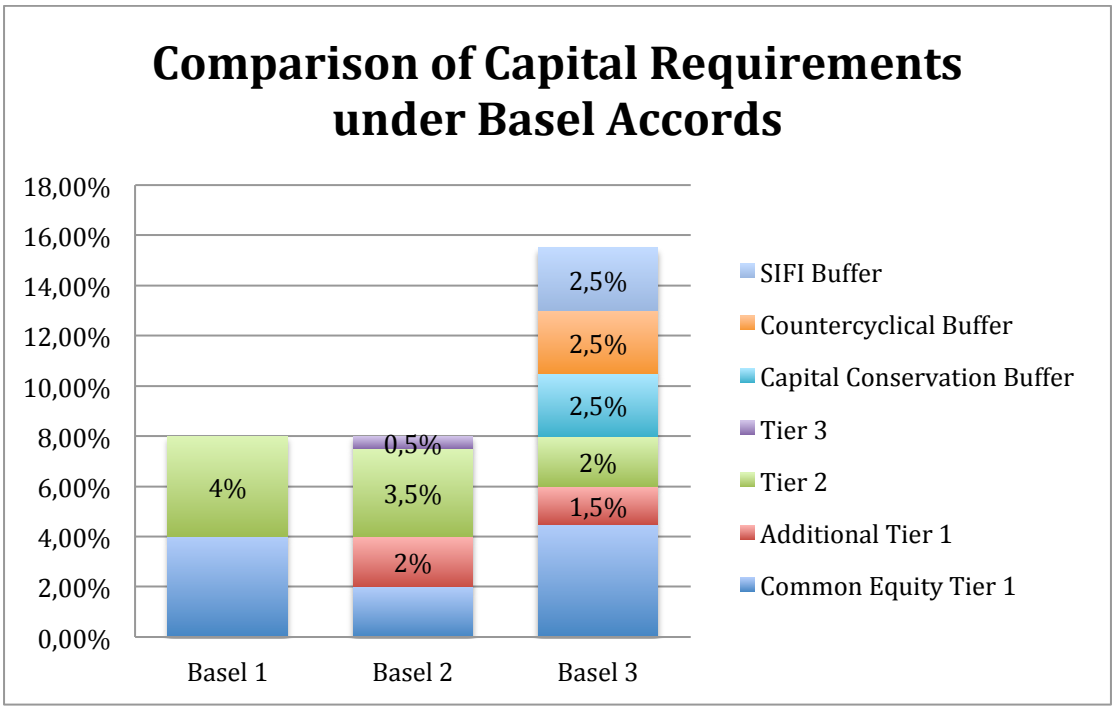

Figure 3: Comparison of Capital Requirements under Basel Accords (BCBS, 1988; BCBS, 2005; BCBS, 2011)

Introduction of Liquidity Requirements

Perhaps the biggest regulatory flaw revealed by the financial crisis was the extent to which even adequately capitalized banks were unable to access useable, liquid cash. In theory, so long as banks hold sufficient capital to remain solvent in times of crisis, then they should be able to access credit markets that would allow them to ride out shocks. The emergence of a strong wholesale credit market was one of the reasons capital requirements have become more important than reserve requirements. But as the crisis hit, and uncertainty reigned over which banks truly held enough high quality capital to be considered solvent, the interbank loan market seized, and a liquidity crunch took hold.

As such, Basel III introduces a comprehensive set of liquidity requirements to avoid just such a liquidity crunch being repeated. There are two measures introduced, dealing with the short and long term respectively. The short-term measure, the Liquidity Coverage Ratio or LCR, requires banks to hold liquid

assets adequate to cover a stress test simulating a thirty-day electronic run on the bank. The stress test will calculate total net liquidity outflows over those 30-days, and set this level as the minimum amount of high quality liquid assets the banks must hold. Formally presented, the LCR is calculated as:

$$LCR = \frac{High\ Quality\ Liquid\ Assets}{\begin{matrix} Total\ net\ liquidity\ outflows \\ over\ thirty\ day\ time\ period \end{matrix}} \geq 100\%$$

Longer term assets will be governed by a different mechanism, the Net Stable Funding Ratio, or NSFR. The NSFR is not concerned with the liquidity of capital per say, but rather with the availability of stable, reliable sources of funding for any funding obligations arising. The level of stable funding required is calculated via a simulated 1-year stress test scenario, which in effect means that banks must have planned stable funding for a year. The formula for the NSFR is therefore:

$$NSFR = \frac{Available\ stable\ funding}{Required\ stable\ funding} \geq 100\%$$

Both are concerned with assuring that banks address their prevailing maturity mismatch, in which short-term deposits are used to fund long-term assets, in so doing weakening their ability to meet short-term obligations. By assuring liquid assets are available for short-term obligations (such as, for example, demand deposits), and that longer-term assets are funded by long-term liabilities (such as, for example, fixed term investments), banks should have enough liquidity to see them through any unforeseen shocks, even in the absence of interbank credit.

Introduction of a Leverage Ratio

The final major change brought about by Basel III is the introduction of a Leverage Ratio. The leverage ratio dictates the total amount of exposure a bank can hold relative to its total unweighted capital. The ratio dictates that total exposure cannot be more 33 times larger than the amount of Tier 1 capital held, or more formally:

$$Leverage\ Ratio = \frac{Tier\ 1\ capital}{Total\ Exposure} \geq 3\%$$

The Leverage ratio acts as a back-stop minimum level of capital, and if the other requirements work, it should rarely come into force, as risk-weighted requirements maintain a level of capital above this minimum level. The leverage ratio is an attempt to avoid both excessive leveraging and to address two concerns raised about previous accords. The first is the potential for regulatory arbitrage, particularly in risk-weighting, in which banks find ways to lessen their regulatory burden through loop holes in the regulation. With a document as excessively long and complex as Basel III – 616 pages for an early draft of the core document alone - regulatory loopholes are a reasonable expectation, and the leverage ratio prevents the presence of such gaps from leading to dangerous over-leveraging. A second and related function is to capture assets that are not easily taken in by the rest of the regulations, particularly off-balance sheet assets, including mortgage backed securities like collateralized debt obligations. Bank exposure to the Shadow Banking Sector was perhaps the primary driver of the recent financial crisis, and this leverage ratio hopes to avoid the type of excessive exposure witnessed in recent years.

Benefits of Basel III

It is extremely difficult to calculate the positive effects of a policy like Basel III, since it relies on calculations of the extent to which the policy will avoid or reduce the severity of potential future crisis, and thus requires major assumptions on unknown future economic swings. A comprehensive study of the stability improving effects of Basel III lies beyond the scope of this paper, which focuses more on downside concerns of the regulation. But it should be noted that the Basel III accord looks like a substantial move forward in protecting against financial crises and reducing the severity of crises that do occur. The reforms detailed above should give banks more capital to protect against losses, and more capital that retains its value in times of crisis. While it is very difficult to calculate the potential stability-promoting effects, one can reasonably assume that the regulation will make banks better equipped to face a broad range of crisis. Some calculations on the subject support this belief. A 2011 joint study by the BCBS, Financial Stability Board, and Macroeconomic Assessment Group estimated that the reduced frequency of crises will lead to a 2.5% increase in GDP, at a cost of a 0.35% reduction in baseline GDP from tighter capital rules. BCBS calculations estimate that the net benefit of Basel III grows progressively greater as capital ratios increase, as illustrated in Figure 2.

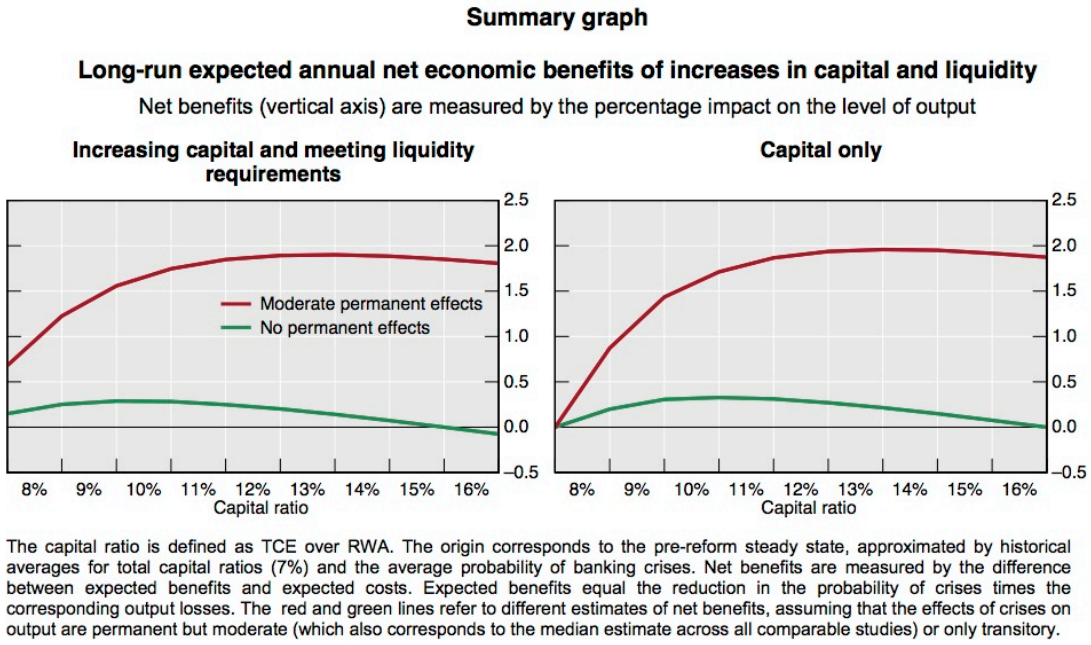

Figure 4: Long-run economic benefits of increases in capital and liquidity (BCBS 2010)

Despite these promising findings on the international level, it should be noted that there are potentially lower gains to be had in South African and the African continent more generally. African banks tend to be relatively conservative, keeping capital levels above regulatory requirements and avoiding excessively risky exposures. Because of this, the probability of financial crises in Africa is lower than in the rest of the world (even if the probability of political and macroeconomic crises remains high), and African banks could stand to bear the cost of the technical implementation of Basel III without necessarily receiving the benefit of greater stability. Caggiano and Calice (2011) sample 53 African countries over a period between 1985 and 2009, and find the probability of a crisis occurring in a given year is 2.7%, relative to levels between 4.1% and 5.2% for G10 countries over the same period. This resilience was clearly evidenced during the financial crisis of 2007-2008, where African banks proved to be markedly resilient relative to European and American banks. Despite this, the same study by Caggiano and Calice does find positive benefits from Basel III in

terms of the reduced frequency of crisis on the continent, culminating in a positive effect on GDP, in line with international expectations.

Costs of Basel III

While Chapter 3 will address the core theoretical effects of Basel III in much more detail, it is useful to acknowledge in a general sense the cost of such regulation. Capital is regarded as a more expensive form of bank funding than liability financing through deposits or debt. Assuming banks don't want to bear the additional costs associated with extra capital, they can respond in three ways: banks can pass the costs on in the form of higher interest spreads, they can reduce the number of loans they issue, or they can shift to lower risk assets. All three alternatives impose costs on the wider economy. In the case of Basel III and the Basel Accords more generally, both this core cost and extra idiosyncratic costs are evident. These additional costs might include increased risk aversion and the moving of capital away from vulnerable borrowers, the creation of liquidity shocks, undue strain placed of the supply of certain assets (particularly government bonds), and aggravating damaging investment cycles.

Macroeconomic costs of Basel III

Econometric estimates of the macroeconomic impact of Basel III are largely based on calculations of changes in lending spreads. A summary of the main studies completed to date are listed in Table 4 below.

Report	Summary impact	Coverage
BCBS/FSB/MAG (2010). Final Report. Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirement.	Reduction in GDP between 0.22% and 0.25% at the point of peak impact.	16 countries + Euro Area
BCBS/FSB/MAG (2011). Assessment of the	Reduction in GDP between	16 countries

macroeconomic impact of higher loss absorbency for global systemically important banks.	0.34% and 0.35% relative to baseline. Reduced frequency of crisis will lead to up to 2.5% increase in GDP per annum	+ Euro Area
BCBS (2010). An assessment of the long-term economic impact of stronger capital and liquidity requirements.	1% increase in capital will lead to 0.09% decline in output. Meeting liquidity requirements will lead to 0.08% decline in output	Basel Committee members
IIF (2011). The Cumulative Impact on the Global Economy of Changes in the Financial Regualtory Framework.	Reduction in GDP by 3.2% over the next five years, Combined 7.5 million job losses.	US, Euro Area, Japan, UK and Switzerland
IMF (2011). Macroeconomic Costs of Higher Bank Capital and Liquidity Requirements.	Cumulative reduction in GDP between 1% and 1.3% in Euro Area and slightly less in US. Liquidity requirements will lead to cumulative reduction in GDP by 0.8% in Euro Area and 1% in US	US, EU
OECD (2011). Macroeconomic Impact of Basel III.	Implementation of Basel III will lead in the medium-term to reduction in GDP between 0.05% to 0.15% per annum	United States, Euro Area, Japan

Figure 5: Selected studies on macroeconomic cost of Basel III (Pagliari, 2011)

Out of this sample, the best case scenario is an OECD study that estimates a reduction in medium term GDP growth of 0.05% to 0.15% relative to the baseline. On the other end of the spectrum is an Institute of International Finance (IIF) study, which estimates a staggering cost of 3.2% lost GDP over the next five years, and the shedding of 7.5 million jobs. Such dramatic estimates should perhaps be taken with a pinch of salt, given that the IIF represents the global financial industry, and has taken a lead role in lobbying against increased regulation. The real short-term cost of Basel III reforms will remain uncertain until the regulation is implemented, but the studies indicate that low 1% loses in

output are most likely. Whichever way you look at it, and as necessary as the reforms no doubt are, there is a very real, albeit small, economic cost of Basel III. This global cost will most likely affect South Africa, even ignoring the direct cost of the country's own application of Basel III, as it stands to feel the potential effects of any global macroeconomic slowdown via weaker export demand and other economic linkages with major trading partners.

Risk-weighted Assets and Lending to Vulnerable Groups

These types of broad macroeconomic costs stand to affect all economic actors, but Basel III's costs are not distributed equally. Swings such as reductions in the flow of capital, increases in lending costs, and a general economic slowdown will most likely harm more vulnerable actors in society more than others.

This unbalanced harm is particularly driven by Basel III's use of risk weighting. Risk weighting speaks to a fundamental truth of finance everywhere: not all borrowers are equal. In the eyes of policymakers and banks, the primary difference is risk, or the ability of a counterparty to repay a given amount of money. Often, the most risky counterparties include some of the most vulnerable and disadvantaged actors in society. These groups may find their disenfranchisement further compounded by their inability to gain access to the type of loan capital that could facilitate their social advancement or act as a safety net in difficult times. Providing access to these groups is thus a vital aim for any working financial policy.

And yet risk-weighted capital requirements of the type found in Basel III directly and explicitly disincentive lending to risky, vulnerable groups. This is achieved by increasing the cost of capital associated with risky counterparties, and thus increasing the overall cost of lending, and decreasing returns. Lower returns

would mean less incentive to take on the risk associated with lending to vulnerable groups, and banks might therefore be more willing to favor safer borrowers.

The South African Context

The effects of economic policy such as Basel III must be considered not only as existing within a world of economic rules and mechanisms, but in the specific, imperfect conditions of the places that apply them. Questions of complex finance are modeled in extremely sophisticated and impressive ways, but the undoutable benefits of these approaches are often ameliorated by the complexity of the scenario in which they are applied. This is especially the case in international regulatory efforts, where the sheer diversity of the economies in which the policy is applied precludes a careful accounting of the effects of the specifics on the ground. The Basel Committee is extremely impressive in the level of work done, usually with domestic regulators at the helm, on the country-specific effects of their policies. But nevertheless, popular understanding of policies like Basel III often arises from an abstract understanding of the policy acting on a world that exists only in the field of economics, informed by very powerful mechanisms of change, but limited by assumptions that are foreign to reality.

