

Open Access Article

The Role of Non-Financial Factors in Detecting Bankruptcy by Mediating Financial Performance

Ani Nuraini¹, Farah Margaretha Leon^{2*}, Bahtiar Usman²

¹ Doctoral Student of Universitas Trisakti, Jakarta, Indonesia

² Lecturer of the Economics and Business Faculty, Universitas Trisakti, Jakarta, Indonesia

Abstract: This study aimed to determine whether non-financial factors directly or indirectly affect bankruptcy through financial performance as a mediating variable. The novelty of this study combines non-financial information as an independent variable and financial performance as a mediating variable in determining the probability of bankruptcy. The population included 19 manufacturing companies listed on the Indonesia Stock Exchange from 2009 to 2019. Furthermore, secondary cross-section and time-series data analyzed using a structural equation model were used to examine the direct and indirect effects. Logistic regression was also performed to determine the effect of the bankruptcy probability. The data processing results show that the non-financial variables, including Corporate Governance, Market Information, Research and Development (R&D), and Macro Factors, do not directly affect bankruptcy. However, they significantly affect the mediation of Financial Performance on Return on Equity (ROE), while the Debt to Asset Ratio (DAR) is insignificant. This leads to a model that detects bankruptcy apart from direct financial performance. Furthermore, it is necessary to detect beforehand the effect of non-financial variables, comprising Good Corporate Governance (Boards of Commissioners and Directors), Market Information (Market Book), R&D, and Macro Factors (Interest and Exchange Rates). These results may help predict company bankruptcy using various non-financial information as independent variables. However, the information is inseparable from financial performance as a mediation determinant of the company's health.

Keywords: bankruptcy, corporate governance, financial performance, research, development.

非财务因素在通过调解财务业绩检测破产中的作用

摘要: 本研究旨在通过财务绩效作为中介变量来确定非财务因素是否直接或间接影响破产。总体包括 2009 年至 2019 年在印度尼西亚证券交易所上市的 19 家制造公司。此外, 使用结构方程模型分析的二次横截面和时间序列数据用于检查直接和间接影响。还进行了逻辑回归以确定破产概率的影响。数据处理结果表明, 非财务变量, 包括公司治理、市场信息、研发和宏观因素, 不直接影响破产。然而, 它们显著影响财务业绩对股本回报率的中介作用, 而债务与资产比率无关紧要。这导致了一个模型, 除了直接的财务表现外, 还可以检测破产。此外, 有必要事先检测非财务变量的影响, 包括良好的公司治理(委员会和董事)、市场信息(市场账簿)、研发、宏观因素(利率和汇率)。这些结果可能有助于使用各种非财务信息作为自变量来预测公司破产。然而, 这些信息与作为公司健康状况的中介决定因素的财务业绩密不可分。

关键词: 破产、公司治理、财务绩效、研究、开发。

Received: June 11, 2021 / Revised: August 8, 2021 / Accepted: September 7, 2021 / Published: October 30, 2021

About the authors: Ani Nuraini, Doctoral Student of Universitas Trisakti, Jakarta, Indonesia; Farah Margaretha Leon, Bahtiar Usman, Lecturer of the Economics and Business Faculty, Universitas Trisakti, Jakarta, Indonesia

Corresponding author Farah Margaretha Leon, farahmargaretha@trisakti.ac.id

1. Introduction

Bankruptcy is a long process that begins with a decrease in sales turnover or profits, which reduces cash inflows and hampers the company's operations. This causes bankruptcy when the company is insensitive to its financial condition. Therefore, it is necessary to conduct a comprehensive analysis to investigate its significant risk of bankruptcy. Furthermore, it is an interesting topic because all companies and interested parties are affected by bankruptcy [1].

The 2008 global crisis resulted in financial difficulties and ultimate company bankruptcies. This condition continued and worsened during the Covid-19 pandemic in early 2020. Subsequently, around 244 large American companies in the energy, retail, and consumer service industries have filed for bankruptcy [2]. Similarly, several manufactures in Indonesia were affected, with the products needed by the global market in the fourth quarter experiencing slow growth in several industries. The global crisis and the pandemic weakened the demand for these products on the global and domestic markets.

The previous study has examined bankruptcy. Altman developed the studies with several bankruptcy models and variables using various analytical methods [3]. This study aims to develop a bankruptcy model by adding non-financial variables to the implementation of governance in the form of a board of commissioners and board of directors variables, market information, Research & Development (R&D), and macroeconomic variables consisting of interest rates and exchange rates which of course cannot be separated from financial performance variables consisting of Debt to Asset Ratio (DAR) and Return on Equity (ROE) in influencing and predicting bankruptcy.

The expected results of this study are the formation of a bankruptcy model by examining the direct and indirect effects of financial performance variables as a mediation on non-financial variables and making predictions of bankruptcy with two-stage logistic regression.

The significance of the mediation model depends on the determined design and should consider the analysis to be used before research. Furthermore, it should explain why a mediator is needed and what variables are used as mediators [4]. A company is a default, financially distressed, or bankrupt when the financial ratio indicators are known, as reinforced by a previous study. Therefore, when using non-financial variables as independent, an intermediate variable is needed to determine the bankruptcy probability [5].

2. Literature Review

A bankruptcy classification model incorporating comprehensive input into discriminant analysis using bankrupt companies explores the model used in 1968 with five variables based on the ZETA sample.

