Anniversary Issue

exponent

A Quarterly Newsletter from Aptivaa
2011 Volume 1

"If you look at the firms that came under pressure in that period ... only one ... was not at serious risk of failure. - *Ben Bernanke*

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Risk Vs Business

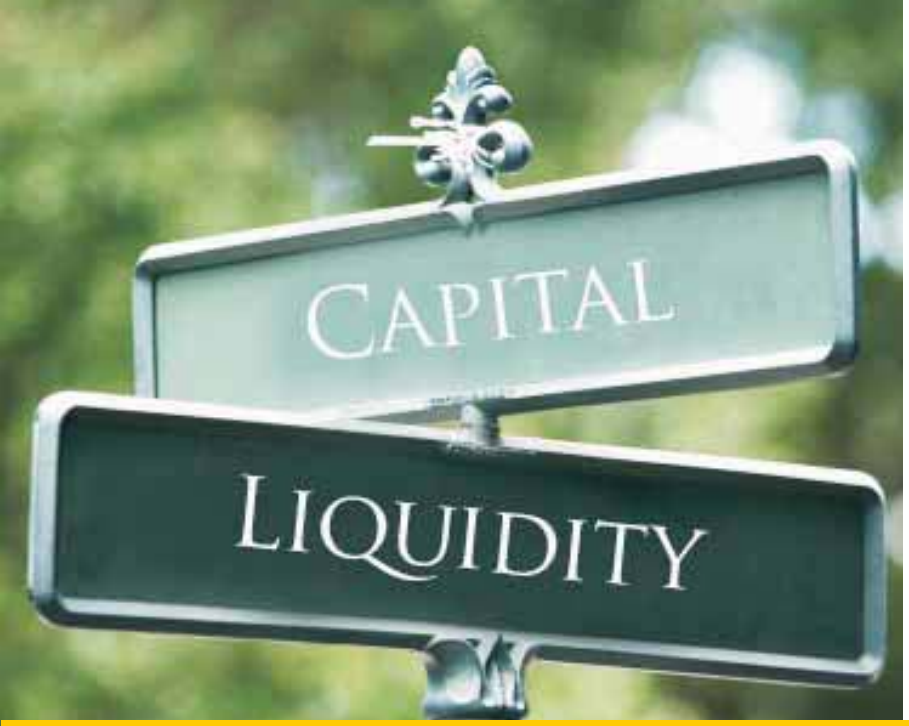
While most CRO's started 2011 by reading and interpreting Basel III guidelines during last year's holiday season, CEO's were getting increasingly worried about a possible competitive disadvantage that might be a consequence within the financial markets. Many believe that the new regulations in post crisis world may lead to significant arbitrage between banks and non banks or "shadow banks", as commonly referred to.

The recent BIS statistics that compare growth between total assets and risk weighed assets over the last decade depict the widening gap between these two. A similar comparison between the growth in assets managed by non banks (hedge funds, PE, SIVs) vs. bank assets leads to the same conclusion. So, what's the best way to distribute the risk among various players? Regulating one part more closely may shift "risks" to other part leading to a significantly higher systemic risk. Well, this argument is similar to the allocation of capital to different lines of businesses within a bank with varying degrees of risks and risk adjusted returns produced.

So in my view, the message for the risk mangers is loud and clear. Focus on risk but don't lose sight of business. Essentially, this will lead to the emergence of a " hybrid risk management organization" combining the "independent" and "in-business" risk functions. While independent risk provides assurance to the Board, in-business risk makes them more competitive and produces superior risk adjusted returns.

This issue, which happens to be the anniversary issue of the magazine features several articles focusing on the recent Basel III regulations. The first article is on study carried out to understand the impact of the new Basel III reforms. How countercyclical buffers are intended to work is the subject of another article. This is followed up by an article on Model validation and on Stress VaR's impact on capital. Lastly, it features an insightful article on the reasons behind the financial crisis and the behavioral shifts in banking. Every issue of our magazine in this eventful year has been received with great enthusiasm and we have been overwhelmed with the positive feedback and support that we have received thus far. We wish you all the best in this new year and look forward to your continued patronage.

Alok Tiwari
CEO | Aptivaa



Basel III

An overview of Basel III QIS

The Basel Committee in its Quantitative Impact Study gauges the impact of the Basel III reforms on capital requirements. While some numbers vindicates the bankers' fears that there will be difficulty meeting the minimum requirements, the timeframe over which it needs to be implemented has allayed the fears.

'In God we trust, everyone else must bring data', said the Basel Committee of Banking Supervision (BCBS) to bankers' plaintive calls that the Basel III norms were too stringent, prescriptive and throttling. Levity apart, BCBS did conduct a Quantitative impact study (QIS) to assess the impact of the proposed norms, collecting information from 263 banks, to assess the impact of the new requirements the banks. The background to the uninitiated to all this is the aftermath of global financial crisis which saw wide spread concern over the existing supervision policies for bank including the most widely accepted Basel II guidelines.

Basel Committee on Banking Supervision (BCBS), the body responsible for framing key guidelines and reviewing them has come up with a series of guidelines spread across papers released between July 2009 to December 2010, now collectively known as Basel III. Subsequently, the same has been confirmed by the Group of Governors and Heads of Supervision (GOHS) and approved by the G20 leaders. The key areas covered in these proposals made in these guidelines are:

- Strengthening the global capital framework
- Increasing the quality, consistency and transparency of the capital base
- Strengthening the risk coverage of the capital framework
- A supplementary leverage ratio
- A countercyclical capital framework
- A global minimum liquidity standard

The comprehensive Qualitative Impact Study (QIS) is based on the information submitted by banks to their National Supervisors. A total of 263 banks participated from 26 jurisdictions. These banks were then classified in two groups, Group 1 and Group 2. Including the effect of all changes to the definition of capital and risk-weighted assets, as well as assuming full implementation as of 31 December 2009, the average common equity Tier 1 capital ratio (CET1) of Group 1 banks was 5.7%, as compared with the new minimum requirement of 4.5%. For Group 2 banks, the average CET1 ratio stood at 7.8%.

In order for all Group 1 banks in the sample to meet the new 4.5% CET1 ratio, the additional capital needed is estimated to be €165 billion. For Group 2 banks, the amount is €8 billion.

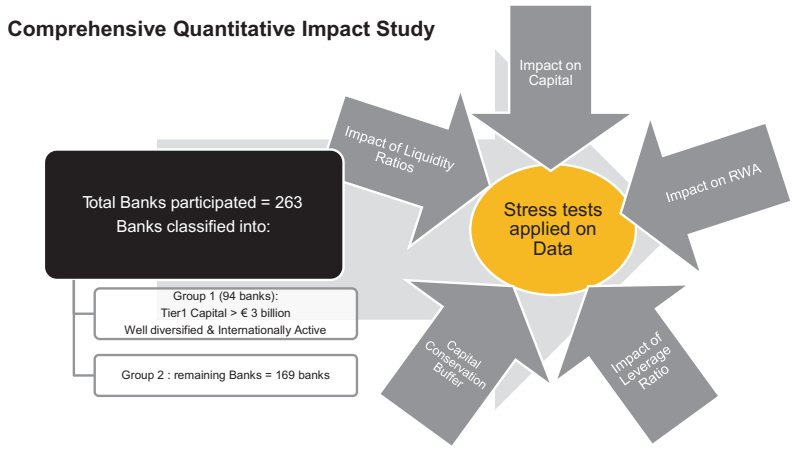


Figure 1: QIS by BCBS

Methodology

BCBS collected data from the member jurisdictions and supervisors were actively involved to ensure data quality. The numbers provided were then merged across categories so as to create a composite banks and thus weighted average results were recorded. Following points are important in relation to overall methodology:

- Methodology: The impact analysis was accomplished by comparing the banks' capital positions under the Basel III to the current regulatory framework in practice. The averages reported for ratios were weighted in terms of numerators and denominators. Example, the average common equity Tier 1 (CET 1) capital ratio reported in the results is the sum of all the banks' total CET 1 divided by all banks' risk weighted assets, rather than a simple average of all banks' CET 1 capital ratio.
- Data Quality: Data quality and integrity was ensured by National supervisors and their QIS team, through the gamut of information provided by the participating banks. In order to avoid the anomalies, the analysis of the revised RWA and capital ratios under Basel III featured banks that submitted comprehensive data on all relevant aspects of the Basel III framework.

" Historical Stress VaR arises from those periods which display high VaR levels resulting from higher than average P&L losses to the portfolio. "

Key Findings of the QIS

For sake of comparability, BCBS divided the participating banks in two groups and all the results have been presented separately for the two groups. Results published by BCBS covers an impact analysis from four perspectives, namely:

- Definition of Capital
- Changes in Risk Weighted Assets
- Leverage Ratio
- The capital conservation buffer above the CET1 minimum
- Impact of Liquidity ratios

The following sections summarize the important findings based on the analysis of the components mentioned above.

Definition of Capital

As per Basel III, the new minimum standard to be achieved by the banks is set at 4.5% for common equity Tier 1 (CET1) ratio. The requirement for this ratio increases to 7.0%, when considered along with the proposed Capital Conservation Buffer of 2.5%. Ideally the banks will be required to maintain the ratio above 7.0% or else will face constraints like restriction in distributing earnings. Though the minimum standard proposed for these ratios will come into picture in a gradual manner, the proposed timelines for meeting the benchmark of 4.5% for CET1 is set to be 2015 and to meet 7.0% benchmark is 2019.

The key findings are as follows:

- On an average the banks were able to meet the minimum CET1 requirement of 4.5% but failed to meet the more realistic number of 7.0%, which includes a capital conservation buffer of 2.5% as proposed in Basel III.
- The shortfall wherever observed resulted in a net shortfall of € 172 billion in CET1 to meet the bare minimum of 4.5% alone, whereas the same requirement increases to € 602 billion when considered for the target of 7.0%.
- These numbers don't represent a direct requirement of raising fresh capital but are definitely indicative enough to highlight the state of participating banks in general.

"… the highest percentage of impact comes from the deduction of goodwill and for banks/jurisdiction which have still not recognized this deduction the impact can be as severe as 20% reduction in CAR"

The new capital ratios will be phased in gradually. On 1st Jan 2013, banks should have 3.5% common equity, 4.5% Tier 1 capital and 8% Total capital. In 2014, this increases to 4%. The full ratios must be in force by January 2015, namely 4.5% common equity and 6% Tier 1.

As Basel III propose fresh deductions and reemphasize some of the already existing deductions the banks will observe a reduction in their eligible capital on account of the deductions. Key points to note in this section are:

- As calculated by BCBS and presented in the table below, the highest percentage of impact comes from the deduction of goodwill and for banks/jurisdiction which have still not recognized this deduction the impact can be as severe as 20% reduction in CAR.
- The other major consideration is Deferred Tax Assets and with full deduction to be applied against carried forward losses etc. The average value of this impact is calculated as 7% reduction in CET1 before deduction, for Group1 banks.
- Deductions arising from the reciprocal cross holdings in other financial institutions are also high and the average value of these deductions stands at 4.3% for Group 1 banks.

