

THE FINE LINE BETWEEN STRATEGY AND MANIPULATION: UNRAVELING BANKRUPTCY RISK IN THE EMERGING MARKET

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Abstract

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This research presents a novel analysis of the intricate interrelationships among Porter's (1980) business strategy — cost leadership and differentiation — and two forms of earnings management (accrual-based and real) and their impact on bankruptcy risk within publicly traded companies in Indonesia. Unlike previous research that predominantly concentrates on the accumulated method of accrual-based earnings management (AEM), this research enhances the discourse by exploring the influence of real earnings management (REM) on bankruptcy risk, especially in a developing nation where regulatory oversight and financial reporting transparency are less critical. This research analyzes a dataset of 756 company-year observations, using a fixed-effect model with clustered standard errors and generalized least squares (GLS) weighting and a two-stage least squares (2SLS) approach to enhance robustness. The results indicate that although AEM does not significantly impact bankruptcy risk, REM, mainly through sales manipulation and overproduction, is pivotal in influencing a firm's financial outcomes and stability. Moreover, cost leadership and differentiation strategies significantly reduce the threat of financial failure. These results support Porter's (1980) framework of competitive advantage theory and empirical findings by Xu et al. (2021) and Zang (2012), highlighting the importance of aligning earnings management practices and strategic direction to maintain financial stability.

Keywords: Earnings Management, Business Strategy, Bankruptcy Risk, Real Earnings Management, Accrual-Based Earnings Management, Financial Distress

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1. INTRODUCTION

In the business world, risk cannot be avoided but can be managed through proper management. One of the main challenges companies face is the risk of bankruptcy, which is always an important issue in

business management and accounting literature (Lukason & Camacho-Miñano, 2019). A corporation's bankruptcy exerts a significant impact not only on the afflicted company but also on all entities connected to it. In contrast to financially stable corporations, entities approaching bankruptcy

frequently manipulate reported profits to obscure indicators of financial distress (Campa & Camacho-Miñano, 2013).

Although earnings management practices are not deemed fraudulent, as they adhere to International Financial Reporting Standards (IFRS) and Generally Accepted Accounting Principles (GAAP) standards, such practices may obstruct investors' rational evaluations, consequently diminishing the reliability of earnings information disclosed in financial statements (Agustia et al., 2020; Kovacova et al., 2021). Long-term earnings management practices may heighten the risk of future financial difficulties due to aggressive earnings adjustments aimed at maximizing short-term profits (Luu Thu, 2023).

Unlike the detrimental effects of earnings management on financial disclosure transparency, which threaten a company's long-term survival, implementing an effective business strategy can enhance operational effectiveness and increase financial performance while diminishing threats to financial sustainability (Bryan et al., 2013). Porter (1980) suggests that business strategies can be divided into three categories: cost leadership, differentiation, and a combination. A cost leadership strategy enhances efficiency to produce superior products by optimising inputs and streamlining asset usage. In contrast, a differentiation strategy focuses on developing unique product features and building customer loyalty.

A multitude of past academic inquiries have been conducted to explore the relationship between financial management practices and strategic approaches against bankruptcy risk, but the findings of these studies show inconsistencies (Agustia et al., 2020). Agrawal and Chatterjee (2015) investigated how discretionary accruals (DA), representing earnings management, relate to financial performance instability. Their research indicates that companies facing little financial distress often achieve greater earnings management, while companies with higher financial distress report earnings conservatively. Campa and Camacho-Miñano (2013) conducted a study on earnings manipulation behaviour in Spain; the results showed that management tends to report higher profits in companies with low performance to cover up less than satisfactory performance. Lisboa and Kacharava (2018) found that companies often engage in earnings management during financial crises.

Empirical studies on earnings management practices largely concentrate on adjusting accruals within earnings (Agustia et al., 2020; Agrawal & Chatterjee, 2015). Earnings management practices can be approached through the accumulation method and real operational method activities. Several other studies have also shown that accrual is not the only way to manipulate earnings (Rakshit et al., 2024; Lee & Choi, 2013). Furthermore, research by Séverin and Veganzones (2021) indicates that while companies can utilize both types of earnings management, they typically adopt one method according to their financial health.

Research that simultaneously investigates the link between a firm's strategic approaches and manipulation practices concerning bankruptcy risk is minimal; most studies related to this only focus on separate analyses of business strategy or earnings management (Luu Thu, 2023). Agustia et al. (2020) conducted the first research on all these aspects simultaneously. This indicates that there remains considerable scope for further research.

Moreover, studies on earnings management concerning the likelihood of bankruptcy predominantly focus on developed countries, with research in emerging markets remaining quite scarce (Luu Thu, 2023). This highlights a considerable gap in research, as weak accounting regulations and insufficient oversight often exacerbate earnings management practices in developing nations (Claessens & Yurtoglu, 2013).

