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Analysis Bankruptcy Banking in Indonesia : A Study Empirical on 20 Commercial Banks 2020-2025

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Abstract: This study aim analyze level bankruptcy of 20 commercial banks in Indonesia during 2020–2025 period using the Altman *Z-score model* modify and identify ratio significant financial predict bankruptcy . Approach quantitative with secondary data report finance annual 20 selected banks in a way *purposive* from the Indonesia Stock Exchange . Variables independent covering *working capital to total assets* (X1), *retained earnings to total assets* (X2), *EBIT to total assets* (X3), and *book value of equity to total liabilities* (X4). Analysis done through calculation *Z-score* , zone classification (*safe* , *grey* , *distress*), and regression logistics . Average *Z-score* of sample banks fluctuating : decreasing sharp in 2020 due to pandemic , improving in 2021–2022, but return under pressure in 2023–2024. The proportion of banks in the *distress* zone decrease from 40% (2020) to 25% (2025). The ratios X3 (*EBIT/Total Assets*) and X4 (*Book Value Equity/Total Liabilities*) are proven significant . Altman *Z-score model* modification effective identify potential bankruptcy banking in Indonesia. Bank regulators and management need to prioritize monitoring profitability and capital structure for guard stability sector .

Keyword: bankruptcy banking, Altman *Z-score*, ratio finance, Indonesia, commercial banks.

Indonesian Abstract: Penelitian ini bertujuan untuk menganalisis tingkat kebangkrutan 20 bank komersial di Indonesia selama periode 2020–2025 menggunakan model Altman *Z-score* modifikasi, serta mengidentifikasi rasio keuangan yang signifikan dalam memprediksi kebangkrutan. Pendekatan yang digunakan adalah kuantitatif dengan data sekunder dari laporan keuangan tahunan 20 bank yang dipilih secara *purposive* dari Bursa Efek Indonesia. Variabel independen meliputi *working capital to total assets* (X1), *retained earnings to total assets* (X2), *EBIT to total assets* (X3), dan *book value of equity to total liabilities* (X4). Analisis dilakukan melalui perhitungan *Z-score*, klasifikasi zona (*safe*, *grey*, *distress*), dan regresi logistik. Rata-rata *Z-score* bank sampel mengalami fluktuasi: menurun tajam pada tahun 2020 akibat pandemi, membaik pada tahun 2021–2022, tetapi kembali tertekan pada tahun 2023–2024. Proporsi bank dalam zona *distress* menurun dari 40% (2020) menjadi 25% (2025). Rasio X3 (*EBIT/Total Assets*) dan X4 (*Book Value Equity/Total Liabilities*) terbukti signifikan.

Modifikasi model Altman Z-score efektif dalam mengidentifikasi potensi kebangkrutan perbankan di Indonesia. Regulator dan manajemen bank perlu memprioritaskan pemantauan profitabilitas dan struktur modal untuk menjaga stabilitas sektor perbankan.

Kata Kunci: *Kebangkrutan Perbankan, Altman Z-score, Rasio Finansial, Indonesia, Bank Komersial.*

INTRODUCTION

Sector banking hold vital role in the Indonesian economy as intermediation finance , distributor credit , and driving force investment (Pertiwi, 2010). However , the industry banking own risk inherently high , encompassing risk credit , liquidity , markets, and operations . Bank failure can trigger crisis detrimental systemic economy in a way extensive , as experienced by Indonesia during the 1997–1998 crisis . Therefore that , analysis bankruptcy banking become instrument crucial for regulators, investors, depositors , and bank management to detection early and taking decision strategic (Kamal, 2012; Haryetti , 2013). Adapting to change requires a strategic approach—supported by financial record-keeping—that dynamically manages cash flow, capital structure, and liquidity across varying economic conditions (D.Kartikaningsih et.al,2026)

Study previously has develop various prediction models bankruptcy , including Altman *Z-score*, *Springate* , *Zmijewski* , and *Grover* (Fauzan & Sutiono , 2017). The Altman *Z-score model* , in particular version modification For non- manufacturing companies , have Lots tested in context Indonesian banking (Aminah & Sanjaya, 2013; Sofi, 2019). Although however , still there is gap research on the period latest which includes impact COVID-19 pandemic and recovery post-2020 economy . Study This fill in gap the with analyzed 20 commercial banks representing various category ownership during 2020–2025.