	N	Goodwill	Intangibles	Financials	Deferred Tax	Mortgage Serv.	Excess above 15%	Other	Total	Minority interest
Group 1	87	-19	-4.6	-4.3	-7	-0.4	-2.4	-3.6	**-41.3**	-2
Group 2	136	-9.4	-2.3	-5.5	-2.8	0	-1	-3.7	**-24.7**	-2.1

Figure 2: Category wise Impact of Deductions on Net CET1 as % of Gross CET1

Changes in Risk Weighted Assets

In the analysis of the crisis in the Global Financial markets, one of the key points agreed by all was the role played by derivatives and other off balance sheet items in the financial meltdown. Thus it was no surprise that the first few papers released by BCBS were exclusively focused on creating new measures of capital requirements against these exotic products and also on creating more linkage between the risk positions and capital requirements. This resulted in following new additions/modifications to the risk weighted asset calculation methodology:

"Basel III notes that due to favorable treatment given under Basel II many banks developed a tendency to book the instruments acquired under securitization as bonds in the trading book. This undermined the specific risk charge"

- **Removal from deduction of Capital values :** Some of the instruments which were earlier treated as deductions from the Capital have now been removed from this list and will be treated as assets. This will impact the denominator, i.e. total RWA of the bank. The same is measured as part of impact on RWA.
- **Counterparty Credit Risk :** This column measures the increased capital charge for counterparty credit risk and the higher capital charge that results from applying a higher asset value correlation parameter against exposures to financial institutions under the IRB approaches to credit risk.
- **Securitization in the Banking Book :** Basel III has proposed more conservative formulae for banking book securitization and also a higher risk weight for re-securitization. This will lead to an increase in the RWA and the same is presented as a separate calculation in the study.
- **Stressed Value at Risk :** Stressed VaR (sVaR) refers to the proposal of inclusion of 12 month period of significant financial stress in VaR calculation. This will lead to the increase in capital requirement against market risk for many banks.
- **Equity standard measurement method (SMM):** This column measures the impact of the higher capital charge for certain equity exposures subject to the standardized measurement method in the trading book.
- **Incremental Risk Charge in Trading BooK:** Basel III notes that due to favorable treatment given under Basel 2 many banks developed a tendency to book the instruments acquired under securitization as bonds in the trading book. This undermined the specific risk charge and the charge was not adequate enough to cover the associated credit default. Thus under Basel III banks are required to calculate credit risk charge for the securitization exposure. The impact in terms of incremental RWA is given in the table below

	N	Overall	Def. of capital	CCR	Sec BB	sVaR	Equity SMM	IRC and Sec TB
Group 1 banks	74	23	6	7.6	1.7	2.3	0.2	5.1
Group 2 banks	133	4	3.2	0.3	0.1	0.3	0.1	0.1

Figure 3: Factor wise impact on RWA in % terms

- The biggest issue as evident from the table above is with the new proposal of including Credit Value Adjustments (CVA) in the standard CCR calculations and also the application of higher asset correlation among FIs. This is particularly an important issue for banks engaged in OTC derivatives and SFTs.

- BCBS also conducted a detailed analysis of the sub components this section and observed a significant dispersion of some of the granual items like Stressed VaR (SVaR), where in some cases it turns out to be as high as 814% of the VaR values calculated by using a non stressed period, i.e. market data of range earlier than 31st, December, 2006.

Leverage Ratio

Leverage Ratio is a supplementary measurement agreed by the GHOS in July, 2010. The leverage in general represents the multiple of exposure to capital and thus a high leverage ratio roughly indicates more risk associated with the bank's position. In contrast Leverage Ratio is defined as follow:

Leverage Ratio Total = Available Capital as per Basel III /Total Exposure incl Off Balance Sheet Exposure

As per Basel 3, Leverage Ratio of bank should meet the minimum of 3%.

"As per Basel III, Leverage Ratio of bank should meet the minimum of 3%."

Timelines for implementation are that there will be supervisory monitoring from 2011 to 2013; a parallel run from 2013 to 2018 and implementation and part of Pillar I reporting from 2019 onwards

The numbers for leverage ratio are as shown in the figure below:

	Group 1	Group 2
Average Leverage ratio	2.8%	3.8%
Banks below the standard 3%	42%	20%

Figure 4: Leverage Ratio Findings

Capital Conservation Ratio

Capital Conservation Ratio is calculated as 1- (Distributions/Profit after Tax)
Trends observed in Conservation Buffer:

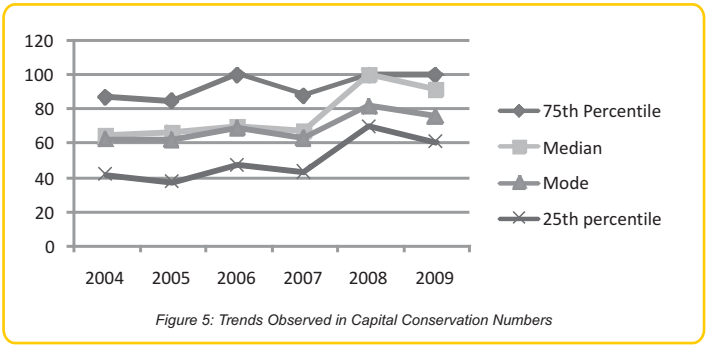


Figure 5: Trends Observed in Capital Conservation Numbers

Following points highlight the information as calculated by the BCBS:

- The data is skewed towards a high Capital Conservation ratio (>90%) as the information gathered (i.e. as till 31, December, 2009) carries multiple cases of capital infusion specially the public sector money.
- Conservation ratio has been observed to share a pattern based on profitability and capital adequacy level of the bank.
- In general the relationship between profitability and conservation ratio is found to be higher than that between conservation ratio and capital adequacy.

Liquidity Ratios

As part of the liquidity ratios, BCBS has mandated a set of liquidity ratios for monitoring. They include the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).

"Average LCR for Group 1 banks is 83% while that for Group 2 banks is 98%. 54% of the banks do not meet the minimum standard of 100%"

Liquidity Coverage Ratio is a measure introduced to monitor 30 days Liquidity position of the bank. The ratio, whose minimum requirement is set to 100%, compares the amount of high quality liquid assets with the bank to the net outflow of 30 days calculated under stressed scenario. The value of liquid assets, outflow/inflow amounts are calculated based on the guidelines mentioned in consultative papers issued by BCBS.

LCR = Unencumbered Eligible Assets/ (30 days stressed outflow 30 days conservative outflow)

This is to be implemented from 2015 onwards, the period till 2015 being an observation period.
The salient observations from the QIS results are the following

- Average LCR for Group 1 banks is 83% while that for Group 2 banks is 98% 54% of the banks do not meet the minimum standard of 100%
- The cumulative shortfall of the liquid assets for the banks not meeting the criteria of LCR >=100% stands at € 1.73 Trillion as on 31st December 2009. It's important to note that this number doesn't necessarily translates into any warning on the shortfall in the corresponding money market instrument but only that banks need to take action in order to meet the agreed standard of LCR before 2015. This can be done not only by accumulating more liquid assets but also by removing concentration of short term funding over a period of time.

"As sovereign debt with 0% risk weight is considered the most liquid instrument, banks now have another reason to add to their already swollen kitty of government debt instruments"

As seen in the table below, BCBS strongly believes huge inter dependencies between the financial institutions were one of the prime causes behind the Global Financial Crisis and even in the QIS, cash flows associated with other FIs turn out to be big ticket items.

Top Three Items (Group1)			
Outflow/Liabilities		Inflows/Assets	
Unsecured Financial Institutions	0.276	Financial Institutions	0.078
Collateral, Securtization and Own Debt	0.24	Secured Lending	0.075
Unsecured Non Financial Corporates	0.159	Other Cash Flows/Derivatives	0.061

Figure 6: Average Liquidity profile in the balance sheets of Group I banks

As sovereign debt with 0% risk weight is considered as the most liquid instrument, banks now have another reason to add to their already swollen kitty of government debt instruments. The following chart shows a list of all items whose holding was found to be at least 5%.

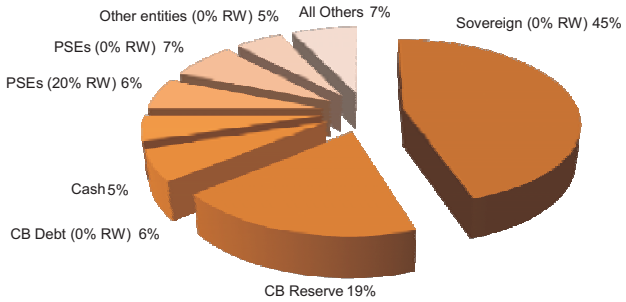


Figure 7: Composition of Liquid Asset Base

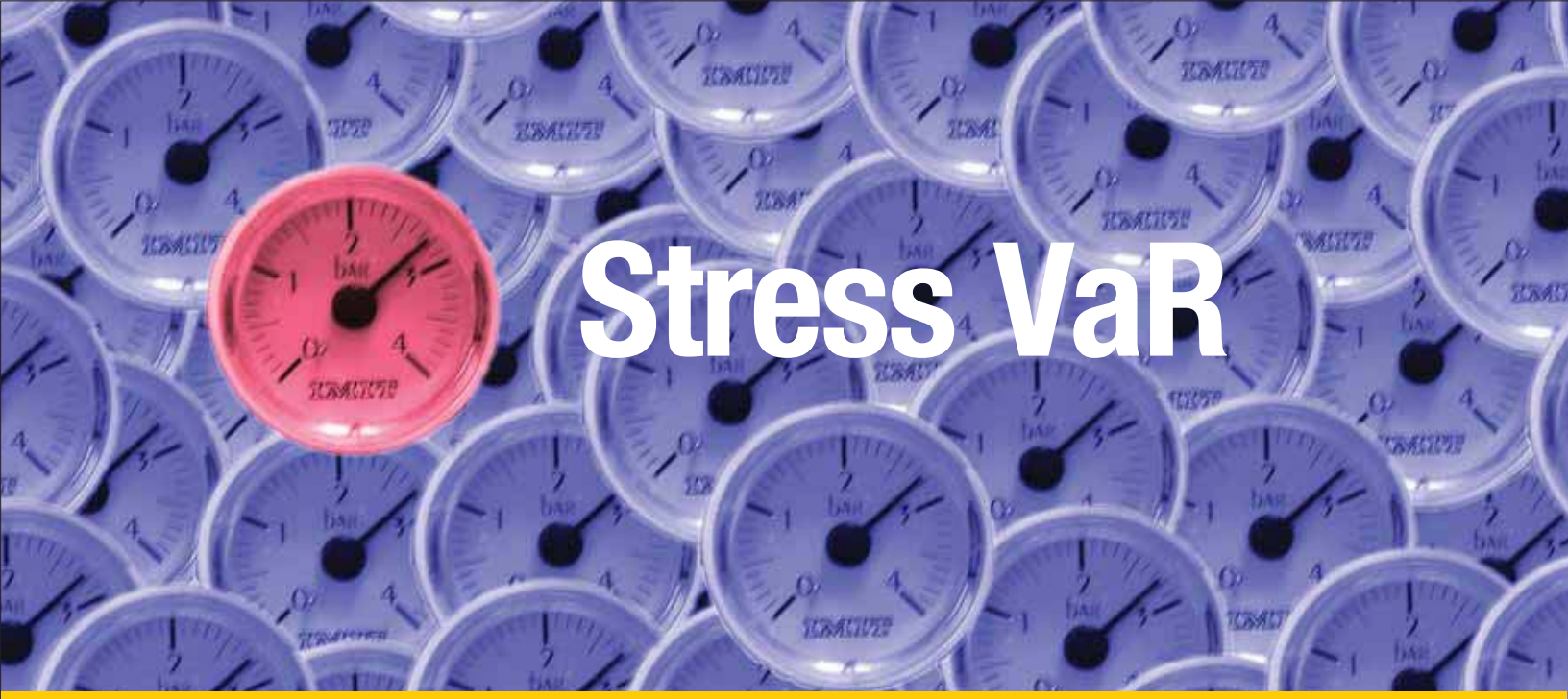
Net Stable Funding Ratio (NSFR), is the second ratio proposed under Liquidity monitoring and it targets to measure the adequacy of sources of stable funding over a period of one year. This is a structural ratio and the value is linked with the basic composition of assets (use of funds) and liabilities (sources of funds). The aim is to incentivize the banks which follow more stable sources of funding and invest in assets with big self funding abilities. NSFR whose minimum requirement is set at 100% is calculated as the ratio between Available amount of Stable funding and Required Amount of Stable Funding

The NSFR minimum requirement will be made mandatory form 2018 onwards, the period till then being an observation period.

