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# Analyzing Bankruptcy Risk and Economic Correlation in a Regional Bank: A Study on Bank Nagari

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**Abstract**
Bankruptcy can cause uncertainty in financial markets and weaken the confidence of economic actors which leads to a slowdown in economic growth. The purpose of this study is to determine the health of regional banking through analysis and in-depth study in the late COVID-19 pandemic and early New Normal periods. The object of research is Bank Nagari. The research method used is a descriptive method sourced from public financial data. The results of this analysis show that Bank Nagari is in a state of bankruptcy. However, Bank Nagari remains in growth and shows an increase in operating profit. The correlation between bankruptcy value and GRDP was also further analyzed. The results show a value of 0.156 which means that the two variables do not have a significant relationship with each other in the period used. Bankruptcy can be one of the components that can affect the economic growth and stability of a country. Therefore, effective banking supervision and management is essential to maintain banking sector stability and promote healthy economic growth.

**Keywords**
Bankruptcy, correlation analysis, COVID-19 pandemic, GRDP, regional banking

## INTRODUCTION

Indonesia's economy has been severely affected by the COVID-19 pandemic, as have many countries around the world. Some of the key impacts include economic shifts, increased unemployment rates, and decreased business activity. Many businesses, especially in the services sector such as tourism, hospitality, and culinary, have seen a significant drop in the volume of operations (Al-Fadhat, 2022; Negara & Sugiana, 2022; Zainul, Hanani, Kustiono, Syafrial, & Asmara, 2021). The pandemic disrupts long-term planning and decision-making due to increased uncertainty. To deal with the economic impact of the pandemic, the Indonesian government has issued fiscal stimulus, support for specific sectors, and mass vaccination programs (Herlina, 2020). Nonetheless, economic recovery remains a challenge, and the circumstances of the pandemic continue to change, so there is uncertainty. Indonesia's economic recovery is expected to achieve a more stable growth rate.

The regional banking sector in Indonesia, including regional and local banks operating at the provincial or city level, has been severely affected by the COVID-19 pandemic. Regional banks must continue to observe and change their strategies to address these challenges as the uncertainties and changes that

occurred during the COVID-19 pandemic affect the regional banking sector in Indonesia (Karina & Soenarno, 2022; Reynaldi, 2022). The impacts include a decline in asset quality, profits, liquidity, and availability of funds. By providing local businesses and individuals with the credit and financial support they need, these banks can also play an important role in driving local economic recovery (Murti, 2021).

Bank Nagari is based in West Sumatra and operates in Indonesia. The bank has been helping the economy of West Sumatra and beyond since its establishment in 1962. In the Minangkabau language, "Nagari" refers to a village or neighborhood. The West Sumatra Provincial Government owns Bank Nagari. Bank Nagari offers a range of banking products, including savings, current accounts, deposits, loans, and other banking products. In addition, they serve individual customers and business and corporate segments. To achieve their goals of local economic development and community welfare, they work closely with the local government, businesses, and communities (Wahyudin, Wira, & Lubis, 2022). Unfortunately, the pandemic increases credit risk as many companies and individuals in West Sumatra struggle to meet their obligations. This may impact the profitability of banks.

Bankruptcy analysis of banks is an important measure undertaken for various important purposes, mainly to supervise and maintain the stability of the banking industry as well as to protect the interests of account holders as well as the overall stability of the economy. Bankruptcy analysis also helps oversee the stability of the financial system as a whole. Regulators and bank supervision agencies can stop problems before they get worse. Some of the methods used to analyze corporate bankruptcy include Springate (S-Score)(Ekonomi, Manajemen, Universitas, & Jambi, 2019; Febrianti & Munandar, 2021), Altman Z-Score Model (Kamaluddin, Ishak, & Mohammed, 2019; Loppies, Esomar, & Turukay, 2020) and Zmijewski Model (Hertina, Kusmayadi, & Yulaeha, 2020; Muzanni & Yuliana, 2021). The Zmijewski model includes more variables than simpler bankruptcy models such as Springate (S-Score) and Altman Z-Score. This may make it more sensitive to changes in a company's financial performance. In addition, the Zmijewski Model is intended to be used as a more dynamic analytical tool, which can be adapted to the company being analyzed and allows it to show changing conditions over time (Hertina et al., 2020; Muzanni & Yuliana, 2021; Supitriyani, Astuti, & Azwar, 2022).