Bank bankruptcy is defined as condition the bank's inability to fulfil obligation financially to depositors and creditors Because loss sustainable development that erodes capital (Pertiwi, 2010). Different with non- financial companies , bank bankruptcy has impact more systemic wide Because relatedness interbank and trust negative . Indicator beginning bankruptcy covering decline ratio capital adequacy , increase credit problematic , and declining profitability (Haryetti , 2013). Theory agency (Jensen & Meckling , 1976) explains conflict interest between management and shareholders shares that can push taking risk excessive , so that increase probability bankruptcy . Theory signal state that information finance , such as ratio profitability and solvency , used by management For send signal about negative impact of banks on investors (Putri et al., 2026). Theory finance behavior emphasize that psychological bias managers and investors can influence decisions that lead to difficulties finance (Wibowo, 2017).

Altman *Z-score* (1968) originally developed For manufacturing with five ratios . Version modification for non- manufacturing use four ratio : $Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$, with $X_1 = \text{working capital/total assets}$, $X_2 = \text{retained earnings/total assets}$, $X_3 = \text{EBIT/total assets}$, $X_4 = \text{book value of equity/total liabilities}$. Classification : $Z > 2.6$ (safe), $1.1-2.6$ (gray area), < 1.1 (distress). This model has tested in Indonesian banking (Aminah & Sanjaya, 2013; Sofi, 2019) and proven own adequate accuracy . Other models such as *Springate* ($S = 1.03X_1 + 3.07X_2 + 0.66X_3 + 0.4X_4$) and *Zmijewski* ($X = -4.5 - 4.5X_1 + 5.7X_2 - 0.004X_3$) were also used , but Fauzan and Sutiono (2017) found that *Grover* own accuracy the highest in Indonesian banking .

Ratio profitability like *ROA* and *ROE* reflect bank's ability to generate profit . Decrease *ROA* signify efficiency low and potential loss (Yunus et al., 2025). Ratio liquidity *Long Distance Relationship* show proportion credit against party funds third ; *LDR* that is too long

tall increase risk liquidity (Sutjipto & Manurung , 2025). Ratio *CAR* capital adequacy measure bank's ability to absorb losses ; low *CAR* increase vulnerability to bankruptcy . Ratio quality *NPL* reflects credit problematic ; *NPL* tall indicates risk credit large (Putri et al., 2026). The ratio efficiency *BOPO* measure burden operational ; *BOPO* tall pressing profitability . Measured capital structure with *DER* also affects risk bankruptcy (Ardillah & Setiawati , 2025).

Research by Putri et al. (2026) found that *NPL* has an effect negative to price shares , while *Long Distance Relationship* No influential . Fiola (2026) shows that management profit influential positive to risk bankruptcy , whereas quality management risk No significant . Ardillah and Setiawati (2025) reported that significant capital structure (*DER*) influence *ROA* , but *GCG* no . Sutjipto and Manurung (2025) identified *CAR* , *LDR* , and bank size as significant to *ROA* . Yunus et al. (2025) at BNI found that debt reduction increases profitability . Sari and Meidiaswati (2025) on negative infrastructure show *leverage* negative significant to *ROA* . Salzabila (2026) in retail found *sales growth* negative to *financial distress* . Ihsan and Kartika (2015, 2016) on negative banks show condition healthy . Wibowo (2017) found connection quadratic between diversification and default probability . Likumahua (2017) shows that bankruptcy (*Z-score*) affects price stocks . Research the become base for studies This For testing the Altman *Z-score model* on 20 commercial banks period latest. Based on the phenomenon and previous research the formulation problem are:

- 1) How level bankruptcy of 20 commercial banks in Indonesia based on the Altman *Z-score model* modification during 2020–2025 period ?
- 2) Factors ratio finance (X1, X2, X3, X4) what only those who significant influence probability bankruptcy of these banks ?

And the objectives study are

- 1) Analyze and classify level bankruptcy of 20 commercial banks in Indonesia using the Altman *Z-score model* modification .
- 2) Identifying ratio the most predictive finance to bankruptcy banking in Indonesia.

The hypothesis are:

H1: X1 (*working capital to total assets*) has an effect negative to probability bankruptcy .