It was observed that out of a sample of 163 banks, the percentage of banks with NSFR greater than 100% is 43% while the percentage of banks with NSFR above 85% is 67%. For Group 1 the average value of NSFR is 93% while for Group 2 the average value is around 103%. Cumulative Shortfall of the banks not meeting the criteria of NSFR >= 100%, stands at € 2.89 Trillion.

Going Forward:

BCBS asked the member jurisdictions to collect the information for the QIS presented above. Similarly, the CEBS (Committee of European Banking Supervisors) collected the information for European institutions and conducted its own QIS. The numbers provided by those banks have already been included in the BCBS QIS discussed here and hence the results of CEBS's QIS are not being discussed separately. But it is important to mention that the Board of Supervisors of newly formed EBA (European Banking Authority) included a new round of stress testing and future assessment of liquidity risk in their very first announcement and hence the analysis is not yet over and the calibration of numbers will still take time before getting complete consensus.



Stress VaR

Stress VaR & its implications for Capital Adequacy

Value at Risk, while an elegant tool for monitoring and management reporting, comes with a set of well known pitfalls. The article discusses the implications of introducing 'Stress VaR' to determine capital requirements and its use as a tool to tackle procyclicality

" it is clear that in respect to the trading books of banks, we need to remove pro-cyclicality and to increase capital requirements not just marginally but by several times. The present system of capital regulation of trading books is from a prudential point of view seriously deficient. Its reliance on value at risk (VAR) measures derived (usually) from the observation of the last year's movements in market prices is clearly pro-cyclical " - Adair Turner, Head of UK FSA, The Economist's Inaugural City Lecture, January 2009

"Losses in most banks' trading books during the financial crisis have been significantly higher than the minimum capital requirements under the former Pillar 1 market risk rules." - Revisions to the Basel II market risk framework Committee, July 2009

The 2007-08 global banking crisis has shown that banking capital was inadequate and reliance on measures such as standard VaR had seriously underestimated the market risk. The speed at which supposedly the strongest and most respected global financial institutions disappeared is the making of fairy tales; Bear Stearns and Lehman Brothers disappeared almost overnight.

Northern Rock only survived with full nationalisation, while RBS and Lloyds (following its acquisition of the beleaguered HBOS) survived but required large government bailouts. The reverberations continue with related economic downturns in many Euro Zone countries, commencing with the Greek crisis and its subsequent bail out in 2010, followed by Ireland. At the time of writing this article (December 2010) Portugal and Spain remain under scrutiny and Allied Irish Bank is close to being nationalised.

July 2009 Capital Adequacy

As a direct consequence of the credit crisis of 2007 and the implied inadequacy of VaR for Capital Adequacy purposes, the Basel Committee suggested the following amendments (July 2009): (i) to reduce the incentive to arbitrage between the banking and trading books by introducing an Incremental Risk Capital charge (IRC) in addition to VaR; (ii) to use stress VaR so as to reduce the pro-cyclicality of minimum capital requirements for market risk. This introduction of the additional capital charge has given rise to industry wide concern in respect of the implications for capital adequacy purposes. More worrying for regulators are the murmurings that more capital may be required under the Advanced Approach compared to the Standard Approach. This would seriously dent the case for banks to adopt the Advanced Approach for Capital Adequacy.

While these concerns are voiced in anticipation of the possible outcome, to date there has been little empirical work based on actual data to estimate the magnitude of such additional capital. However, as long as banks have a choice to remain under the Standard Approach this is a very relevant question and may well undermine the efforts of the regulators to increase bank capital.

This article seeks to shed light on the debate by specifically looking at:

- The variability of VaR between benign and stressed periods
- The variability in size of the P&L relative to VaR when a VaR limit is breached

The first seeks to understand the presence and size of VaR pro-cyclicality, probing the magnitude of additional counter cyclical capital arising from Stress VaR. The second attempts to gain insight into the sufficiency of using such Stress VaR. Since a bank has no choice but to apply VaR in some manner for capital adequacy purposes, other aspects of the debate of the appropriateness of VaR are ignored.

VaR and Stress VaR

VaR is a statistical tool which is one of the key measures adopted by the Basel Accord to determine capital adequacy in Banks. It seeks to determine, to a given degree of confidence, how much a portfolio may lose within a given time frame. Accordingly, capital should be allocated to allow for such potential losses. Conceptually, this is an appealing and reasonably plausible approach to manage the portfolio risk of the book. However, it may also lead to a false sense of security in that one may be more interested in the likelihood of infrequent but large losses occurring, particularly those which are sufficiently large to eliminate the capital base.

To reiterate an oft quoted statement: the problem with such large and previously deemed to be infrequent losses is that they keep happening or, at least, happen more often than were estimated a priori. If the VaR methodology is pro-cyclical then it clearly has not anticipated the crashes seen over the past several decades.

"It may also lead to a false sense of security in that one may be more interested in the likelihood of infrequent but large losses occurring, particularly those which are sufficiently large to eliminate the capital base."

The introduction of Stress VaR to address pro-cyclicality, at least in theory, must be in the right direction for bank's capital reserves. To understand the implications of stress VaR take the statement that says "a portfolio is expected to lose 3% or more on 1 in 20 days". In the context of stress VaR, does this 20 days reflect the risk of the immediate past year or is it the risk that the past year would not have seen but may nevertheless happen?

Risk professionals are aware that VaR as a risk measure is deceptively easy to understand (or perhaps mis-understand) but complex to compute. Practitioners know that it is not one methodology and the same data may lead to many different VaR numbers depending on the chosen methodology. It is affected by choices such as the risk methodology (parametric, historical or Monte Carlo), look-back period (1Y, 2Y,), and decay factor (1, 0.99, 0.94,) among others. Regulators will not endorse a particular statistical approach to calculate VaR but instead have relied on back-testing to validate a given choice of model and data.

Historical VaR

Experience to date reveals the widespread and continued use of Historical VaR rather than VaR derived via Monte Carlo simulation or Parametric approaches. Hence, historical VaR must be taken as the methodology of choice when designing amendments to VaR related regulations. A Survey of Indian Banks by Aptivaa (2010) shows that 67% of Banks use Historical, 13% Parametric, 5% Monte Carlo and 15% a combination of all three approaches. There are many reasons for its popularity and some of the common reasons stated are:

- There is no implicit parametric assumption on the form of its statistical distribution, so it is distribution free or more appropriately parameterisation free.
- It captures 'fat tails' so is more appropriate for regulatory capital purposes.
- It captures asymmetric P&L behaviour.
- If there is a breach it is easy to identify the factors for the breach since it is associated with a date and with that the associated simulation.

With historical simulations, history is deemed to repeat itself in the literal sense with little place for events outside the history. Moreover, this history is often confined to one year (the minimum required by regulations) and each event in the included history is assigned an equal probability of occurring no matter where it occurred in that history. As the view of Basel Committee is to address pro-cyclicality this practice of using Historical VaR may be significant in relation to the other methodologies of Monte Carlo and Parametric.

Given the popularity of Historical VaR, this article will focus on Historical to evaluate Stress VaR for capital adequacy purposes (for a more in-depth comparison of the three methodologies see VaR Performance - The Credit Crises Years, John Duncan, RiskMetrics Group 2009)..

The Evidence

To meaningfully test the questions posed earlier would require decades of data covering sufficient business cycles. It is unlikely that a typical bank's trading portfolio is available for even one business cycle in order to properly perform such an analysis.

In order to gain some insight this article simplifies the analysis considerably by utilising readily available public data which covers many business cycles.

The longest time series publically available is the Dow Jones Industrial Average (DJIA) going back to 1928. Although this may not reflect a typical bank's portfolio in terms of asset coverage or leverage, it is daily market data and one that spans the period from the great depression to the recent credit crises, including all the business cycles in between. The data was downloaded from Yahoo Finance.

"Historical Stress VaR arises from those periods which display high VaR levels resulting from higher than average P&L losses to the portfolio."

Historical Stress VaR arises from those periods which display high VaR levels resulting from higher than average P&L losses to the portfolio. Such periods can be incorporated within an actual portfolio if one has readily accessible historical indices, foreign exchange and yield curves from such stressed periods.

For instruments which did not exist during the previous periods of stress one can utilise measures such as the Beta with respect to the observed index. The advantage of using historical periods is that the correlations are implicit and will generate the fat tails of the distribution as had actually transpired during that period.

The data of DJIA Average daily P&L and 1 year look back for Historical VaR at 99% shows that there are some major tail events, including the 1987 crash where the Dow fell over 25% in one day (but it also significantly rose on the following days). Since the tail events are significant for Capital Adequacy (especially if they cluster or are systematic) one would like to know the nature of the tails relative to VaR, i.e. when there is a breach, is this significantly higher than the VaR and will the capital set aside be sufficient? More importantly, how does it compare with Stress VaR?

