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Bank Capital Adequacy: Where to Now?

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Abstract:

The Global Financial Crisis (GFC) exposed flaws in the current state of bank capital regulation and bank capital management. This paper briefly reviews the history of capital requirements, and some difficulties in their implementation, and then examines what happened to bank capital in the GFC. Based on the problems identified, the paper then outlines and analyses the merits of various proposals which have been made for changes to bank capital regulation.

Introduction

The use of minimum (risk weighted) capital requirements has been an important plank in banking regulation for the last two decades, following the release of the first Basel Capital Accord in 1988. Since that time, there have been various modifications to the Basel framework, and a comprehensive revision (Basel II) was produced in 2006 with many countries such as Australia commencing introduction one or two years later. Coincidentally, the introduction of the Basel II framework coincided with the onset of the Global Financial Crisis in mid 2007, with numerous banking failures and difficulties globally. Even though Basel II was yet to have significant effect¹, the GFC experience has led to a rethinking of approaches to capital regulation and numerous proposals for changes to that framework (as well as more wide-ranging questioning of the appropriate degree and scope of financial sector regulation).

Among those proposals are suggestions for: the use of a (non-risk weighted) leverage ratio as an adjunct to the Basel II risk-weighted capital requirement; contingent capital requirements; countercyclical capital buffers; higher quality capital; a higher quantity of capital; capital maintenance (dividend restriction) requirements; and changes to regulatory risk weights. To assess the merits of these proposals, and possible effects, it is important to clarify the concept of bank capital, and that is done in Section 1 below. It is also useful to trace briefly the history of capital requirements and bank capital experiences during the GFC. Thus Section 2 reviews the history of capital requirements and bank capital ratios and discusses some of the difficulties in appropriately measuring capital – and thus in relying upon it as a regulatory tool. Section 3 examines the capital experiences of banks during the GFC and Section 4 draws out issues arising from those experiences. Section 5 provides an overview and analysis of the various proposals which have been advanced for changes to bank capital regulation. Section 6 concludes.

¹ Although see Blundell-Wignall and Atkinson (2008) who argue that proposed reductions in housing mortgage loan risk weights influenced bank strategies and contributed to the growth of sub-prime lending in the USA. Brown and Davis (2004) also note the significant influence of banks' Basel II planning on development of internal risk management systems.

1. The Concept of Bank Capital

Bank capital is a residual item in bank balance sheets calculated as the difference between assets and those other liabilities which have more senior (prior) claims on the bank's revenue stream and (in case of failure) assets. It represents the claim of the bank's owners on the net assets of the firm and acts as a buffer to absorb fluctuations in the value of assets (such as due to loan defaults or variations in securities prices) and liabilities. It is this latter characteristic which gives rise to its role in prudential regulation, with minimum capital requirements being seen as a way of protecting other stakeholders – particularly depositors (or a deposit insurance fund standing in their stead).

In principle, capital corresponds to shareholder equity and is associated with control (voting) rights over the organization. Regulatory practice, however, has broadened the definition of capital to include some other liability items (such as some forms of debt and hybrid securities) which rank below deposit liabilities and which therefore also serve as a buffer to protect depositors from loss. And since the riskiness of the banks' activities is an important determinant of the adequacy of the capital buffer, minimum required regulatory capital since the Basel I Accord has been calculated by applying risk weights to assets (and off-balance sheet items).

Because it is calculated as a residual item, the measured quantity of bank capital depends crucially on the methods of valuation of assets and other liabilities. If, for example, a loan recorded as an asset worth \$100 is actually worthless or the market value of a security which the bank has purchased has fallen by \$100, the true quantity of capital will be overstated by that same amount. This has led to a longstanding debate on appropriate accounting practices for banks – most specifically relating to the use of historical cost versus mark-to-market accounting. But also relevant has been the question of provisioning for loan losses, because the creation of such provisions involves a corresponding reduction in shareholder equity.² Recent accounting standards had overturned previously long-standing banking practice of creating provisions on the basis of forward looking expected losses, in favour of provisions based on realized or identified potential losses. In “boom” periods, when loan defaults are below long term averages,

² In some nations, accounting presentation of balance sheets involves subtracting provisions from loans to display a “net” loan figure, while in others “gross” loans are shown and a separate liability item of provisions also shown.

this practice can be argued to overstate capital available for dealing with credit losses in a downturn.

Discussion of bank capital is also complicated by another perspective – that of the market value of the bank’s equity. This may vary substantially from accounting values, because it reflects investor’s expectations of the value of future profits of the bank (adjusted for the perceived riskiness of the bank’s activities). This will differ from the “book” (accounting) value because of differences between the mark-to market value of bank assets (and liabilities) and their accounting values, as well as the “franchise” value of the bank. Bank owners will prefer management (who, in principle, they control) to operate the bank in such a way such that the stock market value is maximized while their exposure to loss is minimized. Where their share investment provides limited liability, there is an incentive to minimize the amount of contributed capital. Using the terminology of option pricing, the owner’s stake in the bank has a payoff which resembles that of a call option on the value of the bank’s assets – unlimited upside and limited downside – with the value of that payoff increasing with the volatility of the bank’s assets and leverage. These incentives to increased risk-taking and higher leverage should, in principle, be moderated by other claimants on the bank recognizing the adverse consequences for their own claims, and demanding appropriately higher compensation for the increased risk. But in practice, the ability of other claimants to recognize the level of risk-taking is limited, while explicit or implicit guarantees of bank deposits (or other liabilities) by government as part of a broader “safety net” also weaken the extent of discipline exercised by those other stakeholders.³

2. A Brief History of Bank Capital

Bank capital arrangements have changed substantially over time. For example, some historical examples (including Australia, Scotland, UK, USA) involved bank shareholders having double or unlimited liability. Government owned banks were once more common (although government ownership has reemerged reluctantly during the GFC) in which situations the relevance of an explicit capital base, rather than a

³ In principle, risk based deposit insurance premiums should, if appropriately calibrated, counteract this effect.

government promise of repayment can be questioned. Mutual banks (or other similar depository - lending institutions) were also more common, and in such institutions there is no distinction between owners and depositor customers, although the accumulated reserves constitute a form of “communal” capital able to absorb losses and protect individual deposits.