While previous studies on bankruptcy prediction in the banking sector have predominantly examined national banks or publicly listed companies, there has been limited attention to regional banks. This creates an important research gap, considering that regional banks serve as primary financial intermediaries for local governments, SMEs, and community development projects (Radovanovic & Haas, 2023). Their financial health directly influences regional economic resilience, yet academic inquiry into their bankruptcy risks remains scarce. By focusing on Bank Nagari, this study adds a new dimension to the literature on banking distress and local financial stability.

In this study, an analysis of regional banking bankruptcy was carried out at the end of the Covid 19 Pandemic and the beginning of the New Normal using the Zmijewski model. The object of this research is PT Bank Nagari. This study also investigates the correlation between bankruptcy variables and the growth rate of Gross Regional Domestic Product (GRDP) in the West Sumatra region. The contribution of this research is to provide a systematic line of thought in the analysis of bankruptcy that has an impact on the regional economy.

## LITERATURE REVIEW

### Zmijewski model

The Zmijewski model is a model used to predict the potential bankruptcy of a company. This model was developed by Ron Zmijewski in 1984. This model uses financial ratios as predictors of potential bankruptcy and has become one of the recognized models in bankruptcy analysis. The model uses financial ratios such as profitability, liquidity, leverage, and activity to identify signs of bankruptcy. The use of the Zmijewski Model helps banks, investors, and market observers to identify credit and financial risks in the companies they invest in or finance.(Armenda & Hertina, 2023). The formulation of this model is as follows:

$$\text{Zmijewski Model} = -4.877 + 1.016X1 + 6.184X2 + 1.343X3 + 3.451X4 \quad (1)$$

Where:

Zmijewski Model is the bankruptcy score generated by the model.

X1 is Earnings Before Interest and Taxes (EBIT) normalized to Total Assets.

X2 is Retained Earnings normalized to Total Assets.

X3 is Working Capital which is normalized to Total Assets.

X4 is the Market Value of Equity which is normalized to Total Liabilities.

**Table 1. The "Cut off" Value for the Zmijewski Model (Mahardika & Setyawan, 2022)**

| No | Zmijewski (X-Score) | Zone Discriminant |
|---|---|---|
| 1 | X > 0,5 | Bankrupt |
| 2 | X < 0,5 | Non-Bankrupt |

Various models have been widely used to predict bankruptcy, including the Altman Z-Score, Springate S-Score, and Grover model. While the Altman model remains popular, its design was primarily intended for manufacturing and publicly listed firms, limiting its applicability to financial institutions (Febrianti & Munandar, 2021). The Springate model, though simple, lacks sensitivity to complex balance sheet structures typical in banks (Mahardika & Setyawan, 2022). In contrast, the Zmijewski model incorporates profitability, leverage, and liquidity ratios, making it more suitable for institutions with high leverage and market-based exposures such as banks (Hertina et al., 2020; Armenda & Hertina, 2023). Therefore, this study applies the Zmijewski model as it provides a more comprehensive reflection of the financial distress risk in regional banks.

### Gross Regional Domestic Product (GRDP)

GRDP is an important economic measure for evaluating the economic health of a region, state, or city. It is a measure that reflects the total value of goods and services produced within a region or area in a given period, usually one year (Huda, 2020). This includes all economic activity in the area, both by its residents and by people working outside the area.