Variability of VaR

The variability of VaR from October 1929 to December 2010 is evaluated (Figure 2) with summary statistics (Table 1):

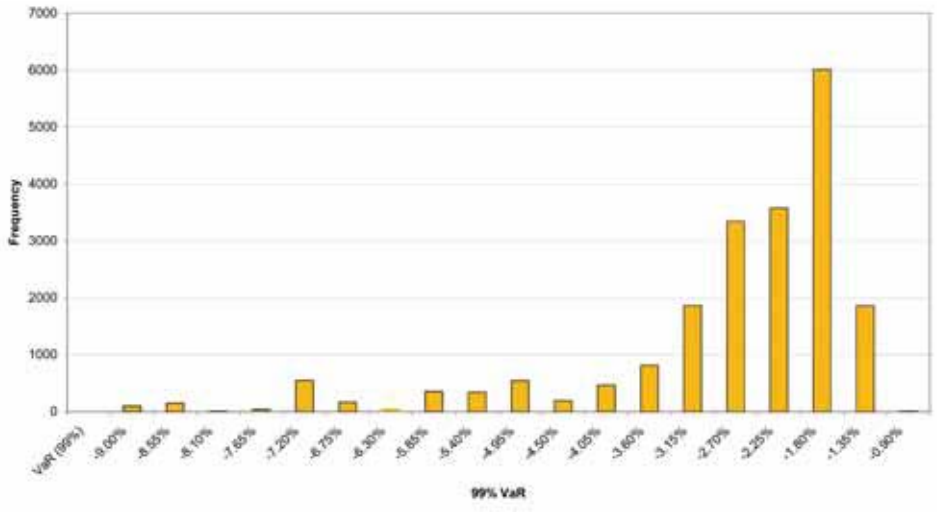
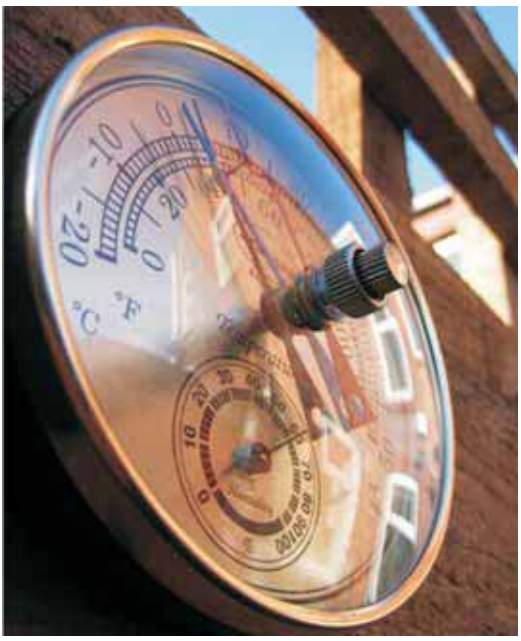


Figure 1 : Var as a Percent of Portfolio Value (1929-2010)



Summary statistics for the dispersion of VaR (1929-2010):

Table 1: VaR as Percent of Value (1929-2010)		
	% of PV	Date Clusters
Maximum	-8.87%	1930
Percentile 99	-8.34%	1929, 1930
Percentile 98	-7.15%	2008, 2009
Percentile 97	-6.92%	1932, 1933
Percentile 96	-6.77%	1933
Percentile 95	-6.26%	1932,1933
Percentile 90	-4.84%	1940, 1941, 2009
Percentile 85	-3.52%	
Percentile 75	-2.78%	
Percentile 50	-2.03%	
Percentile 25	-1.55%	
Percentile 10	-1.37%	1957, 1959, 1968, 1973, 1985
Minimum	-0.86%	1964
Range	**8.01%**	
Range 90% to 10%	**3.47%**	
Range 75% to 25%	**1.23%**	

Evaluating daily VaR over 80 years show the average VaR to be 2% of the value of the portfolio for the DJ index. It increases by approximately 1% for the next 25 percentile towards the tail. However, this tail is fat and gets large fairly quickly, reaching over 8% of the value of the portfolio. The data shows that if we are to use the 90th percentile stress VaR value, this would more than double the VaR of average years, while the worst case (taken as the 99th percentile) is more than 8x the value in benign years.

Also notice that the worst VaR figures were not from the recent 2007 Credit Crisis but from the 1930s crash. In fact, the worst 3 percentile VaR observations stem from the period of the 1930s crash. If more recent data is used (from 1970 onwards) stress VaR is then evaluated to be more than 7x that of the benign years.

Therefore, depending on how Stress VaR is defined, it would have some major implications for Capital Calculations if the DJIA was the underlying portfolio.

"The introduction of Stress VaR is intended to address the pro-cyclicality of VaR."

Variability of P&L Losses at the Tail

The introduction of Stress VaR is intended to address the pro-cyclicality of VaR. It suggests that VaR may not anticipate the next downturn, so it is prudent to set aside more capital in benign periods to cover possible future surprises. For example, a given magnitude of loss is much greater in relative terms when VaR is 2% compared to VaR at 5%. To capture the size of the tail relative to VaR we propose the Breach Ratio

Breach Ratio = P&L/VaR (where both P&L and VaR are expressed as negative)

Recalling that both P&L and VaR is negative, the ratio is ≤ 1 if there is no breach and >1 when a breach occurs. A breach ratio of 2 indicates that the portfolio has lost double tha that suggested by VaR and so on. The larger these values the bigger the insufficiency of VaR for capital adequacy purposes.

Table 2 provides results for 1930 to 2010 for the DJIA. The data is divided into VaR quartiles, quartile 1 being the benign period and quartile 4 that of the stressed period. The central two quartile figures are also presented for completeness

Table 2: Breach Ratios for 99% VaR (1930-2010)			
	Quartile 1	Quartile 2&3	Quartile 4
Minimum	1.00	1.00	1.00
Percentile 5	1.01	1.02	1.02
Percentile 10	1.03	1.03	1.04
Percentile 25	1.09	1.08	1.12
Percentile 50	1.17	1.20	1.31
Percentile 75	1.39	1.49	1.65
Percentile 90	1.74	1.92	2.24
Percentile 95	1.90	2.21	2.53
Percentile 96	1.98	2.26	2.90
Percentile 97	2.19	2.35	3.26
Percentile 98	2.63	2.91	3.62
Percentile 99	3.70	3.40	6.20
Percentile 99.5	4.01	3.62	8.05
Maximum	4.14	3.93	9.90
#Observations	121	165	61

Intuition suggests that the relative size of breaches may be higher in benign periods due to unexpected events occurring at times of lower VaR. The results are surprising in that the average breach ratio increases moving from benign VaR to high VaR periods (17% vs. 31% at the 50th percentile of the breach distribution). This is counterintuitive to that which may be expected via counter-cyclical arguments. Thus, stressed intervals tend to be followed by still further stresses, exhibiting a clustering of such stress events.

"Intuition suggests that the relative size of breaches may be higher in benign periods due to unexpected events occurring at times of lower VaR. "

However this is only half the story, as the surprise element (or the tails of the distribution of the breach ratio) is much larger in high VaR periods compared to low VaR periods. The ferocity of negative P&L at the tails is as much as 9 times that of the figure suggested by VaR in extreme cases; note that VaR is already high in the stress period. In fact, the larger breaches in stress periods increase exponentially compared to benign periods, as one moves down the tail (Figure 3 below).

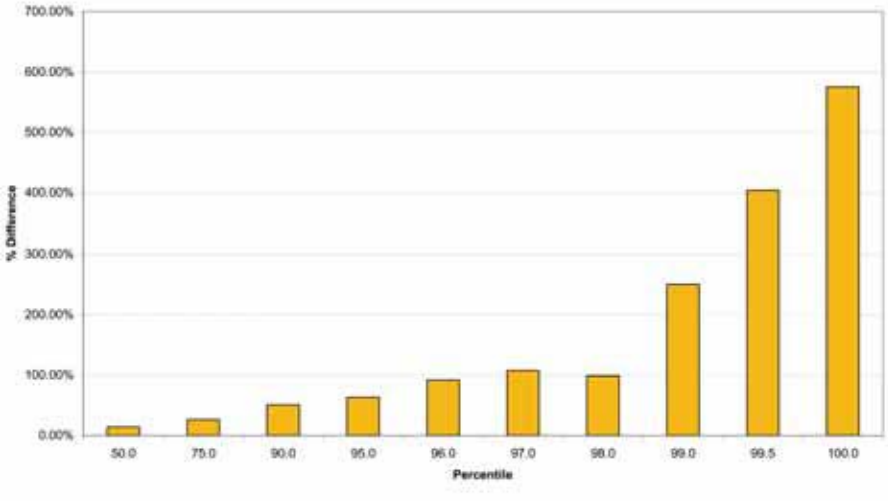


Figure 2: Difference in Breach % Between 1st and 4th Quartile Var (1930-2010)

The observed breach ratio during stress periods is a sobering result and contrary to what one expects from pro-cyclicality discussions of VaR. The tail has substantial sting precisely when VaR is already indicating increased capital. This questions the role of capital reserves managed via VaR for these tail events.

Final Thoughts

The July 2009 Capital Adequacy amendment to include Stress VaR is a direct acknowledgement of the pro-cyclicality of VaR as used for Capital Adequacy. Analysis of daily VaR of the DJIA covering the business cycles over the past 80 years supports this and shows that VaR can vary by as much as 8% of the portfolio value. Surprisingly, the data also shows that realised losses can, proportionally, be many times larger when VaR is already high. This appears counterintuitive, due to possibly the common practice of using Historical VaR with only a 1 year look-back.

"The data also shows that realised losses can, proportionally, be many times larger when VaR is already high."

Clearly, any consideration of Stress VaR requires a close examination of the methodology employed to address pro-cyclicality. The Standard Approach may also require some revision if it transpires that such an approach leads to less required capital than that implied by applying Stress VaR to the Advanced Approach.

The results reaffirm that managing Capital Adequacy is complex and even what appears to be an intuitive measure of Stress VaR to address pro-cyclicality has produced as many questions as answers. Adair Turner (UK FSA) posed the question: "..[How] to design the regulation and supervision of financial services so that we significantly reduce the probability and severity of future financial crises?" The answers are multi-faceted. He hinted that any such re-design would, by its nature, include consideration of macro-economic imbalances, financial instrument innovations, illusory profits, as well as the global co-ordination of regulators and central banks, rather than simply tweaking the margins of current practice.

Footnote

CIRRAC is a risk management firm which specialises in the provision of consulting and analytical services to banks, insurers and asset managers. Colin & John founded the firm in 2010, working with a global network of partner firms for service delivery and the outsourcing of related risk analytics. www.cirrac.com

CIRRAC is presently surveying issues related to the requirement, implementation and use of Credit Value Adjustment (CVA) and would appreciate reader responses to this online survey at CIRRAC CVA SURVEY (www.surveymonkey.com/s/WGX2BLY)

Colin Farquhar

Colin is a founding member of risk advisory firm CIRRAC Ltd. He has completed numerous risk related assignments for a broad spectrum of financial institutions. These assignments mainly concerned risk measurement with a focus on quantitative methodologies, risk model construction & validation and economic & regulatory capital. His experience covers corporate, investment & retail banking. Previously he was Managing Director at Fitch Group, holding positions as EMEA then Global Head of the Risk Advisory business. Prior to this he held positions at Credit Suisse investment bank and at RBS Group Risk. Colin holds a PhD in Physics from the University of Edinburgh and is based in London, UK.