Over the long-term, bank capital relative to assets has fallen substantially. Kaufman (1992, Figure 1) shows that the ratio of equity to assets for US Banks fell from over 50 per cent in the mid 1880s to the mid-teens in the period between the formation of the Federal Reserve in 1914 and the establishment of the Federal Deposit Insurance Corporation in 1933, and subsequently declined to the 6-8 per cent range. Lewis and Davis (1987, Table 5.1) present equivalent data for UK banks showing that in 1880, the ratio of equity capital to assets was 16.8 per cent, then falling consistently to 2.7 per cent in 1950 before recovering to around 5 per cent in subsequent decades. In the case of Australia, Butlin, Hall and White (1971), Table 2i) provide data indicating that shareholders’ equity as a ratio to total assets for Australian Trading Banks was 19.6 per cent in 1876 and 15.4 per cent in 1901, but had fallen to 6.7 per cent in 1945.

The Basel 1 Capital Accord of 1988 (together with prior introduction of minimum capital requirements in some countries such as the UK and USA) led to a global stabilization of risk-weighted capital ratios. Indeed, Jackson (1999) indicates that the average ratio of capital to risk weighted assets in the G10 countries increased from 9.3 per cent at the Accord’s introduction (which prescribed a minimum 8 per cent risk-weighted ratio) to 11.2 per cent in 1996. There is however, some evidence that equity/asset ratios continued to decline, although interpretation is clouded by bank use of preference stock and valuations of intangible assets.⁴ In the US for example “[t]angible total assets rose from 16 times tangible common equity in 1993 to a multiple of 25 in 2007” (Hoenig, 2010)

Why 8 per cent was chosen as an appropriate quantity of capital for the minimum requirement has never been justified on a prudential or systemic risk basis. Rather, it appears that it was a figure capable of being met by banks in all the G10 nations without

⁴ The significant decline in leverage ratios of UK Banks since 2000 is shown in World Bank (2008, Figure 1).

too much stress, and not too distant from existing national averages (although differences in national accounting practices made cross-country comparisons tenuous). The Basel Accord also introduced a distinction between capital items based on a “quality” characteristic. The 4 per cent minimum Tier 1 capital requirement, comprising shareholders funds and some other securities, was essentially seen as capital available to absorb losses on a going concern basis, and for which an absence of mandatory distribution payout requirements would enable conservation of capital in a period of stress. Tier 2 capital was perceived as other securities, with some degree of longevity, subordinate to, and thus providing a buffer for, deposits in the event of a wind-up situation.

The original Capital Accord focused on capital required to meet counterparty default (credit) risk, and incorporated credit risk associated with off-balance sheet activities into the framework. Since that time, various amendments have been made to the Basel Capital framework. Recognition that banks face more than one type of risk was reflected in the 1996 amendment to the Accord which incorporated market risk from trading activities.

The most fundamental changes have been those incorporated in 2006 in Basel II. This involved:

- Introduction of a distinction between a *Standardized* approach and an *Internal Ratings Based* approach, with the latter enabling large banks, approved by their regulator, to use their own internal models in the determination of risk weighted assets and regulatory capital requirements.
- Changes to the risk weights in the standardized approach, including use of credit rating agency gradings to assign risk weights
- More attention to securitization and other off-balance sheet items
- Introduction of a capital requirement for operational risk
- Provision for national regulators to impose capital requirements for interest rate risk in the banking book
- Calibration of overall requirements which may involve some possible reduction in regulatory capital requirements for large IRB banks, but with no

planned change in aggregate capital requirements for the banking sector as a whole.

The absence in the original Basel II proposal of any intention of increasing the aggregate capital position of the banking sector is particularly worth noting for two reasons. First, bank leverage has been dramatically lower than that in other sectors of the economy. Hildebrand (2008) for example notes that “[o]n average, listed non-financial firms have capital-to-asset ratios of 30 to 40 percent ...[i]n stark contrast, before the onset of the current crisis, all of the world’s top 50 banking institutions held, on average, only 4 percent of capital”. Financial sector regulation and supervision, particularly the existence of a “financial sector safety net” providing some degree of protection for bank creditors is a major reason for this situation. Second, the GFC has led to substantial reassessment of the nature of that regulation and the appropriateness of banks operating with such low capital ratios, particularly following the decline in equity to assets ratios observed in the first decade of the 21st century.

3. Bank capital experiences during the GFC

While the GFC affected all nations to some degree, it could reasonably be argued that the banking sector problems were primarily a trans-Atlantic phenomenon, with the USA and Europe experiencing the greatest difficulties. That can be seen in two ways. One is by examining the estimates of bank write-downs of asset values (and thus balance sheet equity) as shown in Table 1. The US and UK banks have the greatest estimated write-downs with cumulative loss rates over twice that of banks in the Euro area and over three times that of the Asian area. This is also reflected in a second indicator of the behavior of bank share prices, with March 2010 bank share prices in the US and Europe having recovered to only around half of their mid 2007 level. In contrast, the bank share price recovery in Australia and Asia (excluding Japan) has been to around 80 per cent. (see RBA 2010, Graph 1).