This research further encompasses the literature on earnings management by incorporating two distinct measurement approaches: accrual-based earnings management (AEM) and real earnings management (REM). It investigates the effect of earnings management practices on corporate bankruptcy risk. Specifically, this study aims to fill the gap in research regarding the impact of REM on bankruptcy risk, a topic that remains underexplored. Furthermore, this study also examines the influence of business strategy on bankruptcy risk, thereby offering a comprehensive understanding of how managerial decisions impact corporate sustainability.

The sample utilized in this study comprises 756 company-year observations listed on the Indonesia Stock Exchange (IDX) between 2019 and 2023. This research employs the modified Jones (1991) model to assess AEM and follows Roychowdhury (2006) to estimate REM. Following Agustia et al. (2020), we evaluate business strategy using the asset turnover of operations and the profit margin. Altman et al. (1977) Z-score is used to measure bankruptcy risk. The results indicate that REM significantly impacts bankruptcy risk, primarily through sales manipulation and overproduction, while AEM has no relationship with bankruptcy risk. Furthermore, the findings reveal that business strategy plays a pivotal role in reducing the risk of bankruptcy.

The structure of this paper is as follows. Section 2 reviews relevant literature for this study and states the hypotheses. Section 3 describes the research methodology, including proxies and variable measurements employed to conduct empirical analysis. Section 4 presents and discusses the empirical results from our study based on the fixed effect and two-stage least squares (2SLS) estimation approaches. Section 5 provides a conclusion to this study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Bankruptcy risk theory

A company risks bankruptcy when it encounters severe financial difficulties. Companies that file for bankruptcy can bring significant economic losses to all stakeholders. The discourse regarding bankruptcy risk is predominantly influenced by three principal perspectives: 1) the definition of bankruptcy that emphasizes events, 2) the definition of bankruptcy that underscores the process, and 3) technical definitions (Outecheva, 2007). In the definition that focuses on events, bankruptcy signifies a corporation's financial distress through its inability to meet financial obligations or by formally declaring bankruptcy or insolvency (Beaver & Engel, 1996). In contrast, according to the definition that emphasises the process, bankruptcy begins with a decrease in a company's cash flow, suggesting it is having difficulty generating enough revenue to meet

its expenses, and ultimately ends with a bankruptcy filing (Turetsky & McEwen, 2001). This implies that bankruptcy is not just a single event but a journey that involves various stages before the company finally fails. Ultimately, bankruptcy, as defined by the technical perspective, is a condition in which a company exhibits financial indicators indicative of an inability to meet its obligations (Ohlson, 1980; Altman et al., 1977).

2.2. Agency theory

Agency theory clarifies the relationship between a company's shareholders and its management. This relationship can be viewed as an agreement between one party acting as the principal and another acting as the agent. The principal assigns the agent to work in their interests and gives the agent the authority to make decisions. Consequently, ownership and management are interrelated yet distinct functions. This agency relationship will incur costs for monitoring and binding; in addition, there is a possibility of differences between the decisions taken by the agent and those expected by the principal (Jensen & Meckling, 1976). Additionally, agency theory highlights the knowledge gap between managers and owners, with managers having deeper insights and access to key information that owners might lack. Consequently, the details managers communicate to the principals may not entirely reflect the true conditions (Jensen & Meckling, 1976; Watts & Zimmerman, 1990).

Agency problems emerge when disparities in objectives and asymmetric information exist between the owners and their agent's management; the principal seeks to maximize the benefits of an investment, while the agent focuses on maximizing personal benefits. For example, when the compensation scheme is related to profit, agents may choose accounting policies that aim to increase profit (Schroeder et al., 2019). Besides the agency problem, agency costs emerge from the contractual link between the principal and the agent. These costs are linked to the owners and their agent's relationship in business management, covering: 1) tracking costs faced by the principal, 2) adherence expenses shouldered by the agent, and 3) residual losses.

2.3. Types of earnings management

2.3.1. Accrual-based earnings management

Companies often overstate their financial performance for several motives, including the need to meet specific forecasts and targets or to conceal unfavourable financial situations (Rosner, 2003). When a company faces financial challenges and is unable to generate profits that align with financial market projections, its stock performance and overall value may decline (Li et al., 2020). Companies experiencing financial difficulties often face serious agency problems due to information asymmetry (Jensen & Meckling, 1976). Management is responsible for providing financial information to external parties. Stakeholders rely on financial disclosures to assess the company's current performance (Jensen & Meckling, 1976). Agency theory posits that discrepancies in information between management and shareholders may lead corporations to adjust their financial reporting

strategies to mitigate the adverse effects of financial difficulties (Jacoby et al., 2019).