As shall be seen in Sections 2 and 3, South Africa is a uniquely complicated place to apply the findings. South Africa has one of the most efficient and sophisticated financial sectors in the world, and easily the best in Africa. The World Bank's Doing Business report places the country first in the world for "Getting Credit", getting full marks for the strength of legal rights and the depth of credit information (World Bank, 2013). South African banks tend to hold strong capital buffers, with current total regulatory capital ratios sitting at between 14% and

17% for the big four banks (according to Bankscope data). Beyond the basic health of the financial system, the capital stocks are helped by a legal system that promotes a cautious approach to bank leverage and client lending, and a historically conservative mindset amongst South African bankers. South African repo rates tend to fluctuate around the 5% mark, a historically stable rate that is aided by a Central Bank that is extremely focused on monetary stability, and very rarely uses interest rates as a form of macroeconomic stimulus, rather favoring a policy of targeting specific inflationary bands. On average, the South African private sector makes ample use credit, with the country's domestic credit to the private sector sitting at 151.1% of GDP in 2012, ranking as the 13th highest in the world (according to World Bank development indicators database).

But despite the undeniable healthy state of the banking industry, large parts of the population remain on the fringes of the financial sector. The industry has struggled to reach the risky but vulnerable "second economy", and many in the formal economy remain on the fringes. This fact is perhaps most clearly illustrated by the state of SMEs' access to finance. SMEs account for 98% of South African firms and contribute 35% of GDP, and yet only 8.7% of SMEs make use of bank credit (The DTI, 2008; Finscope, 2010). In a review of four studies of South African SMEs – Finscope, 2010; Olawale & Garwe, 2010; SBP, 2013; and World Bank, 2007 – access to finance was the only factor to appear as a top five restraint on growth across all fours studies.

The mixed picture of finance in South Africa will be considered in each of the following sections, with findings from theoretical and empirical work applied to the South African context, in an attempt to gauge the cost of Basel in South Africa.

Section 2: Increased Capital Costs

Increases in the cost of capital under Basel III could be driven by two forces: the increase in overall capital requirements (including buffers) and the increase in Tier 1 capital requirements, with this higher quality capital generally regarded as more expensive than less loss-absorbing capital. Banks could respond to this theoretical higher capital cost in four ways. First, they could swallow the cost and accept lower profits. Second, they could pass the increased cost of capital on to customers, through higher interest rate spreads. Third, they could deleverage, reducing the number of assets they hold and therefore their required capital. Fourth and finally, they could turn to less risky assets, lowering their risk-weighted assets and thus their capital requirements. The final strategy, risk-aversion, will be dealt with in Section 3, but all other strategies will be examined here.

Theoretical Effects

Modigliani-Miller

While there has been increasing acceptance of the idea that capital requirements could impose costs on banks that spillover to the real economy, this acceptance has only arisen after a protracted period of fierce debate. This is partly because theoretical explanations of this potential cost were underdeveloped, and the most important piece of theory in the field of capital structure – the Modigliani-Miller Capital Irrelevancy theory – is opposed to the idea of costs stemming from capital structure (Modigliani & Miller, 1958; Modigliani & Miller, 1961; Modigliani & Miller, 1963). Capital regulation controls the relationship between equity and debt financing for assets, and Modigliani-Miller would hold that these two financing options are equally costly. Financing operations with equity rather

than debt – as is dictated by an increase in capital requirements – would thus not change the overall cost of capital. However, many would argue that equity (and other qualifying assets) is more expensive than debt (and other liabilities like deposits). Banks therefore face higher costs of capital when regulation compels them to increase their usage of equity finance.

But the core assumption of that argument – that equity is expensive – is widely disputed, including by the Modigliani-Miller theorem itself. The theory argues that market value is purely based on a company's expected asset returns, with the average cost of capital constant across all possible combinations of equity and debt. This result is achieved because markets price-in the reduced risk attached to having less leverage, resulting in investors demanding lower returns on equity as leverage decreases. Equity investors and debtors basically act the same way – trading off calculations of risk and return, and thus they demand the same return on their respective investments.

Modigliani-Miller is a cornerstone theory in corporate finance and the debate on capital requirements, but it is highly restrictive, reliant on a range of unrealistic assumptions. Despite this, the theory has some empirical basis in the real world, and has been widely used as a starting point for recent arguments against the assumption of expensive equity in the context of Basel III. A range of authors - for example, Pfleiderer, 2010 and Hanson, Kashyap & Stein, 2010 - argue that the theory remains relevant in the current economic world of relatively efficient capital markets, and that, even if some frictions do exist, equity is only marginally more expensive than alternative sources of funding. The most impressive effort in this regard comes from Admati, DeMarzo, Hellwig & Pfleiderer (2011). The four argue that the claim of expensive equity is a fallacy

based on the assumption of static returns on equity, rather than responsive returns demanded as a result of decreasing risk associated with higher stockpiles of equity. They do admit that there are some costs to banks associated with tax incentives around a more highly leveraged structure (discussed below), but argue that these marginal benefits only accrue to the banks, whereas increased stability creates benefits for broader society. The final result of this line of thinking is that, since bank equity is not very expensive, there is little downside to requiring substantial capital ratios. These would costlessly improve systemic financial stability, resulting in broad benefits for society.

Restrictions on Modigliani-Miller

Despite this, most observers do see some capital cost attached to increased equity holding. Every major study on Basel III, including those conducted by the Basel Committee itself, has assumed some increased cost of capital. While more sophisticated challenges to the theory of capital irrelevance have been presented, a useful starting point are critiques based on the four key restrictions Modigliani-Miller place on their own theory. They argue that capital structure irrelevance only holds given the following assumptions:

1) Neutral Taxes (taxes that are equal regardless of capital structure).
2) No Capital Market Frictions (for example, no transaction costs).
3) Symmetric Access for firms and investors to credit markets.
4) Firm financial policy reveals no information (for example, loading up on equity doesn't send a message to the markets that the bank is undercapitalized relative to their risk position).

In the real world, all four restrictions fall. Of the four, taxes perhaps stands out as the most influential, with the tax-shield effect explored in the Orgler & Taggart Jr

(1983) model of optimal capital structure for banks. Since debt interest payments are tax deductible, the gathering of progressively larger pools of debt relative to equity results in a reduction in overall tax burden. The state effectively incentivizes banks to take on more and more leverage, offering a de facto tax subsidy to more indebted banks. The tax difference seems a clear and direct additional cost on holding equity capital, and plays an important role in influential models of bank behavior given capital shocks, such as Van den Heuvel (2002: 20-21).

The fourth factor is also worth mentioning, since the information disclosed by various bank actions can create a signaling problem. As argued by Myers & Majluf (1984), markets may counterintuitively view banks that seek additional equity as more risky. Because of the market's limited access to internal bank information, and because there is an assumption that it is costly for banks to raise equity, investors would see the issuance of capital as evidence that a bank is either undercapitalized or looking to build reserves in preparation for expected losses. The bank's move to reduce risk could thus be seen as evidence of the riskiness of the bank. Instead of the traditional Modigliani-Miller mechanism, by which investors price reduced risk into their considerations and therefore demand lower returns for greater levels of equity, investors could actually increase their return demands as more equity is raised, resulting in higher costs of capital. Different signaling fears also exist, with investors wary that banks may issue equity as the point at which it is most overpriced (Admati, et al., 2011: 59). Slovin, Sushka & Polonchek (1992), Wall & Peterson (1991), and Cornett & Tehranian (1994) examined the impact of announcing equity issuance on stock returns, and found strong evidence of abnormal negative returns. This

seems consistent with the hypothesis that the decision to issue stock was viewed as evidence that the market had overvalued financial firm's assets, and that some of the basic mechanisms at work in Modigliani-Miller do not hold true in the real world. Whether such a signaling effect would exist under Basel III remains debatable, since markets would be aware that changes in capital structure are the result of regulatory changes, and not any expectations of loss or high risks.

The Low Risk Anomaly

The pricing-in of risk is a problem that is broader than these few restrictions, and many question whether market's have the ability to accurately price in the lower risk associated with more equity, which is essential to keep the cost of equity capital low.

Empirical studies do seem to confirm that banks get less risky the more equity they hold (see, for example, Baker & Wurgler, 2013 and Kashyap, Stein & Hanson, 2010). And the latter study by Kashyap, Stein & Hanson argues that markets do price this risk into their valuations of firms, and thus the primary Modigliani-Miller mechanism is working.

But many other empirical studies hold that markets do not seem to be pricing this risk premium into their decisions. High risk banks (or firms in general) seem to offer equal or slightly lower returns to shareholders than less risky banks, despite that fact that theory would tell us that higher returns would be necessary to overcome the market's risk aversion. Baker & Wurgler (2013) investigate whether increases in bank capital holdings have led to a reduction in the cost of equity, using 40 years of American bank and stock return data. They find strong evidence that decreasing systemic and idiosyncratic risk through capitals holdings does not lead to a decrease in the cost of capital. They argue that

instead the relationship varies between being flat (decreasing risk doesn't impact the cost of capital) or even in some cases negative (decreasing risk actually increases the cost of capital). Because of this, they estimate that a theoretical 10% increase in Tier 1 capital requirements would have increased the cost of capital by between 60 and 90 basis points per year, tripling or doubling lending spreads faced by consumers. Their findings are in line with other studies of this Low Risk Anomaly[4], conducted in sectors outside of banking. The anomaly seems to be unique to stock markets, with risk being more accurately priced-in for government bonds or other very safe assets.

This inaccurate pricing of risk may be even more severe in the case of deposit holders, thanks largely to the moral hazard of Deposit Insurance. Since deposit holders are mostly covered by national insurance schemes, they are much less likely to consider the risk implications of highly leveraged banks. Deposit holders are thus largely unconcerned by the riskiness of bank capital structures, and therefore they do not demand higher returns as banks amass ever greater leverage. Both equity investors and deposit holders thus seems to have risk appetites well beyond that expected by Modigliani-Miller, meaning that leverage does not become more expensive as more is gathered and equity does not become cheaper as more is held – together making for a capital structure in which equity is more expensive than debt.

[4] See, for example, Haugen and Heins (1975); Fama and French (1992); Baker, Bradley, and Wurgler (2011); Baker, Bradley, and Taliaferro (2013); and Ang, Hodrick, Ying, and Zhang (2006, 2009)

Maturity Transformation

A further addition is offered in a model by Van den Heuvel (2002), who argues that swings in monetary policy or monetary conditions could incentivize loan rationing for banks constrained by capital adequacy regulation. More generally, the mechanism could work with shocks such as a rush of defaults or a collapse in housing prices, but the particularly focus here is on interest rate risk arising from banks' role in maturity transformation. Bank loans tend to have longer terms than bank non-equity liabilities (particularly deposits). Because of this, an unexpected increase in interest rates harms bank's profits, because the shorter-term liabilities adjust to the higher interest rate more quickly than the longer-term assets. These loses must be absorbed by bank equity, which can erode capital adequacy. Assuming that bank equity markets are not perfect (and in fact are quite expensive and difficult to access), Van den Heuvel argues that the most likely result of these swings would be a rationing of loans. This model is slightly different to other approaches, since it does not argue that capital requirements are just expensive to implement, but that prudential regulation could impose long-term costs over the length of the business cycle. If this line of thinking is true, it would mean Basel III has the potential to impose costs on banking systems, even if applied to banks that initially hold enough capital to meet the requirements. Finally, one point that complicates this matter is that the model also argues that better capitalized banks, particularly those holding a voluntary buffer about the regulatory minimum, will be better able to absorb monetary swings, and thus will likely be more profitable in the long-run, even given expensive equity. This is good news given the Capital Conversion buffer being introduced under Basel III. However, depending on how banks perceive this

buffer, it might mean they voluntarily choose to hold an additional buffer above the total regulatory requirement. This offers the prospect of Basel III encouraging even greater prudential buffers, to the benefit of financial stability, but potentially at a greater cost in foregone loan growth.

The Bank Capital Channel

Overall, there is substantial theory to support the belief that equity is more expensive and more difficult to raise than deposit or loan financing. Imposing capital requirements may therefore impose costs on banks that could encourage them to seek ulterior methods of meeting regulatory standards. Assuming that equity is expensive, capital regulation can then be met without impacting profits in three ways: raising more capital and passing the cost on to borrowers, reducing the overall amount of assets a bank holds, or moving to less risky assets. The third option will be explored in the Risk Aversion section below. But the first two together make up what has been called the Bank Capital Channel, in which banks holding high levels of capital results in increased lending costs or decreased lending opportunities for those in the real economy.

Empirical Evidence

The 1990s Capital Crunch in the US

This theoretical Bank Capital Chanel was given practical life in the form of a major credit slowdown in the 1990s, particularly in the United States. Following the 1987 collapse of the Dow Jones, and the ensuing financial chaos around the savings and loan crisis, economic growth dropped off from its recovery in the late 1980s to slump into a period of recession in the early 90s. A key component of this slowdown was the extremely weak level of bank lending around the world. While the problem began in the early 1990s in the United States, it spread

across the globe as the decade wore on, with some of the most startling examples including Finland shedding 44 percentage points of GDP between 1992 and 1997 in bank credit to the private sector, and Thailand dropping 36 percentage points between 1998 and 2000 (Barajas, et al., 2004). This was to be somewhat expected in a recession, as weak loan demand from the strained real economy offers fewer lending opportunities for banks. But the unusually slow recovery of credit led to a debate on whether these demand-side explanations were adequate, or whether supply-side problems were driving the credit-crunch. Particularly, the 1989 introduction of Basel I emerged as a potential explanation for the anemic recovery in credit supply. Table 5 compares the recovery of credit in 1990 to five other recessions.

Percent

Type of loan	*1960*	*1969*	*1973*	*1980*	*1981*	*1990*
All financial intermediaries						
Total loans	7.5	4.4	12.2	3.5	5.4	−3.6
Commercial-industrial loans	3.6	10.1	19.2	4.8	17.0	−2.4
Real estate loans	8.9	4.0	10.4	4.9	2.6	−3.7
1–4–family	8.6	3.3	9.9	5.7	1.6	−2.3
Other	10.6	5.8	11.9	2.5	5.6	−7.1
Consumer and other loans	7.6	0.2	10.0	−1.0	2.3	−4.3
Domestically chartered commercial banks						
Total loans	4.4	4.1	14.6	3.1	9.3	1.7
Commercial-industrial loans	3.6	10.1	19.2	4.8	16.8	−1.1
Real estate loans	1.6	2.9	15.4	5.8	7.7	5.9
1–4–family	−0.9	2.0	15.0	6.4	5.9	10.5
Other	6.9	4.2	16.0	4.8	10.7	0.1
Consumer and other loans	6.8	−1.3	9.7	−1.0	2.6	−1.7
Macroeconomic conditions						
Nonagricultural employment growth	−1.3	0.6	2.4	−0.9	−1.3	−1.3
Inflation	1.8	4.9	10.3	11.0	7.2	5.8

Source: Nominal loan data are from the Flow of Funds and have been seasonally adjusted by X11. All financial intermediaries include all commercial banks, savings and loans, mutual savings banks, and credit unions. Nonagricultural employment growth and inflation (measured by the CPI-X, which excludes the inappropriate influence of mortgage interest rates that exists in the standard CPI) are from the Federal Reserve Board and have been seasonally adjusted. Percentage growth rates are annualized and measured from the quarter preceding the cyclical peak until three quarters later.

Figure 6: The Growth of Lending over Sex Recessions, by Year of Cyclical Peak (Bernanke & Lown, 1991)

The debate over the 1990s credit crunch is important because it offers an example of a scenario in which the bank capital channel should be evident and testable. It is also the incident that sparked the greatest level of attention from academics, and produced the most research on the effects of bank capital regulation. In reviewing the ensuing debate over the slow credit recovery, Berger & Udell (1994: 2-6) identify six different working hypotheses for the credit slowdown, which can be categorized into three different schools of thought. The first captures only one hypothesis, the Secular Decline hypothesis, which states that weakening credit provision was simply the evolution of a long-term trend. The second school of thought captured two hypotheses that both attributed the slowdown to the economic instability at the time. The Demand Side hypothesis argues that the strained economy's weak appetite for credit was the cause, while the Voluntary Risk-retrenchment hypothesis held that the crisis sparked a wave of risk aversion in banks that made them less likely to lend. The other three hypotheses lay the blame on the recently implemented Basel I accord and related reforms. The first of those, the Loan Examination hypothesis, argues that increase regulator scrutiny triggered greater caution amongst banks. The next, the Leverage Credit Crunch hypothesis, argues that risk weighting encouraged banks to substitute risky commercial loans for safer government bonds, and hence lending to the real economy dwindled (this will be more thoroughly examined in the Risk Aversion section below). Finally, and perhaps most prominent, was the risk-based capital credit crunch hypothesis – which argued that lending slowed down because banks struggled to raise well-priced equity, and hence cut back on their loan portfolios to meet Basel capital requirements.