The two main components of GRDP are Current GRDP and Constant GRDP. Constant GRDP measures the value of a region's economy in a particular base year price, which is used to remove the effects of inflation and provide a picture of the real growth of the economy. The Current GRDP measures the value of the economy in current prices, reflecting price changes and inflation each year. GRDP is used to compare economic prosperity between different regions and find areas that are growing rapidly or contributing heavily to the local economy. GRDP is also used to calculate economic growth rates, unemployment rates, and per capita income (Mulia, 2022).

### Linking Bankruptcy Risk and Regional Economic Performance

While bankruptcy analysis and GRDP are often treated as separate domains—microeconomic financial health versus macroeconomic output several studies have argued for a dynamic interaction between the two (Haq, Wati, & Istianda, 2023; Isyandi & Trihatmoko, 2022). Bank insolvency can diminish credit availability, affect business continuity, and weaken consumer confidence, all of which contribute to a contraction in regional economic activity. Conversely, regions experiencing rapid GRDP growth may exhibit stronger financial resilience due to higher demand for banking services and reduced credit risk.

Despite this theoretical linkage, empirical evidence on the correlation between banking distress and GRDP remains mixed. Some studies suggest a lagged or indirect relationship, especially in emerging economies where financial depth is limited. This study seeks to empirically test that relationship in the case of Bank Nagari and the West Sumatra GRDP during the post-pandemic transition period, contributing to the literature by contextualizing the micro-macro dynamics in regional financial stability (Zhu et al., 2023).

### Financial Intermediation and Regional Economic Growth

Recent literature emphasizes the critical role of financial intermediation in promoting economic stability and development. Financial intermediaries, particularly banks, reduce transaction costs, manage liquidity risks, and facilitate the efficient allocation of capital, which in turn supports long-term growth (Konstantakopoulou, 2023). A resilient banking system enhances the ability of regional economies to withstand shocks, ensuring that savings are mobilized and redirected into productive investments, even during periods of crisis (Bastan, Tavakkoli-Moghaddam, & Bozorgi-Amiri, 2024).

In the context of regional development, the health of local banks has direct implications for Gross Regional Domestic Product (GRDP). Studies highlight that inclusive access to financial services—driven by local banks—strengthens small and medium enterprises, increases household consumption, and improves regional competitiveness (Shen et al., 2023). Evidence from community banking research further indicates that localized banking institutions stimulate household spending and local economic multipliers, thereby enhancing regional growth prospects (Ding, Shi, & Hao, 2022). This theoretical foundation

suggests that the solvency and operational health of regional banks are not only indicators of financial system stability but also fundamental drivers of regional economic resilience. Therefore, examining the relationship between financial distress in regional banks and GRDP provides an important perspective on how financial intermediation interacts with regional economic development.

## RESEARCH METHOD

The method used in this research is the descriptive method. Descriptive research can be understood as a research method in which the author seeks to describe the subject or object under study in a more in-depth, detailed, and extensive manner (Anonim, 2020; Engel, 2019). The data in this study comes from public data, namely Bank Nagari's quarterly financial reports starting from Quarter 1 2022 to Quarter 2 2023. This data comes from the OJK (Financial Services Authority) website. In addition, West Sumatra GRDP in the same period was taken from the website of the Central Bureau of Statistics (BPS). The conceptual framework of this research can be seen in Figure 1.

This research focuses on the business situation of Bank Nagari in the late COVID-19 pandemic and the new normal period. This study analyzes the financial risks that occurred during this period. Bankruptcy analysis on Bank Nagari using the Zmijewski model is applied. The decision to use the Zmijewski model over other models such as Altman or Springate is based on its enhanced predictive ability in financial institutions and its inclusion of both operational and market-based indicators (Hertina et al., 2020; Yendrawati & Adiwafi, 2020). Then this analysis is compared with the GRDP value in West Sumatra. The relationship between the two aspects will form a correlation that can be discussed more deeply and systematically.