AEM occurs when management adjusts accruals from earnings; this technique is simple and cost-effective (Xiao & Xi, 2021) indicates that management engages in earnings management primarily for short-term benefits rather than prioritizing long-term transparency and accountability, both of which are critical for sustainability investment. Furthermore, earnings management obstructs the early detection of a company's financial issues, potentially leading to erroneous decision-making by management, thereby escalating the risk of bankruptcy in the future. Drawing from this description, we propose the following hypothesis:

H1: Accrual-based earnings management positively impacts bankruptcy risk.

2.3.2. Real earnings management

Real earnings management refers to the deliberate manipulation of operational activities by company management that directly affects the firm's financial performance (Xiao & Xi, 2021). REM can be defined as managerial steps deviating from normal business practices to achieve profit targets (Roychowdhury, 2006). While REM is regarded as costlier due to its associated long-term expenses, REM is more favored than AEM due to several reasons (Alsharairi et al., 2020). It is relatively more challenging to detect than AEM, which tends to draw the scrutiny of auditors and regulators more than REM (Kim et al., 2019). Furthermore, REM encompasses actual business activities, thereby justifying it as a managerial decision.

Research shows that firms with solid finances are more inclined to utilize REM, as their financial stability provides them with greater flexibility to achieve optimal business efficiency (Muljono & Sung Suk, 2018). On the other hand, companies that experience more significant financial difficulties tend to be less involved in REM because it requires high costs (Li et al., 2020). According to Zang (2012), REM, due to its more expensive nature compared to AEM, carries more significant risks and economic consequences for the company, which can worsen the company's current condition. From the preceding explanation, the following hypothesis is proposed:

H2: Real earnings management positively impacts bankruptcy risk.

2.4. Business strategy

Companies operate in a highly dynamic environment, necessitating the adoption of diverse strategies to address various challenges (Ghazalat & AlHallaq, 2009). Porter (1980) asserts that organizations that maintain a competitive edge in a tough marketplace by employing unique strategies, unlike their rivals, can achieve lasting business success objectives. Porter's (1980) competitive strategy framework identifies two main approaches: cost leadership and differentiation. Firms pursuing a cost leadership strategy primarily maximize productivity by implementing efficient cost management and asset savings while maintaining a consistent level of quality (Purba et al., 2022; Fedora et al., 2025). Conversely, the differentiation strategy focuses on developing unique products, building strong customer relationships, and implementing distinct distribution channels to secure exceptional financial returns (Agustia et al., 2020).

Though implemented differently, both strategies pursue a common goal: improving performance or attaining the highest profit margins. Essentially, they function as a protective measure for business sustainability, assisting organizations in addressing competitive challenges and mitigating financial risks of collapse. This view aligns with research conducted by Bryan et al. (2013), which examined how business strategies influence company failures, offering empirical support that effective strategies enhance financial performance and consequently lower the risk of failure in bankruptcy. Based on the description, the following research hypotheses are proposed:

H3: Implementing a cost leadership approach minimizes a company's exposure to bankruptcy risk.

H4: Adopting a differentiation strategy helps safeguard a company against bankruptcy risk.

3. RESEARCH METHODOLOGY

This study employs multiple linear regression analysis to test the hypotheses, primarily utilising the fixed effect model with clustered standard errors and generalized least squares (GLS) weighting to address the issue of heterogeneity and autocorrelation. In addition, this study also employs the 2SLS method to address the endogeneity problem that arises in the model. The 2SLS method facilitates more consistent parameter estimation by incorporating instrumental variables that satisfy the criteria of relevance and exogeneity.

$$\frac{TAC_{jt}}{A_{jt-1}} = \alpha_1 \left(\frac{1}{A_{jt-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{jt} - \Delta REC_{jt}}{A_{jt-1}} \right) + \alpha_3 \left(\frac{PPE_{jt}}{A_{jt-1}} \right) \quad (1)$$

where,

- TAC_{jt} — total accruals of firm j in period t ;
- A_{jt-1} — total assets of firm j at the end of period $t - 1$;
- ΔREV_{jt} — change in revenue of firm j from period $t - 1$ to period t ;
- ΔREC_{jt} — change in receivables of firm j from period $t - 1$ to period t ;

$$NDA_{jt} = \alpha_1 \left(\frac{1}{A_{jt-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{jt} - \Delta REC_{jt}}{A_{jt-1}} \right) + \alpha_3 \left(\frac{PPE_{jt}}{A_{jt-1}} \right) + \varepsilon_{jt} \quad (2)$$

where, NDA_{jt} — non-discretionary accruals for company j in period t .