TABLE 1: BANKING SECTOR LOSSES

Estimated Global Bank write-downs by domicile (2007-2010), \$US billion

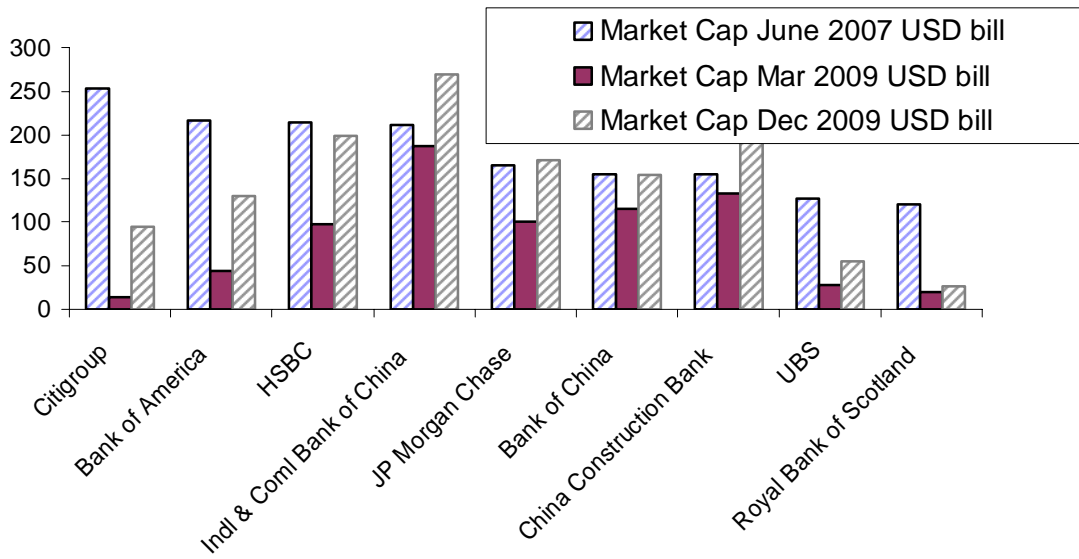
	Estimated Holdings	Estimated Write downs	Implied Cumulative Loss Rate (percent)
U.S. Banks			
Total for loans	8,059	588	7.3
Total for securities	4,502	296	6.6
Total for Loans and Securities	12,561	885	7
U.K. Banks			
Total for loans	6,744	398	5.9
Total for securities	1,625	57	3.5
Total for Loans and Securities	8,369	455	5.4
Euro Area Banks			
Total for loans	15,994	442	2.8
Total for securities	6,907	224	3.2
Total for Loans and Securities	22,901	665	2.9
Other Mature Europe Banks			
Total for loans	3,241	134	4.1
Total for securities	729	22	3
Total for Loans and Securities	3,970	156	3.9
Asia Banks			
Total for loans	6,150	84	1.4
Total for securities	1,728	30	1.8
Total for Loans and Securities	7,879	115	1.5
Total for all bank loans	40,189	1647	4.1
Total for all bank securities	15,491	629	4.1
Total for Loans and Securities	55,680	2,276	4.1

Source: http://www.imf.org/external/pubs/ft/gfsr/2010/01/c1/table1_2.csv

The consequences for both banks and banking systems have been dramatic. Figure 1 shows the dramatic decline in market capitalization during the GFC for some of the world's largest banks and also shows the rise to prominence of the Chinese banks.⁵

⁵ Note that these figures reflect a mix of share price changes and equity injections and, in the case of non-US banks, valuation changes due to exchange rate changes.

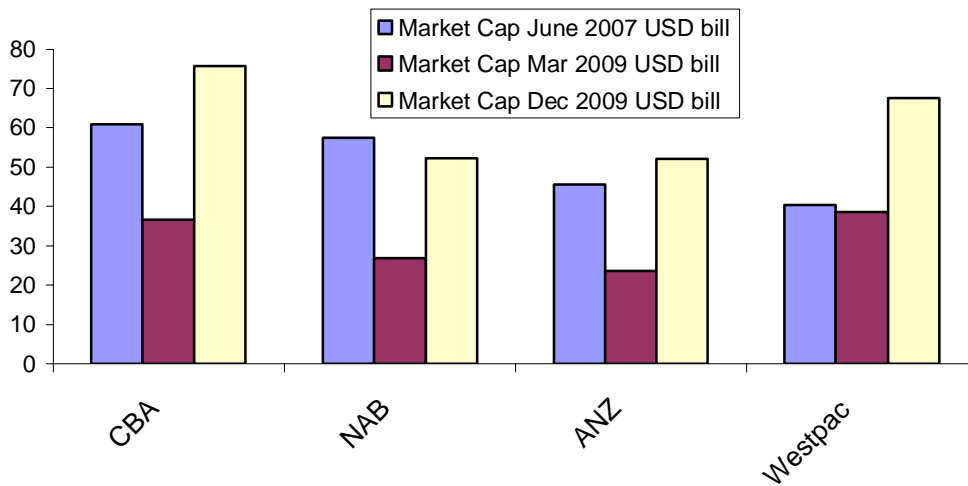
FIGURE 1: Changes in Bank Market Capitalization



Source: Financial Times

Figure 2 shows the experience of the major Australian banks over the same period.

FIGURE 2: Changes in Australian Bank Market Capitalization

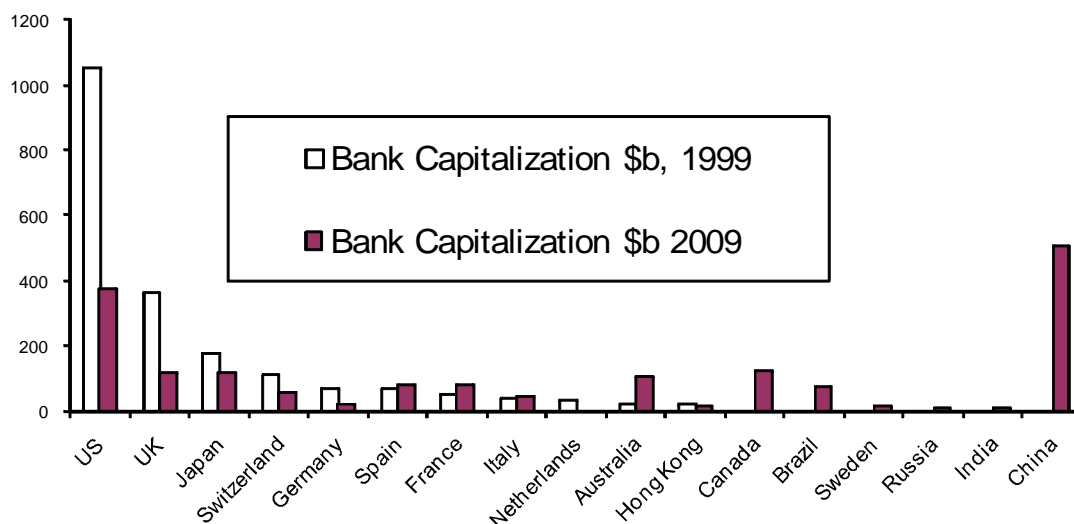


Source: Financial Times

The consequences have been dramatic at the national level, as shown over a longer term horizon (1999 – 2009) in Figure 3, with the US and UK banking sectors suffering

dramatically. While the Australian banking sector appears to have had a significant increase in market capitalization over the decade, this is partly due to the effect of exchange rate changes on the USD figures used.