In general, this view argues that the bursting of the New England real estate bubble forced write-downs that eroded bank's equity holdings and forced an effort to recapitalize in order to meet the new Basel ratio. However, in the face of risk-adverse markets and a short time horizon to meet regulatory requirements, banks began rationing loans in an effort to meet their ratio by way of changing the denominator. The resulting credit supply slowdown was therefore dubbed a "Capital Crunch" by Richard Syron (1991), then President of the Boston Federal Reserve, in testimony before the US congress.

While there has been concerted interest in this capital crunch, the issue is difficult to explore, because all the above hypotheses are extremely difficult to distinguish from one another. Empirically, weak demand would look very similar to a supply-side contraction of credit. As such, while the literature clearly supports the presence of a credit crunch, there are very mixed results on whether this contraction can be attributed to the bank capital channel.

The initial formulation of the capital crunch hypothesis, by Bernanke & Lown (1991), argues that differences in historic loan growth rates after other recessions (illustrated in figure 6) and divergent regional credit growth rates, shows that something more than demand was driving the weak recovery. While they are relatively conservative with their estimates, and argue that there is little evidence at that point of the credit crunch effecting employment, commentators on the study took a stronger view. Freidman (1991), for example, points to the fact that half of the 15% difference in loan expansion between the fastest growing region (East South Central) and slowest growing region (New England), could be explained by supply factors. New England, and to a lesser extent the mid-Atlantic States (New York, New Jersey and Pennsylvania) were very much

the focal point of interest in the credit crunch. Both regions suffered large housing bubbles that eroded bank's capital positions, and therefore they were forced to make a concerted effort to recapitalize to meet Basel I limits. Regional differences also gave scholars some means of controlling for the effects of the national slowdown, and thus the North East became a focal point of many of the related studies. Peek & Rosengren (1991) look specifically at New England banks during the crisis period of 1990 and 1991, and control for the impact of weak loan demand in the region, by comparing loan growth for local banks with different levels of capital. They find evidence that banks with lower capital ratios shrank loan supply or grew credit more slowly than better-capitalized banks, attributing this to an inability to raise capital in a depressed market. Brinkmann & Horvitz (1995) support the more general idea that low-capital holdings could have driven the capital crunch. They divide a sample of all US banks between 1987 and 1991 into three categories: undercapitalized, marginal surpluses, and large surpluses (when a surplus is the amount of capital above regulatory minimum.) Undercapitalized banks grew loans much more slowly than those with marginal surpluses, and marginally capitalized banks grew slower than those with large surpluses – indicating that slowing loan growth or rationing of loans may have been the strategy used to meet capital requirements. In an illustrative but unscientific estimate from these differences, the authors estimate that if all banks had initially held large capital surpluses, overall loan growth would have improved by $370 million. Lown & Peristiani (1995) also find evidence of capital requirements playing a role in the credit slowdown, but not through explicit loan rationing. Their sample of US banks between 1988 and 1992 rather indicates that large banks raised interest rates, in an effort to pass

on costs and discourage marginal borrowers. Thakor (1996) also found evidence that a small increase in capital requirements could make it harder for potential borrowers to access loans, and also documented a shift in risk appetite amongst banks during the credit crunch, and a rush to stock up on government bonds. Finally, Hancock, et al. (1995) also document the role of capital in the slow loan recovery, and argue that this was particularly problematic for small banks, who were less able to raise additional equity.

Despite this evidence, doubts remains. All the above studies saw the impact of capital adequacy as playing a substantial but still quite small role in the crisis. They do not contribute the slowdown to capital regulation alone, and all note the difficulty in distinguishing between demand and supply side drivers of the credit crunch. Other studies argue against the existence of a capital crunch. Baer & McElavrey (1992) see capital regulations as having very little effect on bank holding companies in the early 1990s, while Berger & Udell (1994) argue that low-capital, high-risk banks did not perform disproportionately badly, as one would expected if the problem was risk-based capital adequacy requirements. Dahl & Spivery (1995) also note that less than one-quarter of undercapitalized banks paid dividends between 1981 and 1988, which perhaps shows some effort to meet capital ratios by building equity.

The 1990s Capital Crunch around the World

While the debate over the capital crunch began in the United States, the subject received broader attention as crises around the world displayed similar signs of weak credit recovery. But studies found similarly mixed results. Finland suffered one of the most serious credit slowdowns following a housing bust, but Pazarbaioglu (1996) argues that demand reduction drove the majority of the

credit slowdown. There was some limited evidence of a decreasing supply of credit and increasing interest rates, but not enough to indicate a major credit crunch. As the Asian crisis hit in the late 1990s, Indonesia faced a similarly deep downturn, and displayed strong evidence of a role for the bank capital channel. Agung, et al. (2001) argue that supply issues played a larger role in credit recovery after the crisis than demand problems, although Ghosh & Ghosh (1999) attribute the slowdown to high interest rates and weak economic activity. Yudistira's (2003) results sit somewhere in the middle, arguing that certain badly capitalized banks did slow or shrink loan expansion in response to capital requirements, but that in general this effect was very weak and in some cases not statistically significant. The same study also argued that capital played a largely insignificant role in the credit slowdown in Thailand and Korea. Japan is an interesting example, as the Basel requirements were introduced alongside major domestic reforms to the banking sector. Ito & Sasaki (1998), argue that for major Japanese banks between 1990 and 1993, weakly capitalized banks cut the amount of loans they offered, as well as attempted to make up the difference with subordinated debt rather than additional equity. Woo (1999), argued that there was very little evidence of a credit crunch in the early 1990s, but there is some evidence after 1997. This coincided with major financial reforms, particularly the Japanese government tackling the moral hazard problem of an assumed guarantee of banks, by letting a few large banks fail. Wagster (1999) also finds very little evidence of a Japanese capital crunch, in a study that also found ambiguous evidence of capital problems in the US and Canada, and no evidence of capital problems in the United Kingdom. Less crisis-hit countries seemed to fare somewhat better than some of the cases detailed above. Naceur &

Kandil (2008) find no evidence of a capital channel for a selection of countries for the relatively more stable Middle East and North African countries between 1989 and 2004. They argue that in Egypt, Jordan, Lebanon, Morocco, and Tunisia credit expansion was not effected by capital requirements, as bank's equity expanded in sync with credit and assets. Chiuri, Ferri & Majnoni (2001) challenge whether effects were limited to crisis-hit countries, and examine 15 developing countries (from Latin America, Eastern Europe, and Asia – but not from Africa). They argue that the introduction of Basel I led to a significant curtailing of bank credit supply, which was particularly serious for domestically-owned developing country banks, and which had a large macroeconomic effect given the large role banking plays in meeting credit requirements in developing states.

Further Studies

The study of the bank capital channel slowed as the 1990s ended, as credit supply recovered and attention turned to the Basel II reforms. Nevertheless, a few later studies are worth mentioning. Barajas, et al. (2004) conducted a large-scale study of the fifty largest banks from 152 countries between 1987 and 2000. They find that although capital holdings did increase, return on equity substantially decreased, indicating the potential for less expensive equity. This was reflected in loan portfolios, which generally grew larger. There was some evidence of contractions in some areas, but mostly this was a very weak effect and driven more by risk aversion than the bank capital channel. Francis and Osborne (2009b) examine 200 United Kingdom banks between 1996 and 2007, and surmise that banks actively manage their capital ratios by adjusting both the capital and loan sides of the equation, and that loans might therefore be reduced

when capital drops too close the regulatory minimums. Very recent studies naturally turn their attention to the recent financial turmoil, which offers exactly the type of capital shock and regulatory shifts that should offer evidence of a bank capital channel. Spain is particularly reminisant of the original New England crisis, having suffered the bursting of a construction bubble that saw a subsequently contraction in lending of between 6% and 25%. Hernando & Vilanueva (2010) find that the resulting capital shortfall and the need to rebuild capital holdings did have some negative impact on lending, but that the effect was generally small. While the crisis literature is still underdeveloped, other work such as Puri, Rocholl & Steffen (2010) study of German banks, Albertazzi & Marchetti's (2010) work on Italy, and Gianetti & Simonov's (2010) study of Japan all point to some role for capital in the post-crisis credit crunch. There is, however, some uncertainty in these findings on the extent to which the bank capital channel played a role, versus possible explanations such as liquidity problems or increased risk aversion. Finally, returning to the start of this discussion, Berrospide & Edge (2010) examine 165 United States bank holding companies from the end of the credit crunch in 1992 until 2009. They find modest effects of capital requirements on loan growth, and find that banks are more likely to curtail loans in the face of weak demand or increased risk.

Key Findings

Overall, there is some theoretical and empirical basis for fears over of a bank capital channel. However, there is also substantial evidence that puts such a channel in doubt, and even stronger evidence that any macroeconomic effect of capital requirements will be small.

Given this result, it is perhaps fair to conclude that capital adequacy requirements can reduce loans or drive higher interest rate spreads, but that this effect will likely be small, and will only occur under specific conditions. As regulatory and market structures better reflect the Modigliani-Miller conditions, avoid the Low-Risk Anomaly, and ameliorate the Bank Capital Channel; then the cost of equity grows closer to financing via debt and deposits, and thus reduces the overall cost of bank capital adequacy requirements. The size of banks and conditions under which they operate also seem to have an impact. There is limited but noticeable evidence that small banks have a harder time raising equity than larger banks, a relatively intuitive result given the large market value of big banks. The evidence of the effect of market conditions, particularly from the early 1990s, is more convincing. During times of financial stress banks have lower profits to retain and weaker capacity to raise capital via equity issues, and therefore may opt to cut back on lending as a more efficient means to manage their capital ratios. This is a particularly important consideration, for two reasons. First, because the current Basel III rules are being introduced after a period of protracted financial distress, and into a market that (despite the solid profitability of banks) remains wary of investing heavily in the financial sector. Second, after the implementation of rules, periods of financial stress are the occasions in which banks are most likely to fall below their required capital ratios. As risk increases and equity is eroded by write-downs, banks would have to raise new capital to stay compliant. This could either mean that they ration loans in the short term, triggering a second round shock in an already distressed market, or that banks choose to hold capital above the regulatory minimum in good times, meaning the capital requirements being considered under Basel III

should be understood to be higher than the actual percentages detailed in the Accord.

From this discussion, a few key conditions and indicators can be identified, which would make it more likely that Basel III would impact South African banks. From the theoretical discussion, three leading indicators of a capital channel can be identified:

1) A tax system that encourages debt financing.
2) Markets that inaccurately price debt into their valuations of banks.
3) The presence of a maturity mismatch, and thus interest rate risk.

From the studies, a further three considerations could be added:

1) Smaller banks are more likely than larger banks to ration loans in order to meet capital requirements.
2) Banks are more likely to ration loans to meet capital requirements in times of economic distress.
3) As a corollary to number 2, higher growth rates lessen the impact of higher capital requirements.

One additional point to note is that the analysis presented above is not only relevant to increases in capital requirements, but also shifts in the quality of capital that needs to be held. For conceptual clarity the discussion above compared equity and debt financing, finding equity to be more expensive than debt. But higher quality equity is also more expensive than other acceptable capital instruments, particularly those in Tier 2 or Tier 3 categories, such as Subordinated Debt. The shift under Basel III to holding higher quality capital

therefore also stands to increase the cost of capital, following similar mechanisms to the bank capital channel.

Impact on South African Banks

Applying the above indicators to South Africa might offer some guidance on the extent of impact that increasing capital requirements might have on the country's banks. However these effects would only be felt if Basel III actually results in higher capital requirements. And thus the analysis examines two broad considerations:

1) Basel III must encourage capital ratios higher than South African banks might otherwise choose.
2) Capital (equity) must be expensive; indicated by:
    a. A beneficial tax structure
    b. Inaccurate pricing of risk
    c. Evidence of a bank capital channel

Higher Capital Ratios

The first criteria might be rephrased as: do South African banks currently hold capital higher than that required by Basel III? But this question would miss two important distinctions by which higher capital ratios might still impact lending, regardless of the initial capital held by banks.

Firstly, the question is not solely whether Basel III will force South African banks to increase their regulatory capital, but whether it would lead to them increasing their capital ratios. The distinction exists because there is substantial evidence that many banks choose to hold capital buffers at a set level above the regulatory minimum. Studies by Barrios & Blanco (2002) on Spain, Baer & McElravey (1992) in the United States, and Francis & Osborne (2009a) and Alfon, et al.

(2005) in the United Kingdom all point to the fact that well capitalized banks use regulatory minimums as a guideline, with their real level of capital then held at a set buffer above the base minimum. The studies postulate that these excess buffers are driven by some combination of a fear of shocks driving capital below regulatory minimums and leading to penalties, and a desire to send a message to markets about the safety of the bank. While the second consideration is more complicated, it seems unlikely that the first reason will remain as influential, given the fact that Basel III institutionalizes these practices in the form of the Capital Conversion Buffer. The buffer offers a warning period with no penalties other than restrictions on paying dividends, and thus will likely decrease the incentive to choose to keep excess buffers. Nevertheless, South African banks may still choose some level of capital ratio above the minimum, and thus Basel III could still drive an increase in their capital even if it is currently above new regulatory requirements.

Secondly, focusing solely on current capital holdings misses the dynamic nature of the financial industry and the South African economy more generally. The potential remains for changes in bank's approaches to capital management, and for future scenarios under which South African banks would, in the absence of prudential regulation, choose to let their capital ratios fall. We cannot assume that the current, conservative level of capital held by banks will always be the level they desire to hold in the future. In reality, changing macroeconomic conditions in a developing country like South Africa could easily lead to conditions in which banks would find it more efficient to operate with capital levels below Basel III requirements. More than this however, it is mistaken to assume that the current levels are, and always will be, the socially optimal choice

for the rest of society. It might be in the country's best interests for policymakers to make use of monetary and regulatory policies that encourage banks to lend more, lend cheaply, and take on more risks – all of which could drive a socially desirable capital ratio that is below what is permissible in the Basel III accord. Nevertheless, these two considerations cannot truly undermine the fact that South African banks do seem well equipped to handle the higher Basel III capital requirements. Figure 7 illustrates the unweighted capital holdings of the five biggest South African banks.

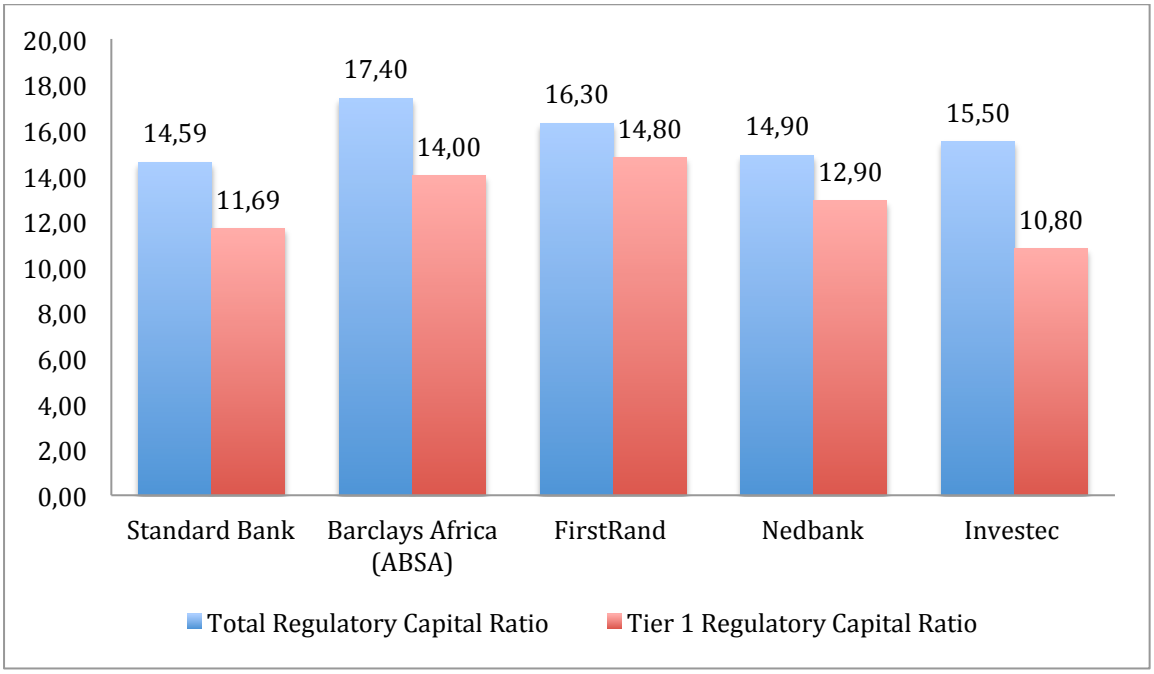

Figure 7: Largest Five South African bank's Regulatory Capital Ratios, June 2013 (Bankscope data)

All five banks hold capital levels that exceed the combined core requirements and capital conversion buffer, which together stand at 11.5%. The introduction of a SIFI and countercyclical buffer, both of which are unlikely as a blanket policy, could exceed some of the banks unweighted ratios. Smaller banks are in a similarly healthy position, and if anything are better capitalized than the major banking groups, as shown in figure 8.