3) Next, DA is determined by deducting NDA from TAC .

$$|DA_{jt}| = \frac{TAC_{jt}}{A_{jt-1}} - NDA_{jt} \quad (3)$$

where, DA_{jt} — absolute value of discretionary accruals.

3.2. Measurement and proxies for real activities earnings management

Real earnings management can be achieved in three ways: through sales manipulation, cutting discretionary spending, and overproduction. (Roychowdhury, 2006; Sun et al., 2014).

This research utilises data from the Bloomberg database. The study includes companies listed on the IDX between 2019 and 2023. This research sample does not include financial firms due to their distinct regulations and governance concerning bankruptcy risk (Fama & French, 1992). Considering the available data for conducting research variables, a sample of 189 companies was obtained, meaning 756 company-year observations. The following table is the criteria for sample selection.

Table 1. Sample criteria

Criteria	Unit
Non-financial companies consistently listed from 2019–2023	598
Companies with incomplete data	375
Companies with extreme outliers	34
Final total sample	189

3.1. Measurement and proxies for accrual-based earnings management

Accrual-based earnings management can be estimated through DA (Campa & Camacho-Miñano, 2013). This research employs the modified Jones (1991) model to measure DA . This model provides more accurate results than other models (Cohen et al., 2008). The following are the steps and formulas used in this study to measure DA .

1) Calculation of total accrual (TAC). Regression analysis is conducted on TAC items to derive coefficients: $\alpha_1, \alpha_2, \alpha_3$.

- PPE_{jt} — property, plant, and equipment of firm j in period t ;
- $\alpha_1, \alpha_2, \alpha_3$ — regression coefficients estimated from the sample.

2) Calculation of non-discretionary accrual (NDA). Once the coefficient values α_1, α_2 , and α_3 are obtained, they are utilized to measure the NDA of each sample company using the following formula.

1) Sales manipulation. Sales manipulation occurs when managers try to temporarily increase sales in a certain period by providing price discounts or unreasonable credit terms (Sun et al., 2014). Additionally, offering price reductions to boost sales is a viable strategy for enhancing both sales volume and profits within the existing timeframe, contingent upon maintaining a favourable profit margin. However, this approach will decrease financial inflows during that same period (Utami & Pernamasari, 2020). Consequently, sales manipulation correlates with a decline in liquidity during the current period when compared to the prior period. (Roychowdhury, 2006). Following the research by Roychowdhury (2006), the initial measure of REM is assessed through unusual cash flow from operations, calculated using Eq. (4).

$$\frac{CFO_{jt}}{TA_{jt-1}} = \alpha_0 \left(\frac{1}{TA_{jt-1}} \right) + \alpha_1 \left(\frac{SALES_{jt}}{TA_{jt-1}} \right) + \alpha_2 \left(\frac{\Delta SALES_{jt}}{TA_{jt-1}} \right) + \varepsilon \quad (4)$$

where,

- CFO_{jt} — cash flow from operations of company j in year t ;
- TA_{jt-1} — total assets of company j in the previous period;
- $SALES_{jt}$ — sales of company j in year t ;
- $\Delta SALES_{jt}$ — change in sales from the previous period.

Abnormal cash flow is calculated from the actual cash flow's absolute value minus the cash flow's normal value obtained from the coefficients in the regression model.

2) A decrease in discretionary spending. REM carried out through a decrease in discretionary spending aims to increase profits because these expenses are typically charged during the same period as the expenses occur (Sun et al., 2014). In this study, discretionary spending is measured based on research by Roychowdhury (2006), covering costs associated with advertising, research and development, sales activities, and general and administrative expenses operations. This study conducted a regression based on

$$\frac{PROD_{jt}}{TA_{jt-1}} = \alpha_0 \left(\frac{1}{TA_{jt-1}} \right) + \alpha_1 \left(\frac{SALES_{jt}}{TA_{jt-1}} \right) + \alpha_2 \left(\frac{\Delta SALES_{jt}}{TA_{jt-1}} \right) + \alpha_3 \left(\frac{\Delta SALES_{jt-1}}{TA_{jt-1}} \right) + \varepsilon \quad (6)$$

where, $PROD_{jt}$ — production costs that include the cost of goods sold and changes in sales.

Abnormal production costs are the residual value of Eq. (6). High abnormal production costs indicate REM (Roychowdhury, 2006).