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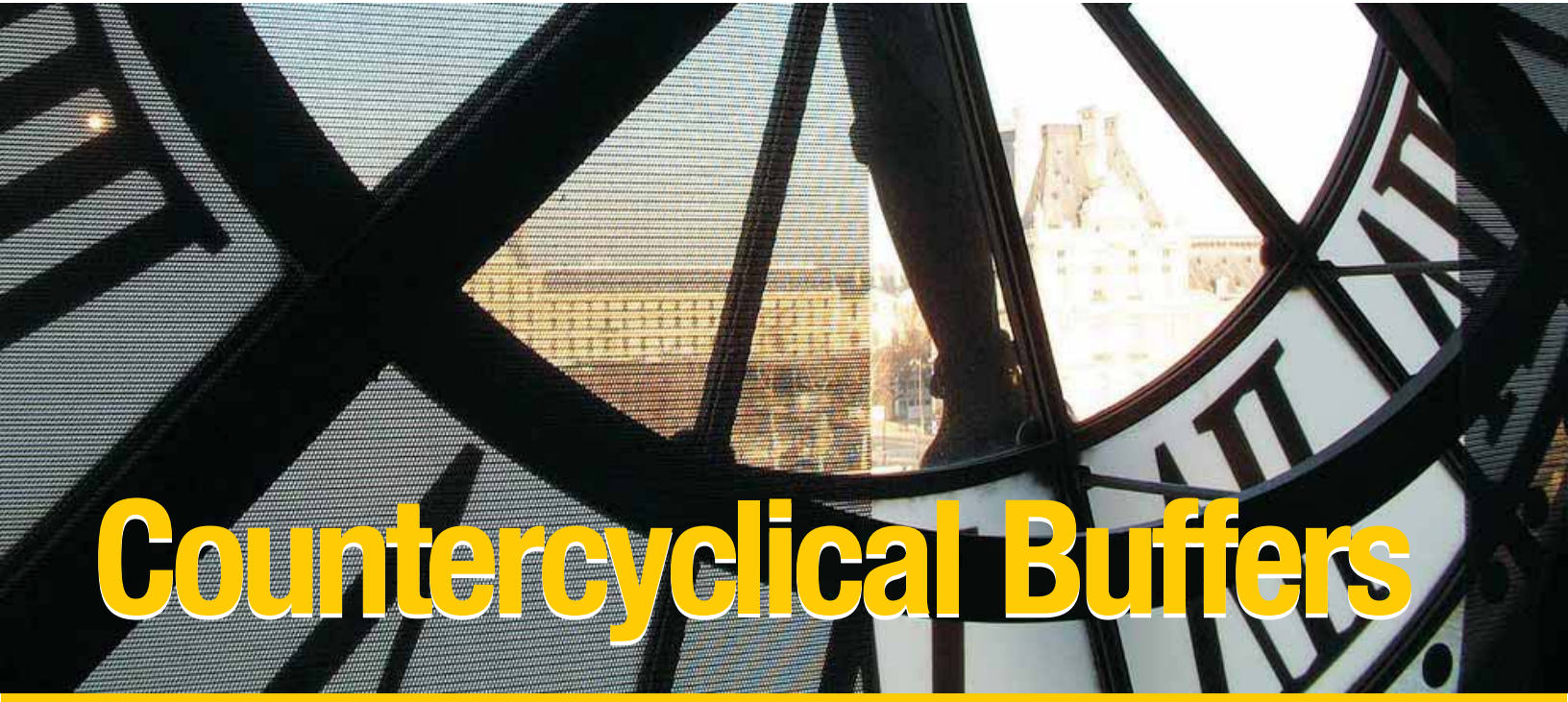


Countercyclical Buffers

How much is enough?

Yet another measure to tackle procyclicality, countercyclical buffers are intended to be built up to protect the banks against potential future losses in times of excessive credit growth. While the intentions are laudable, there have been misgivings about potential regulatory arbitrage and also skepticism about its effectiveness

In December 2009, the Bank of International Settlements put out two discussion papers Strengthening the resilience of the banking sector consultative document which outlined "a package of proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector" and International framework for liquidity risk measurement, standards and monitoring consultative document which outlined "a package of proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector". This was followed up with the "Basel III A global regulatory framework for more resilient banks and banking systems" where the requirements under Countercyclical Capital Buffers were crystallized.

Basel says "The primary aim of the proposal is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build up of system-wide risk."

The aim is to curb the pro-cyclical behaviour of the financial markets and to protect the banking system from excess credit growth. This framework will help attenuate the excessive cyclicality of the minimum capital requirement and conserve capital in good times. This is in line with a growing awareness that prudential regulation has to be counter-cyclical.

How will they be operated

The level of Countercyclical buffers to be maintained is to be determined by the national regulator depending upon their judgments of whether the credit growth is excessive and is leading to build of system-wide risk. The regulators need to decide if the buffer should increase of decrease over time within the range of 0 to 2.5% of the risk weighted assets.

"The regulators need to decide if the buffer should increase of decrease over time within the range of 0 to 2.5% of the risk weighted assets. "

While the Capital Conservation buffer is to be governed by the national regulator, it is governed by some principles as shown below

Principle 1	Buffer decisions should be guided by the objectives to be achieved by the buffer, namely to protect the banking system against potential future losses when excess credit growth is associated with an increase in system-wide risk.
Principle 2	The credit/GDP guide is a useful common reference point in taking buffer decisions. It does not need to play a dominant role in the information used by authorities to take and explain buffer decisions. Authorities should explain the information used, and how it is taken into account in formulating buffer decisions.
Principle 3	Assessments of the information contained in the credit/GDP guide and any other guides should be mindful of the behaviour of the factors that can lead them to give misleading signals.
Principle 4	Promptly releasing the buffer in times of stress can help to reduce the risk of the supply of credit being constrained by regulatory capital requirements
Principle 5	The buffer is an important instrument in a suite of macroprudential tools at the disposal of the authorities

What the principles are trying to enforce is that

- That the buffer is not meant to be used as an instrument to manage economic cycles or asset prices
- Credit/GDP growth is only a statistical measure that doesn't capture turning points too well; the regulators should form their own judgments
- The rate of release of buffers would matter and is an important signaling tool

How are bank specific buffers calculated

The applicable countercyclical buffer applicable to the bank is dependent on the location of its counterparties rather than the location of the bank itself. For example, bank A has 60% of its clients in the UK and 40% of the clients in Germany. The regulators in UK and Germany have set up the buffer levels at 1% and 2% respectively. The applicable buffer level for the bank A is hence

$$=0.6*1\% + 0.4*2\% = 1.4\%$$

What this means is that the banks will need to know the country of residence of each of its foreign counterparties

The host authorities will have the right to demand that the countercyclical buffer be held within their jurisdiction at a legal entity level or the consolidated level.

Basel also states this, "In cases of lending through foreign branches or cross-border lending by banks located offshore, the international reciprocity provisions of the proposal will result in the authorities in the home jurisdiction of the bank in question levying a buffer equal or greater to the one required by the host jurisdiction. That buffer would of course be located in the home jurisdiction."

"The host authorities will have the right to demand that the countercyclical buffer be held within their jurisdiction at a legal entity level or the consolidated level. "

The frequency of calculation of the buffers will be same as the one for minimum capital requirements. It is also to be noted that the Pillar II capital cannot be used to satisfy the requirements under the countercyclical buffer.

What is the linkage with capital conservation buffer

A Capital Conservation buffer is established above the regulatory minimum Tier 1 capital requirement and capital distribution constraints will be imposed on the bank when capital levels fall within this range. The Countercyclical buffer is intended to be established in interaction with the capital conservation buffer. This is shown with the help of an example

The amount by which a bank's capital exceeds the minimum requirements in terms of a percentage of the size of the conservation range determines the capital conservation ratios. In scenario II, it is seen that the amount by which a bank's capital exceeds the minimum requirements in terms of percentage of the size of the conservation range lies in the 3rd quartile and hence accordingly a 60% minimum capital conservation buffer is applied. In scenario 1, the percentage amount by which a bank's capital exceeds the minimum requirements in terms of percentage of the size of the conservation range lies in the above the top of the buffer and hence there are no restrictions on the distribution of profit

Bank Minimum Capital Conservation Standards	
Amount by which a bank's capital exceeds the minimum requirement in terms of a percentage of the size of the conservation range	Minimum Capital Conservation Ratios (expressed as a percentage of earnings)
1st quartile	100%
2nd quartile	80%
3rd Quartile	60%
4th Quartile	40%
Above top of buffer	0%

Figure 1: Minimum Capital Conservation Standards

Particulars	Scenario I	Scenario II
Tier 1 Capital requirement or Minimum Requirement	4%	4%
Capital Conservation buffer	2%	2%
Countercyclical Capital Buffer	0%	2.5%
Total Buffer	2%	4.5%
Total Requirement	6%	8.5%
Bank A's Tier I Ratio	6.5%	6.5%
Amount by which a bank's capital exceeds the minimum requirement in terms of a percentage of the size of the conservation range	Above top of buffer	3rd Quartile
Restrictions on distribution?	No	Yes, 60% minimum capital conservation buffer

Figure 2: Scenarios illustrating how the Capital buffers will be calculated

In Scenario 2 above, the banks will be given 12 months to get their capital levels above the top of the extended range (Tier 1 above 8.5% in the example), before restrictions on distributions are imposed. This period of grace will help reduce the chances that the market will view the countercyclical capital buffer add-on as a new minimum and avoid a rise in the buffer add-on in one jurisdiction having the potential to require banks to automatically restrict distributions, while being short enough to help ensure that the buffer is accumulated in time to cope with turns in the credit cycle. During this 12 month period, banks will have the options of meeting the requirement though retaining earnings, raising capital or cutting lending growth.

"With respect to jurisdictional reciprocity, which will be applied to internationally active banks, the host authorities take the lead in setting buffer requirement that would apply to credit exposures held by local entities located in their jurisdiction."

Guidance to the regulators

BIS has also released a set of guidelines to be followed by the national regulators or the 'home authorities'. Titled "Guidance for national authorities operating the countercyclical capital buffer", it mentions the frequency of buffer decisions and communication and states that banks be provided a lead time of at least 12 months to adjust the buffers.

All announced changes to the prevailing buffer requirement should be reported to the BIS on a timely basis. This will enable a list of prevailing buffers, and pre-announced buffers, to be published on a dedicated page at the BIS website. This will provide banks with the information they need to calculate their specific buffer requirements.

With respect to jurisdictional reciprocity, which will be applied to internationally active banks, the host authorities take the lead in setting buffer requirement that would apply to credit exposures held by local entities located in their jurisdiction. The home authorities will always be able to require that the banks they supervise maintain higher buffers if they judge the host authorities' buffer to be insufficient. However, the home authorities should not implement a lower buffer add-on in respect of their bank's credit exposures to the host jurisdiction.

How are banks placed to satisfy the new requirements?

While no studies have been conducted yet to check the preparedness of the banking sector with the requirements of the Countercyclical Buffers, a study has been conducted by the Basel Committee of Banking Supervision (BCBS) to assess the impact of the Capital Conservation buffer alone which will give an idea about the preparedness.

The comprehensive Qualitative Impact Study (QIS) is based on the information submitted by banks to their National Supervisors. A total of 263 banks participated from 26 jurisdictions. These banks were then classified in two groups, Group 1 and Group 2. The estimates assume the Full Impact of the Final Basel 3 package on the data as of 31st December, 2009, without considering and phase in arrangements etc.