FIGURE 3: Bank Capitalization Changes by Country



Source: *Financial Times*

While the headlines have focused upon large bank failures and problems, the economic problems associated with the GFC have transmitted problems with delayed effects to smaller banks. In the USA for example, the FDIC has closed 41 banks in the first three months of 2010 and 140 banks during 2009, compared to 25 in 2008 and only 23 in total for the years 2001 -2007.⁶

4. Capital Lessons from the GFC

Stevens (2009) identifies five lessons from the GFC including: inadequate bank capital and mismeasurement of risk; inadequate attention to liquidity risk; growth of systemically important shadow banking institutions (often linked to banks); complexities in national regulators dealing with multinational banks facing difficulties; the tendency for the financial sector to impart procyclicality. Within the first of those categories, a

⁶ Data from <http://www.fdic.gov/bank/individual/failed/banklist.csv>

number of lessons about deficiencies in the capital adequacy regime have emerged from the GFC:

- Inadequacy of Value at Risk (VAR) for determining capital requirements
- Risk weights based on historical experience over a relatively benign period are inadequate for risk exposures in downturns
- Excessive liquidity risks (such as commitments to off balance sheet entities) were partly a result of financing techniques which avoided capital requirements
- Valuations of complex financial assets can be problematic, particularly when markets are disrupted, with adverse consequences for reliable measurement of capital
- Collateralised financing created risks
- Bilateral exposures through over the counter markets in derivatives created complex risk interdependencies which may be avoided by the use of Central Clearing Counterparties
- Banks were unwilling to reduce cash distributions to equity and other investors for fear of signaling weakness – even though this reduced their capital bases.
- The current Basel capital framework allows banks to operate with very low shareholders funds. (For example, a bank with a Tier 1 risk weighted ratio at the 4 per cent minimum and with assets with a 50 per cent risk weighting could have an equity/assets ratio as low as 2 per cent).
- Ratings provided by credit ratings agencies were not good signals of default risk

5. Proposals for Bank Capital Requirements

There have been a large number of proposals suggested by individuals, private and official sector working groups, and regulatory agencies for changes to bank capital requirements.

(a) Increased Capital Levels

As noted earlier, the setting of capital requirements at 8 per cent of risk weighted assets has never been fully justified in terms of its adequacy in terms of either prudential requirements for individual banks or systemic risk issues. Following the GFC there has

been much discussion about whether higher capital levels are desirable, with most commentary arguing for substantial increases.

Greenspan (2010), for example, points to the behaviour of Credit Default Swap (CDS) spreads for US banks since the onset of the GFC. In early 2007, prior to the crisis, 5 year CDS spreads for six major US banks averaged around 17 basis points – with this figure indicating that investors in bank debt had to pay very little (17 basis points p.a.) to insure against default by the bank. At that time, the equity/assets ratios for those banks were around 10 per cent. The CDS spreads had jumped to over 400 basis points following the Lehmann failure, and on the basis of subsequent declines in the spread in response to equity injections under the TARP program, Greenspan derives a ball-park estimate of an equity/assets ratio of 14 per cent as necessary to reduce spreads back to their previous low implied default risk levels.

Other analysis (eg Geneva, 2009) has focused on the fact that a minimum requirement should only be a part of a regulatory capital supervision process. If there is to be some critical capital level at which regulators act to resolve a bank, there needs to be a “ladder” of capital ratios – each lower rung of which involves some increasingly stringent regulatory position being taken. In this perspective, it is the potential for regulatory forbearance which needs to be minimized, a view which finds its strongest support in the prompt corrective action (PCA) requirements of US legislation.

(b) Additional Capital requirements for systemically important institutions

There are a number of proposals suggesting that large, systemically important financial institutions should face higher capital requirements than smaller institutions with similar underlying risk of failure – which may be described as a “bigness tax”. Two separate arguments can be advanced for such additional capital requirements.

The pervasiveness of the “too big to fail” (TBTF) perception underpins one argument. If it is widely believed that large, systemically important, institutions will not be allowed to fail by regulators, they are in effect receiving an implicit government subsidy enabling them to raise funds more cheaply than otherwise. This has adverse competitive consequences as well as being an implicit cost to taxpayers – for which ideally compensation should be received. Higher capital requirements both reduce the

implicit benefit accruing to the bank's owners, and reduce the risk of failure and thus extent of subsidy.

An alternative argument advanced, for example, by the Squam Lake group of economists (Squam Lake, 2009a) is based upon the externalities which such large financial institutions create for the economy. These externalities take several forms reflecting the effect of aggregation of risks in a large institution rather than in a number of smaller ones. First, the consequences of a large institution facing failure are more significant because the impact of any forced asset sales on financial market prices is larger. Second, failure will impact on many more counterparties simultaneously creating problems for their own solvency.

How to adjust capital requirements for systemically important institutions to incorporate macro-prudential risk effects remains to be determined. The Geneva Report (Geneva, 2009) suggests augmenting the capital requirement by a multiplicative factor which would reflect such signals of macro prudential risk as leverage, maturity mismatch and rate of expansion. These factors do not, however, take into account the "interconnectedness" of individual large financial institutions or the key role they play in the financial system network, which is crucial to understanding the extent of externalities associated with their failure (or actions to avert such an outcome).