3.3. Measurement and proxies for business strategy

3.3.1. Cost leadership strategy

Cost leadership strategy is measured through asset turnover of operation (ATO), which measures operational efficiency by comparing sales with average operating assets (Agustia et al., 2020).

$$ATO_{jt} = \frac{\text{Operating sales}_{jt}}{\text{Average operating assets}_{jt}} \quad (7)$$

where,

$$\text{Operating assets} = TA - \text{Cash} - \text{Short term investment} \quad (8)$$

3.3.2. Differentiation strategy

A metric of this approach is the profit margin (PM), which signifies the firm's ability to generate profits from unique or differentiated products (Agustia et al., 2020). The PM is determined by comparing the sum of operating income and research and development (R&D) expenses to total sales.

$$PM = \frac{\text{Operating income}_{jt} + \text{R\&D expenses}_{jt}}{\text{Sales}_{jt}} \quad (9)$$

the following equation to obtain the abnormal value of discretionary spending.

$$\frac{DISX_{jt}}{TA_{jt-1}} = \alpha_0 \left(\frac{1}{TA_{jt-1}} \right) + \alpha_1 \left(\frac{SALES_{jt-1}}{TA_{jt-1}} \right) + \varepsilon \quad (5)$$

where, $DISX_{jt}$ — discretionary expenditure of company j in year t .

After the estimation regression model is obtained, the value of DA expenditure is compared with the estimated value from the model. The deviation or difference between actual and predicted expenditures is considered abnormal and indicated as REM.

3) Overproduction. Companies that engage in REM through overproduction can boost profits since these activities lower the cost of goods sold. When there is excess production of goods, the cost of goods sold drops as overhead costs are distributed over more units (Luu Thu, 2023). Abnormal production costs are estimated based on the following regression model.

3.4. Bankruptcy risk

Bankruptcy risk is the main focus of this study. Therefore, finding the most appropriate proxy for estimating bankruptcy risk is essential. This study employs the Altman Z-score as a measure of bankruptcy risk. This model has been proven to work very well in predicting bankruptcy in samples at the global level, with a prediction accuracy of up to 75% (Altman et al., 2014). Following Altman et al. (1977), the Z-score value is calculated based on the equation shown below.

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5 \quad (10)$$

where,

$$X1 = \frac{\text{Working capital}}{TA} \quad (11)$$

$$X2 = \frac{\text{Retained earnings}}{TA} \quad (12)$$

$$X3 = \frac{\text{Earnings before interest and taxes}}{TA} \quad (13)$$

$$X4 = \frac{\text{Market value of equity}}{\text{Book value of total liabilities}} \quad (14)$$

$$X5 = \frac{\text{Sales}}{TA} \quad (15)$$

3.5. Empirical model

This study uses the research Model 1 from Eq. (16) to answer $H1$, $H2$, $H3$, and $H4$. In addition to the specified independent variables, this

study incorporates various control variables, consistent with methodologies employed in prior research (Agrawal & Chatterjee, 2015; Bryan

et al., 2013; Luu Thu, 2023; Dalwai & Salehi, 2021; Agustia et al., 2020).

$$Z_Score_{jt} = \beta_0 + \beta_1 DA_{jt} + \beta_2 Ab_CFO_{jt} + \beta_3 Ab_DISX_{jt} + \beta_4 Ab_PROD_{jt} + \beta_5 ATO_{jt} + \beta_6 PM_{jt} + \beta_7 LEV_{jt} + \beta_8 SIZE_{jt} + \beta_9 LIQ_{jt} + \beta_{10} LOSS_{jt} + \beta_{11} Year \& Industry + \varepsilon \quad (16)$$

where,

- *Z_Score* — Altman Z-score;
- *DA* — discretionary accrual;
- *Ab_CFO* — abnormal cash flow operation;
- *Ab_DISX* — abnormal discretionary expenditure;
- *Ab_PROD* — abnormal production;
- *ATO* — asset turnover of operation;
- *PM* — profit margin;
- *LEV* — leverage (total liabilities to assets ratio);
- *SIZE* — company size (natural logarithm of total assets);
- *LIQ* — liquidity ratio (the speed of the company to convert assets into cash, calculated through total cash and cash equivalents divided by total assets);
- *LOSS* — dummy variable indicating whether the company is experiencing a loss, with a value of 1 indicating that the company is experiencing a loss and 0 otherwise;
- *Year & Industry* — indicator variables for fiscal years 2019–2023 (IDX sample period, one year is omitted as the base category) and for IDX sector classifications (one sector is omitted as the base category);
- ε — disturbance term.

4. RESULTS AND DISCUSSION

Table 2 presents a comprehensive overview of the descriptive statistical findings derived from this research. The observed minimum value of the *Z-score* is recorded at -0.70, while the maximum reaches a value of 11.27. The dataset of *Z-score* demonstrates an average of 3.37 and a standard deviation (SD) of 3.10. This indicates a significant variation in the financial condition of the research sample companies. *DA* exhibits an average value of -0.55 with a corresponding SD of 0.15. This negative value indicates that most sample companies tend to have negative *DA*, which means that the company records less accrual than expected based on accounting standards. This indicates that the company may reduce or delay the recording of income or expenses that should be recorded.