H2: X2 (*retained earnings to total assets*) has an effect negative to probability bankruptcy .

H3: X3 (*EBIT to total assets*) has an effect negative to probability bankruptcy .

H4: X4 (*book value of equity to total liabilities*) has an effect negative to probability bankruptcy .

METHOD

This study use approach quantitative with design descriptive and inferential . Panel data is used For catch dimensions time and *cross-section* .Secondary data in the form of report finance annual (balance sheet , profit loss) 20 commercial banks acquired from the official BEI website (www.idx.co.id), the OJK website, and each bank's website. Period observation is 2020 to 2025 . Population is all commercial banks listed on the IDX. Sample as many as 20 banks were selected use technique *purposive sampling* with criteria : (1) registered on the IDX during 2020–2025; (2) has report finance annual complete ; (3) represents various category

ownership (state-owned enterprises, private national , foreign). List of sample banks includes : Bank Mandiri , BRI, BNI, BTN, BCA, Bank Danamon , Bank Panin , Bank Maybank Indonesia, Bank CIMB Niaga , Bank Permata, Bank OCBC, NISP, Bank UOB Indonesia, Bank BTPN, Bank Mega, Bank Bukopin , Bank Jatim , Bank Jateng , Bank Sumut , Bank Sulselbar , and Bank Papua. The period study 2020–2025 , a total of 6 years observations , resulting in 120 panel data (20 banks $\times$ 6 years). Data collected through documentation report finance annual that has been audited . Every ratio counted manually using *Microsoft Excel*

Variables dependent is measured bankruptcy with two method : (1) score *Z-score* continuous ; (2) binary variable (1 = distress, if $Z < 1.1$; 0 = no distress, if $Z \geq 1.1$). Variable independent is :

1. **X1 (Working Capital to Total Assets)** = (Assets Current – Liabilities Current) / Total Assets .
2. **X2 (Retained Earnings to Total Assets)** = Profit Retained / Total Assets .
3. **X3 (EBIT to Total Assets)** = Profit Before Interest and Taxes / Total Assets .
4. **X4 (Book Value of Equity to Total Liabilities)** = Total Equity / Total Liabilities .

Data analysis was performed in three stage . First , the calculation ratio finance and *Z-score* For each bank per year . Second , the classification of banks into in the safe , *grey* , and *distress* zones . Third , regression logistics For test the influence of X1–X4 on probability bankruptcy (distress vs. non- distress). Regression model logistics : $\ln(p/(1-p)) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$. Significance test use *Wald test* at $\alpha = 5\%$. Analysis done with *EViews 12*.

RESULTS AND DISCUSSION

Two twenty sample banks consists of of 4 state-owned banks (Mandiri , BRI, BNI, BTN), 10 private banks national banks (BCA, Panin , Permata, BTPN, Mega, NISP, Bank Jatim , Bank Jateng , Bank Sulsebar , Bank Papua), and 6 foreign banks (UOB Indonesia, Bukopin , Danamon , Maybank Indonesia, CIMB Niaga , OCBC). The average total assets per bank in 2025 are around IDR 150 trillion , with around Rp. 5 trillion up to Rp1,800 trillion .

Table 1 The average ratios annual finances For all over sample .

Year	X1	X2	X3	X4
2020	0.12	0.08	0.03	0.22
2021	0.14	0.10	0.05	0.25
2022	0.13	0.11	0.04	0.24
2023	0.11	0.09	0.03	0.21

2024	0.10	0.08	0.02	0.19
2025	0.12	0.10	0.04	0.23

Source: research data

Seen decline in X3 (profitability) in 2024, which indicates pressure profit.

Table 2 Average Z-score and Classification 2020–2025

Year	Average Z	Safe Zone (%)	Grey Area (%)	Distress (%)
2020	1.05	15	45	40
2021	1.42	20	50	30
2022	1.38	20	50	30
2023	1.12	15	50	35
2024	0.98	10	45	45
2025	1.32	25	50	25

Source: research data

In 2020, 40% of banks were in the distress zone, especially consequence pandemic . Conditions improved in 2021–2022, however return worsen in 2024 (45% distress). 2025 shows repair with 25% *distress* .

Table 3 Regression logistics with variables binary dependent (*distress* =1).