In its Financial Stability Report, the IMF (2010) reviews a number of proposals which focus on interconnectedness. One approach would be to link systemic capital charges to interbank correlations of equity returns. While easy to implement this is, at best, rough and ready measure of interconnectedness which may have limited relevance in periods of market stress. Another is to utilize the concept of co-value-at-risk (covar) which estimates how the value at risk of other financial institutions behaves when a specified institution is experiencing negative outcomes. Yet another (although suggested in the form of a tax rather than a capital charge) would be based upon positions in the OTC derivatives markets. (This is consistent with the regulatory desire to encourage exchange traded or centrally cleared derivatives in order to reduce bilateral interdependencies and consequent spillovers).

The IMF itself (IMF, 2010) suggests two possible approaches. One, using network analysis and simulation, estimates the level of impairment a particular

institution's failure would impose on capital positions of other institutions. The second, based on the covar concept, would relate systemic risk capital charges to an institution's probability of failure and the effect it would have on system-wide credit VAR.

(c) *Contingent Capital*

A number of proposals have been put forward for the introduction of *contingent capital* which generally involve banks being required to issue hybrid debt securities which convert automatically into equity if certain trigger conditions (such as reaching a low pre-specified equity/assets ratio) are met. The objectives of such proposals are that bank capital would be automatically augmented by the conversion in conditions where this is desirable, and it may also be argued that investors in such securities would closely monitor bank performance and thus enhance market discipline.

One of the earliest proposals for requiring contingent capital was made by Flannery (2005) who argued for a requirement for banks to have on issue some minimum ratio of "reverse convertible debentures" (RCDs) to assets. Should the bank's capital ratio, measured using the market value of equity, fall below some specified level, RCD's would convert automatically into a fixed value of bank equity (ie the number of shares received would be inversely related to the share price). This fixed-value conversion arrangement is the same as that found in the converting preference shares popular during the 1990s with Australian banks (Davis, 1996) although the trigger conversion mechanism is novel. The RCDs would not prevent bank failure (if bank asset values fell by more than the total of equity and RCD's on issue) but would provide an automatic "top up" to equity for smaller declines in bank asset values (as reflected in equity prices). To the extent that the conversion value was specified to be some larger amount than the face value of the securities, shareholders would suffer a dilution in the event of a conversion.

Another version of the contingent capital proposal emanates from the Squam Lake group of economists (Squam Lake, 2009b). It involves two necessary conditions being met in order for conversion to occur. One condition is that regulators declare that a systemic crisis exists, with this condition being aimed at limiting risk of investors to conversion only occurring in a crisis and not being simply due to poor performance of the

bank involved. This provides discipline on bank managers who might otherwise regard such securities as a form of “reserve” equity which can be called upon if excessive risk-taking has unfortunate outcomes. The second necessary condition is that the bank has hit some minimum equity/assets ratio or other such covenant requirement, protecting investors in well capitalized banks from risk of conversion, and altering the political lobbying process for regulators to declare a systemic crisis which is likely to occur.

Another approach is suggested by Kashyap, Rajan, and Stein (2009) involving requiring banks to buy insurance policies which payoff in crisis states of the world, thus augmenting equity capital, or to be subject to a higher capital requirement. To ensure that the provider of the insurance policy is able to meet the payoff required, they propose that the insurer is required to invest an amount equal to the sum insured in Treasury (risk free) securities in some form of trust fund. From the insurer’s perspective this investment can be viewed as akin to investing in a form of “catastrophe bond”, in which catastrophe involves loss of principal, but for which the return is otherwise high (involving both the interest earned and insurance premiums received).

Another approach is suggested by Hart and Zingales (2009) who view banks as being equivalent to levered investors, borrowing from depositors and other fund providers to invest in a risky portfolio of assets. They use the analogy of margin calls to suggest that bank creditors should be able to demand injections of equity into the bank when the risk of the bank being unable to meet its obligations to creditors reaches some undesirable level. They suggest that CDS spreads may provide an appropriate signal, with spreads above some level triggering a “margin” call in the form of a regulatory requirement for the bank to issue new equity. They prefer use of this market based mechanism to regulatory discretion to require banks to recapitalize. How such a requirement would affect bank stock price dynamics, whether it might induce create opportunities for strategic manipulative behaviour, and what type of equity injection is appropriate are questions requiring further elaboration.

The Hart and Zingales approach could, if the equity injection was required from existing shareholders, be seen as a form of “less than limited liability” structure for bank shareholders – akin to cases of double or unlimited liability found in long distant banking systems. But it is only applicable (and intended) for large financial institutions for whom

there are CDS markets. Implementing such an approach more generally could be achieved if bank equity took the form of partly paid shares, where a call for the unpaid amount would correspond more closely to the margin call concept. But in modern financial markets where bank shares turnover rapidly, requiring that bank equity took the form of an investment with a contingent liability could create significant problems for investor understanding.

A form of contingent capital has already been issued by (among others) Lloyds Bank in November 2009 as contingent capital notes (popularly referred to as “CoCos”) which are debt securities which convert automatically into equity if the bank’s capital ratio falls below five per cent. There are many who are skeptical about the merits of such securities, arguing that conversion would induce adverse market reaction to the bank, and that hedging of risk by holders of CoCos involving increased shorting of the bank’s shares as the conversion point was neared would depress the share price, leading some to describe such securities as “death spiral convertibles” (Aldrick, 2010).

These proposals can be viewed as attempts to ensure that the public sector (taxpayer) does not become the provider of contingent capital such as happened during the GFC. Those actions included direct government equity injections into stricken banks, but also included the government provision of guarantees of bank deposits and debt. Although no explicit equity injection is made in that latter case, the actions should be viewed as essentially equivalent – in that the Government budget provided the buffer to absorb bank losses. While fees were generally charged for those guarantees, it is arguable whether a fair return for the risk taken on was received by governments (and taxpayers).