Table 2. Descriptive statistics

Variable	Min	Max	Mean	SD
<i>Z-score</i>	-0.70	11.27	3.37	3.10
<i>DA</i>	0.06	0.1	-0.55	0.15
<i>Ab_CFO</i>	-0.35	0.34	-0.004	0.12
<i>Ab_DISX</i>	-0.16	0.65	0.05	0.19
<i>Ab_PROD</i>	-0.83	0.28	-0.018	0.178
<i>ATO</i>	0.017	2.43	0.75	0.57
<i>PM</i>	-0.35	0.28	0.037	0.14
<i>LEV</i>	0.13	2.16	0.51	0.31
<i>SIZE</i>	25.33	31.34	28.45	1.51
<i>LIQ</i>	0.003	0.53	0.1	0.1
<i>LOSS</i>	0	1	0.30	0.46

Source: Authors' elaboration using R Studio.

The average values of all REM proxies are nearly zero, meaning that some companies in the sample use REM as a tool to increase profits, and others vice versa. Meanwhile, the higher average *ATO* value compared to *PM* suggests that the sampled companies prioritize a cost leadership strategy over differentiation.

4.1. Multicollinearity test

Table 3 displays the multicollinearity test result. All variables fall within the acceptable range of less than 10, with the *Ab_PROD* variable exhibiting the highest variance inflation factor (VIF) value at 5.241847. The results obtained affirm the nonexistence of multicollinearity issues within the dataset.

Table 3. Multicollinearity test results

Variable	VIF	GVIF ^{1/(2 * df)}
<i>DA</i>	2.57244	1.603883
<i>Ab_CFO</i>	2.428680	1.558422
<i>Ab_DISX</i>	3.714262	1.927242
<i>Ab_PROD</i>	5.241847	2.289508
<i>ATO</i>	1.574969	1.254978
<i>PM</i>	2.283814	1.511229
<i>LEV</i>	1.374540	1.172408
<i>SIZE</i>	1.344843	1.159674
<i>LIQ</i>	1.369412	1.170219
<i>LOSS</i>	2.059826	1.435209
Factor (<i>Industry</i>)	2.146307	1.043344
Factor (<i>Year</i>)	2.623544	1.174396

Source: Authors' elaboration using R Studio.

4.2. Pearson correlation

The results of the Pearson product-moment test, shown in Table 4, demonstrate the relationships among the dependent variable, independent variable, and other relevant factors in this study. The Pearson product-moment test indicates that the *Z-score* does not correlate with *DA*, consistent with earlier research by Agustia et al. (2020). The correlation coefficients between the *Z-score* and REM, represented by *Ab_CFO* and *Ab_DISX*, are 0.22 and 0.26, respectively, both significant at the 0.01 level. These results contrast with earlier research indicating that REM adversely affects a company's financial well-being (Xu et al., 2021; Joosten, 2012). Furthermore, the differentiation strategy exhibits a significantly positive correlation with the *Z-score*, reflected by a coefficient of 0.28 at a 0.01 significance level. Meanwhile, on the control variables *LEV* and *LOSS*, the results of the Pearson correlation show a significant negative value, which means that firms with more outstanding financial obligations and experiencing losses face an increased risk of bankruptcy.

Table 4. Pearson correlation test results

Variable	Z	DA	Ab_CFO	Ab_DISX	Ab_PROD	ATO	PM	LEV	SIZE	LIQ	LOSS
Z	1										
DA	-0.005	1									
Ab_CFO	0.22***	-0.0002	1								
Ab_DISX	0.26***	0.04	0.16	1							
Ab_PROD	-0.36	-0.06	-0.57	-0.76***	1						
ATO	0.40	0.04	-0.09***	0.31***	-0.17***	1					
PM	0.29***	0.08***	0.34***	0.12***	-0.35***	0.25***	1				
LEV	-0.53***	-0.01	-0.17***	-0.03***	0.13***	-0.10***	-0.16***	1			
SIZE	-0.002	-0.03	0.35***	0.05***	-0.19***	0.08***	0.33***	-0.037	1		
LIQ	0.37***	0.07	0.27***	0.15***	-0.23***	0.28***	0.23***	-0.31***	0.088***	1	
LOSS	-0.35***	-0.03	-0.23***	-0.09***	0.22***	-0.32***	-0.64***	0.28***	-0.32***	-0.26***	1

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' elaboration using R Studio.

