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RELEVANCE OF RISK INDEX FOR INDIAN BANKS –
A STUDY OF GLOBAL TRUST BANK

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ABSTRACT

The Insolvency Risk Measure

If we want to capture the overall risk of a bank, the variability of Return on Assets, ROA provides a comprehensive measure that reflects not only credit risk but also interest rate risk, Liquidity risk, operating risk, and any other risk that is realized in bank earnings. The standard deviation of ROA is a good measure of the variability of ROA. Combining ROA, Capital to asset ratio (CAP), and the standard deviation of ROA provide the risk index.

KEYWORDS :*Indian Banks , Global Trust Bank , Liquidity risk, operating risk.*

INTRODUCTION

From a regulatory discipline, Z risk Index is a comprehensive measure of bank insolvency risk exposure because it captures the impact of capital. It was developed by Hannan & Hanweck (1988) and has been employed by Liang & Savage (1990), Eisenbeis & Kwast (1991), Boyd et al, (1993), Sinkey & Nash (1993), Nash & Sinkey (1997), Kwan & Laderman (1999), Ahmad et al. (2005), Beck & Leaven, (2006). Blasko & Sinkey Jr. (2006), and, Pankaj et al, (2009). Theoretically, Hannan and Hanweck (1988) hypothesize that insolvency occurs when current losses exhaust capital, thus, the probability of insolvency (Zrisk) can be is expressed as follows:

Risk Index, Z
= {Return on Asset (ROA) + Capital to Asset Ratio (CAP)}/ Standard Deviation of ROA
**= {ROA+CAP}/ σROA**

Where, Return on Assets (ROA) = Net Income / Average of Total assets
Capital-to-Asset Ratio (CAP) = Equity / Total Assets

Risk Index, expressed in units of standard deviations of ROA, is a measure of how much a bank's accounting earnings can decline until it has a negative book value. It is even referred to as the distance-to-default.

ROA, the most widely accepted accounting measure of overall bank performance, the variability of ROA   which is a standard measure of risk in financial economics, and book capital adequacy which represents an industry standard for bank safety and soundness.

The Determinants of the Probability of Insolvency
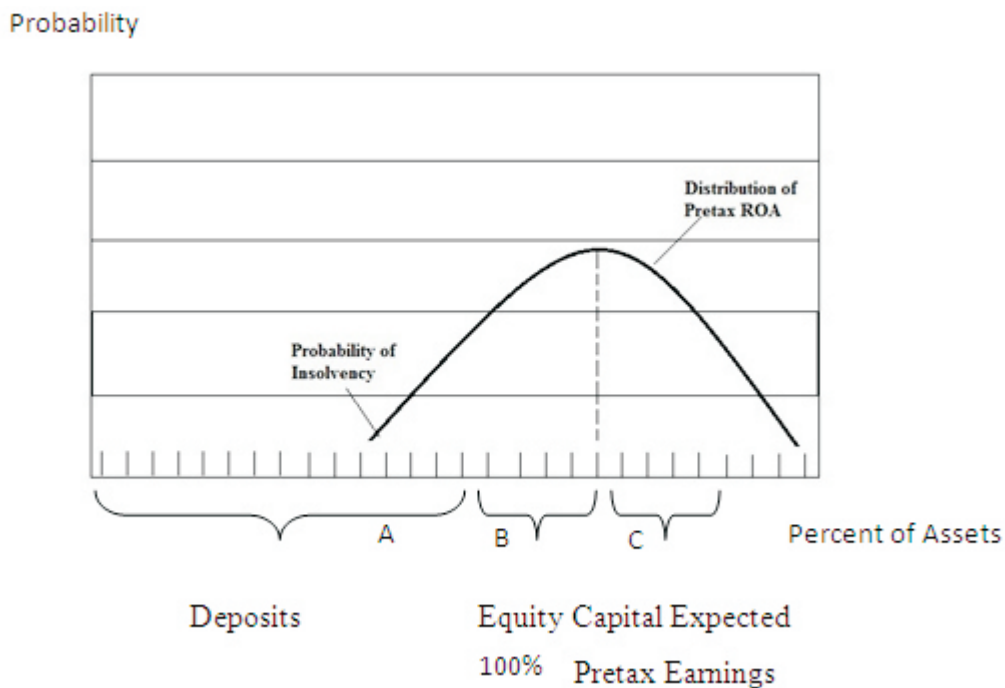
(Source: Ralf C. Kimball, "Specialization, Risk & Capital in Banking", New England Economic Review, November/December, 1997 pp. 63)

The relationship between Z and the probability of book-value insolvency is shown graphically in above Figure. The horizontal axis is denominated in terms of percent of total assets. The distance OA represents the ratio of deposits to assets, while the distance AB represents the ratio of equity to assets. Their sum, represented by OB, represents 100 percent of assets. The distance BC represents the expected pretax return on assets, approximated by the historical mean of pretax return on assets (ROA). The normal distribution with mean BC represents the potential variation in pretax ROA around the expected value. Book insolvency occurs when operating losses exceed the bank's equity capital and is represented by the shaded area under the normal curve to the left of A on the horizontal axis. In graphic terms the Z-score is simply the distance AC divided by the standard deviation of the distribution of ROA, and represents the decline in pretax ROA, measured in units of the standard deviation of ROA, that can occur before insolvency follows. The greater the amount of equity capital and the higher pretax profit margins are relative to the variation in ROA, the smaller the probability of insolvency.