Variables	Coefficient	Wald	p-value
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Constant	2,104	8.45	0.004
X1	-1,237	1.28	0.258
X2	-0.987	1.05	0.306
X3	-4,562	6.78	0.009
X4	-3,214	5.42	0.020

Source: research data

The results show that X3 (*EBIT/Total Assets*) and X4 (*Book Value Equity/Total Liabilities*) have an effect negative significant to probability bankruptcy (p)

The low average Z-score in 2020 (1.05) reflects impact the pressing COVID-19 pandemic profitability and increase credit problematic . This is in line with Sofi's (2019) findings noted that conventional banks more prone to moment crisis . Recovery in 2021–2022 was driven by relaxation policies and restructuring credit . However , the increase in distress in 2024 (45%) indicates that some banks still face problem quality assets and efficiency . State-owned banks such as Mandiri and BRI tend to be in the safe zone Because support capital strong , while private banks small such as Bank Bukopin had time enter *grey area* .

The significance of X3 (*EBIT/Total Assets*) confirms that profitability is indicator main bank health . The decline in EBIT indicates decline income flower or improvement backup loss credit , which can trigger bankruptcy (Putri et al., 2026). X4 (*Book Value of Equity/Total Liabilities*) reflects capital structure ; increasingly tall equity relatively to liabilities , the more big bearings For absorb loss . Findings This consistent with Ardillah and Setiawati (2025) and Yunus et al. (2025) emphasized importance leverage management . No the significance of X1 and X2 is possible caused by characteristics banking where working capital is lacking relevant Because asset fluent dominated credit that is not liquidity and profit detained often small Because profit shared as dividends .

Research result This support studies Fiola (2026) that management profit (which affects X3) has an impact on risk bankruptcy . Meanwhile that , Sutjipto and Manurung (2025) found that *CAR* and *LDR* significant to *ROA* , but In Altman's model, X4 (equity / liabilities) is more direct reflect solvency . Findings that X3 and X4 are significant and also in line with Wibowo (2017) who emphasized importance profitability and capitalization in prevent default. Fauzan and Sutiono (2017) reported that Grover's model is more accurate , but the modified Altman Z-score still give informative results For distress classification .

In a way theoretical , results This strengthen theory signal that information finance (especially profit and equity) to signal credible for stakeholders interests . In terms of In practice , the regulator (OJK) is advised For tighten supervision against the bank with ratio

Low EBIT /Total Assets and equity / liabilities . Bank management needs to focus on improvement profitability through efficiency operational and management credit problematic . Investors can using Z-score as tool screening beginning before invest . Depositors also need notice ratio solvency of the bank where they save funds.

CONCLUSION

Study This conclude that level bankruptcy of 20 commercial banks in Indonesia during the 2020–2025 period is sufficient varies , with the proportion of banks in the highest distress zone in 2020 (40%) and 2024 (45%), as well as lowest in 2025 (25%). Altman *Z-score model* modification effective identify potential banks bankrupt . Ratio profitability (*EBIT/Total Assets*) and solvency (*Book Value Equity/Total Liabilities*) are proven become predictor significant . The more tall second ratio said , the more low probability bankruptcy . Study This own a number of limitations : (1) only using the Altman *Z-score model* modification without compare with other models; (2) period study only 6 years , so Not yet covers cycle economy full ; (3) sample limited to 20 banks, so that generalization need be careful ; (4) not enter variables external like ethnic group interest , inflation , or policy monetary.

The advice for academic and practical advice are Study furthermore recommended For expand sample and period , comparing several prediction models (Altman, Springate , Grover), as well as integrate variables macroeconomics and governance company. For OJK, the results This can used For set *threshold* ratio finance as trigger supervision intensive . Share bank management , priorities main is strengthen profitability and capital structure . For investors, the Z-score can made one of indicator in portfolio investment share banking .