(d) Changes to Regulatory Risk Weights

One consequence of the GFC experience has been a recognition that the Basel II Accord needed revision, even though it had not been in operation in the lead up to the GFC. In July 2009, the Basel Committee announced a number of changes including higher capital charges (and outlining other required operational requirements) for some securitization assets (including re-securitisations such as CDOs) and for liquidity facilities provided by banks to off-balance sheet conduits. This recognizes the role which these activities played in the crisis. These changes also involved requirements for banks

to undertake an appropriate Internal Capital Adequacy Assessment Program (ICAAP) and for discrepancies between that and regulatory capital assessments to form the basis of a dialogue with supervisors. Changes to international accounting standards for the valuation of financial assets were also supported.

In December 2009, a consultative document was released outlining proposed changes to capital requirements as follows:

- An increase in the quality of the capital base, such that Tier 1 is to be predominantly shareholders funds, with other Tier 1 instruments to be subordinated, with discretionary non-cumulative dividends or coupons, no maturity nor incentives to redeem.
- An increase in the relative counterparty risk weights for financial institutions versus corporates, to reflect the greater correlation of risks in the case of the former.
- Increased capital requirements for counterparty risk on derivatives, repo and securitization transactions.
- Lower relative risk weights for counterparty derivatives exposures to Central Clearing Counterparties versus bilateral exposures.
- Use of “downturn” probability of default estimates to accompany “downturn” loss given default estimates
- Use of “stressed” VAR figures in determining capital requirements
- Reduced reliance on ratings agency assessments in the Standardized approach
- Expected loss provisioning.

(e) *A Leverage Ratio*

There is strong support internationally for the introduction of a non-risk-weighted minimum leverage ratio as a supplement to the Basel risk weighted capital requirement. Indeed, in some countries such as the USA, a minimum leverage ratio (equity/assets) existed prior to the introduction of Basel 1 and has remained in place (at 3 per cent for “strong” banks and 4 per cent for other banks (World Bank, 2008) as a complement to the Basel risk weighted requirement, often being the more binding constraint on bank activities.

The main argument behind supplementing the Basel requirement with a leverage ratio requirement is argued by Hildebrand (2008) to be the problems of adequately measuring bank risk-taking in a world of imperfect information. Because risk weights may involve errors, and because banks have incentives for increased leverage, there is the potential for them to engage in activities which are more risky than assumed in the Basel framework. Hildebrand notes that a leverage ratio is simple to operate, and may contain additional information about potential bank failure than can be derived from the risk weighted ratio. And Bordeleau, Crawford and Graham (2009) conclude from a study of Canadian bank capital management that a leverage ratio may be a useful complement, with banks experiencing shocks which reduce capital buffers close to required leverage ratios above the taking rapid action to remedy that position.

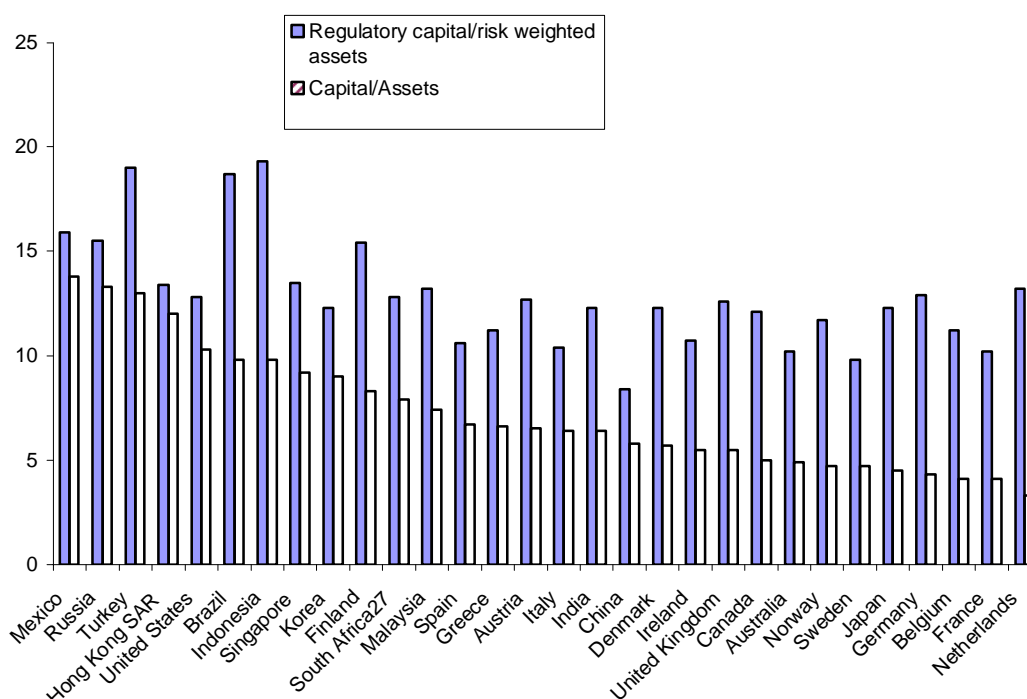
But, on the downside there are problems.⁷ These include incorporating off balance sheet activities into such a simple measure, and pro-cyclicality arising from banks' losses in economic downturns reducing capital and requiring contraction of lending (and vice versa in upturns). To the extent that a leverage ratio is binding and requires banks to increase shareholder equity, it also can have adverse effects on bank profitability (if equity is a more expensive source of funds). Whether that latter effect should be a cause for concern depends on to what degree capital requirements offset the benefits banks receive from the existence of the financial safety net.

Australian banks and their regulators do not appear favourably disposed towards introduction of a leverage ratio requirement. As well as the implied downgrading of the importance of risk in capital allocation (RBA, 2010, p54), another reason is that, because of the preponderance of low risk weight housing mortgages in bank portfolios, it is likely that the leverage ratio would be binding and require banks to increase their capital positions. This is reflected in Figure 4 which shows the relationship between risk weighted capital and leverage ratios at the onset of the GFC in 2007. While there are many important caveats to be entered in comparing such figures across nations (including different capital measures, risk weights, consolidation etc), it would appear that Australian banks are towards the lower end of the scale in terms of leverage ratios. But in

⁷ See World Bank (2008) for more information on strengths and weaknesses of a regulatory leverage ratio.

assessing that situation, it is also the case that Australian banks have focused on housing loans partly because of the low associated capital requirements under the Basel Accord. This may reflect housing loan risk weights being too low, and a leverage ratio may induce a shift of bank activities towards other forms of lending and improve the competitive position of other forms of mortgage financing such as securitization.