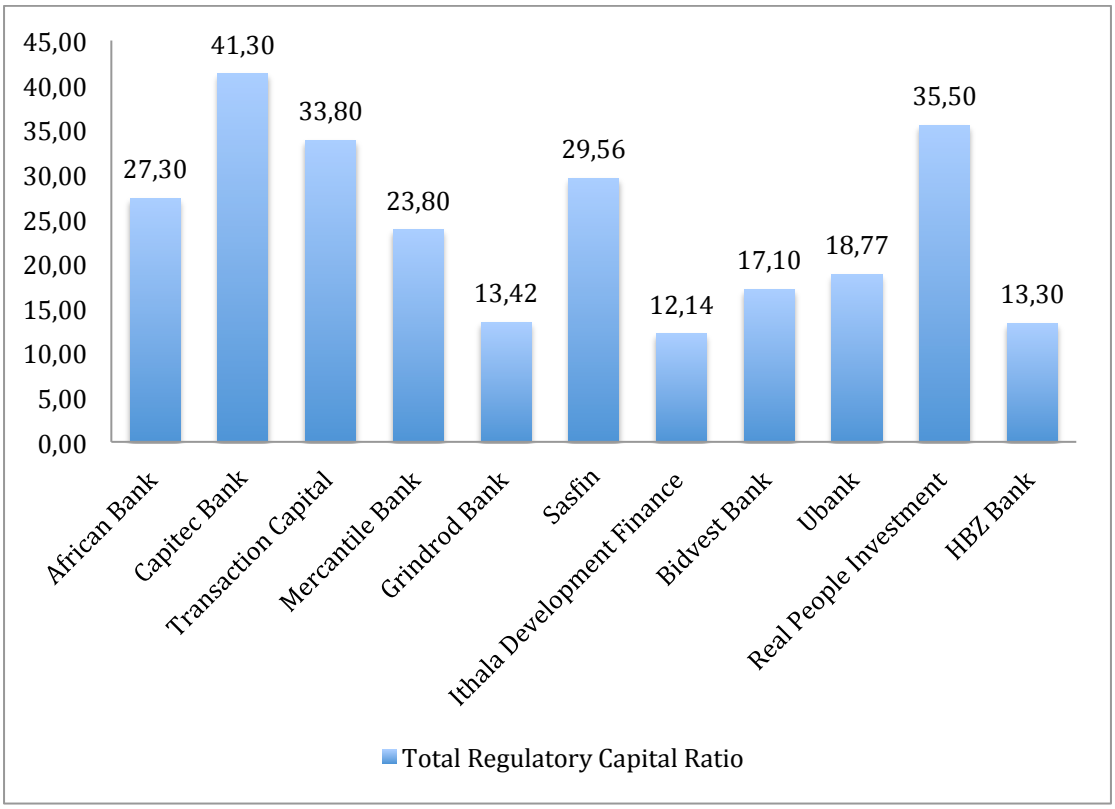

Figure 8: Other South African bank's Unweighted Capital Ratios, most recent reported figures 2013 (Bankscope data)

While all banks are required to report their risk-weighted capital adequacy ratios to the South African Reserve Bank, using a BA700 form, this data is more difficult to find on a bank-by-bank level. The Reserve bank only publishes aggregate data for the banking system as a whole, and other sources of this data are mostly collected by specialist private efforts (such as the Financial Time's BankMonitor or Standard & Poor's RAC rankings). Banks do often report their risk-weighted capital to investors or in ad-hoc public disclosures. However, due to the complexity of the calculation of the ratio, these disclosures are not particularly useful for comparative purposes, which would require a more homogenous collection of data.

The message is extremely clear: South African banks are very well prepared for the Basel III capital rules. Well capitalized and with high quality holdings, the

banks are already Basel III compliant, and have been deemed so by the Basel Committee's compliance reports.

There is some evidence, however, that the level of regulatory capital held by banks is increasing, as can be seen in figure 9 and figure 10.

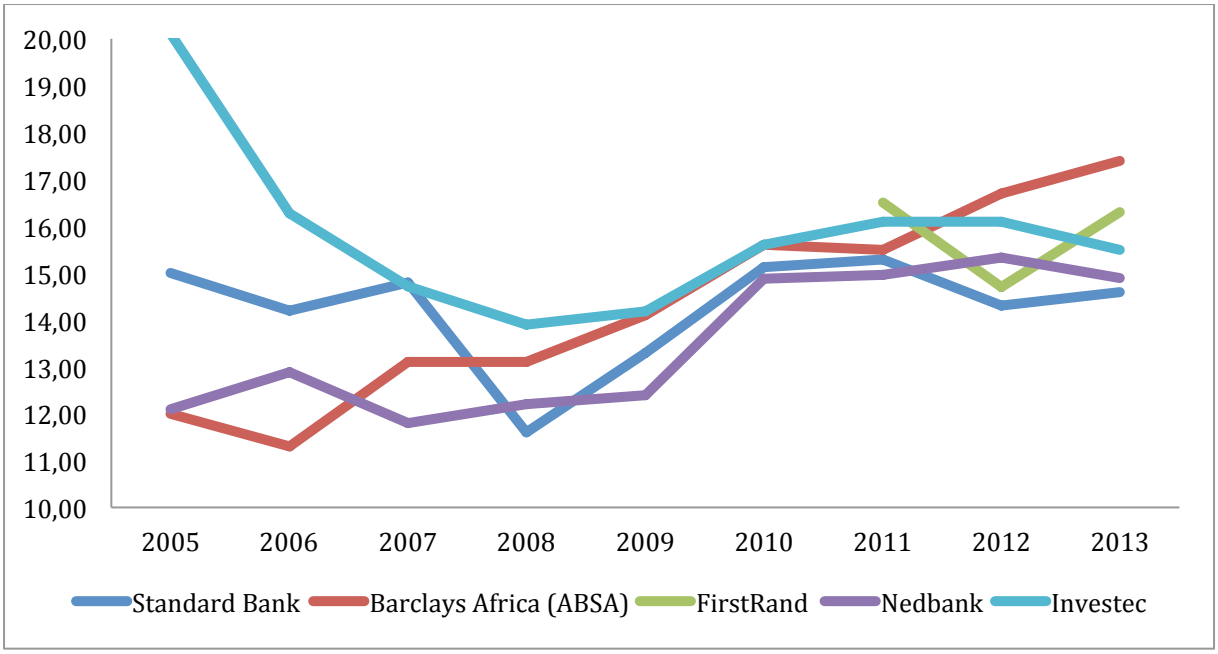

Figure 9: Total Regulatory Capital of large South African banks, 2005-2013 (Bankscope data)

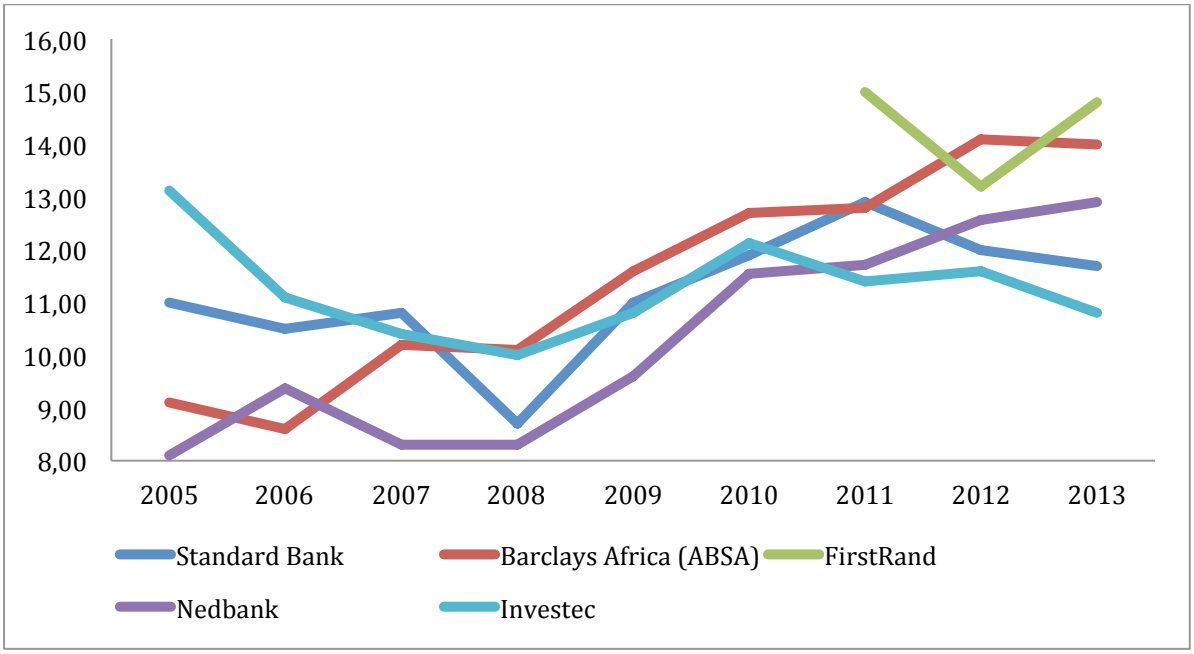

Figure 10: Tier 1 Regulatory Capital of large South African banks, 2005-2013 (Bankscope data)

Although the data period is too short to establish a significant trend, and is complicated by the dip in capital during the financial crisis, there does seem to be an indication that capital levels are increasing relative to pre-crisis levels. It cannot be said whether this is due to the pending Basel III reforms. There is substantial pressure on banks to assuage a nervous post-crisis market, and this could just as easily be driving higher capital holdings. The difference between Tier 1 increases relative to overall capital increases might, however, point to some role for Basel III, which insists on higher quality capital.

Overall, there seems little evidence to suggest that banks will find it difficult to meet the Basel III capital requirements. They hold high capital levels of high quality, and given this there might not be a large enough shift in bank capital positions to drive a slowdown in credit. Nevertheless, there is a minor indication that capital ratios are increasing, even if this can't be directly attributed to Basel III. And the larger issue remains of the potential for future scenarios in which society might want banks to operate at a lower capital level, to drive more developmental lending. Therefore, despite the weak likelihood of a negative impact from the implementation of Basel III, it is useful to examine whether there is reason to believe a potential increase in capital could lead to an increase in capital costs, and a subsequent long-term increase in the cost of capital.

Expensive Equity

Making use of the indicators identified by the extensive literature study conducted above, it is possible to gain some insight into the additional capital costs associated with raising more regulatory capital.

A few considerations can be immediately put in doubt. Particularly, the potential weakness in small banks seems a relatively small threat. While it remains

uncertain whether smaller banks would face higher costs to raise equity, they already hold capital ratios larger than those of the big banks. Firstly, this means small banks are particularly unlikely to be encouraged to raise additional capital as a result of Basel III. And secondly, it indicates that small banks are voluntarily choosing higher capital requirements and are thus not put off by any higher costs that might be associated with this capital.

Nevertheless, there is reason to believe that, on a basic level, capital is expensive to raise and hold. Particularly, the tax incentive attached to debt and deposit funding holds true in South Africa, as it does in virtually all markets. Some hybrid financial instruments are not tax deductible in the context of Section 11 of the South African Income Tax code, but besides these minor exemptions banks still stand to benefit from the tax deductions of a highly leveraged debt shield, which could impose a long-term cost on higher capital holdings.

Despite this, however, market conditions do not seem to display any obvious telltale signs that could make raising capital particularly expensive. It cannot be summarized in the context of this study whether the low-risk anomaly plays out in the South African case. However, a relatively concentrated market, dominated by a few major players, might weaken the competitive pressures that would otherwise drive banks to recklessly pursue risk at the expensive of security. More importantly however, the two major methods banks might use to raise additional capital – withholding profits and issuing new equity – seem relatively easy given recent market conditions. Figure 11 illustrates recent trends in bank profits, while figure 12 shows market valuations. With the exception of Investec, all major banks are currently more profitable than prior to the crises, and all five have seen unit stock price increases since the pre-crisis period. While both

measures might be lower than the trend one would expect if the crisis had never occurred, the figures present strong evidence of a swift recovery from the financial crisis, and certainly do not indicate the type of harsh market conditions that might constrain capital growth.

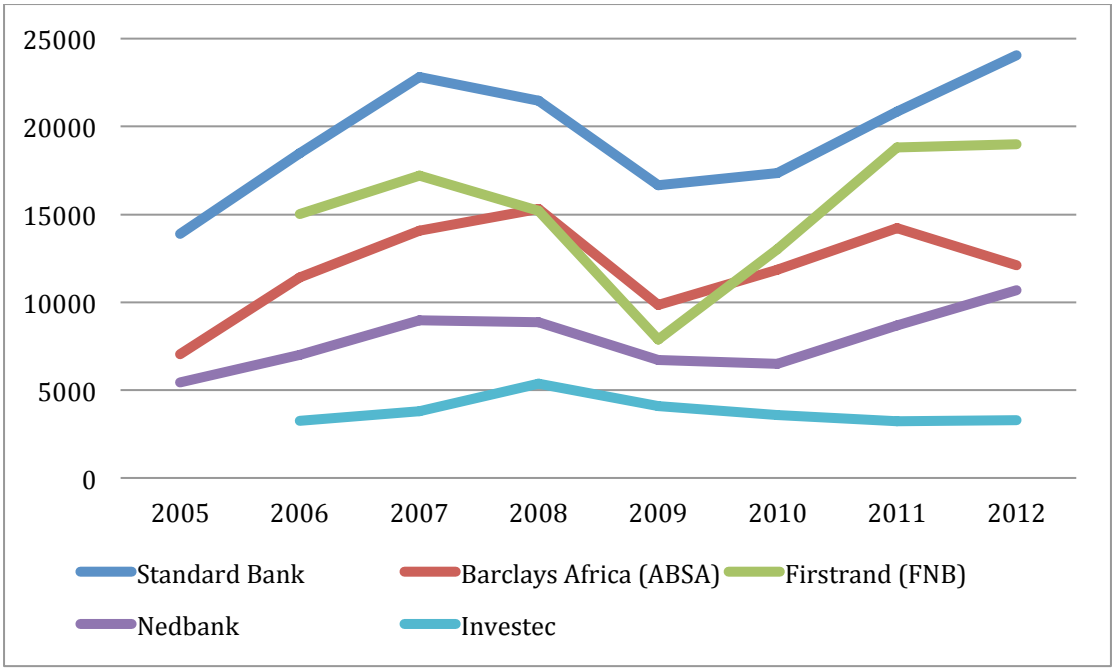

Figure 11: Largest five South African banks, Profits before tax

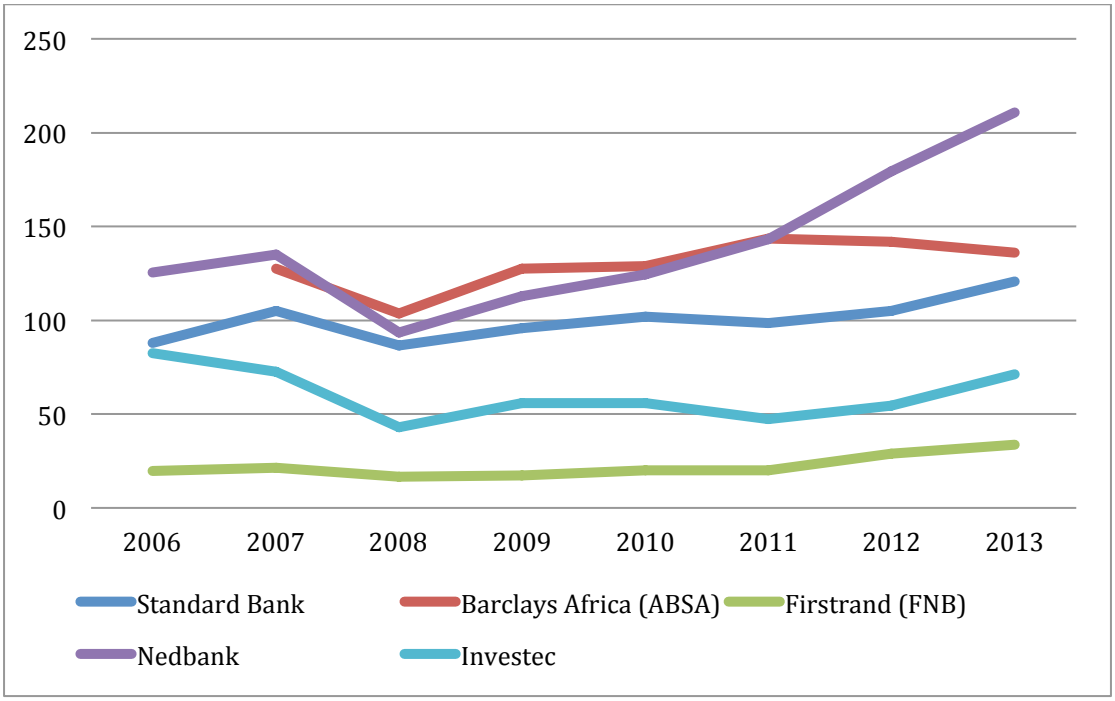

Figure 12: Largest five South African banks, JSE stock price as of December of each year

This is particularly true given the long phase-in period of the Basel III accord. Although South Africa has taken to very early implementation of the Accord, the expected date for full implementation is 2019. That means that even if post-crisis economic conditions remained challenging, there is ample opportunity to raise the necessary capital from a deflated market.

