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Bandyopadhyay, Arindam and Saha, Asish

National Institute of Bank Management, India, National Institute of
Bank Management, India

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Assessment of Economic Capital: An Equity Market approach

-Dr Arindam Bandyopadhyay (Assistant Professor, Finance, NIBM)

-Dr Asish Saha (Director, NIBM)

Assessment of individual bank's need for economic capital will enable them to understand their actual solvency position for internal management of capital and evaluating the larger strategic issues like expanding or contracting its risk appetite to generate returns.

One important aspect of the role of capital in a deposit-taking institution is to protect depositors. This is the regulatory perspective, ensuring bank solvency, and thereby, safeguarding the health of the banking system. The Basel II accord stipulates the minimum level of capital required to achieve this objective and as such does not specify the optimum level "economic capital" required based on the 'true risks' of any particular bank. Economic capital generally does not equal cash capital or book capital or regulatory capital. By definition, Economic capital is the cushion available to a bank to absorb both expected and unexpected losses arising out of its business profile. Determining economic capital for a bank is a complex and difficult process in view of its diverse nature of its business and hence its risk profile.

We have followed a "distance to default" approach - a market based risk measure to find the economic capital or solvency for Banks. The "distance to default" is a market-based risk measure specifically tailored to banks, which are subject to statutory capital-adequacy requirements (first introduced by Financial Stability 2004). Bank's distance to default measures the difference between the estimated market value of the assets and the total liabilities (the critical value), scaled by the standard deviation of the assets' market value. Economic capital can be compiled on the basis of accounting and equity-price data in an

option price framework (see Table 1 as an illustrative example). The market value of asset (MVA) and volatility of the asset of a bank are not known (or implicit), but are estimated on the basis of accounting and equity-price data in an option price model (Black and Scholes 1973 and Merton, 1974) in which the share capital is seen as a call option on the company's (here bank) assets. A popular implementation of the model is the commercial KMV model of Moody's. Bank's distance to default (DD) measures the difference between the estimated market value of the assets (MVA) and the book value of total liabilities (BVL), scaled by the standard deviation of the assets' market value. The distance to default illustrates the market's assessment of the probability that the bank will be able to honor its fixed liabilities (subordinated tier II debt, borrowings and all deposits). It measures the changes (in number of standard deviations) in the market value of the assets that can be accommodated within the bank's buffer. Hence, it can be used as a measure of bank solvency.

In essence, this is a top down approach to estimate the level of capital that a bank requires to operate its business successfully with a desired 'target reputation' in the market. If the equity price of a bank is increasing while the volatility in its equity price is declining, this can be interpreted as the market expectations of a better solvency status of the bank. It effectively means that the bank's cash flow is stable, its implicit return on market value of asset is also stable and hence the bank's solvency is also very high. The experts always suggest that the relevant measure of risk for determining capital adequacy is the volatility of a bank's 'cash flow' and not the volatility of its 'book or regulatory capital'. Viewed in this perspective, the capital allocation to individual business units of the bank should correspondingly be based on the its contribution to the overall volatility of the bank's cash

flow. It needs however to be kept in mind that market-based risk measures (e.g. distance to default or insolvency) can change significantly within a short space of time.

[Insert Table-1]

The bank in our exercise (reported in Table 1) has distance to default 3.67 which corresponds to 99.99% confidence level about its solvency. That means the bank is having enough capital (economic capital) to be able, with a probability of 99.99%, to absorb fluctuations in the market's assessment of the value of the assets with this capital. Such confidence about its solvency may earn him a rating of AAA in the market for the year 2006-07. We also find that this bank's need for economic capital (as a ratio of risk weighted assets) is 11.90% which is above its tier I percentage (9.36%).