The choice of the Zmijewski model is based on its stronger predictive ability in financial institutions compared to the Altman or Springate models. Banks typically operate with high leverage and complex liability structures, which are better captured by the Zmijewski formulation. Furthermore, prior studies in the Indonesian banking context have confirmed the robustness of this model in identifying financial distress (Muzanni & Yuliana, 2021; Supitriyani et al., 2022). Nevertheless, the study acknowledges the limitation of not including other models as a comparison, which may be addressed in future research.

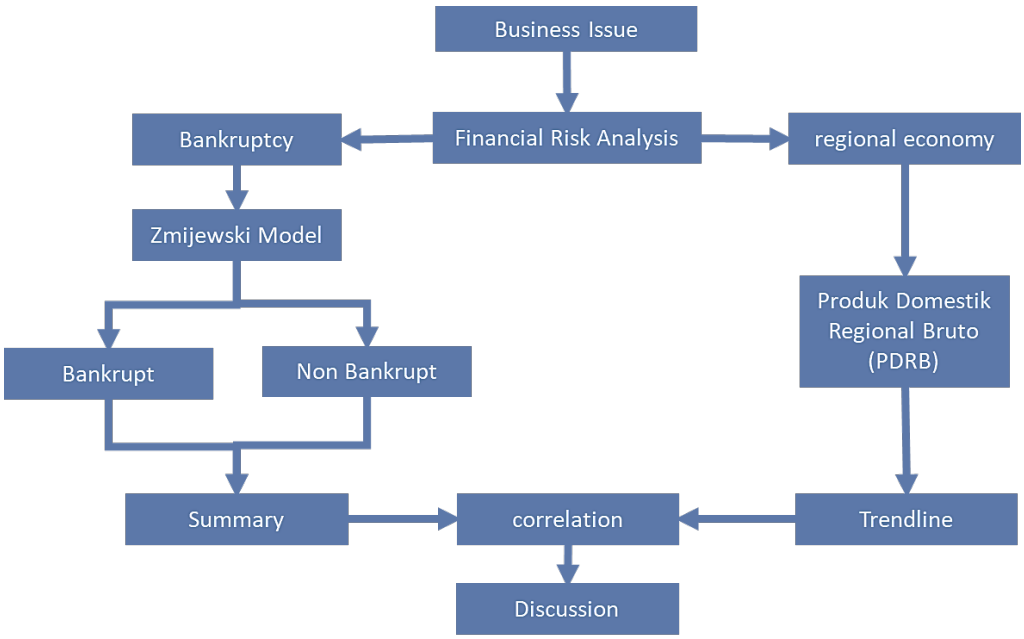


**Figure 1. Conceptual Framework**

## RESULTS AND DISCUSSION

This section consists of an analysis of the bankruptcy of Bank Nagari, an analysis of the value of West Sumatra GRDP, the correlation between the two variables, and a discussion. In table 1, it can be seen that the Zmijewski model at Bank Nagari for the period Q1 2022 to Q2 2023.

**Tabel 2. Zmijewski Model at Bank Nagari**

| Year | Period | Zmijewski | Zone Discriminant |
|---|---|---|---|
| **2022** | Q1 | 0,68 | Bankrupt |
| | Q2 | 0,72 | Bankrupt |
| | Q3 | 0,69 | Bankrupt |
| | Q4 | 0,66 | Bankrupt |
| **Average** | | 0,69 | Bankrupt |
| **2023** | Q1 | 0,68 | Bankrupt |
| | Q2 | 0,72 | Bankrupt |
| **Average** | | 0,70 | Bankrupt |

The Zmijewski results indicate that Bank Nagari was in a condition of financial distress, categorized as 'Bankrupt' according to the model's classification. Every quarter in 2022 the Zmijewski value is greater than 0.5. This means that Nagari Bank is in a state of bankruptcy. The highest bankruptcy value is in Quarter 2. The lowest bankruptcy value is in Quarter 4. The average Zmijewski value in 2022 is 0.69 with Zone Discriminant Bankrupt. In 2023, the Zmijewski value is only represented by Quarters 1 and 2. Where the respective values are 0.68 and 0.72. Both of these values are the same as the previous year's achievements. This means that both at the end of the pandemic and the beginning of the new normal, the situation of Nagari Bank has not changed and is still in a bankrupt state.

