

Інноваційний фінансовий ризик	Непередбачена нестача фінансових засобів щодо витрат на розвиток нових технологій
Криміногенний ризик	Погіршення криміногенної обстановки в країні

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A regulator's view on the usefulness of the z-score as an indicator of bank default risk

The stability of the financial system and identifying ways to improve its resilience against external shocks is a key concern for regulators. Individual large banks failures can have strong negative consequences for overall economic stability through contagion of other financial institutions.

Since today's international financial markets are much more integrated as they were even a few decades ago, regulators in particular are seeking to further develop methods to assess near-term banking system stability. Stress tests and other scenario based approaches have become the norm after the recent financial crisis. Through the implementation of the Basel III regulatory framework and its influence on national laws, accounting ratios have become an integral part of regulatory compliance evaluation and bank default risk.

The problem this article investigates is whether a simple financial ratio based on accounting data, in this case the z-score, can be used as an indicator of default probability in the Ukrainian banking sector. For this, historical financial data for performing and insolvent banks is compared to find if there are significant differences between the two groups regarding their z-scores.

Method used in this research is the z-score - a statistical metric proposed by Hannan and Hanweck [1] and Boyd and Runkle [2]. It is calculated by adding a company's current capital asset ratio to its mean return on assets and dividing the resulting sum by the standard deviation of its return on assets.

The z-score measures the number of standard deviations of return on assets (ROA) required to use up the bank's current equity, the point of insolvency [3].

The z-score can be easily transformed into a default probability. Lepetit and Strobel [4] use Cantelli's lemma to derive the upper bound of the insolvency probability which is utilised for the measurements in this article. The z-scores are calculated using quarterly National Bank's of Ukraine accounting data for the banking sector. The data set covers 252 banks for a period between July 2007 and October 2015, i.e. 34 quarters.

Following Lepetit and Strobel [4], ROA mean and standard deviation estimates for individual banks are calculated across the complete sample period available, resulting in less variation, and the capital asset ratio (CAR) is derived at every quarter end.

To calculate individual z-scores and resulting default probabilities for each period, net income for the past 12 months period and banks' individual total assets and total equity at the end of each available quarter were collected. This resulted in a total of 5,696 observations. The 252 banks were then divided into two groups, those which were declared insolvent during the observation period (90 banks) and those with continuing operations (162 banks).

Reviewing the z-scores measured for both groups, there is a clear evidence that the group of failed banks has, on average, significantly lower z-scores than the group of performing banks, which translates into higher default probabilities. The average of the median z-scores for insolvent financial institutions over the observed 34 quarters is

3.02 across the observation period, implying an upper bound for the default probability of 9.9% (N=1,896 observations) while the average median z-score for performing banks is 17.26 indicating an upper bound for default probability of only 0.3% (N=3,800).

However, large in-sample standard deviations can be observed for individual banks. This leads to average z-scores being higher for both groups compared to the median, with average z-scores across the observation period at 45.92 for performing banks (0.0% upper bound for default probability) and 22.05 for insolvent banks (0.2%).

In conclusion, the results demonstrate that using the z-score is a very useful method to monitor insolvency risk among financial institutions. The metric is easy to calculate and based on widely available accounting data. However, any preliminary screening of z-scores should be complemented with an in-depth analysis of a bank's individual financial position, considering the large in-sample volatility observed. Given the infrequent nature of financial reporting with often only four data points per year, market-based data, where available, could allow to form a more immediate picture of a bank's financial health.

References:

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