4.3. Primary analysis

This research applies a panel data analysis with clustered standard errors and GLS weighting to enhance robustness. The weighting method reduces disparities among cross-sectional units and improves consistency in the analysis (Gujarati & Porter, 2009). This study incorporates clustered standard errors, adjusting for year and industry fixed effects to address heteroscedasticity and autocorrelation. This approach ensures that the model's error terms remain consistent and reliable across different conditions (Petersen, 2009). The study's data is winsorized at 1% to address the normal distribution issue. A panel data regression analysis employs the Chow test to determine whether a common effect model or a fixed effect model is more appropriate, followed by the Hausman test to assess the appropriateness of fixed effect versus random effect models. Table 5 presents the findings of the Chow test, whereas the results of the Hausman test are displayed in Table 6.

Table 5. Chow test results

Model	F-statistic	df1	df2	p-value
Pooled vs. Fixed effect	2.2533	9	736	0.0173

Source: Authors' elaboration using R Studio.

The model's significance is evaluated using a p-value of 0.0173. This result confirms that the individual effect is statistically significant. Hence, the fixed-effect model is more appropriate.

Table 6. Hausman test results

Statistical test	Value
Chi-squared	55.872
df	10
p-value	2.17e-08

Source: Authors' elaboration using R Studio.

The Hausman test yields a p-value of 2.17e-08, significantly lower than 0.05. This suggests that the fixed effects model is the most suitable model for analyzing the dataset in this study.

The test results with fixed effect clustered standard error can be seen in Panel A of Table 7.

4.4. Additional analysis

The results of testing with fixed effects may be influenced by bias due to endogeneity problems. (Kim et al., 2019). Therefore, it is important to carefully address potential endogeneity issues. This study conducts additional tests to examine whether the findings are affected by omitted variable bias and endogeneity issues. To address these issues, this study applies the 2SLS approach. In the first stage of the 2SLS approach, this study estimates the value of earnings management and bankruptcy risk (Rakshit et al., 2024; Hassanpour & Ardakani, 2017).

The instrument variables used are carefully selected based on research that has been proven in previous literature to affect bankruptcy risk. Specifically, the variable is a business group with an indicator that is one if the company is affiliated with a business group and zero if the company is an independent entity (Beaver et al., 2024), political connections are measured using a dummy variable, where the variable has a value of one if the board of directors and commissioners of the company are affiliated with politics and zero otherwise (Rahim et al., 2024), and Big 4 as a proxy for the level of auditor supervision, using a dummy variable with a value of one if the company auditor is one of the four large auditor firms and zero otherwise (Xu et al., 2021).

In the second stage, using the estimation results from the first stage of testing, this study then conducted a test on the initial model. As an additional step to ensure the validity of the use of instrumental variables in the 2SLS approach, we conducted an overidentification test (Sargan, 1958). The results show that the instrument meets the exogeneity assumption. In this test, we do not include goodness-of-fit statistics for the 2SLS estimation results because our main focus is to obtain more consistent estimation results (Verbeek, 2004). The results of the 2SLS test are presented in Panel B of Table 7.

Table 7. Fixed effect GLS weighting and 2SLS regression result

Variable	Panel A: Fixed effect		Panel B: 2SLS	
	Coefficient	t-value	Coefficient	t-value
Intercept	4.844	(3.842)***	19.312	(5.898)***
DA	-1.251	(-1.377)	-0.001	(-0.503)
Ab_CFO	1.259	(1.851)*	3.680	(3.677)***
Ab_DISX	0.752	(1.445)	0.354	(0.506)
Ab_PROD	-0.627	(-0.911)	-2.238	(-2.481)*
ATO	0.821	(6.981)***	1.459	(8.511)***
PM	1.065	(1.965)**	1.576	(1.850)*
LEV	-2.644	(-13.341)***	-3.760	(-13.130)***
Size	-0.021	(-0.510)	-0.537	(-4.68)***
LIQ	0.161	(0.267)	2.502	(2.917)**
Loss	-0.157	(-0.984)	-0.673	(-2.636)**
Year & Industry dummy	Included		Included	
F	119.62***			
R ²	0.7898			
Adj. R ²	0.7835			
Sargan test (p-value)			0.275	
N	756		756	

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.5. Discussion

Panel A of Table 7 presents the primary analysis results using fixed effects with GLS weighting and clustered standard errors. The F-statistic value of 119.62 is significant and very high, which means that the overall model is relevant in explaining bankruptcy risk. Upon examining the fixed effect test results, the coefficient of DA, which serves as a proxy for AEM, appears to be statistically insignificant. Similar findings are observed when employing the 2SLS approach. This result contradicts the proposed hypothesis and the findings of most prior research (Agrawal & Chatterjee, 2015; Luu Thu, 2023). However, this insignificant result is in line with research conducted by Agustia et al. (2020), who found that earnings management is not always an indicator of a company's financial health problems, as even financially stable companies engage in such practice.