Three conclusions can be made at this point. First, theory and empirical studies suggest that the capital channel effect would be small, and would only exist under certain circumstances. Second, South African banks' impressive capital levels make it unlikely that Basel III will incentivize a large increase in capital levels, although there is some evidence of an upward recent trend in capital holdings. Finally, South Africa does not exhibit many of the telltale signs that would indicate capital is expensive to raise, particularly given high market valuations of banks and the large profits they turn. The sum total of these three findings is that it is unlikely that Basel III will purely shrink bank's assets, and thus there should not be a significant slowdown in credit.

While the results found here are a promising sign, three risks remains for Basel III and the bank capital channel in South Africa. First, in the case of systemic economic shocks that erode the capital positions of banks, Basel III could lead to a contraction in lending. The stricter capital requirements would mean banks would find it more difficult to recover their capital positions to acceptable levels, and thus it seems likely banks would try to manage their ratio using both the capital and loan side of the equation – a scenario clearly evident in the 1990s credit slowdowns examined above. While a weaker credit recovery is certainly preferable to failing banks, this is still a potential threat of a contraction in

lending as a result form a real or expected shock. This is an example of the debate over the procyclicality of capital adequacy requirements, which has been an ever-present concern since Basel I. The introduction of the Capital Conversion Buffer is a welcome attempt to safeguard against this, by requiring banks to hold a level of capital above the absolute regulatory minimum, and thus allowing them to continue to operate even after a shock.

Second, a slowdown in GDP has been shown to impact the cost of raising capital, particularly by weakening bank profits and equity issues. South Africa's economic future is uncertain enough to invoke some caution over the GDP effect on capital, however there is more than enough scope for the reserve bank to manage these fluctuations.

Finally, it needs to be remembered that the bank capital channel works both ways – higher capital holdings can slow lending, but lower capital could also boost lending. While South African banks do seem well placed to avoid any further negative effects, South Africa's financial system is nevertheless still suboptimal to the development needs of the country. There are funding gaps for vitally important infrastructure projects, and key players such as small and medium enterprises remain on the fringes of the financial system. While there is a constant need to weigh the demand for credit against the need for stability, it is nevertheless worthwhile considering that encouraging less conservative capital holdings might be a useful strategy to expand loan growth in the future. Counterintuitive as it might sound, Basel III might be a little too easy to implement. In a country with as large a development deficit as South Africa, the financial system should extend the maximum possible credit compatible with

sensible lending. Basel III may yet prove a challenge to any attempts to build a more developmental financial sector.

Section 3: Greater Risk Aversion

Thus far the focus has been on Basel III triggering a slowdown in loans or a rise in lending costs, which impacts consumer spending and credit-reliant companies. However, even in the absence of an absolute slowdown in bank activity, the economy could still suffer. This is because the risk-weighted nature of capital requirements allows banks to improve their capital ratio without reducing their assets, by shifting to a less risky set of assets. This poses a two-fold problem for South Africa. First is the basic concern that highly valuable commercial spending is often the most risky, and banks could be encouraged to turn to less risky but less productive government and consumer lending. The second concern is that, as a developing country, the South African economy features many risks and yet has to focus on building a commercial base from the underdeveloped and under-resourced second economy. Small businesses are a clear example of this challenge. Tomorrow's corporate champions are today's SMEs, which are generally considered risky and weighted heavily. The Basel II standardized approach, for example, weighted SMEs as requiring 100% of the regulatory ratio if classified as corporate, and 75% if classified as retail. The concern over risk-aversion is made more serious by the fact that most major South African banks employ the more detailed internal ratings based (IRB) approach, which is better able to differentiate between risky loans, and thus can weight SME and other valuable loans as more risky than, for example, large corporate loans or small retail loans.

Risk aversion can result from capital regulation in two ways. First, if banks increase their capital holdings under Basel III (a result we already know is in doubt), then certain literature would expect higher risk aversion even without

the weighting system. This is triggered by the fact that more capital generally means shareholders are more exposed to any losses, and therefore there is more pressure from owners and institutional investors to favor security over the riskiness of high returns. Secondly, assuming equity is expensive, banks could see a less risky portfolio as a way to manage their regulatory capital burden, and thus to increase their capital ratios without increasing their costs. This cost difference changes the relative return on different investments, and could mean riskier counterparties either get less credit or must offer higher returns to incentivize banks to keep credit flowing. Importantly, there is evidence to suggest that this risk-aversion could become present under Basel III even if banks already meet capital requirements, thus not offering South Africa the major buffer to changes seen in the previous section. Indeed, anecdotal evidence from South African bankers suggests this change is being anticipated as the largest shift under Basel III, as a "new way of thinking" about risk comes into force (Baxter, 2012). Nevertheless, the effect of the Basel Accords on risk taking is heavily contested, as will be seen in an exploration of the theoretical effects and evidence from studies.

Two broad strands of literature exist on the effect of capital requirements on bank risk-taking. The first examines the core effect of increased capital holdings on bank decisions. The main intuition of this literature is that as capital holdings increase, shareholders are more exposed to potential loses, and therefore demand increased loan scrutiny from bank managers, and often increased risk aversion. The second strand of literature focuses on the effect of risk-weighting on bank risk-taking. Risk-weighting is meant to provide an explicit incentive for banks to diversify towards a less risky portfolio, by offering lower capital costs

for safer loans. The two types of risk-weighting in the Basel Accords – risk brackets in Basel I and risk-modeling in Basel II and III – offer very different challenges in this regard, with Basel I for example potentially encouraging more risk taking within certain brackets. The section will start with examining the core effects of increasing investor exposure to loses, before then analyzing the incentives attached to risk-weighting of capital requirements, and the empirical evidence available from past capital regulation.

Theoretical Effects

Risk Aversion and Capital

Capital regulations predates risk-weighting, and initial formulations of such regulation in many major financial centers – such as the United States and United Kingdom – made use of unweighted capital ratios (Burhouse, 2003). These ratios captured a more simple measure of leverage, and assumed that banks with sufficient capital holdings would be safe even without explicit risk-weighting, since the capital allowed banks to better absorb losses. As debate over capital regulation intensified in the late 1970s and into the 1980s, there were questions raised on why capital ratios were needed in the first place. Rational, informed banks should choose safe levels of capital anyway, and thus some market failure was needed to identify why capital regulation was required and how it fixed the problem. While lots of explanations were offered, the core argument focused on the appetite for risk amongst banks.

Traditional theory holds that banks activities are kept from growing too risky by pressure from two parties: bank shareholders and bank deposit holders (or other liabilities counterparties). Shareholders want to maximize their returns, and thus put pressure on management to run a level of risk that offers the

highest returns that avoid the costs associated with bankruptcy. Deposit holders do not stand to directly gain much from high-risk, high-return behavior, and thus demand higher interest rates on their deposits with high-risk banks. Shareholders and deposit holders thus demand higher returns as risk increases, and keep banks from taking on excessive levels of risk.

Despite this, the 1970s saw increasingly rising risk, evidenced by the increasing failure rate of banks and decreasing intermediation margins. From this already high risk baseline, the 1980s saw a remarkable growth in leverage. Bank failures started to gather steam, and in the US risk-based deposit insurance premiums were spiking – all indicating that banks were taking on more risk. Furlong (1982) argues that between 1975 and 1986, US bank risk doubled. Boyd & Gertler (1994) found this increase in risk to be particularly steep in the case of large banks, suggesting this might be due to the moral hazard of the belief that they were too big to fail. Figure 13 shows the drastic increases in risk seen in the 1980s.

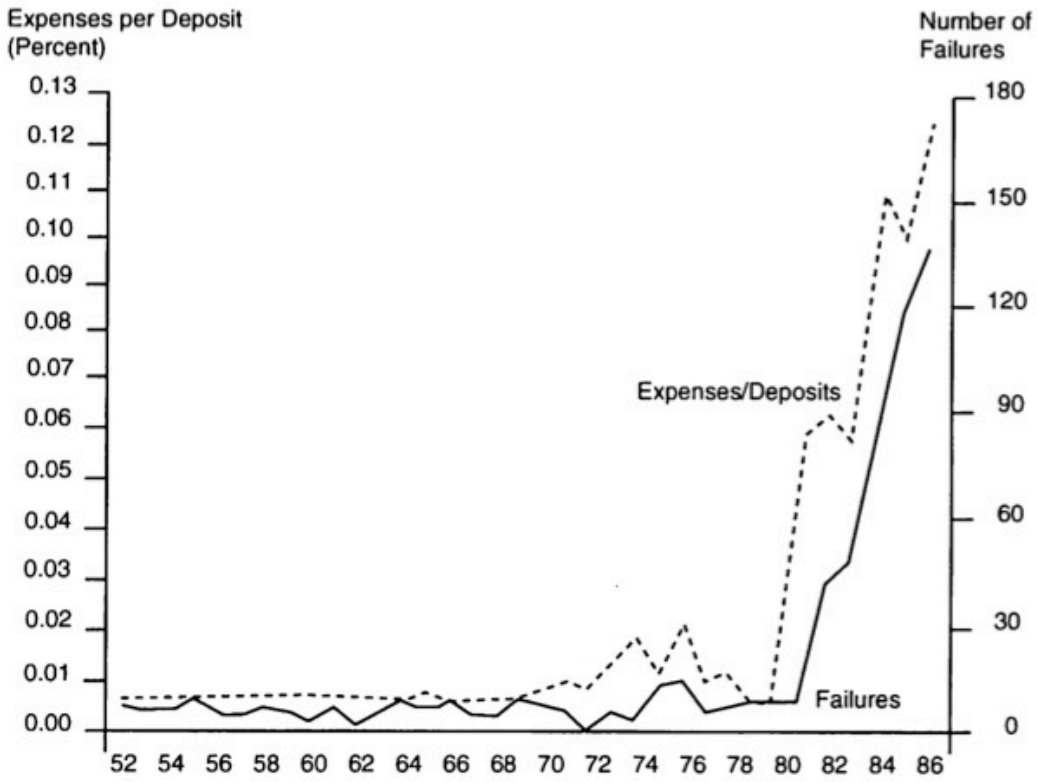

Figure 13: Deposit Insurance Expenses per Dollar of Deposits, and Bank Failures (Keeley, 1990)

The theoretical work on this growing risk argued that there were failures in risk calculations for both the shareholders and deposit holders. Perhaps the most important factor fell on the depositor's side, in the form of deposit insurance. The advent of deposit insurance made a large category of deposit holders (those with deposits valued lower than the insurance ceiling) indifferent to risks taken on by banks. All other deposit holders had a reduced incentive to demand higher returns for additional risk, since they stood to lose less in the case of failure. The combination made for very weak pressure from depositors, allowing banks to leverage heavily and cheaply using the insured deposits held by their bank. Equity holders had a similarly large appetite for risk, in part because of the empirical low-risk anomaly already discussed above, but also because of a more basic problem in the face of the moral hazard of deposit insurance: given risk-indifferent deposit holders, banks can raise their leverage at low costs, thus

increasing their returns and those of shareholders, without these shareholders having to increase their exposure (Buser, Chen & Kane, 1981). In theory, shareholders should still be wary of this build-up of risk, as risk erodes expected returns, but the reality seemed to indicate that the threshold at which this risk-aversion kicked in was only at a very high level of leverage.

A further complication is the disconnect between managers and shareholders. Economic theory tends to assume shareholders can easily communicate their wishes to managers and get them to perform in their best interests, but the reality is different. Models by Saunders, Strock & Travlos (1990) and Bris & Cantale (2003) argue that managers are more risk-adverse than shareholders, thanks largely to their attempts to protect their reputation, and the former study finds clear empirical evidence of this in US banks from 1979 to 1982. John, Saunders & Senbet (1999) go so far as to argue that stopping paying management at undercapitalized banks could be a more effective means to promote risk-aversion than capital regulation. All the studies share a common belief that the risk-aversion of management could be broken down by offering large incentives – like bonuses or stock payments – that tie the management to the demands of shareholders. This is an interesting finding, given the well-documented proliferation of enormous bonus payments to leading managers in the financial sector prior to the recent financial crisis, and around the time banks started leveraging up.

These theoretical explanations do not explain why the 1980s specifically saw such a drastic spike in risk, given that deposit insurance and other considerations predate the decade. But these attitudes laid the foundation that made excessive risk-taking possible, and that would allow banks to take on risk

when market conditions allowed it. In the case of the 1980s, three possible market conditions might have triggered banks to take advantage of the risk-incentives: a fast growing global economy (in most places), the opening up of new markets for finance (particularly in the developing world), and increased competition (particularly from foreign banks). The first two considerations meant there were more assets banks could invest in, while the latter consideration put pressure on banks to invest more aggressively to remain competitive. Another extremely important factor, the rise of securitization, will be discussed later.

But the core problem remains that in the presence of deposit insurance, shareholders can leverage up and increase their returns without facing higher costs or greater exposure. Capital requirements offered a way to rebuild risk-aversion even with deposit insurance. Increasing equity capital holdings represent an increase in the exposure of shareholders to the risks associated with a bank's loan portfolio. Capital regulation forces increases in risk to be accompanied by increased equity, and thus greater risk would result in greater exposure to any potential loses via the capital mechanism. In a sense then, capital regulation was first and foremost an attempt to build risk-aversion into banking activities. This is by no means a bad thing, since in the presence of deposit-insurance and other moral hazard problems like too big to fail, banks would have been excessively highly leveraged and risky. But it does beg the question of what capital ratio avoids this moral hazard problem without making banks so risk-adverse as to deprive some good potential borrowers of access to finance.

A number of studies attempted to estimate the outcome of a simple system of unweighted capital regulation on bank risk-taking, with most of this literature focusing on capital as a response to the moral hazard problems explored above, and some producing surprising results. Koehn & Santomero (1980) present an early model that argues that capital requirements could actually increase risk-taking, since shareholder's returns are diluted by the raising of more capital, and thus banks take higher risks to generate the higher returns necessary to compensate for this loss of value. This view builds off a landmark study by Kahane (1977), and from work in sectors outside of finance, where a similarly unexpected relationship between risk and capital exposure has been observed. Later studies, such as Gennotte & Pyle (1990), seemed to confirm that capital could spark increased risk-taking. However further studies, such as Shrieves & Dahl's (1991) review of US banks between 1983 and 1987, still seem to indicate that capital doesn't encourage risk-taking. The study does find a positive correlation between risk and capital ratios, but this seems to be down to banks feeling more comfortable adding risk when they have more secure capital levels, and does not indicate an increased appetite for risk. Rochet (1992) provides a theoretical basis for why capital doesn't encourage risk-taking to offset returns. He argues that a potential turn to risky investments is offset by considerations of franchise value, which gives utility-maximizing banks good reason to invest more cautiously. This stands in contrast to Hellmann, Murdock & Stiglitz (1990), who argue that franchise value considerations actually drive risk-taking, since more capital and the associated costs tend to erode this franchise value, which thus must be rebuilt through risk-taking. Between the two sides are those, such

as Furlong (1988), who argue that shifts in riskiness occur independent of the level of capitalization of bank.