Probability of Insolvency & Z-Score

Hannan & Hanweck (1988) explained their derivation of the risk index by pointing out that insolvency for banks occurs when current losses exhaust capital, or equivalently, when the return-on-assets is less than the negative capital-asset ratio. They go on to show that the probability of insolvency is:

$$p = \frac{1}{2}[ROA/(ROA+CAP)^2]$$

The 1/2 in this inequality accounts for the fact that failure occurs only in one tail of the distribution. If profits follow a normal distribution, then the risk index is the inverse of the probability of insolvency. It measures the number of standard deviations that a bank's return- on-assets has to drop before its equity is wiped out (Beck & Laeven, 2006). Because of this relationship, the risk index is sometimes referred to as the probability of failure (Kwan & Laderman, 1999). Even if returns on assets are not normally distributed, the risk index is still useful for relative comparisons (Boyd et al, 1993). It likely underestimates the true probability of bankruptcy since it specifies failure only if a one-period loss exceeds a bank's total capital. Realistically, however, a bank could experience losses on a much smaller scale and still experience liquidity problems, creditor runs, or regulatory interventions, any of which could precipitate bankruptcy (Boyd & Graham, 1986).

The probability of book value insolvency, p, expresses the probability of book value insolvency which significantly differs from market value solvency. In terms of RI, Z

$$P = 1/[2 Z^2]$$

For each Z-score, there is a corresponding probability of book insolvency. As shown in Fig-6.2, the relationship between a bank's Z-score and its probability of book-value insolvency is inverse, with higher Z-scores corresponding to lower probabilities of Insolvency. Moreover, the relationship is nonlinear, so that equal incremental improvements in Z result in smaller marginal declines in the probability of insolvency. For example, an improvement in the Z-score from 5.0 to 10.0 results in a decline in the probability of insolvency from 2.0 percent to 0.5 percent, a decline of 1.5 percentage points, while an equal improvement in the Z-score from 10.0 to 15.0 results in a decline in the probability of insolvency from 0.50 percent to 0.22 percent, or only 0.28 percentage points.

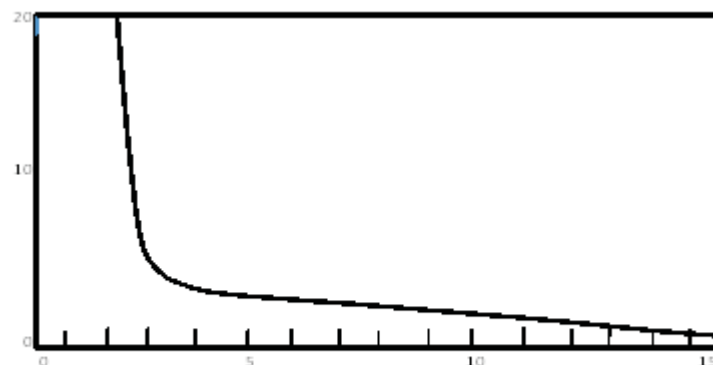## Probability of insolvency and the Z-Score

Fig 6.2: Probability of insolvency and the Z-Score

(Source: Ralf C. Kimball, "Specialization, Risk & Capital in Banking", New England Economic Review, November/December, 1997 pp. 63)

Relevance of Risk Index for Indian Banks

The framework developed by Hannan and Hanweck(1988), was tested for applicability in the Indian banks by Pankaj et al. (2009) for Global Trust Bank that became insolvent in 2004 suggest that the framework of Risk Index is also relevant in the Indian context.

Bankruptcy is a situation in which an organization falls short of cash to repay its debt or has liabilities that exceed its assets.

The Company Law Board treats insolvency in a slightly different manner. When over 50 per cent of a company's net worth is washed away, making it impossible to repay debts, the company declares itself potentially 'sick' and BIFR (Board for Industrial and Financial Reconstruction) begins the process of finding out if the company can be rehabilitated.

A case in point is Global Trust Bank. The bank became sick with huge bad debts in 2004 However; the RBI managed the crisis by merging it with Oriental Bank of Commerce. Pankaj et al. (2009) applied the frame work to Global Trust Bank for the year of 2003, and they got the Risk Index, Z-Statistic for Global Trust Bank as 1.93, which is much less than the survivors Risk Index found during the study conducted on the banks in New England. Hence the framework is relevant in the current scenario.

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