The key findings are as follows:

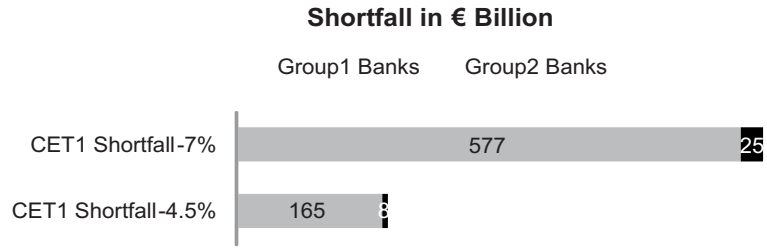


Figure:1 Category wise Impact of Deductions on Net CET1 as % of Gross CET1

- On an average the banks were able to meet the minimum common equity requirement of 4.5% but failed to meet the more realistic number of 7.0%, which includes a capital conservation buffered of 2.5% as proposed in Basel 3.
- The shortfall wherever observed resulted in a net shortfall of € 172 billion in common equity to meet the bare minimum of 4.5 % alone, whereas the same requirement expands to € 602 billion when considered for the target of 7.0%.
- These numbers don't represent a direct requirement of raising fresh capital but are definitely indicative enough to highlight the state of participating banks in general.

Model Validation

How to spot best model when all look alike?

As important statistical tools are for model validation, equally so is the understanding of the principles behind it. It is paramount that a validation team be clear upon its goal and the approach to be taken

One key question that modellers, reviewers, regulators and key stakeholders within a bank will ask is "Can you prove to me that the Basel models are working adequately?". This is a multi-faceted question and it is not obvious how it can be answered. It is crucial to know the answer to this for Basel II I.R.B. Models. Possibilities answers might be:

(1) Is the power of the model equal to some benchmark?
(2) Has the power of the model dropped since the model's development?
(3) Has the model optimised its use of the underlying data?

For Basel II modelling there are discussion papers by regulatory bodies on monitoring and validation but these seem short on the principles behind it. Also, the regulators may have a different perspective from the key stakeholders because, arguably, capital calculations have a requirement for accuracy over a long term whereas, if the Basel models are to be used in the business, there will also be a requirement for short-term accuracy.

The questions above are not easy to answer. For example, for benchmark power measures on different portfolios there are many reasons why the bank's own power measures will differ; the benchmark data is unlikely to be for exactly the same products, have the same provenance, have the same mix of business etc. Also, it may not be possible to examine the benchmark data in detail to determine how similar it is to one's own data; one may only have high-level statistics and time-series.

Even simple answers, such as to question (2), might not be straightforward. The distribution of accounts by risk grade may have changed since the model development. This will lead to a change in the apparent power of the model but not necessarily in its real power. In other words, a reduction in power does not necessarily mean that the model needs upgrading. Alongside this, it may not be possible to measure the model's power satisfactorily because insufficient time may have elapsed. LGD models, for example, can have a very long outcome period (e.g. 4 years for mortgages), but they need to be monitored well in advance of this time it is no use waiting 4 years to find out one has a problem.

The real crux of model validation is actually answering question (3) Has the model optimised its use of the underlying data. Given that models are comprised of a structure and a set of parameters this breaks down to two questions

(1) Is the model structure correct given the underlying data?
(2) Are the model parameters correct given the underlying data and the chosen model structure?

For Basel II there are two types of validation that are necessary and both of these should be done when the model is constructed:

- A Holdout validation
- An Out of Time validation

The latter is really crucial and involves taking a sample of accounts from a different time period to the development sample and using this for a validation. In essence, subsequent model monitoring is identical to Out of Time validations, which is why Validation and Monitoring are treated as being synonymous within the Basel literature.

Principles based approach to model validation

We present an approach to validation/monitoring that is principles-based. This is familiar to bankers in the UK because the UK regulator (the Financial Services Authority [FSA]) has always adopted a principles-based approach towards regulation.

First of all we define what we mean by monitoring (be it a "statistical model" or anything else):
"Monitoring" is the comparison of actual results with pre-set targets (A)
Accepting this criterion means that we have to define the pre-set targets for a statistical model. To simplify the discussion we limit ourselves initially to describing monitoring/validation of PD models, although the principles are the same for other types of models. We also note that the validation/monitoring samples should be independent of the model development sample.

If one takes a logical and independent approach towards the validation/monitoring one is forced to answer the question:
"How do we know that we have the best model given the data?"

It does not seem possible to adequately validate a model unless this question is answered. In fact, it is not obvious that there is a simple answer to the above question!

We formulate an answer to the above that is independent of the model type, the model construction method and also the model parameters:

The Subset Criterion

"The best model is the one for which the "Average (Mean) PD" equals the "Default Rate" for every subset of accounts defined by the data."

The best model is the one for which the "Average (Mean) PD" equals the "Default Rate" for every subset of accounts defined by the data.

In producing this answer we have immediately satisfied the monitoring criterion (A), as the pre-set targets are the set of default rates on all the data subsets. We are sure key stakeholders will find this a natural set of targets and would concur with it. Moreover, it is based on statistical theory.

As an example, if the average PD for self-employed customers were 1% and the default rate were 2% the stakeholder would be justified in complaining that the model needed correcting (this is especially the case if he/she needs to take actions based on this PD).

If the Subset Criterion is accepted as defining the best model then one only needs to check the model for all key subsets to show that it works.

What subsets then should be examined? In the main they will be defined by the variables that have been considered for the model construction and also those of interest to the business. E.g.:

- The whole book [i.e. is the PD prediction correct overall]
- PD-grades/scorebands
- Characteristic-level subsets:
  - All subsets defined by characteristics that are in the model
  - All subsets defined by characteristics that were included as candidate variables for the final model build but did not enter into the final model [e.g. left out owing to correlations]
  - Any subset not in the model that is of interest to operations [e.g. "source of business"]

- Any subset defined by new data sources
- In practice, monitoring may be based on a different outcome definition in order to check problems with early arrears, rather than waiting for the full Basel definition of default. Thus a two-stage monitoring approach may be necessary.

The difficulties in the approach
What then are the difficulties with the above simple approach? We list some of them to show that, despite the apparent simplicity of the principles, care needs to be taken with every aspect of Basel modelling and validation:

- If one were to monitor EAD on the above basis [that is, check that the mean EAD per subset equals the actual average EAD for the subset] one would probably have problems with "outliers". This is because a handful of customers who have been given high-balance loans can have a much larger impact on the mean value than the many customers who have smaller loans.
- One might try to circumvent the above problem by monitoring Conversion Factors (CCFs) instead. These are defined in the Basel literature as (EAD Current Balance) / (Credit Limit Current Balance). Unfortunately an analogous problem arises. When the denominator is very small, that is, when the customer is near to his/her limit, the ratio becomes destabilised, approaching infinity, and has to be treated as an outlier or examined in a different way.
- For LGD monitoring one will often need to check how well the model is working before the full outcome is up. This means that the validator may actually have to do some modelling to determine what the target LGD% is for each time period, as these targets might not have been set my the original modeller if he/she was only interested in the Basel infinite-outcome.
- Often checking on subsets will involve comparisons on small numbers. Statistical care has to be taken to be sure that one is making the correct inferences. We recommend the use of use standard statistical tests. For example, for PD monitoring on subsets we use chi-squared tests.
- It is not possible to monitor scorecards without understanding the background of the bank's business and the underlying economy. The numbers alone, without this perspective, are meaningless. Many analytical people forget this. As much effort should go into explanations for what is happening as into simple measurement and identification of problems. It is our experience that finding appropriate explanations can be more difficult than most people realise.

"For LGD monitoring, one will often need to check how will the model is working before the full outcome is up. This means that the validator may have to do some modeling to determine what the target LGD% is for each time period"

When we do our training workshops in model validation we start with the following group exercise:

Task 1- You are an engineering consultant meeting a client. You know nothing about the client's machinery which makes cardboard boxes. You are asked to check whether a piece of equipment is working. What do you do? How would you go about it

Task 2 - You are a restaurant critic. You are billed to visit an Ethiopian restaurant having never tasted Ethiopian food before. How do you plan your visit and how would you gauge the food.

Task 3 - You are a teaching inspector at a senior school. What considerations would you use to judge the teaching?

Task 4 - You are an inspector who checks the work of aeroplane mechanics. How should you go about this?

We have found that answering these four tasks successfully will give very solid background to what monitoring/validation is all about. It helps give a qualitative perspective on the quantitative data explorations.

> **"We must not forget that Basel II I.R.B. requires estimates of Long-run PD and Downturn LGD. Thus, for long-run monitoring purposes, it is crucial to know where one is on the economic cycle."**

- We must not forget that Basel II I.R.B. requires estimates of Long-run PD and Downturn LGD. Thus, for long-run monitoring purposes, it is crucial to know where one is on the economic cycle. This may involve some further forms of modelling before true validation can begin.
- Our monitoring principles seem laudable. Actual PD = Expected PD by subset seems an obvious criterion. In fact it is so obvious that the most popular scorecard construction method, logistic regression, works (behind the scenes) by focussing on this criterion. Nonetheless, there are problems even here. For example the "expected value of PD x LGD" is not necessarily equal to "the expected value of PD" x "the expected value of LGD". Similarly, matching actual and expected EAD on subsets does not guarantee that CCF will be matched on the same subsets. Neglecting these issues can have a noticeable capital impact of one's models are sub-optimal.
- What are we to do about this? Are the foundations of monitoring are crumbling? Our recommendation is, where possible and within Basel II constraints, that one should always monitoring those measures that are related to money. Thus, EAD is much more relevant financially than CCF, even if CCFs have been produced by the modeller. Similarly, PD and EL (= PD x LGD) are much more relevant for the business than PD and LGD, even though the regulators have a separate focus on PD and LGD because of the workings of the regulatory capital formula.
- If in doubt we recommend that the models should be monitored in more than one way to meet regulatory, statistical and business objectives.
- Another pertinent aspect is that just because a model can be shown to be sub-optimal does not imply that it should immediately be changed. There is a cost to making even the smallest change as this has to be specified and programmed under formal governance procedures and then user testing has to be done and documented. Also, constantly changing ones models can cause problems when one is examining risk across long time periods. Of course, living with sub-optimal models can have a capital impact and this should be assessed before making a do-nothing decision.

A further point to mention is that most organisations have adopted particular monitoring measures that their regulators have favoured. For example, the Gini coefficient is almost universally used to monitor the power of scorecards. The regulators seem to like this and we ourselves concur that it is an excellent measure which can be used (carefully) for cross-portfolio comparisons. Very few lenders though actually adjust their Gini coefficients when the distribution of accounts changes. These adjustments are easy to do and without them the Ginis can be misleading.