Nevertheless, there was a general recognition that flat-rate capital regulation could lead to unexpected consequences, as shareholders react in an ambiguous ways to their increased exposure. Risk-weighting was, in part, a response to these concerns, and offered a way to build risk-adverse incentives to offset the ambiguous results of simple capital requirements (Kim & Santomero, 1988).

Risk Aversion and Risk-Weighting

While capital has an indirect effect on risk-taking, by increasing shareholder exposure to risk, the weighting system used in the Basel Accords offers a more direct incentive. Assuming, as discussed above, that raising capital is costly and banks have a preference for leverage, then loans that require more capital are more costly than loans that require less capital. Weighting assets in this way is partly supposed to build an appropriate buffer given the risk of the asset, but this differentiated cost also directly incentivizes banks to diversify their portfolio away from riskier assets.

Some finance theory looks at the effect of risk-weighting on capital regulation generally, and finds promising results. Most of this theoretical literature focuses on franchise value, which is the value of potential future bank earnings. High franchise values are said to encourage risk-aversion, to guarantee these future returns; while low franchise values encourage gambling behavior in order to raise the returns on offer. Repullo (2002) examines these low franchise value banks, and finds that risk-weighted capital requirements do encourage them to

hold a more conservative level of capital and avoid excessive risk-taking.[5] Milne & Whalley (2001) argue that capital-holdings actually increase franchise value, and in so doing can encourage risk-aversion. However, they see this as mostly playing out in the short term, when banks are still raising capital, and with no substantial shift in bank risk attitudes in the long-run.

Beyond the question of franchise value however, most work is focused on specific systems of risk-weighting, since different weights or methods of weighting can produce starkly different results. The biggest change in the move from Basel I to Basel II was the system of risk-weighting, which shifted from a risk-buckets system to a modeling-based approach. The work on risk-weighting can thus be divided between the two accords.

Empirical Evidence

Basel I

The origins of much of the literature on the effect of risk-weighting on the makeup of banks portfolios can be traced back to the previously explored credit crunch of the 1990s, after the introduction of Basel I. While many of the studies reviewed thus far focus their attention on the reduction in bank activity, and attempt to find the role of Basel I in the credit crunch, an arguably more important effect was the ensuing rush by banks to invest in safe, zero-weighted government securities, at the expense of more risky loans. As Furfine (2001: 33) notes "the share of total bank credit invested in commercial and industrial loans fell from around 22.5% in 1989 to less than 16% in 1994. The share of total bank credit invested in U.S. Government securities increased from just over 15% to

[5] It should be noted, however, that the model assumes the presence of deposit insurance premiums that decrease with higher capital holdings, and without this mechanism the model does not seem to hold true.

nearly 25% over the same time period." Figure 11 below, from Furfine's paper, demonstrates the dramatic shift in the relative shares of loans and government securities held by banks.

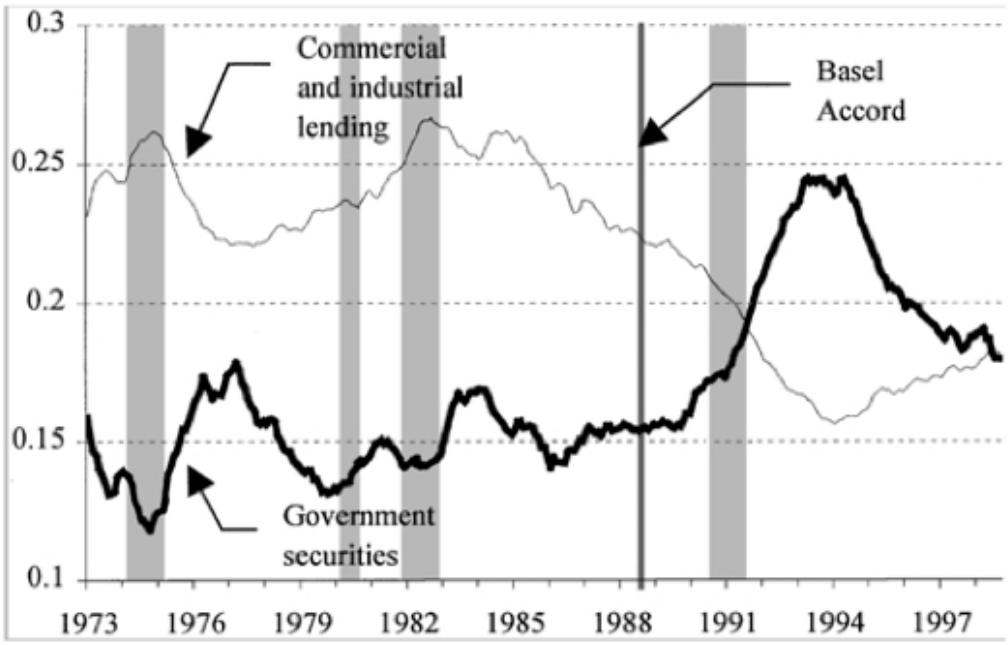

Figure 14: Share of Commercial and Industrial loans, and Government Securities, as a proportion of bank portfolios (Furfine, 2001: 34)

The arguments goes that banks, unable to raise sufficient capital after the financial crisis, turned to reductions in risk as a route to meeting the capital requirements, hence the shift to lower weighted government securities. While part of this shift might have also indicated risk-aversion resulting from the crisis, and the lack of credit demand, it nevertheless seems a particularly sharp adjustment, and one that seemed to trend towards a new, higher level of government securities after the recovery. A number of studies attempted to disentangle the various potential causes of the shift to government securities, and most find evidence of a role for risk aversion sparked by Basel I.

Hall (1993) studied macro and micro data on US banks between 1988 and 1992, and found a strong correlation between shifts in loan portfolios and the

introduction of the Basel Accords. The largest portion of this shift was away from heavily weighted Corporate and Industrial (C&I) loans, which accounted for $100 billion of the $150 billion decrease in overall loans. These shifts were particularly severe for weakly capitalized banks, indicating that banks may have been managing their risk exposure as a way to meet new Basel I regulations. Haubrich & Wachtel (1993) describe this change in portfolio structure as a "dramatic and virtually unprecedented shift", which was clearly related to regulation in their sample of US banks from 1988 to 1992. Thakor (1996) attributes the rise in holdings of government securities to the increased capital costs associated with risk-weighting, which made lending less competitive relative to government securities. He also makes use of the concept of screening costs, which increase as more scrutiny is given to loans in an attempt to avoid taking on risky exposures, further increasing the costs associated with risky loans. Furfine (2001) conducts a slightly more up to date study, on US banks between 1989 and 1997, and again finds that a combination of capital regulation and increased regulatory oversight led to a shift away from loans and to government securities.

Outside of the United States, evidence of this substitution away from loans is more mixed. Horiuchi & Shimizu (1998) look at the top 20 Japanese banks between 1990 and 1995, and find evidence of a small negative relationship between capital and loan growth. On a slight variation on the norm, they attribute this conservative attitude less to the costly capitalization via equity, and rather to the costs of capitalizing via the issuance of subordinated debt. Montgomery (2004) finds that international bank's portfolios weren't directly affected by bank capital regulation, but that they were affected by tier 1 capital.

For tier 1 capital requirements, Japanese banks chose to shift their portfolio, moving to government securities, potentially because higher quality tier 1 capital is more expensive to raise than other tiers, which can be met in ways such as the aforementioned subordinated debt issuance. Barjas, et al.'s (2004) study of Latin American banks finds mixed results, but does conclude that there is evidence of risk retrenchment in the banks studied. Agung, et al. (2001) study of Indonesia banks after the crisis made use of direct questionnaires to bankers, and concluded that weak capital often meant banks were unwilling to lend to higher-risk customers at any interest rate. This is perhaps the international example that best fits the US case, and both occurred after a crisis, suggesting that weak macroeconomic conditions could place constraints on bank's ability to raise capital via equity markets, and hence the turn to risk-shifting. Contrast this to Ediz, Michael & Perraudin's (1998) study of UK banks between 1989 and 1995, which found that banks raised their ratios purely by increasing capital, not by substituting away from riskier loans. Similarly, Naceur & Kandil's (2008) study of bank in Egypt, Jordan, Lebanon, Morocco and Tunisia observed no noticeable increase in government securities held by banks. Swiss banks also saw no marked change, succeeding in raising capital, according to Rime (2000). Switzerland did have a history with risk-weighted capital ratios, which might have made it easier to meet the requirements.

Despite the clear empirical evidence of banks loading up on safe government securities, there were increasing signs that the financial sector were becoming riskier. This seeming contradiction – banks growing riskier even as they choose lower risk-weighted assets – is possible because of two reasons.

Firstly, the early 1980s had seen the increasing rise of securitization and the secondary market for bank securities was booming. Banks were increasingly able to manage their risk after loans were originated, thus encouraging them to issue risky loans and offload them in the secondary market if they required too heavy a capital burden. Cebonoyan & Stahan (2001) examined the effect of securitization on US banks between 1987 and 1993, and found that banks active in the secondary loan market held less capital despite making riskier loans, while also increasing leverage and decreasing liquidity. The study argues that even though securitization helps banks manage their portfolio risk, any 'risk-savings' they derive from this is spent on new, risky loans. Importantly, a model by Froot & Stein (1995) argued that this portfolio management is therefore particularly severe in the case of illiquid assets, which in this context means loans that cannot be securitized. They single out SME loans as a perfect example of this. Since these loans cannot be easily offloaded if deemed to be too risky, banks are more risk-adverse during the choice of whether or not to make the loan in the first place.

Secondly, and potentially more importantly, was a problem inherent to the way in which risk-weighting worked under Basel I. The risk-buckets system encouraged banks to move their portfolio towards better weighted-assets, but was indifferent to the varying levels of risk within risk buckets. Within the risk-bucket of Corporate and Industrial loans, for example, banks could choose to lend to a riskier company over a safer company, with no additional capital burden. And banks had an incentive to do exactly this, because the shift to government securities meant a large part of their portfolio was now offering lower returns. This shift was modeled by Blum (1998), who argued that shareholders pressure banks to choose riskier investments within risk

categories, in order to compensate for decreasing returns. This was confirmed in a study by Calem & Rob (1996) of US banks between 1984 and 1993, in which higher capital requirements seemed to lead to greater portfolio risk. Interestingly, this was true even when the expected return on the risky assets was lower than safe assets, because shareholders seemed to expect the risky asset to pay higher returns. Jacques & Nigro (1994) study of large US commercial banks finds that capital requirements did have the desired risk-aversion effect for well capitalized banks, but that it encouraged riskier loans for undercapitalized banks, perhaps as they gambled for higher returns. International studies on whether substitution within categories could increase risk provided much more mixed results. For example, Sheldon (1996) argues that even as US bank volatility was increasing, Japanese banks volatility was decreasing, even though Japanese banks were facing an arguably more difficult shift to Basel I risk-weighted capital requirements.

Overall, there does seem to be convincing evidence that Basel I risk-weighting prompted a shift in portfolios away from loans and towards safe assets like government securities. This evidence is clear for the US and crisis hit countries like Indonesia, and holds to some extent in Japan. This phenomenon was, however, not universal, and some regions and countries seemed to escape this risk-shifting. Where the shift in portfolio did occur, it remains unclear what effect this had on bank portfolio risk, since many banks seemed to substitute towards more risky loans within risk-brackets. These risk brackets were eliminated in Basel II, which shifted to two broad models of calculating risk-weights: the Internal Ratings Based approach (IRB), which used bank's internal

risk models, and the Standardized approach, which offered a simpler model to less sophisticated banks.

Basel II

The Basel reforms II offered solutions to many of these concerns, fine tuning the risk categories used in the Standardized approach, and introducing the much more intricate IRB approach, which can distinguish between the riskiness of counterparties in a way that goes beyond the broad type of borrower. As previously mentioned, Basel II also offered, on balance, a reduction in the regulatory capital burden facing banks, which therefore made it easier to transition to the new regulations.

Despite this, there were immediate concerns raised about the risk-weighting system used and the potential to slow loans to riskier parties. This concern was particularly focused on loans to SMEs. This concern was partly because the IRB approach would have distinguished more precisely between counterparties, and since SMEs tend to be more risky, they could be made proportionately more expensive than other loans. But the greater concern was over the weighting used in the Standardized approach. The approach weighted unrated corporate loans at 100%, with SMEs counted as corporate. Since most of these companies tend to be unrated, lending to SMEs stood to face the maximum possible capital requirement. The loudest concerns over this issue originated from Germany. The Mittelstand (German SMEs) make up an incredibly important part of the German economy, and are generally reliant on credit from small, local banks, which would have made use of the Standardized approach. Grunert, et al (2001), using Basel Committee impact study data, estimated that the move to Basel II could increase lending costs for German SMEs by 2.2%. Sachverständigenrat (2002)

and Hommel & Schneider (2003) find similar risks of SMEs facing higher lending costs, although the German relationship banking model would largely have prevented excessive rationing of loans. While Germany was the focal point of concerns about SME lending, similar concerns over Basel II risk-weighting were raised elsewhere. Saurina & Trucharte (2004) find that the original Basel II ratios would have increased the required capital holdings for Spanish SME loans by between 9.95% and 17.95%. Chmielewski (2005) found evidence of risk-aversion decreasing credit supply in Poland, although this effect remained small.

These concerns led to substantial lobbying efforts in Basel, led by the Germans, that resulted in a revised set of rules being issued in 2002. The revision's biggest change was to allow SME loans of under 1 million Euros to be classified as retail loans, thus qualifying for the lower weighting of 75%. The changes immediately allayed fears, and encouraged some to argue that SME lending could be made more attractive, as the retail loans weights were below those of some corporate loans (Hommel & Schneider, 2003). The changes were well received almost everywhere. Saurina & Trucharte's (2004) estimate of Spanish SME loan capital increases of up to 17.95% were reduced to estimates between 5.93% and 10.83%. Altman & Sabato (2005), looking at banks in the US, Italy and Australia, estimated that capital requirements for SMEs classified as retail would decrease, while corporate SME capital would still increase. They note that there could be a redistribution of loans between these two groups, with banks that held more than 40% of SME loans in the retail category facing decreasing capital requirements. Banks would therefore benefit from issuing more small loans or fewer big loans to SMEs.

Concerns still remained, but they shifted to a focus on larger loans and loans from banks using the IRB system. The concern in the IRB approach was the importance of debt-to-equity ratios and their role in calculating the risk-weighting of a counterparty. In the case of Germany, SMEs tend to be highly indebted, and thus would have very high debt-to-equity ratios and face high capital requirements (Hommel & Schneider, 2003). Austria also faced a number of concerns. Some were unique to the country, for example the tendency of Austrian banks to lend to companies when they are doing badly, as a way to smooth the business cycle (Jager & Redak, 2007). During these downturns, risk would be higher, and thus more capital would be needed. More general concerns also existed, such as the need to improve the assessment of SME loans, which might further increase costs.

Regardless of the specific results, the controversy over SME loans demonstrated that the calibration of risk-weighting can have substantial effects on the flow of loans to certain groups. If risk-weights are unbalanced, or if the maximum capital ratio were high enough to exaggerate minor imbalances, then the direction of loans could change significantly.

Key Findings

While risk-weighted capital requirements seem a simple mechanism to build risk-aversion, the theory and evidence explored paints a more complex and ambiguous picture. In a system as complex as the Basel capital ratios, it seems relatively easy for the policies to have unintentional consequences that could actually stoke bank risk. In general, however, a few key observations should be noted.

Risk-taking and Capital

1. In the presence of deposit insurance and the absence of any capital regulation, banks will leverage to an excessively risky level.
2. Increased equity holdings have an ambiguous effect on bank risk-taking.
3. Banks in which management exert a greater level of influence than shareholders, are more likely to be more risk-adverse than shareholder-dominated banks.

Risk-taking and Risk-weighting

1. Ceteris paribus, banks seem to favor assets with lower risk-weights.
2. The closer the returns offered by differently weighted assets, the more likely banks are to invest in the lower weighted asset.
3. Ceteris paribus, banks favor riskier assets of equal risk-weighting (since they offer higher returns).
4. Under the IRB approach, SMEs with high risk profiles, such as those with high debt-to-equity ratios, face higher risk-weightings
5. Under the Standardized Approach, smaller SME loans, classified as retail loans, face lower risk-weighting than larger SME loans, classified as corporate loans.