We have derived the distance to default and estimates of economic capital for 14 Banks in India for the year 2006-07 (See Chart 1). It can be seen that the distance to default (DD) estimates for 14 banks in the study ranged from 2.1% to 3.67%. These 14 banks are Bank of Baroda, Andhra Bank, Allahabad Bank, Bank of India, Bank of Rajasthan, Federal Bank, Dena Bank, Syndicate Bank, HDFC Bank, ING Vysya Bank, ICICI Bank, Bank of India, State Bank of India and Kotak Mahindra Bank. It is important to note that a DD range of 3 to 3.5 fetches AA to AAA rating for a bank in the market. Similarly, DD of 2 gives it A rating and DD range between 1.5 to 1.7 corresponds to BBB solvency rating in the market. Our computation suggests that there are banks which are under capitalized in terms of its inherent risk profile i.e. their economic capital has been lower than the supervisory requirement of 6% as tier I % under Basel II. There is therefore a clear possibility of 'capital arbitrage' opportunity for these banks which is detrimental to the interest of financial stability.

We have mapped solvency status of two banks which had capital problems during year 2004 (erstwhile Global Trust Bank), 2006 (erstwhile United Western Bank) and finally had to be merged through regulatory interventions with Oriental Bank of Commerce and IDBI Ltd respectively as a bail-out option in the interest of the depositors. Our market based measures reveals that (Chart 2 and Chart 3) the DD estimates of these banks sharply came down to a dangerously low level (it became negative for GTB in year 2000 and below 1.5 for UWB in year 2005).

[Insert Chart 1, Chart 2 and Chart 3 Here]

Email to Authors: arindam@nibmindia.org, director@nibmindia.org

Table 1
Market Based Economic Capital Computation for a large PSB for year 2006-07

Variable	Value	Methods
Market Value of Equity	Rs. 42,718 Cr	(Share Price)x(Share Outstanding)
Book Liabilities	Rs. 4,94,161 Cr	Balance Sheet
Market Value of Assets	Rs. 5,48,488 Cr	Option-pricing model
Asset Volatility	2.70%	Option-pricing model
Distance to Default	3.67	Ratio: $(5.4849 - 4.9416) / (2.7\% * 5.4849)$
Solvency Rating	AAA	
Economic Capital %	11.90%	
Tier I %	9.36%	

Note: The economic capital % is an estimate of the market's assessment of the need for economic capital of the bank as a ratio of risk weighted assets. The solvency rating is obtained from our own calculations.