FIGURE 4: Risk weighted capital and leverage ratios: 2007



Source: IMF Global Financial Stability Report October 2009, Tables 22, 23

<http://www.imf.org/external/pubs/ft/gfsr/2009/02>

The ratings agencies have also focused upon alternative measures of capital adequacy for the purposes of providing ratings. S&P (2009a, 2009b) for example argues that neither the Basel risk weighted capital ratio nor the leverage ratio provide a good signal of capital strength, and that national differences in risk weightings and capital measures inhibit global comparisons of banking strength. In calculating their Risk Adjusted Capital (RAC) ratio, they opt to use industry based risk weights, essentially assuming that all banks have the same underwriting standards for credit risk, rather than

relying on the risk assessment implied in each bank's own internal models. Their risk adjusted capital ratio estimates also include adjustments for the effects of diversification and concentration on risk.

Table 2 provides a comparison of the relationship between S&P calculations, the Basel risk weighted capital ratio and leverage ratio for three of the major Australian banks (available from S&P, 2009b). The apparent low correlation between the measures observed there is apparent when a larger sample of international banks is considered. For the 29 banks listed in S&P (2009b) with the largest RAC ratios, the correlation between the Basel Tier 1 and Leverage ratios is 0.36, and while that between the Basel and S&P ratios is 0.37, the correlation between the leverage ratio and the S&P ratio is 0.03.

TABLE 2: Alternative capital ratios: Major Australian Banks 2009^a

Bank	S&P RAC	Basel II Tier 1	Leverage	
NAB		6.9	8.3	4.5
CBA		6.3	8.1	3.3
ANZ		6.1	8.2	4.8

(a) Figures for CBA are June 2009, and for NAB and ANZ are March 2009

Source: S&P (2009b)

Brewer, Kaufman and Wall (2008) note that there are significant differences across nations in capital ratios of large banks, whether measured on a risk adjusted or unlevered basis – despite all those banks being subject to the Basel accord requirements. For the period 1992-2005, the average leverage ratio for the largest 55 banks in 12 countries leverage ratios ranged from 8.4 percent (USA) to 3.01 per cent (Germany) and with Basel Tier 1 ratios ranging from 10.04 per cent (Switzerland) to 6.27 per cent (Germany). Notably, and illustrating the problems in such cross country comparisons, their data has Australian banks having the second highest leverage ratio! They find that higher capital ratios are associated with countries in which prompt corrective action is applied, where there is good corporate governance, while they are lower in bank dominated financial markets and for larger banks.

(f) Improving the Quality of Capital

Under the current Basel Accord, banks are able to meet capital requirements by including the value of various hybrid securities issued in the calculation of their capital base. The rationale has been that such securities rank behind depositors and thus are part

of the buffer to absorb and protect depositors from loss. However, such securities may be of limited term and redeemable by the holders, which can see the bank “losing” such capital in situations where its performance is weak, reducing its capital position on a “going concern” basis. For this reason, “core” capital represented by shareholder funds may be a preferred measure. Hybrid securities, intensively used by banks as part of Tier 1 capital since the October 1998 BIS “Sydney” press release (The Banker, 2009) have tended to become disregarded by analysts in assessing bank capital strength, and government rescues of banks in the GFC have made their status as “wind-up” capital less relevant. The Basel Committee’s December 2009 proposals imply a move in this direction, with the calibration of new requirements to be determined after an impact assessment study is conducted.

(g) *Procyclical Capital Requirements*

Because bank capital management tends to aggravate economic cycles (attempting to build up capital and reducing loans in periods of downturns etc) there are various proposals for the introduction of procyclical minimum capital requirements. Higher minimum requirements in an economic upswing would both inhibit excessive credit creation and create a capital buffer which could be used to offset effects of a downturn, when the minimum requirement would decline. Implementing such an arrangement is complicated for several reasons. One is whether changes in the requirement would be automatically linked to certain economic indicators or at the discretion of bank regulators. Another is in identifying the appropriate sensitivity of minimum requirements to economic indicators, as well as understanding how bank behaviour might change under such a regulatory approach.

6. Conclusion

The range and severity of the capital adequacy changes currently under consideration internationally could be interpreted as suggesting that the Basel capital adequacy regime was a failed experiment. Indeed, many of the proposals have elements of historical approaches to capital adequacy operating before the introduction of the Basel Accord in 1988. Higher capital ratios, identifying “high quality” capital with shareholders funds, contingent capital requirements imposing equity contribution requirements on some

stakeholders of troubled institutions, and use of a leverage ratio requirement all have antecedents in the history of banking.

While inadequacies of the regime were exposed by the GFC, it is more appropriate to view the current proposals for change as part of an evolutionary process involving adaptation of regulation to ongoing financial sector development and innovation – itself partly the result of attempts to avoid the constraints imposed by regulation. But it is also appropriate to note that there appears to have been a widespread shift in attitudes towards the appropriate balance between government regulation and market freedom in the case of financial markets.

How many of these proposed capital adequacy changes will be implemented remains to be seen. But an implication of higher capital adequacy standards arising from any of these measures is an increase in the cost of bank intermediation. Whether that is ultimately borne by bank customers or their shareholders is an empirical question, but it seems likely (unless the scope of prudential regulation is expanded significantly beyond banks) that some decline in the relative share of banks in the financial intermediation process will result.

To the extent that bank intermediation was artificially favoured in the pre-GFC environment by the existence of the financial safety net (including such things as “too big to fail” policies, implicit or underpriced government guarantees and insurance, Central Bank liquidity support facilities), this outcome is not necessarily undesirable. An efficient financial system should facilitate financing activities along the whole spectrum of risk taking. To the extent that bank executives were able to exploit regulatory distortions which facilitated or encouraged high-risk activities being conducted by supposedly low-risk prudentially regulated banks, this situation needs to be reversed.