Impact on South African Banks

Many of the preconditions that exist under the capital discussion hold for risk-taking as well, mostly importantly the fact that South African banks are well capitalized, and it remains uncertain whether Basel III will require a significant shift in their capital holdings. Nevertheless, there are important implications of the above discussion for both the effect of capital exposure and risk-weighting on South African banks.

Risk Aversion and Capital

This relatively small expected increases in South African bank capital is particularly important given the discussion of the direct risk-aversion of rising capital exposures. Since capital is unlikely to rise substantially in the South African context, shareholders do not stand to significantly increase their exposure, and thus are unlikely to shift their risk attitudes.

Importantly however, the literature explored does not simply indicate that high capital requirements could encourage risk-aversion, rather it argued that high capital holdings, regardless of the reason, are likely to encourage risk-aversion.

South African banks have tended to hold high capital ratios relative to international comparisons. And there are substantial theoretical and empirical reasons to believe that these higher capital ratios may have contributed in some way to the relatively conservative lending attitude of South African banks. Exploring this comprehensively is beyond the scope of this study, but it is worthwhile to note that the capital structure of South African banks might make it difficult for policy to encourage banks to be more actively involved in riskier asset categories.

A second consideration regards the specific ownership structures of South African banks. The literature seems to suggest that, in the presence of moral hazards such as deposit insurance and the absence of significant capital holdings, shareholder-controlled banks will tend to be more risky than management-controlled banks. It is difficult to assess this relationship between the two in South Africa. There is evidence that management of South African banks receive far more modest bonuses and incentives than their American counterparts, and thus could operate with a greater level of independence from shareholders. A

further complication is the high percentage of institutional shareholders present in South Africa banks, such as Barclay's controlling interest in ABSA or the Industrial and Commercial Bank of China's (ICBC) stake in Standard Bank. The aims and internal structure of these institutional investors makes it hard to know if they follow similar behavioral patterns as those explored in the literature. Overall, there seems to be insufficient room to draw conclusions from the ownership structure of South African banks.

Finally, higher capital requirements might be especially important in the face of moral hazard, while banks may hold high capital levels in the absence this moral hazard. In general, South Africa's regulatory regimes seem to do well in minimizing excessive moral hazard. The collapse of SAAMBOU bank in particular sent a strong message to markets that regulators were not willing to save all large banks, placing doubt into the minds of banks as to whether they could rely on being too big to fail. Crucially, South Africa does not have an explicit system of deposit insurance, although there is an ongoing debate about whether one should be introduced. In the case of the collapse of SAAMBOU, the state did step in to guarantee deposits, creating the expectation that they would do so in the future, and thus setting up an implicit deposit insurance scheme. But nevertheless, the lack of formal legislation in this regard might encourage shareholders and depositors to be more cautious than in the presence of such a scheme, and may be a further potential explanation for the higher capital levels observed in South African banks.

Overall, the relatively weak empirical evidence of risk-aversion generated from capital exposure is even weaker in the case of South Africa, which lacks the key drivers of aggressive shareholders and explicit deposit insurance. There might

exist some link between high capital holdings and the relatively conservative behavior of South African banks, but this remains uncertain in the presence of a range of competing considerations that could also drive this general trend towards risk-aversion.

Risk Aversion and Risk-Weighting

The risk-weighting system, on the other hand, applies equally to South African banks as it would to international comparisons. Assuming, as discussed before, that equity is expensive, risk-weighting might then generate greater risk-aversion in South African banks if two conditions are met. Firstly, distortionary risk-weights would have to exist in the system of weighting that South African banks choose to use. Secondly, the difference in cost of capital associated with different risk-weights would have to increase under Basel III.

The first criteria has two parts: the existence of distortionary risk-weights, and the choice of weighting system by banks. Basel III does introduce revised risk-weights, and potentially a new system of risk-weighting, but in general the system is not set to change drastically from Basel II. The changes will be more in the details, with the broad overall thrust of the system remaining in tact. As such, Basel II offers a useful and more thoroughly researched benchmark by which to understand Basel III risk-weighting. The choice of risk-weighting system is therefore mainly between the Standardized approach and the Internal Ratings Based Approach. Both explicitly encourage lending to safer groups, but to differing extents. The Standardized approach relies on rating agencies to determine the risk associated with corporate counterparties, and in the absence of ratings these borrowers could attract the maximum 100% weighting. This is a

concern for South African companies, which tend to be unrated, particular in the case of SMEs. Smaller loans to businesses might nevertheless be actively encouraged, as they can be classified under the preferentially treated retail segment, but larger loans to unrated companies might still be discouraged. The IRB approach seems less problematic, but will still discourage lending to risky prospects, particularly companies with high debt-to-asset ratios. The big four South African banks will all make use of the IRB approach. This immediately decreases the concerns associated with the more distortionary Standardized approach, which may still be utilized by smaller banks. These smaller banks seem less likely to approve large company loans, and may therefore benefit from a retail weighting for the majority of SME loans.

Nevertheless, some distortions are still possible, and might still grow worse. The distortions set-up in Basel II could be accentuated because the overall level of capital required under Basel III stands to increase. While an SME retail loan would still be weighted at 75% and an SME corporate loan rated at 100%, the overall ratio by which these percentages are calculated increases from the flat 8% found in Basel II. The uncertainty over which buffers will be applied and when makes it hard to quantify the extent of this shift, but it does seem clear that overall higher capital requirements could exacerbate the distortions between different groups of lenders.

Overall, while capital exposure risk-aversion does not seem to have an impact on South African SMEs, risk-weighting still could. This effect if likely to be small and to only affect companies. Most at risk are mid-sized companies, which are small enough to be risky and unrated, and yet large enough to require larger loans.

Also at risk are companies with high debt-to-asset ratios, borrowing from large banks. And companies requesting larger loans, from small banks.

Applying this to the profile of South African business, it seems these groups would represent a small minority of South African small businesses. In the case of SMEs, the prevalence of the sole proprietor ownership structure and small size of SMEs in South Africa mean the vast majority will probably make use of retail loans, and thus could actually find it easier to gain access to credit from small banks (The DTI, 2007). For larger companies that make use of corporate loans, the vast majority are likely to turn to big banks, which dominate the market, and which would use the IRB approach and avoid some of the worst distortions of the Standardized approach. The dominance of small informal SMEs and large corporate oligopolies – a reflection of South Africa's dual economy – means most companies will avoid the burden of risk-weighting discouraging lending. But this does not mean the South Africa economy won't suffer. On the contrary, the development of medium sized enterprises – small and informal enough to employ less skilled workers, but large enough to compete – is a primary focus of policy in South Africa. The missing middle is an already entrenched problem that could be exacerbated by the risk-weights of Basel III, which make this neglected sector even less attractive. Nevertheless, this concern should be understood as less of a cost in term of forgone GDP, but rather as the entrenching of the structure of the South African economy. To many experts, this would not be a problem, since the middle is not necessarily vital to the development of the economy. But, as the sector that stands to be potentially most effected, it falls on policymakers to take steps to safeguard against any possible distortions arising from Basel III.

Conclusion

Basel III, the headline reform effort in response to the financial crisis of 2007/2008, has met increasing resistance from the financial sector. The lobbying efforts and arguments made in response to Basel III are reminiscent of the messages emanating from the sector during the period of financial deregulation during the late 1990s and early 2000s, which set the stage for the crisis and the ensuing recession from which many are yet to escape. The lesson of this period is clear: the regulatory decisions we make now define the volatility and efficiency of the financial sector in the coming decades. These decisions must be made in an inclusive process, which incorporates the knowledge of industry insiders, but also examines research and information beyond these vested interests.

This paper has attempted to do exactly that, examining the finance literature on downside effects of the previous two Basel Accords. The theoretical literature would suggest that risk-weighted capital adequacy requirements should create a safer financial system, but one that charges higher interest rates, offers fewer loans, and shies away from risky investments – all of which could negatively effect the fragile macro-economy. Capital regulation achieves this via two mechanisms. The first is the capital channel, by which the increased cost of capital associated with equity funding drives up lending costs, reduces lending, and disincentives lending to groups that require relatively more equity to offset their risk. The second is the risk aversion channel, by which larger equity holdings result in increased exposure to potential losses, and risk-weighting makes lending to risky groups more expensive, decreasing returns and making banks less willing to extend loans to these risky parties.

While the empirical literature on these two channels in the case of Basel I and Basel II is quite concentrated in certain geographical areas, and the two policies explored do differ from Basel III, they do paint a clear consensus that there is some reason to believe Basel III will come at some macroeconomic cost. However, the studies also are clear in that, except in certain limited circumstances, these effects should be small.

29 core empirical studies on the bank capital channel were examined. Of these, five studies argue that the bank capital channel has no effect on loan growth or loan costs. Three argue that the effects of the bank capital channel would be large. And the remaining 23 argue that the bank capital channel will have some effect, but it is likely to be small. Smaller banks and banks that are weakly capitalized are shown to be more greatly effected, and there is clear evidence that economies recovering from a crisis are more likely to encounter the bank capital channel. This is because raising equity is difficult in a badly depressed market, and thus financial firms turn to managing their loan issuance and lending costs as a means to meet their regulatory requirements.

20 core empirical studies on the risk aversion channel were examined. Of these, six studies argue that the bank capital channel has no effect on loan growth or loan costs. Only two argue that the effects of the bank capital channel could be large. And the remaining 12 argue that the bank capital channel will have some effect, but it is likely to be small. The risk aversion channel is more complicated, because it does not have a mechanical relationship to economic growth. This channel rather diverts the flow of lending to a different group of counterparties – for example away from big businesses and towards SMEs. Except in the case of a shift away from loans and towards government securities, this counterparty

effect has an ambiguous impact on economic growth, determined more by the way in which loans are used. How one views the shifts found in the risk aversion channel depends on one's views on the relative contributions of different categories of economic actors – such as consumers, corporates, SMEs – and such a determination lies beyond the scope of this paper.

The empirical evidence thus points to weak effects of both macroeconomic channels of Basel III capital adequacy requirements. This result seems even more promising in light of the strong position of South African banks. South African banks are well capitalized, large, and have recovered well from the financial crisis – thus avoiding the preconditions identified in the bank capital channel, that might have increased the negative impact of Basel III. The lack of explicit deposit insurance weakens any moral hazard problems, and the strict regulatory regime already in place means compliance should be relatively easy. While challenges remain in some of the new innovations, which are well worth additional study, on the whole there is little reason to believe South African banks will substantially shift their behavior as a result of Basel III.

While this conclusion is positive, an important consideration must be borne in mind. The extent of this result is only to determine whether it is likely banks will change their current behavior in a way that might slow economic growth or disadvantage certain borrowers. But it cannot be said whether the current behavior of banks is the best approach for development. South African banks are world class by many measures: cautious, professional and well equipped to serve an advanced economy. But it remains an open question whether they adequately serve South Africa's dualistic economy. A truly developmental financial sector requires the flexibility to straddle the divide between South Africa's large

corporate firms and struggling middle income firms, to provide funding for both large government infrastructure problems and the nascent entrepreneurial potential of small enterprises. While Basel III does not seem likely to have an impact on South African banks, it can limit the ability of banks to move away from this more conservative model, and limits the capacity of policy makers to incentivize such a shift. South Africa has little reason to fear Basel III, but it should be concerned about a financial system that is out of sync with the demands of the economy that drives it.

Bibliography

Admati, et al. 2011. "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive." Stanford University Graduate School of Business Working Paper.

Agung, J., Kusmiarso, B., Pramono, B., Hutapea, E., Prasmuko, A. & Prastowo, N. 2001. "Credit Crunch In Indonesia In the Aftermath of the Crisis." Jakarta: Directorate of Economic Research and Monetary Policy Bank Indonesia

Albertazzi, U. & Marchetti, D. 2010. "Credit Crunch, Flight to Quality and Evergreening: An Analysis of Bank-Firm

Relationships After Lehman." Banca d'Italia

Alfon, I., Argimon, I., Bascunana-Ambros, P. 2005. "How individual capital requirements affect capital rations in UK Banks and building societies." Banco de Espana: Documentos de Trabojo, No 0515

Allen, F. & Gale, D. 2003. "Capital Adequacy Regulation: In Search of a Rationale." Wharton Financial Institutions Centre: Working Paper 03-07.

Altman, E. & Sabato, G. 2005. "Effects of the New Basel Capital Accord on Bank Capital Requirements for SMEs." Journal of Financial Services Research, 28: 1/2/3, pgs 15-42.

Ang, Andrew, R. Hodrick, Y. Xing, X. Zhang. 2006 “The Cross-Section of Volatility and Expected Returns.” Journal of Finance 61, pp. 259-299.

Ang, Andrew, R. Hodrick, Y. Xing, X. Zhang. 2009. “High Idiosyncratic Volatility and Low Returns: International and Further U.S. Evidence.” Journal of Financial Economics 91, pp. 1-23.

Baer, H. & McElavrey, J. 1992. "Capital Adequacy and the Growth of US Banks." Federal Researve Bank of Chicago: Working Paper 92-11.

Baker M., Bradley, B. & Wurgler, J. 2011. "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly." *Financial Analysts Journal,* vol 67, no 1.

Baker, M & Wurgler, J. 2013. ‘Do Strict Capital Requirements Raise the Cost of Capital? Banking Regulation and the Low Risk Anomaly’. NBER Working Paper No 19018. Cambridge, Mass: National Bureau of Economic Research.

Baker, M., Bradley, B. & Taliaferro, R. 2011. “Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly.” Financial Analysts Journal 67, pp. 40-54.

Baker, M., Bradley, B. & Taliaferro, R. 2013. “The Low Risk Anomaly: A Decomposition into Micro and Macro Effects.” Harvard Business School, working paper.

Barajas, A., Chami, R., & Cosimano, T. 2004. "Did the Basel Accord Cause a Credit Slowdown in Latin America?" Economia, Fall 2004, pgs 135-182.

Barrios, V. & Blanco, J. 2002. "The effectiveness of bank capital adequacy regulation: A theoretical and empirical approach." Journal of Banking & finance 27, pgs 1935-1958.

Baxter. 2012 "The Future Of Banks Hangs In Their Balance Sheets." Forbes, Bain Insights.http://www.forbes.com/sites/baininsights/2012/05/16/the-future-of-banks-hangs-in-their-balance-sheets/ Acccessed: 13/04/2013.

BCBS (Basel Committee on Banking Supervision). 1988. *International convergence of capital Measurements and Capital Standards.* Basel: Bank for International Settlements (BIS).

BCBS (Basel Committee on Banking Supervision). 2004. *International Convergence of Capital Measurement and Capital Standards: A Revised Framework*. Basel: Bank for International Settlements.

BCBS. 2006. "Results of the fifth Quantitative Impact

Study." Basel: Bank of International Settlements.