The findings of the REM proxy test indicate that abnormal cash flow (*Ab_CFO*) exhibits a significant value at the $p < 0.1$ level using the fixed effect approach and 0.01 in 2SLS, with a positive coefficient trend. This means that REM actions through sales manipulation reduce the risk of bankruptcy; this result is contrary to the hypothesis statement (*H2*). This phenomenon can be elucidated as follows: a disproportionate escalation in sales will augment both the sales-to-total-assets ratio and the working-capital-to-total-assets ratio in calculating the Altman Z-score. An increase in these two ratios will subsequently elevate the Z-score, diminishing the indication of bankruptcy in the Altman analysis model. This aligns with studies conducted by Gunny (2010), which found that firms engaging in real activity manipulation to achieve profit targets tend to have better financial conditions in the following years. However, improving financial conditions is only temporary; in the long term, it can cause liquidity problems in the company (Roychowdhury, 2006).

The next proxy of REM that shows significant results is overproduction. Using the 2SLS approach, overproduction shows a significantly negative result at the 10% significance level. On the other hand, abnormal discretionary expenses show insignificant results under both estimation methods. This indicates that companies facing the risk of bankruptcy tend to manipulate profits through overproduction, rather than cutting non-core

operating costs. Profit manipulation through an overproduction strategy only provides short-term benefits, but has a negative impact on operational efficiency and the company's sustainability in the long term due to the accumulation of inventory that is not absorbed by the market (Xu et al., 2021; Zang, 2012).

The next hypothesis being tested is that business strategy lowers a company's bankruptcy risk. According to the fixed effect approach and 2SLS test result, both cost leadership and differentiation strategies significantly enhance the Altman Z-score. This finding validates the theoretical framework of Porter (1980), which states that the business strategy carried out by a company is an effort to gain market superiority and survive in a competitive industrial environment. In line with the research findings of Dalwai and Salehi (2021), Luu Thu (2023), and Agustia et al. (2020), the results of this study indicate that companies that adopt both cost leadership and differentiation business strategies can maintain cost efficiency and product competitiveness and be more resistant to financial pressure.

In this study, several control variables are found to have a significant influence on bankruptcy risk. Leverage, size, and loss have been shown to significantly increase the risk of bankruptcy. Meanwhile, liquidity plays an important role in reducing these risks. A significant reliance on debt instead of equity to finance a company's assets heightens its vulnerability to future financial instability, as the company must repay the interest and principal of the loan periodically. If a company does not have good operating cash flow, the company may experience difficulties in meeting its financial obligations, which could lead to bankruptcy (Hernandez Tinoco & Wilson, 2013). In addition, firm size also contributes to increased bankruptcy risk. Large-scale companies generally have high complexity and less efficient internal business processes, which slow down their ability to respond to financial pressures (Zikri et al., 2024).

5. CONCLUSION

In conclusion, this study can be summarized with the following points. Firstly, AEM has no impact on bankruptcy risk, which aligns with earlier studies performed in the Indonesian market by Agustia et al. (2020). Moreover, through sales manipulation, REM

shows a significant positive relationship with the Altman Z-score, indicating that increased sales manipulation enhances the company's financial standing. This positive relationship may be temporary, as sales manipulation can lead to liquidity issues for the company in the long run. Secondly, overproduction shows a significantly negative coefficient towards the Altman Z-score. These results support the findings of Xu et al. (2021), suggesting that firms engaging in excessive production practices are more likely to experience financial distress. Lastly, the findings of this study also emphasise a significant positive relationship between the two distinct business strategies and the bankruptcy risk, which is essential in augmenting financial stability. This finding confirms Porter's (1980) typology of business strategies means that strategic business approaches can enhance a company's competitive advantage.

This study has several limitations, including the fact that it only uses one developing country as a research sample, so generalising the research results to other countries requires caution. This study also has limitations related to the proxy

variables used, which may not be free from measurement errors. REM measurement with Roychowdhury's (2006) model faces several limitations, where the model contains the assumption that normal operating cash flow and cash flow from discretionary spending are considered uniform across all research samples; in practice, the financial condition and strategy of the company can be very diverse (Mellado & Saona, 2020). This model might inaccurately identify earnings management if a company exhibits a distinct cash flow or discretionary spending pattern. The third limitation is related to the sample period used, which was only four years, so it will be difficult to detect the long-term effects in the bankruptcy prediction model.

Further research is expected to expand the sample size to include several developing countries in a single region, thereby enhancing the generalizability of the study results. The use of other proxies for earnings management and bankruptcy risk is also highly recommended to understand the influence of different methods on research results.

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