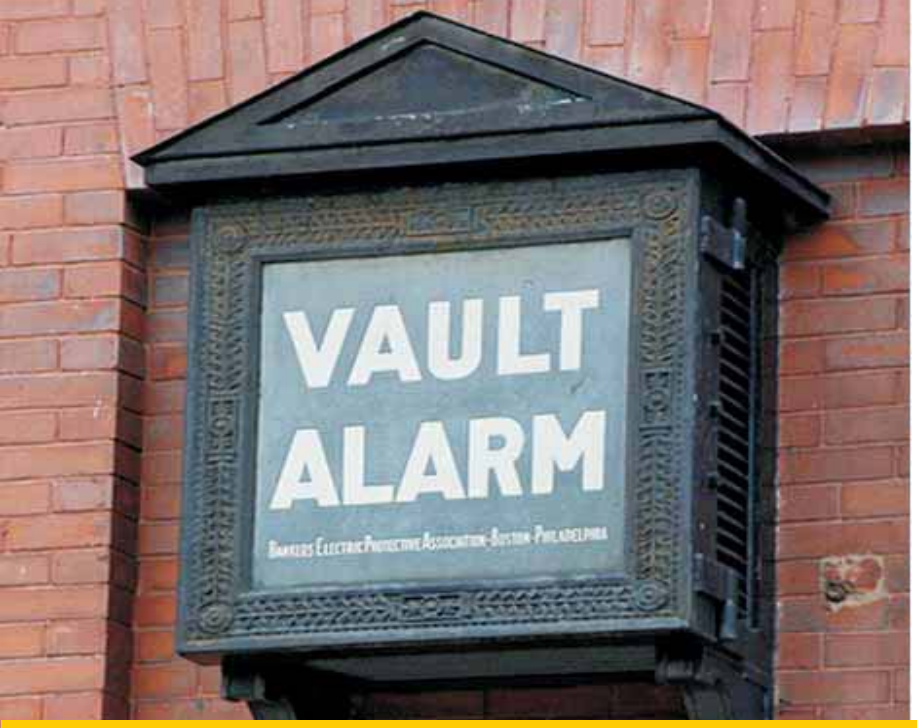
In this short article we have just touched the surface of the validation issues that can arise. However, a combination of (a) the "principles approach" towards monitoring and validation that we advocate and (b) careful consideration of all the potential problems that can arise, should enable experienced analysts to monitor their portfolios correctly and in a way that is meaningful to all stakeholders, statisticians and business stakeholders alike.


Alan Lucas

Alan has over 25 years experience in the area of retail credit risk management and credit risk modelling. He is recognised as an expert in the innovative use of data and statistical methods to solve business problems. He is a fellow of the Royal Statistical Society, has presented at many credit conferences, has credit and statistical papers published and has won one of the early Credit Today awards. Alan has worked for TSB/UDT, Scorelink, Barclaycard, Equifax and KPMG. Alan is currently a director of Rhino Risk Ltd. His recent work at Rhino Risk has been mainly related to Basel II, covering consultancy, audits, modelling and training, much of it for mortgage portfolios. Alan has a degree in mathematics.


Jon Hinder

Jon has over 15 years experience in the area of retail credit risk management. He has developed technical and strategic risk management solutions with a wide range of clients in the banking and retail lending Industry, and has in depth knowledge and experience of the regulatory framework, including Basel II. Jon has worked for LloydsTSB, Equifax, PricewaterhouseCoopers and he was one of the founding directors of Rhino Risk. Jon's work at Rhino Risk has covered consultancy, model validations, analysis and training. He has been the driving force behind Rhino Risk's LGD data sharing initiative. Jon has a degree in economics.



Recent Financial Crisis

Behavioral Shifts in Banking

While technological advances have transformed the face of banking, it has also led to behavioral changes resulting in the transition from utility banking of bygone days to the market driven banking of today.

The reasons for the 2008 financial crisis have been analyzed threadbare by many. It is not proposed, in this note, to try and add to this analysis. Instead, I wish to reflect on the much changed banking scene during the last 30 years essentially spanning my banking career - and the reasons which might have brought about that change. If the repeated crises faced by the banking industry is any guide, then one would be hard-pressed to argue that this change was for the better and contributed in a positive way to the developments of the financial markets and the needs of the society.

Banking of yore

Till the 80's banks operated largely like utilities, recycling capital from providers to users. This was done through branch networks that were essentially manned by career employees. Systems and authorities were well established and as compared to today were risk averse. Young employees were taught by experience, not to make bad loans and were in no doubt that were they to make a few bad loans, that would end any semblance of a career with their employer and potentially in the industry itself. Being considered a "sound and prudent" banker were hall-marks of success, often gained towards the end of a long career, typically within a single institution.

There were few investment banks then. The London financial market had merchant banks but they were primarily engaged in facilitating trade between the commonwealth and other emerging market economies.

Risk management systems were then primarily based on experienced officers leading the way in terms of knowing their client and developing an ability to smell problems. They were conscious that they had no mandate to lead their organizations down the path of taking higher risk and they were devoid of any concept about shareholder return. That was the domain of Boards, who were themselves somewhat laid back about this concept. Shareholders, who were largely individual, were content to receive a periodic payoff in the form of distributed dividends and as long as they felt reassured that their investment was safe, they were content.

Most banks had a relatively simple business model with balance sheets that reflected well matched spread of risks on both sides of the ledger.

The remuneration of bank executives reflected this "utilities type" business model and in the 80's few bank chiefs attracted seven figure remuneration, some did not even attract six figures!

Utility to Market Driven

All this began to change in the 90's when the thought that banks could be involved in greater part of the market for financial services, and indeed it was only natural that this should happen, began to be voiced. Bank strategists voiced a business chain involving financial products creators, whole sellers and distributors.

This was also the time when retail investors began to be attracted by the then nascent funds management industry based on the notion that professional fund managers were a better conduit to making investment in companies than the individual investors themselves, many of whom were not equipped to assess financial risks. The growth of such institutional investors in listed companies brought about an urgency in those companies to perform to market expectations. It was no longer sufficient that banks conducted themselves as utilities but had to now show a degree of dynamism that reflected in their share price performance. This brought about a dramatic change in management culture and behaviour. No longer were branch managers expected to behave as providers of a social service with a direct and often self believed responsibility for upholding the highest standards of ethics in their communities. Such old fashioned prototypes were replaced by the savvy business graduates, short on experience but long on presentation rhetoric. New thinking often led to attempts at cultural transformation from a staid bank to one that innovated to lead the market.

"The concept that risk could be taken off balance sheet and thus leveraged to overcome capital hurdles became an enormous creator of perceived value."

Daily conference between managers now discussed peer comparatives, and looked for differentiating factors that would drive superior financial performance. Individuals were assessed based on agreed performance criteria and their periodic evaluation.

This change from a utilities based culture to a market driven risk undertaking one was ironically assisted by the very institutions that were supposed to limit risks to an acceptable framework. Basel I and II provided "capital arbitraging" opportunities, the precursor to which were infact demonstrated in the spectacular failure of ENRON. The concept that risk could be taken off balance sheet and thus leveraged to overcome capital hurdles became an enormous creator of perceived value. There was, however, little recognition that such "value" creating activities led to a quantum increase in risk. Basel itself failed to recognize that the growth in the size of risks taken were themselves a factor in increasing the portfolio risks and was, therefore, an added element of risk that should have required increased capital. There was no capital impost for this additional risk. A number of institutions led by the majors were quick to take advantage of this opportunity to expand balance sheets and risks without the need to provide additional capital. For one, the 50% risk weight on self occupied mortgages and the lower capital requirements for off balance sheet items meant that banks could move on-balance sheets assets in to special purpose vehicles and then pretend that they had magically off loaded the risk, retaining of course vast amounts of fees they had earned. Regulators permitted this!

Whilst in the past banks sold their services through a network of branches manned by career employees, a new phenomena of outsourced sales came in to being. Bank agents, for a commission, began to market mortgages and other products. The model here was designed to gain volume which it did but in the process little attention was paid to risk. There is sufficient evidence to suggest that this situation led not only to mortgages being generated where clearly they should not have been, based on the risk taking ability of the mortgagor, but it also led to creativity on the part of the agents bordering on fraud.

"In a caricature of the typical well fed banker, you could almost imagine a bank being driven by outsourced activity, with the only activity not outsourced was the receipt of salaries and bonuses."

It almost appeared that banks were now outsourcing all aspects of their business : the creation of assets, the funding of assets and the technology that speeded up the process. In a caricature of the typical well fed banker, you could almost imagine a bank being driven by outsourced activity, with the only activity not outsourced was the receipt of salaries and bonuses. Banks ensured there was no leakage in this activity.

There were other well advertised behaviours that led to excessive risk taking. The creation of complex instruments linked to mortgages and the insurance of these by organizations such as the AIG were seen as a welcome development by the Regulators, which in their view, enabled the transfer of risks to those that had the capacity to manage them. As was seen subsequently, this belief proved to be singularly misguided. The tax payers had to finally bail out venerable institutions such as Citibank, UBS, Lloyds and the like from bankruptcy they who should have had the ability to manage risk were found seriously wanting in this endeavour!

The reasons for the change

So what were the reasons that led to such monumental behavioral changes in banking businesses in a remarkably short period such that they were transformed from a bunch of utilities like entities to multi-headed organizations that piled on risks as they grew.

These were:

- The change in their shareholders so that a large part of the shareholding now was with institutional shareholders who themselves believed that they were responsible to their principals for quarter by quarter improvement in performance.
- The origination of the concept of shareholder value creation taught to most business graduates that came to occupy positions of influence in banking institutions. Shareholder value creation was synonymous with growing earnings per share with little tangible relationship to measuring these with reference to risks. The accounting standards nor the rating agencies questioned such growth predicated on increased risk taking.
- Participation in share holder value so created by non-shareholders, that is, the managements of the banks themselves. Most banks that came to grief were found to be payers of large bonuses based on fees generated. If such fees were generated via the creation of complex products, so much the better, because that was seen as an example of creativity within the organization.
- These remuneration standards also led to a belief that the CEOs and top managers of banks were in fact owners of capital. They could take unhindered risks with few questions asked but, unlike owners of capital, they did not participate in any unfavourable consequence of their actions. Losses were not for them. But gains were theirs!
- The belief held by regulators that by allowing complex instruments to be created and derivatives to be traded, risks were somehow being transferred to those who could manage them proved grotesquely wrong.
- Macro factors such as the low interest rates that led to asset bubbles contributed to this unhindered risk taking by banks.

So are there any remedies that would ensure that we do not have a replay of these events, hopefully during the current but preferably the next generation too?:

"Shareholder value creation was synonymous with growing earnings per share with little tangible relationship to measuring these with reference to risks."

Clearly, return to the old Utilities structure of banking businesses is not a reality. Placing limits on growth (too large to fail etc) does not also seem realistic without saying to the shareholders that if they are seeking growth opportunities for their investment, then they had better look to other industries. Tightening the regulatory noose to such a level that it kills all creativity (back to the utilities model) is also not sensible nor feasible.

Regulation a panacea?

The answer to me lies in looking at the reasons for the way the banks behaved prior in this crisis. This behaviour, in my view, is inextricably linked to the compensation policies adopted by the banks. CEOs, top managers and traders of foreign exchange, commodities, risk instruments, the last often no more in their actions than like someone going to a casino with someone else's money to place a bet, behaved as if they were the owners of the capital of their businesses that could direct the capital to work as they chose without any consequence for their actions. Their Boards, in allowing this behaviour, singularly failed themselves to carry out their duties of governance. The fact that they acquiesced in such actions by management was itself not surprising, because these very Board members were often themselves CEOs of other organizations and engaged in similar behaviour as they were now expected to curtail!