REFERENSI

- Aminah, A., & Sanjaya, A. (2013). Analysis of bankruptcy in Indonesian banking companies during the 2001–2012 period using the Altman Z-Score model. *Jurnal Akuntansi dan Keuangan*, 4(2), 1–15. <https://doi.org/10.36448/jak.v4i2.414>
- Ardillah, R., & Setiawati, R. (2025). The influence of capital structure and good corporate governance on the financial performance of banking companies listed on the Indonesia Stock Exchange during 2022–2024. *Jurnal Ilmiah Manajemen dan Akuntansi*, 11(1), 45–60. <https://doi.org/10.69714/pkdw7z42>
- <https://books.google.co.id/books?id=vTHkEQAAQBAJ&lpg=>
- Fauzan, H., & Sutiono, F. (2017). Comparison of the Altman Z-Score, Zmijewski, Springate, and Grover models in predicting bankruptcy of banking companies listed on the Indonesia Stock Exchange. *Jurnal Online Insan Akuntan*, 2(1), 1–15. <https://www.neliti.com/publications/234086>
- Fiola, O. (2026). *The influence of risk management quality and earnings management on bankruptcy risk in banking companies listed on the Indonesia Stock Exchange (2021–2023)* (Master's thesis, University of Lampung). Digilib Universitas Lampung.
- Haryetti. (2013). Financial distress analysis to predict bankruptcy risk in banking companies listed on the Indonesia Stock Exchange. *Jurnal Ekonomi*, 18(2), 1–12. <http://ejournal.unri.ac.id/index.php/JE/article/view/757>
- Ihsan, D. N., & Kartika, S. P. (2015). Potential bankruptcy in the Islamic banking sector in facing changes in the business environment. *Etikonomi*, 14(2), 1–14. <https://doi.org/10.15408/etk.v14i2.2226>
- Kamal, S. I. M. (2012). *Analysis of bankruptcy prediction in banking companies listed on the Indonesia Stock Exchange using the Altman Z-Score model* (Bachelor's thesis, Hasanuddin University). <http://repository.unhas.ac.id/id/eprint/8562>

- Likumahua, D. (2017). Bankruptcy analysis and stock prices of banking companies listed on the Indonesia Stock Exchange. *Jurnal Keuangan dan Bisnis*, 11(1), 1–12. <https://doi.org/10.32524/jkb.v11i1.183>
- Pertiwi, A. P. I. (2010). *CAMELS ratios as indicators of banking soundness and bankruptcy* (Bachelor's thesis, Universitas Sebelas Maret). <https://digilib.uns.ac.id/dokumen/abstrak/17388>
- Putri, A., Nurdin, E., & Basru, A. M. F. R. (2026). The influence of non-performing loans and loan-to-deposit ratio on stock prices of banking companies listed on the Indonesia Stock Exchange. *Accounting Student Series on Emerging Trends*, 1(1), 1–10. <https://doi.org/10.66896/asset.1.01.2026.7>
- Salzabila, S. (2026). *The influence of firm size, asset tangibility, and sales growth on financial distress in retail sub-sector companies listed on the Indonesia Stock Exchange during 2022–2024* (Bachelor's thesis, University of Jember).
- Sari, S. D. K., & Meidiaswati, H. (2025). The influence of leverage, ownership structure, and innovation on financial performance in infrastructure, utilities, and transportation companies during 2019–2023. *Jurnal Ilmu Manajemen*, 13(1), 39–51. <https://doi.org/10.26740/jim.v13n1.p39-51>
- Sofi, P. W. M. (2019). *Comparative analysis of bankruptcy risk in Indonesian banking using the modified Altman Z-Score method: A comparison between Islamic and conventional commercial banks during 2013–2017* (Bachelor's thesis, Maulana Malik Ibrahim State Islamic University).
- Sutjipto, H., & Manurung, A. H. (2025). The influence of internal and external bank factors on the financial performance of commercial banks in Indonesia. *Journal of Capital Markets and Banking*, 13(4), 1–18. <https://doi.org/10.63607/jcmb.v13i4.40>
- Wibowo, B. (2017). Methods for measuring the probability of bank bankruptcy and the relationship with income diversification: Evidence from Indonesian banking. *Matrik: Jurnal Manajemen, Strategi Bisnis dan Kewirausahaan*, 11(1), 1–14. <https://doi.org/10.24843/matrik:jmbk.2017.v11.i01.p05>
- Yunus, M. H., Baso, U. A., Nadia, N., Pradina, W. A., & Adnyani, N. K. D. (2025). Capital structure analysis in improving profitability at PT Bank Negara Indonesia (Persero) Tbk during 2021–2024. *Journal of Social Society*, 5(2), 1–12. <https://doi.org/10.54065/jss.5.2.2025.921>