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Research Paper

Anticipation of Financial Crisis in Banks by Structural Equations Model[1]

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INTRODUCTION

The Iranian economy has a bank-oriented structure, and different economic sectors are mostly financed by the money market. Financial distress is one of the most important problems in banks. The undeniable effects of a banking crisis on the economy and the need for anticipating the crisis before its occurrence remind us of the necessity of having a model for anticipating banking crises. Current models mostly rely on financial statement data and ignore different aspects of the crisis. Therefore, these models are incomplete and cannot provide an accurate anticipation of banking crises. The aim of this study is to provide a comprehensive model that includes all the effective variables on banking crises so that we can better anticipate them.

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In the current theoretical literature, researchers such as Kurniasih (2021), Paule-Vianez et al. (2020), and Climenta et al. (2018) have focused on the impact of liquidity risk and capital adequacy on financial distress in banks. Meanwhile, Paule-Vianez et al. (2020) and Ahmadyan & Gorji (2017) have examined the impact of profitability and credit risk, Zarei & Komijani (2015) and Moshiri & Nadali (2013) have explored the influence of economic growth and interest rates, and Poghosyan & Cihak (2011) have investigated the contagion effect and parallel markets. Additionally, Kurniasih (2021) has studied the impact of corporate governance on financial crises in banks. However, the existing models primarily focus on a single dimension, with the most important variables being related to financial ratios of banks, while other factors have been overlooked. Therefore, it is necessary to develop a model that takes into account all the variables that affect banking crises.

MATERIALS AND METHODS

We employed a quantitative method in this study. The research process involved the following steps:

1. We conducted a thorough study of important texts to identify the factors that contribute to banking crises.
2. Subsequently, we developed the research model using structural equation modeling and the Smart PLS software.
3. To determine the predictive power of the proposed model in distinguishing between healthy banks and distressed ones, we utilized artificial neural networks and the SPSS version 27 software. This involved a three-stage process, which included using theoretical literature, model development, and model accuracy testing. Through this process, we identified the effective factors in crisis forecasting and developed the research model.

RESULTS AND DISCUSSION

As depicted in Figure 1, the significance of all path coefficients confirms the influence of financial, non-financial, industry, and macroeconomic factors on financial distress in banks. Consequently, the main research question, "What factors are effective in predicting financial distress in banks before it occurs?" has been answered.

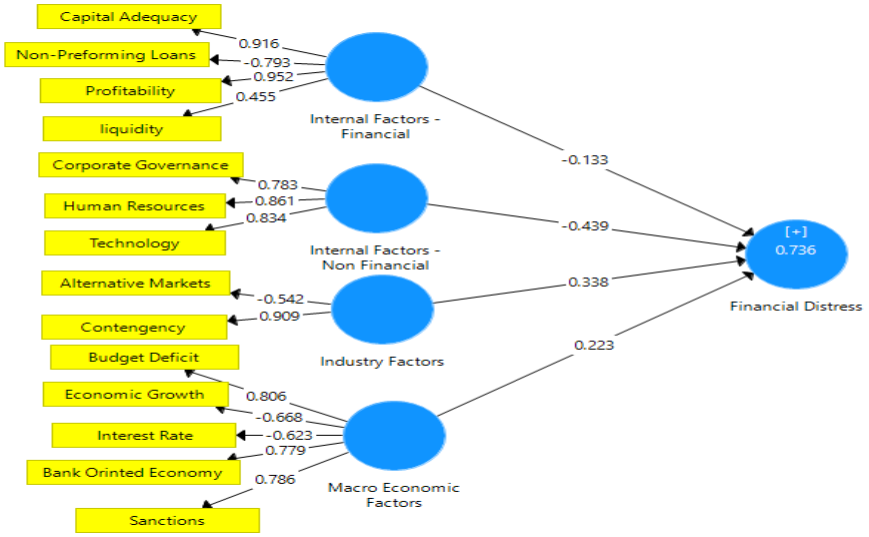

Figure 1. The final research model

After identifying the factors affecting the crisis, artificial neural networks were employed to validate the model. Table 1 demonstrates that artificial neural networks successfully predicted the healthiness or distress status of banks using the developed model. In the training phase, 105 cases of healthy banks/years and 47 cases of distressed banks/years were accurately classified. Similarly, in the testing phase, 24 cases of healthy banks/years and 14 cases of crisis banks/years were correctly classified with 100% accuracy.

Table 1. The accuracy of the model in predicting the financial distress

		Predicted		
Sample	Observed	.0	1.0	Percent Correct
Training	.0	105	0	100.0%
	1.0	0	47	100.0%
	Overall Percent	69.1%	30.9%	100.0%
Testing	.0	24	0	100.0%
	1.0	0	14	100.0%
	Overall Percent	63.2%	36.8%	100.0%

Dependent Variable: Financial Distress

CONCLUSION

The results of the research indicate that financial variables, internal non-financial variables, banking sector variables, and macroeconomic variables contribute to bank distress. The most significant factors in anticipating bank distress are human resources, corporate governance, liquidity, and capital adequacy. Additionally, the model successfully distinguished between distressed and healthy banks in both the train and test groups, achieving a precision rate of 100 percent. By identifying the key factors that lead to banking distress, this model can serve as a tool for bank managers and central banks to implement preventive and corrective actions.

Keywords: Financial Crisis in Banks, Crisis Anticipation Model, Structural Equations Model, Artificial Neural Networks.

JEL Classification: G21, G33.