Finding the appropriate regulatory balance is a difficult task. What increase in the private cost of bank financial intermediation counterbalances the social benefits from the (hopefully) lower risk of further financial crises such as the GFC? If intermediation outside of the prudentially regulated sector is encouraged, will that help or hinder financial stability? What changes in securities and market regulation might be required? These and other questions need to be included in the cost-benefit analysis process by which the various capital adequacy proposals should be judged and an appropriate

package of changes selected. Whether the political processes (both national and international) through which an outcome will be decided will reflect such analysis is another question.

REFERENCES

- Aldrick Philip (2010) “Mervyn King’s plan for bank capital ‘will backfire’”, *The Telegraph*, 11 February
- Blundell-Wignall Adrian and Paul Atkinson (2008) “The Sub-prime Crisis: Causal Distortions and Regulatory Reform” in P Bloxham and c Kent (eds) *Lessons from the Financial Turmoil of 2007 and 2008*, Reserve Bank of Australia, Sydney, 2008
- Bordeleau Etienne, Allan Crawford, and Christopher Graham (2009) “Regulatory Constraints on Bank Leverage: Issues and Lessons from the Canadian Experience” *Discussion Paper 2009-15*, Bank of Canada
- <http://www.bankofcanada.ca/en/res/dp/2009/dp09-15.pdf>
- Brown Christine and Kevin Davis (2004) "The New Basel Accord and Advanced IRB Approaches: Is there a case for capital incentives?" in *The New Basel Accord* ed Benton Gup, Thomson, New York, 125-149 ISBN 0 324 20298 9.
- Brewer III, Elijah. George Kaufman and Larry Wall (2008) Bank Capital Ratios Across Countries: Why Do They Vary?. *Journal of Financial Services Research* 34:177–201
- Butlin S. J., Hall A.R. and R.C. White (1971) “Australian Banking and Monetary Statistics 1817 – 1945” *Occasional Paper No. 4A*, Reserve Bank of Australia.
- Davis, Kevin (1996) "Converting Preference Shares: An Australian Capital Structure Innovation" *Accounting and Finance*, 36, 2, November, 213-228
- Flannery, Mark J., (2005), “No Pain, No Gain? Effecting Market Discipline via Reverse Convertible Debentures”, Chapter 5 of Hal S. Scott, ed., *Capital Adequacy Beyond Basel: Banking Securities and Insurance*, Oxford: Oxford University Press.
- Geneva Report (2009) "The Fundamental Principles of Financial Regulation." By Brunnermeier, M., A. Crockett, C. Goodhart, A. D. Persaud, and H. Shin. In *Geneva Reports on the World Economy* Geneva: ICMB International Center for Monetary and Banking Studies (2009)
- Greenspan Alan (2010) *The Crisis* Greenspan Associates LLC, March 9, 2010
<http://documents.propublica.org/docs/draft-of-former-fed-chairman-alan-greenspan-s-paper-on-the-financial-crisis/original.pdf>
- Hart Oliver and Luis Zingales (2009) “To regulate finance, try the market” *Foreign Policy*, 25 March
http://experts.foreignpolicy.com/posts/2009/03/30/to_regulate_finance_try_the_market
- Hoening T.M. (2010) “Written statement by Mr Thomas M Hoening: President and Chief Executive Officer of the Federal Reserve Bank of Kansas City, before the House Financial Services Oversight and Investigations Subcommittee, United States House of Representatives, Kansas City, 6 May 2010” <http://www.bis.org/review/r100511e.pdf> .
- IMF (2010) *Global Financial Stability Report: Meeting New Challenges to Stability and Building a Safer System*, IMF, April,
<http://www.imf.org/external/pubs/ft/gfsr/2010/01/index.htm>

Jackson Patricia (1999) “Capital Requirements And Bank Behaviour: The Impact Of The Basle Accord”, Report by a working group led by Patricia Jackson, Basle Committee On Banking Supervision Working Papers No. 1 – April 1999.

Kashyap, Anil, Rajan, Raghuram, and Jeremy Stein (2009) , “Rethinking Capital Regulation” www.kc.frb.org/publicat/sympos/2008/KashyapRajanStein.03.12.09.pdf

Kaufman, George (1992) “Capital in banking: Past, present and future” *Journal of Financial Services Research*, 5, 4 / April, 385-402.

Lewis Mervyn and Kevin Davis (1987) *Domestic and International Banking*, MIT Press, Cambridge, Mass.

RBA (2010) “Developments in the Financial System Architecture” *Financial Stability Report: March 2010*

S&P (2009a) *Methodology And Assumptions: Risk-Adjusted Capital Framework For Financial Institutions*, Standard & Poors Ratings Direct, April 21, http://www2.standardandpoors.com/spf/pdf/media/20090421_Methodology_And_Assumptions_FI_RACF_04_21_09.pdf

S&P (2009b) *S&P Ratio Highlights Disparate Capital Strength Among The World's Biggest Banks* Standard & Poors Ratings Direct, November 30

Squam Lake Working Group (2009a) *Reforming Capital Requirements for Financial Institutions*, Working Paper 2, Squam Lake Working Group on Financial Regulation, Council on Foreign Relations, April 2009 <http://www.squamlakeworkinggroup.org/>

Squam Lake Working Group (2009b) *An Expedited Resolution Mechanism for Distressed Financial Firms: Regulatory Hybrid Securities*, Working Paper 3, Squam Lake Working Group on Financial Regulation, Council on Foreign Relations, April 2009 <http://www.squamlakeworkinggroup.org/>

Steven, Glenn (2009) “Developments in Financial Regulation” *Reserve Bank Bulletin*, December, 28 – 34 <http://www.rba.gov.au/publications/bulletin/2009/dec/pdf/bu-1209-4.pdf>

The Banker (2009) “The Capital Conundrum” *The Banker*, December 1

World Bank (2008) *Background Note: Banking and the Leverage Ratio* Financial Systems Department, World Bank <http://crisistalk.worldbank.org/files/Banking%20and%20the%20Leverage%20Ratio.pdf>