If traced more deeply, Bank Nagari's Total Assets and Total Liabilities from this analysis period are recorded to continue to increase. The average increase in Bank Nagari's Total Assets is IDR 536,249,500,000.00 per quarter. The average increase in Bank Nagari's liabilities is IDR 408,836,600,000.00. There are several possibilities if the total assets and total liabilities of a bank continue to increase such as business growth, increased risk, increased profits, and so on. Business growth can be reflected in the increasing demand for banking products and services offered by the bank. If asset growth is faster than liability growth, then the bank may see an increase in profits. However, if liability growth is faster than asset growth, then higher interest costs may reduce the bank's profits. However, this can also be a sign of greater risk. If a bank expands its portfolio too quickly without adequate risk management measures, this could result in credit and operational risk issues that could potentially hurt the bank and its shareholders.

After the analysis of the Zmijewski model is carried out, the GRDP of West Sumatra province for the same period is shown.

**Table 3. GRDP Value of West Sumatra Province for the Period 2022-2023**

| Year | Period | GRDP (Billion Rupiah) | Quarterly Average (Billion Rupiah) |
|---|---|---|---|
| **2022** | Q1 | 225.643,67 | 238.798,27 |
| | Q2 | 235.346,16 | |
| | Q3 | 244.065,36 | |
| | Q4 | 250.137,89 | |
| **2023** | Q1 | 251.949,51 | 256.156,30 |
| | Q2 | 260.363,09 | |

Table 3 shows the GRDP value of West Sumatra province from 2022 to 2023. In general, this GRDP value increases every quarter. The average GRDP in 2022 is Rp 238,798.27 billion and in 2023 is Rp 256,156.30 billion. Some of the sectors that contribute to this increase in GRDP are Agriculture, Trade, and Transportation. These three types of products and services usually get funding from commercial banks, cooperatives, and other microfinances. This commercial funding comes from the funding of Bank Nagari and several other national and private banks. With the close relationship with the local government of West Sumatra, regional projects that require funding are usually given to Bank Nagari.

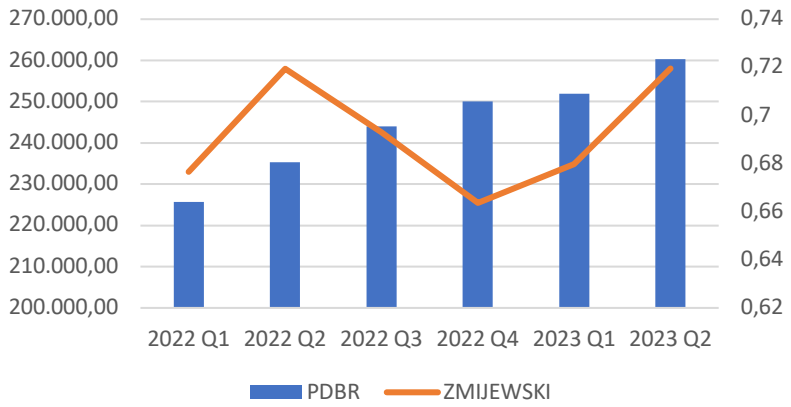


**Figure 2. Graph of the Zmijewski Bank Nagari Model and West Sumatra GRDP for the Period 2022 to 2023**

Figure 2 shows the Zmijewski model of Bank Nagari and West Sumatra GRDP for the period 2022 to 2023. From the graph, it can be concluded that Bank Nagari at the end of the Covid 19 pandemic and the beginning of the New Normal is still in a bankrupt situation. The highest bankruptcy value is in Q2 2022 and 2023, which is 0.72. While the lowest value is in Q4 2022. In contrast to the value of GRDP, West Sumatra province continues to increase. This indicates an increase in the regional economy. This reflects that the local government can encourage people to be productive in every financial sector.