Chart 1 Distance to Default of Fourteen Indian Banks: Projections till 2007

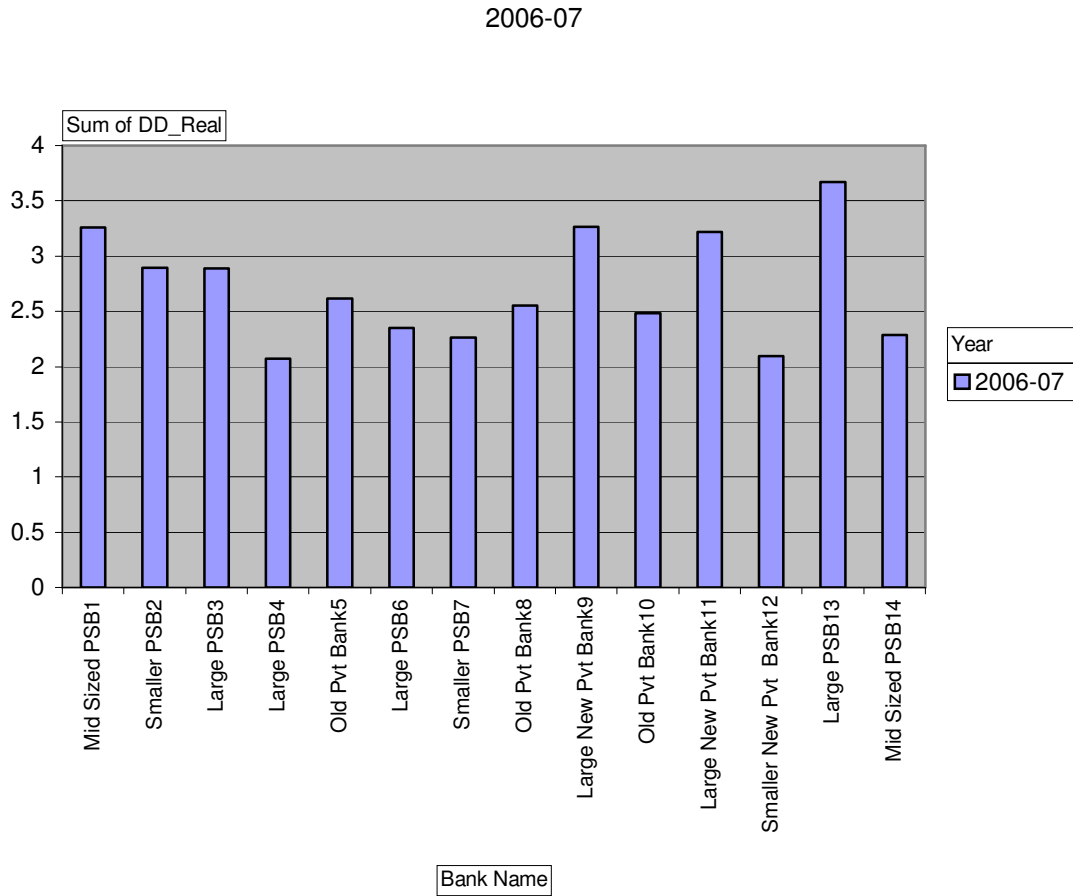


Chart 2

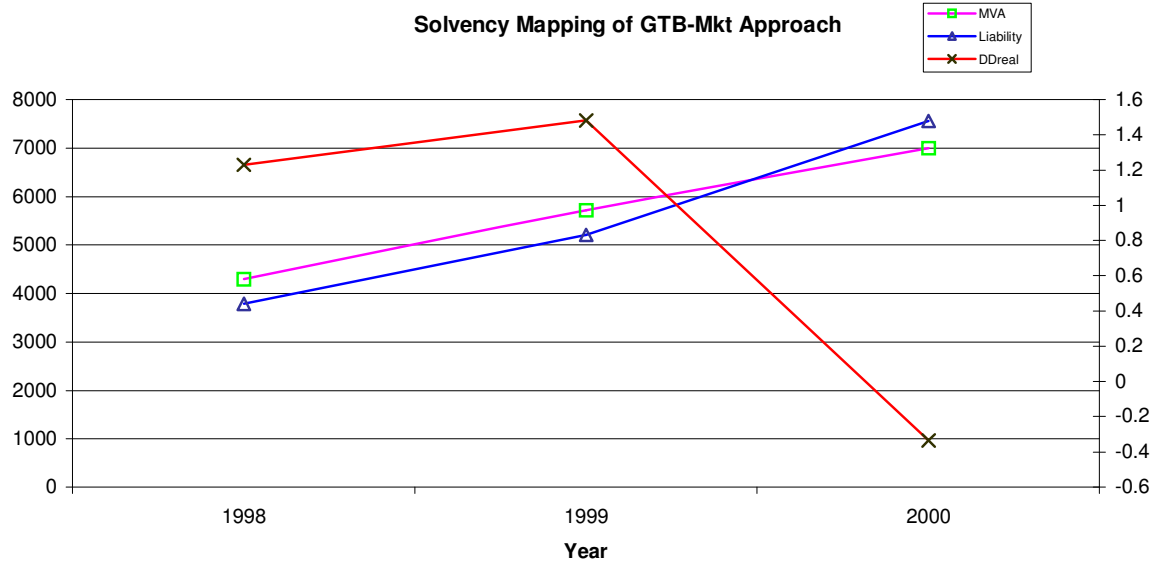


Chart 3