There is a need for better regulation and perhaps even more capital in banking businesses but without a major change in bank compensation policies and attitudes to these, they will not amount to much. After all, the best regulating brains did come under the Basel umbrella and after much investigation did come up with Basel II. But the banks found a way of taking advantage of the regulations. They did this because it benefited the top echelons in the banks, driven by extreme greed, to devise ways to circumvent these regulations. Unless, therefore, compensation policies are linked to risk adjusted performance hurdles with the proviso that whilst positive action would reap rewards, destruction would lead to claw-backs that are over and above the compensation paid, bank behaviour will not change and indeed may again find ways to circumvent whatever new regulations are imposed on them.

"Banks having lost billions seem to have no difficulty arguing that any restriction on compensation will result in flight of quality of their staff."

Indeed when Basel III was under discussion, at least one of the major consulting firms was offering advice on how to mitigate the impact of increased capital requirements. Changing current compensation policies seems to be one of the few ways of changing behaviour and thus controlling risk. When your actions impact your own pocket, then you instantly become more circumspect in your actions.

Attempts to link compensation to long term performance have begun, rather more aggressively in Britain but they are resulting in serious resistance by the powerful banking lobby. Banks having lost billions seem to have no difficulty arguing that any restriction on compensation will result in flight of quality of their staff. Bankers seem to think it is no longer sufficient for them to earn a salary as a reward for going to work. This must be topped up by multi-million dollar bonuses! We have had a serious crisis where the tax payer has bailed out the banks. But this has in no way even marginally dented the compensation standards of banks. CEOs continue to earn large rewards, much in excess of those received by the ordinary shareholders they serve. This must change and without any fear for any potential flight of quality!

Jayant Yardi

Jayant Yardi has international banking experience of some 35 years. He has held senior executive positions with Grindlays Bank Group and the Australian ANZ Bank Group in India, the UK, the Middle East and Australasia. These positions were in diverse disciplines such as Group Strategic Planning; Global Treasury management; Group Risk Management, Investment Banking and Commercial Banking:

Following retirement from ANZ in 1998, Mr Yardi Promoted JYI Risk Management Services (JYI). JYI and Tata Consultancy Services developed a probability default model for Basel II application. The model algorithm was based on the pattern recognition technique

Mr Yardi is a Director of Surya Software Pvt Ltd , Bangalore which provides risk management products and services to the banking industry (www.surya-soft.com).

Mr Yardi is also associated as a Director with Yardi Inc a software company head quartered in the US with offices in most continents and which employs around 1500 staff globally.

Mr Yardi has an M.A. in Economics from the Cambridge University, UK. He has lived in Melbourne, Australia for the past 20 years.

Regulatory Update

CEBS has published its final guidelines on the application of Article 122a of the CRD

31 December 2010

The Committee of European Banking Supervisors (CEBS) has published its final guidelines on the application of Article 122a of the Capital Requirements Directive (CRD).

Article 122a of the CRD provides new requirements to be fulfilled by credit institutions when acting in a particular capacity, such as originator or sponsor, and also when investing in securitisations. These include retention on an on-going basis of a material net economic interest of not less than 5% (so called 'skin in the game'), due diligence and disclosure.

For more details, visit
http://www.eba.europa.eu/News--Communications/Latest-news/CEBS-has-today-published-its-final-guidelines-on-t.aspx

Capitalisation of bank exposures to central counterparties - consultative paper issued by the Basel Committee

20 December 2010

The Basel Committee issued a consultative paper on the Capitalisation of bank exposures to central counterparties.

The Committee's proposals relate to the capitalisation of bank exposures to a central counterparty - CCP - and, in particular, those related to the capitalisation of default fund exposures. The Committee is engaging in this consultation to give affected parties and interested stakeholders an opportunity to comment on the proposed rules set out in this publication.

For more details, visit
http://www.bis.org/press/p101220.htm

Final report on the assessment of the macroeconomic impact of the transition to stronger capital and liquidity requirements

17 December 2010

The Financial Stability Board (FSB) and Basel Committee on Banking Supervision (BCBS) concluded their assessment of the macroeconomic impact of the transition to the new bank capital and liquidity standards.

The assessment, produced by the joint FSB-BCBS Macroeconomic Assessment Group (MAG) in close collaboration with the International Monetary Fund, is summarised in the MAG's final report,

For more details, visit
http://www.bis.org/press/p101217.htm

Basel III: A global regulatory framework for more resilient banks and banking systems

December 2010

The Basel Committee issued the Basel III rules text, which presents the details of global regulatory standards on bank capital adequacy and liquidity agreed by the Governors and Heads of Supervision, and endorsed by the G20 Leaders at their November Seoul summit. The Committee also published the results of its comprehensive quantitative impact study (QIS). The rules text presents the details of the Basel III Framework, which covers both microprudential and macroprudential elements. The Framework sets out higher and better-quality capital, better risk coverage, the introduction of a leverage ratio as a backstop to the risk-based requirement, measures to promote the build up of capital that can be drawn down in periods of stress, and the introduction of two global liquidity standards.

For more details, visit
http://www.bis.org/publ/bcbs189.htm

Basel III - IIF Preliminary Analysis

December 16, 2010
The IIF Regulatory Affairs Department has undertaken a quick analysis of the final standards published by the Basel Committee on Banking Supervision (BCBS) on December 16. These two documents contain our initial assessment of the capital and liquidity standards, focusing in particular on what are the main issues and the most salient changes regarding the original proposals and the July and September 2010 decisions.

For more details, visit
http://www.iif.com/regulatory/article+936.php

CEBS has published its draft Consultation Paper on Guidelines on AMA changes (Cp45)

15 December 2010
The Committee of European Banking Supervisors (CEBS) has published a Consultation Paper on the Guidelines on AMA changes with the aim of assisting institutions using the Advanced Measurement Approach (AMA) to further develop their AMA models.

For more details, visit
http://www.eba.europa.eu/News--Communications/Archive/2010/CEBS-has-today-published-its-draft-Consultation-Pa.aspx

Operational risk - consultative papers issued by the Basel Committee

10 December 2010
The Basel Committee on Banking Supervision issued for consultation two papers on operational risk: Sound Practices for the Management and Supervision of Operational Risk and Operational Risk - Supervisory Guidelines for the Advanced Measurement Approaches. Sound Practices for the Management and Supervision of Operational Risk updates the Committee's 2003 paper on this topic. The principles outlined in the report are discussed within the context of three overarching themes: governance, risk management and disclosure.

For more details, visit
http://www.bis.org/press/p101210.htm

CEBS reviews the functioning of supervisory colleges

18 October 2010
CEBS has published its second peer review report on the functioning of colleges aimed at enhancing supervisory convergence by means of assessing the implementation of supervisory provisions set out in EU legislation, CEBS guidelines and other CEBS documents. The focus of the review was to highlight the methods used by supervisory authorities in the setting up and functioning of supervisory colleges as well as to identify good practices.

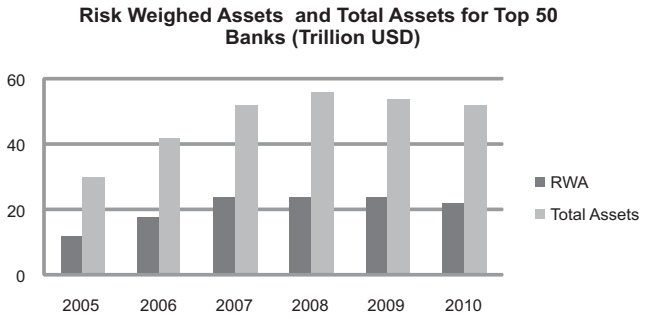
For more details, visit
http://www.eba.europa.eu/News--Communications/Archive/2010/CEBS-reviews-the-functioning-of-supervisory-colleg.aspx

Principles for enhancing corporate governance issued by the Basel Committee

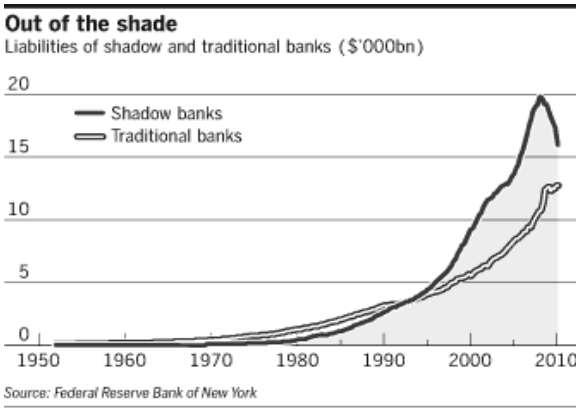
4 October 2010
The Basel Committee on Banking Supervision issued a set of principles for enhancing sound corporate governance practices at banking organisations. The Principles for enhancing corporate governance address fundamental deficiencies in bank corporate governance that became apparent during the financial crisis. The principles were first issued for consultation in March 2010. Comments received were highly supportive of the Committee's proposed corporate governance guidance.

For more details, visit
http://www.bis.org/press/p101004.htm

What the Numbers reveal?



From 2004 to 2009- total assets at the top 50 banks have increased at a more rapid pace than the risk weighted assets



Concerns rise as the growth of 'Shadow banks'or non banks like hedge funds, Commodities funds, Private equity groups and other money market funds overshadows the Banks

The Eleven in 2011

4 interesting dates:

- ⋆ 1.1.11
- ⋆ 11.1.11
- ⋆ 1.11.11
- ⋆ 11.11.11

Sum of 11 consecutive prime numbers:
2011=157+163+167+173+179+181+191+193+197+199+211

Finally, a prime number year 2011 . first since 2003

Take the last two digits of the year you were born and add them to the age you will be this year. The answer will be equal to 111

We wish you a very prosperous 2011

Infinite Wisdom

“There was a period of remorse and apology; that period needs to be over. We need our banks willing to take risks, to be confident and to work with the private sector in the UK to create jobs and improve economic growth”

Bob Diamond, in a rather aggressive mode at the Treasury Select Committee

“You can get false comfort from legal entity separation, and you can also create greater instability, and risk a failure to the extent that you undermine the resilience of the institution,”

Peter Sands rejects the theory that ring fencing would save banks

“The biggest opportunity for us is not necessarily to do more things, but to be Goldman Sachs in more places.”

Goldman Sachs CEO Lloyd Blankfein at the Bank of America Financial Services Conference

“If you look at the firms that came under pressure in that period ... only one ... was not at serious risk of failure. Even Goldman Sachs, we thought there was a real chance that they would go under.”

Goldman Sachs CEO Lloyd Blankfein at the Bank of America Financial Services Conference

“’Virtually every investment bank got too big. Virtually every investment bank drifted away from its core mission and took on too much leverage and risk, ultimately proving unable to either measure or manage that risk, especially in the volatile market conditions during the crisis”

Deutsche investment banking head Anshu Jain at a conference in Frankfurt

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We would love your feedback on this issue of exponent.
Please feel free to email us at the above address.

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