To see the relationship between the bankruptcy value of regional banks, more specifically Nagari Bank, and GRDP, a correlation analysis was conducted. Correlation analysis is a statistical method that helps in understanding the extent to which two variables move together or against each other and measures the strength and direction of the relationship between these variables. The correlation values used in this analysis along with the information can be seen in table 4.

**Table 4. Correlation Values**

| Correlation | Description |
|---|---|
| -1 | When two variables have a perfect negative correlation, it means that they move in opposite directions. If one variable goes up, the other goes down, and vice versa. |
| 0 | If two variables have no statistically significant relationship with each other, the correlation is zero. A change in one variable does not predict a change in the other variable. |
| 1 | When two variables have a perfect positive correlation, it means that they move together. If one variable goes up, the other also goes up, and vice versa. |

This correlation analysis was done with Microsoft Excel and the results are shown in table 5.

**Table 5. Correlation analysis results**

| | ZMIJEWSKI | GRDP |
|---|---|---|
| **ZMIJEWSKI** | 1 | |
| **GRDP** | 0,156049482 | 1 |

The result of the correlation analysis between the Zmijewski value and GRDP is 0.156. This value indicates that the Zmijewski value and GRDP generally do not have a significant relationship with each other. The weak correlation (r = 0.156) between Bank Nagari's financial distress and West Sumatra's GRDP indicates that regional growth during the transition period was not primarily determined by the solvency of this regional bank. This outcome can be explained by several external factors. First, government stimulus and subsidy programs in the post-pandemic era helped sustain aggregate demand, protecting the economy from shocks in the banking sector (Haq et al., 2023). Second, the financing role of national and private commercial banks in West Sumatra remained significant, ensuring that key sectors such as agriculture, trade, and transportation continued to expand despite Bank Nagari's weakened intermediation capacity (Oktaviani & Yefriza, 2024). Third, non-bank financial channels such as cooperatives, microfinance institutions, and fintech platforms provided alternative access to credit, further buffering the regional economy. Finally, it is possible that the impact of financial distress in regional banks exhibits a lagging effect, where the deterioration of bank health does not immediately translate into macroeconomic

slowdown. Nonetheless, if distress persists over the long term, these vulnerabilities may eventually spill over into regional growth performance. More specifically, this occurred at the end of the covid 19 pandemic period and the beginning of the new normal.

## Discussion

The economic impact that financial problems in the banking sector can have is associated with the relationship between bankruptcy and regional GRDP (Ummah et al., 2021). The availability of credit and funding can be hampered if some banks experience bankruptcy or serious financial problems. Bank insolvency can create uncertainty in financial markets and weaken the confidence of economic actors, which can lead to economic contraction, decreased consumer spending, and decreased business activity, all of which can slow economic growth and GRDP.

Related industry sectors, such as supplier companies or business partners of the affected banks, may be impacted by bank insolvency. If these industries are disrupted, this may impact the overall regional GRDP (Pratiwi, 2020; Yuliadi, 2023). Banking insolvency can cause financial uncertainty in the region, which can reduce investor confidence and encourage capital outflows. This can impact GRDP by lowering investment and economic activity. GRDP is an important indicator that shows the economic condition of a region (Alyana & Munawar, 2021). Banking insolvency can be one of the components that can affect a country's economic growth and stability. Therefore, effective banking supervision and management are essential to maintain banking sector stability and promote healthy economic growth.