BCBS. 2010. "An assessment of the long-term economic impact of stronger capital and liquidity requirements."
Basel: Bank of International Settlements.
BCBS. 2011."Basel III: A global regulatory framework for more resilient banks and banking systems". Basel: Bank of International Settlements.
Berger, A. & Udell, G. 1994. "Did risk-based capital allocate bank credit and cause a 'credit crunch' in the US?" Journal of Money, Credit and Banking, Vol. 26.
Bernanke, B. & Lown, C. 1991. "The Credit Crunch." Brookings Papers on Economic Activity, 2: pgs 205-239.
Berrospide, J. & Edge, R. 2010. "The Effects of Bank Capital on Lending: What Do We Know, and What Does it Mean?" Washington, DC: Federal Reserve Finance and Economics Discussion Series, 2010-44.
BIS. 2005. *This is the Biz*. Basel: Bank of International Settlements.
BIS. 2013. 83rd BIS Annual Report. Basel: Bank for International Settlements (BIS).
http://www.bis.org/publ/annualreport.htm
Blum, J. 1999. "Do capital adequacy requirements reduce risks in banking?" Journal of Banking & Finance , no 23: pgs 755-771.
Boyd, J., De Nicolò, G. & Loukoianova,E. 2009. “Banking Crises and Crisis Dating: Theory and Evidence.” IMF Working Paper No. 09/141.
Braithwaite, T. & Jenkins, P. 2011. "JPMorgan chief says bank rules ‘anti-US’." Financial Times, http://www.ft.com/intl/cms/s/0/905aeb88-dc50-11e0-8654-00144feabdc0.html#axzz2rakecnhE, accessed: 30/07/2013.
Brinkmann, E. & Horvitz, P. 1995. "Risk-Based Capital Standards and the Credit Crunch." Journal of Money, Credit and Banking, Vol. 27, No. 3, pgs. 848-863.
Bris, A. & Cantale, S. 2004. "Bank capital requirements and managerial self-interest." The Quarterly Review of Economics and Finance, no 44, pgs 77–101.
Burhouse, S., Feid, J., French, G. & Ligon, K. 2003. "Basel and the Evolution of Capital Regulation: Moving Forward, Looking Back." Federal Deposit Insurance Corporation: FYI Update on emerging Issues in Banking.
http://www.fdic.gov/bank/analytical/fyi/2003/011403fyi.html
Buser, S., Chen, A. & Kane, E. 1981. "Federal Deposit Insurance, Regulatory Policy, and Optimal Bank Capital." The Journal of Finance, Vol. 36, No. 1, pgs. 51-60.
Caggiano, G. & Calice, P. 2011. "The Macroeconomic Impact of Higher Capital Ratios on African Economies." Tunis: African Development Bank, working paper no 139.
Calem, P. & Rob, R. 1996. "The Impact of Capital-Based Regultion on Bank Risk-Taking: A Dynamic Model." Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series 96, no. 12.
Cebonoyan, A. & Stahan, P. 2001. "Risk Management, Capital Structure and Lending at Banks." Wharton Financial Institutions Center, 02-09.
Chiuri, M., Ferri, G. & Majnoni, G. 2002. "The Macroeconomic Impact of Bank Capital Requirements in Emerging Economies: Past Evidence to Assess the Future." Journal of Banking and Finance, 26(5): pgs 881–904.
Chmielewski, T. 2005. "Bank risks, risk preferences and lending." National Bank of Poland.
Clark, J. 2010. "Regulators hit back at IIF’s doom-laden predictions of Basel III impact." Risk magazine, http://www.risk.net/risk-magazine/news/1686822/regulators-hit-iif-s-doom-laden-predictions-basel-iii-impact, accessed: 30/07/2013.
Cornett, M. & Tehranian, H. 1994. “An examination of voluntary versus involuntary security issuances by commercial banks: The impact of capital regulations on common stock returns.” Journal of Financial Economics, 35, pgs. 99-122.

Dahl, D. & Spivey, M. 1995. "Prompt corrective action and bank efforts to recover from undercapitalization." *Journal of Banking & Finance,* 19, pgs 225-243.
Ediz, T., Michael, I. & Perraudin, W. 1998. "The Impact of Capital Requirements on U.K. Bank Behaviour." FRBNY Economic Policy Review, October 1998, pgs 15-22.
Fama, E. & French, K. 1992. "The Cross-Section of Expected Stock Returns." Journal of Finance 47, pgs. 427-465.
FDIC. 1998. *Managing the Crisis: The FDIC and RTC Experience.* Washington, DC: the Federal Deposit Insurance Corporation (FDIC).
Finscope. 2010. "Finscope South Africa Small Business Survey 2010." Johannesburg: Finmark Trust.
Fleming, S. & Chon, G. 2014. "Banks win Basel concessions on debt rules." Financial Times, http://www.ft.com/intl/cms/s/0/d920db5e-7bb6-11e3-84af-00144feabdc0.html#axzz2rakecnhE, accessed: 14/01/2014.
Francis, W. & Osborne, M. 2009a. "On the behaviour and determinants of risk-based capital ratios: Revisting the Evidence from UK Banking Institutions." Financial Services Authority, Occasional Paper Seies 31.
Francis, W. & Osborne, M. 2009b. "Bank regulation, capital and credit supply: Measuring the impact of Prudential Standards." Financial Services Authority, Occasional Paper Seies 36.
Freidman, B. 1991. "Commnets and Discussion: The Credit Crunch." Brookings Papers on Economic Activity, 2: pgs 245-247.
Froot, K. & Stein, J. 1995. "Risk Management, Capital Budgeting and Capital Structure Policy for Financial Institutions: An Integrated Approach." Wharton Financial Institutions Center, 96-28.
FSI (Financial Stability Institute). 2004. *Implementation of the new capital adequacy framework in non-Basel Committee member countries.* Occasional Paper No 4. Basel: Bank for International Settlements.
Furfine, C. 2001. "Bank Portfolio Allocation: The Impact of Capital Requirements, Regulatory Monitoring, and Economic Conditions." Journal of Financial Services Research, 20:1, pgs 33-56.
Furlong, F. 1992. "Capital Regulation and Bank Lending." Federal Reserve Bank of San Francisco Economic Review, no 3, pgs 23-33.
Gale, D. & Ozgur, O. 2004. "Are Bank Capital Ratios Too High or Too Low? Risk Aversion, Incomplete Markets, and Optimal Capital Structure." Journal of the European Economic Association, vol 3, pgs 690-700.
Gale, D. 2010. "Capital Regulation and Risk Sharing." International Journal of Central Banking, vol 6, no 4, pgs 187-204.
Gennotte, G. & Pyle, D. 1990. "Capital controls and bank risk." Journal of Banking and Finance, no 15, pgs 805-824.
Ghosh, S. & Ghosh, A. 1999. "East Asia in the Aftermath: Was there a Crunch?" International Monetary Fund Working Paper, WP/99/38.
Gianetti, M. & Simonov, A. 2010. "On the Real Effects of Bank Bailouts: Micro-Evidence from Japan." Centre for Economic Policy Research, Bank Crisis Prevention and Resolution conference, 2-3 June 2010.
Grunert, J., Kleff, V., Norden, L. & Weber, M. 2001. "Mittelstand und Basel II - der Einfluss der neuen Eigenkapitalvereinbarung für Banken auf die Kalkulation der Kreditzinsen". Zeitschrift für Betriebswirtschaft, 72:10, pgs. 1045-1064.
Hall, B. 1993. "How has the Basle Accord Affected Bank Portfolios?" Journal of the Japanese and International Economies, no 7, pgs 408-440.
Hancock, D., Laing, A. & Wilcox, J. 1995. "Bank capital shocks: Dynamic effects on securities, loans, and capital." Journal of Banking & Finance, no 19, pgs 661-677.
Hanson, S., Kashyap, A. &. Stein, J. 2010. "A Macroprudential Approach to Financial Regulation." Journal of Economic Perspectives.

Haubrich, J. & Wachtel, P. 1993. "Capital Requirements and the Shifts in Commercial Bank Portfolios." Federal Reserve Bank of Cleveland Economic Review, no 29, pgs 2-15.
Haugen, R. & Heins, A. 1975. “Risk and the Rate of Return on Financial Assets: Some Old Wine in New Bottles.” Journal of Financial and Quantitative Analysis, no 10, pgs 775-784.
Hawkins, P. 2007. "Financial liberalisation and global governance: Role of international entities - South Africa and Basel II." Johannesburg: FEASibility.
Hellmann, T., Murdock, K. & Stiglitz, J. 2000. "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Require- ments Enough?" American Economic Review, 90, pgs 147-165.
Hernando, I & Vilanueva, E. 2012. "The recent slowdown of bank lending in Spain: Are supply side factors relevant?" Banco De Espana: Documentos de Trabajo No 1206.
Hommel, U. & Schneider, H. 2003. "Financing the German Mittelstand." European Investment Bank Papers, Vol 7, no 2, pgs 52-90.
Horiuchi, A. & Shimizu, K. 1998. "The deterioration of bank balance sheets in Japan: risk taking and recapitalization." Pacific-Basin Finance Journal, No 6, pgs 1–26.
IIF. 2011. *The Cumulative Impact on the Global Economy of Changes in the Financial Regualtory Framework*. Washington, DC: Institute of International Finance.
Ito, T. & Sasaki, Y.. 1998. "Impacts of the basle Capital Standard on Japanese Banks' Behavior." National Bureau of Economic Research, Working Paper 6730.
Jackson, P., Furfine, C., Groeneveld, H., Hancock D., Jones, D., Perraudin, W., Radecki, L. & Yoneyama, M. 1999. "Capital requirements and bank behaviour: the impact of the Basle Accord." Basel Committee on Banking Supervision, Working Paper No 1, April 1999
Jacques, K. & Nigro, P. 1994. "Risk-Based Capital, Portfolio Risk, and Bank Capital: A Simultaneous Equations Approach." Office of the Comptroller of the Currency, Working Paper 94-6.
Jager, J. & Redak, V. 2007. "Austrian Banks’ Lending and Loan Pricing Strategies against the Background of Basel II." ONB Financial Stability Report 12.
John, K., Saunders, A. & Senbet, L. 1999. "A Theory of Bank Regulation and Management Compensation." The Review of Financial Studies, Vol. 13, No. 1, pgs 95-126.
Kahane, Y. 1977. "Capital adequacy and the regulation of financial intermediates." Journal of Banking Finance, no 1, pgs 207–218.
Keeley M. 1990. "Deposit Insurance, Risk, and Market Power." *American Economic Review,* December 1990, pgs. 1183-1200.
Khumalo, S. & Naidoo, S. 2012. "Banks are greedy monsters – Gordhan." Cape Times, July 4 2012. http://www.iol.co.za/capetimes/banks-are-greedy-monsters-gordhan-1.1334212#.UuYtkZHg4b0, accessed: 11/10/2013.
Kim, D. & Santomero, A. 1988. "Risk in Banking and Capital Regulation." The Journal of Finance, Vol 43, No 5, pgs 1219-1233.
Koehn, M. & Santomero, A. 1980. "Regulation of Bank Capital and Portfolio Risk." The Journal of Finance, Vol 35, No 5, pgs 1235-1244.
Lee, C. 2009. "Obama blasts 'reckless' Wall Street." Politico, http://www.politico.com/news/stories/1209/30500.html, accessed: 11/10/2013.
Lown, C. & Peristiani, S. 1995. "The behavior of consumer loan rates during the 1990 credit slowdown." Journal of Banking & Finance, no 20, pgs 1673-1694.
Masters, B. 2013. "Banks win more flexible Basel rules", Financial Times, http://www.ft.com/intl/cms/s/0/e4effd30-5820-11e2-b997-00144feab49a.html#axzz2lLTvUkmw, accessed: 30/07/2013.

McAleer, M., Jimenez-Martin, J. & Perez-Amaral, T. 2009. "Has the Basel II Accord Encouraged Risk Management During the 2008-09 Financial Crisis?" Universidad Complutense de Madrid.
Milne, A. & Whalley, E. 2001. "Bank Capital Regulation and Incentives for Risk-Taking." Journal of Economic Literature, G21.
Modigliani, F. & Miller, M. 1958. "The Cost of Capital, Corporate Finance and the Theory of Investment." American Economic Review, 48, pgs 261-97.
Modigliani, F. & Miller, M. 1961. "Dividend Policy, Growth and the Valuation of Shares." Journal of Business, 34, pgs 411-33.
Modigliani, F. & Miller, M. 1963. "Corporate Income Taxes and the Cost of Capital: A Correction." American Economic Review, 53, pgs 433-43.
Montgomery, H. 2004. "The effect of the Basel Accord on bank portfolios in Japan." Journal of Japanese International Economics, no 19, pgs 24-36.
Myers, S. & Majluf, N. 1984. "Corporate Financing and Invesment Decisions when firms have information that investors do not have." Journal of Financial Economics, 13, pgs 187-221.
Naceur, S. & Kandil, M. 2008. "Basel Accord and Lending Behavior: Evidence from MENA Region." Economic Research Forum, Working Paper No 385.
Olawale, F. & Garwe, D. 2010. "Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach." *African Journal of Business Management,* vol 4(5), pgs 729-738.
Orgler, Y. & Taggart Jr, R. "Implications of Corporate Capital Structure Theory for Banking Institutions." Journal of Money, Credit, and Banking, vol. 15, pgs 212-21.
Owualah, S. 1999. "Banking Crisis, Reforms, and the Availability of Credit to Japanese Small and Medium Enterprises: A Research Note." Asian Survey, Vol. 39, No. 4, pp. 656-667.
Pazarbaioglu, C. 1996. "A Credit Crunch? A Case Study of Finland in the Aftermath of the Banking Crisis." IMF Working Paper, WP/96/135.
Peek, J & Rosengren, E. 1992. "Crunching the Recovery: Bank Capital and the Role of Bank Credit." Federal Reserve Bank of Boston Conference Series, vol 36, Pgs 151-186.
Pfleiderer, P. 2010. "On the Relevancy of Modigliani and Miller to Banking: A Parable and Some Observations." Rock Centre for Corporate Governance at Stanford University, Working Paper no 93.
Puri, M., Rocholl, J. & Steffen, S. 2010. "Global Retail Lending in the Aftermath of the US Financial Crisis: Distinguishing between Supply and Demand Effects." Journal of Financial Economics, vol 100, pgs 556-578.
Repullo, R. 2002. "Capital Requirements, Market Power, and Risk-Taking in Banking." Journal of Financial Intermediation, Vol. 13, pgs 156-182.
Rime, B. 2001. "Capital requirements and bank behaviour: Empirical evidence for Switzerland." Journal of Banking & Finance, 25, pgs 789-805.
Rochet, J. 1992. "Capital requirements and the behaviour of commercial banks." European Economic Review, 36, pgs 1137-1178.
Sachverständigenrat. 2002. "Jahresgutachten 2001/2002", Ziffer 80-96 (Basel II), pgs 35-40.
SARB. 2005. "Annual Report 2005: Bank Supervision Division." Pretoria: South African Reserve Bank.
Saunders, A., Strock, E. & Travlos, N. 1990. "Ownership Structure, Deregulation, and Bank Risk Taking." The Journal of Finance, Vol 45, No 2, pgs 643-654.
Saurina J & Trucharte, C. 2004. "The Impact of Basel II on Lending to Small- and Medium-Sized Firms: A Regulatory Policy Assessment Based on Spanish Credit Register Data." Journal of Financial Services Research, 26:2, pgs 121-144.
SBP. 2013. "Headline Report of SBP's SME Growth Index: Easier, Harder for Small Business in South Africa." Johannesburg: SBP.

Sheldon G. 1996. "Capital adequacy rules and the risk-seeking behaviour of banks: a firm level analysis." Swiss Journal of Economics and Statistics, 132, pgs 709 – 734.
Shrieves, R. & Dahl, D. 1991. "The relationship between risk and capital in commercial banks." Journal of Banking and Finance, 16, pgs 439-457.
Slovin, M., Sushka, M & Polonchek, J. 1993. "The Value of Bank Durability: Borrowers as Bank Stakeholders." Journal of Finance, 48, pgs 247-266.
Syron, R. 1991. "Are we experiencing a Credit Crunch?" New England Economic Review, July/August 1991, pgs 3-10.
Tarullo, D. 2008. Banking on Basel: The Future of International Financial Regulation. Washington, DC: Peterson Institute for International Economics. (eBook)
Thakor, A. 1996. "Capital Requirements, Monetary Policy, and Aggregate Bank Lending: Theory and Empirical Evidence." The Journal of Finance, Vol 51, No 1, pgs 279-324.
The DTI. 2007. "Annueal Review of Small Business in South Africa, 2005-2007." Pretoria: the Department of Trade and Industry.
Valladares, M. 2013. "You Call That Liquid? New Basel III Liquidity Rules Ineffectual." American Banker, http://www.americanbanker.com/bankthink/you-call-that-liquid-new-basel-iii-liquidity-rules-ineffectual-1055635-1.html, accessed: 30/07/2013.
Van den Heuvel, S. 2002. "Bank Capital Channel of Monetary Policy." Federal Reserve Bank of Atlanta.
Wagster, J. 1999. "The Basle Accord of 1988 and the International Credit Crunch of 1989-1992." Journal of Financial Services Research, 15:2, pgs 123-143.
Wall, L. & Peterson, P. 1996. "Banks Responses to Binding Regulatory Capital Requirements." Federal Reserve Bank of Atlanta, Economic Review, March/April 1996, pgs 1-17.
Woo, D. 1999. "In Search of "Capital Crunch": Supply Factors Behind the credit Slowdown in Japan." International Monetary Fund Working Paper, WP/99/3.
World Bank. 2007. "Enterprise Surveys: South Africa Country Profile 2007." Washington, DC: International Finance Corporation, World Bank Group.
World Bank. 2013. "Doing Business 2013: Smarter Regulation for Small and Medium-Size Enterprises." Washington, DC: World Bank and International Finance Corporation.
Yudistira, D. 2003. "The Impact of Bank Capital Requirements in Indonesia." *Economics Working Paper Archive at WUSTL*, 12.