## Implications and Contextual Interpretation

The persistence of Bank Nagari's financial distress despite the observable recovery in West Sumatra's GRDP reveals a structural disconnect between micro-level banking health and macroeconomic output (Khan & Gunwant, 2024; Raghavan, Khan, & Devadason, 2024). This disconnect suggests that regional economic growth, as reflected in GRDP, may be driven by broader government stimulus, inter-regional trade, or sectoral performance in agriculture and services, rather than by the financial intermediation of regional banks. In such conditions, a regional bank may continue operating under the appearance of stability while internally exhibiting signs of vulnerability, as indicated by Zmijewski scores exceeding the bankruptcy threshold. This misalignment raises concerns over the reliability of traditional macroeconomic indicators in signalling underlying financial sector fragility (Oktaviani & Yefriza, 2024).

Furthermore, this finding implies that financial distress within a regional bank does not immediately translate into macroeconomic contraction at least not in the short term(Lagerborg, Pappa, & Ravn, 2023; Sotirakopoulos, Mount, Guven, Ulker, & Graham, 2023). This temporal lag may be due to the presence of informal financial systems, the dominance of national banks, or government-backed credit schemes that temporarily buffer the economy. However, if unresolved, the cumulative risks borne by distressed banks could spill over into the real economy, disrupting credit flows, weakening investor confidence, and eventually impacting GRDP. Hence, reliance on economic growth figures alone can be misleading for policymakers seeking to assess financial system resilience in post-crisis environments(Chen & He, 2022).

From a governance and policy perspective, this case underscores the urgent need for targeted financial oversight mechanisms tailored to regional banks. Unlike their larger national counterparts, regional banks are often more exposed to local economic shocks and more reliant on concentrated credit portfolios(Probojakti, Utami, Prasetya, & Riza, 2024). As such, integrating early-warning models like the Zmijewski analysis into regular supervisory protocols can help identify latent risks and guide timely interventions. This study also encourages a rethinking of the relationship between banking solvency and regional development strategies—moving beyond growth-oriented metrics to incorporate financial soundness as a prerequisite for sustainable recovery.

Beyond general recommendations, specific measures can be proposed. For regulators such as OJK, implementing an early-warning system that obligates regional banks to conduct periodic financial distress assessments would enable proactive monitoring. Strengthening capital adequacy requirements, coupled with risk-based supervision tailored to regional banks' concentrated credit exposures, could further enhance resilience. Local governments, as majority shareholders, should align banking intermediation with regional development priorities, ensuring that credit flows target productive sectors such as agriculture, trade, and infrastructure.

For Bank Nagari itself, concrete reforms include reinforcing risk management practices, particularly in non-performing loan handling and credit evaluation, as well as pursuing capital strengthening through shareholder equity injections. Digital transformation initiatives can improve efficiency and expand outreach to underserved communities, while strategic collaboration with larger national banks may help

diversify funding sources and reduce vulnerability. These measures not only address the immediate risks identified by the Zmijewski model but also contribute to the long-term sustainability of regional banking in West Sumatra.*

## CONCLUSION

This study found that Bank Nagari consistently exhibited bankruptcy risk from Q1 2022 to Q2 2023 based on Zmijewski scores above 0.5, indicating persistent financial distress. Meanwhile, West Sumatra's GRDP showed steady growth, and correlation analysis revealed a weak relationship (r = 0.156) between the two variables. These results suggest that regional economic growth may not reflect the underlying financial health of local banks. Practically, regulators such as OJK should integrate early-warning models into routine supervision, while local governments as shareholders may reinforce capital support to strengthen solvency. For Bank Nagari, key priorities include improving risk management, advancing digital transformation, and exploring partnerships with national banks to diversify funding sources and stabilize operations. Therefore, regulators such as the OJK and local governments should not rely solely on macroeconomic indicators but adopt early warning models like Zmijewski in monitoring regional bank performance. For Bank Nagari, internal improvements in risk management and capital structure are critical. Regional authorities may also need to consider targeted interventions—such as capital strengthening or governance reforms—to prevent systemic risks and ensure that banking institutions effectively support economic recovery. Future research should explore long-term causality between banking health and regional development to inform sustainable financial supervision policies.

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