However, the new model uses seven variables with the same sample to produce slightly more accurate results. This ZETA model could predict company bankruptcy five years earlier using a sample of manufacturing and retail companies [6, 7]. It is a significant problem for business, administration, and the economy [8]. Altman z-score is demonstrated to be extremely exact in predicting bankruptcy in a wide assortment of settings and markets [9].

The bankruptcy prediction was developed two years before as an improvement from the previous model [10]. A better method was introduced using a neural network to answer the weaknesses of the previous approaches [11].

The financial health of emerging companies is monitored by determining their sustainability and growth in a competitive world. In addition, signs of financial distress are identified to avoid bankruptcy and entry of new players into the market. Financial markets are integrated to attract foreign investors. Moreover, monitoring involves determining any reluctance to invest due to political uncertainty and coalitions [12]. Bankruptcy cannot be explained without macroeconomic variables as a whole economic condition not only caused by the company's internal financial ratios [13].

The first study empirically examined the relationship between firm life cycle stages and bankruptcy risk. It stated that managers should incorporate life cycle effects into financial planning and decision-making for sustainable firms [14]. The interaction between R&D investment timing, default probability, and capital structure is irreversible, with an uncertain return rate financed through debt. The company's attitude towards changes in R&D investment is determined after the leverage reaches a certain amount because the company becomes riskier, causing a higher default probability [15]. Furthermore, a company experiencing financial difficulties reduces R&D investment [16].

Corporate Governance is a non-financial factor that predicts bankruptcy. This is because good corporate governance is an effort to overcome corporate defaults [17]. In emerging markets, corporate governance is better able to predict defaults [18]. Market ratios such as the book-to-market ratio provide a reliable early warning signal about potential financial difficulties [19]. Additionally, increasing linkages in financial markets leads to default [20]. Information, including the four basic financial statements, is important in measuring relative performance. Financial ratios are a calculation method that interprets financial ratio results to analyze and monitor company performance [21].

2.1. Previous Studies

Ratios that measure liquidity, profitability, and solvency, are significant indicators. Bankruptcy predictions use certain ratios, and each study has

different importance based on effective indicators of future problems [22]. Using logistic regression analysis to find the determinants of default risk with financial performance factors to predict bank failures [23].

The hypothesis was examining the relationship between corporate governance and default prediction using logistic regression results in a less effective board [24]. However, the logistic regression model shows that the composition of the board of commissioners and directors positively affects financial distress [25, 26].

Previous studies examined the indirect effect of financial distress on profitability, employment, and R&D investment using 42 ratios. R&D has a high failure risk because of its characteristics and accounting estimation [27]. Furthermore, R&D investment significantly reduced the default probability for financially constrained firms [28].

Black Scholes and Merton's model is based on market information, and the market price describes future cash flow and can predict bankruptcy. Moreover, some studies used market-based models to predict default. Corporate bankruptcy due to the crisis is inseparable from macro variables, which are the overall economic condition [13]. External factors as macro variables include inflation and the exchange rate, causing companies to experience financial difficulties [29]. Other macro variables include interest rates, SP 500 stock returns, and gross domestic product [30].

Several previous studies evaluated bankruptcy using traditional statistical techniques such as discriminant analysis, logistic regression, and artificial intelligence models [31]. More companies are facing economic problems and financial difficulties that could lead to bankruptcy in the current conditions. The Partial Least Square model with Logistic Regression (PLS-LR) integrates most ratios to solve the correlation problem by considering the missing data in the matrix [32]. The multi-period logit model shows strong predictors of possible financial distress for private companies in Greece. These include profitability, leverage, retained earnings to total assets, size, liquidity ratio, export dummy variable, dividend payout, and real GDP growth rate [33].

Empirical findings using logit regression show that the predictive model of corporate financial distress, which includes financial factors with macroeconomic indicators, performs better [34].

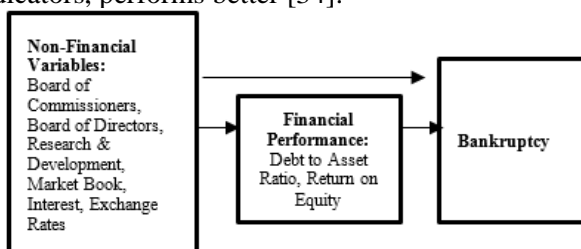


Fig. 1 Conceptual framework

The conceptual framework in Figure 1 explains the effect of non-financial independent variables,

comprising Board of Commissioners (BoC), Board of Directors (BoD), R&D, Market Book (MB), Interest (INT), and Exchange Rates (ER), on the dependent variable of bankruptcy. The effect is either direct or indirect using financial performance mediating variables, consisting of DAR and ROE.

2.2. Hypothesis

2.2.1. The Direct Effect of Non-Financial on Bankruptcy

The non-financial variables consist of Governance, BoC, and BoD. A large board of directors is an ineffective monitor, and CEOs as founders have more effect on their company's operations and are less accountable to the board of directors. In addition, various studies show that the composition of the board of directors determines its effectiveness. Fama and Jensen stated that a board consisting mostly of outsiders is more effective in improving the company's financial performance. Several tests were later performed to support additional corporate governance information for the default prediction [24]. Based on the previous study, the following hypothesis is formulated:

H1a: The Effect of the BoC on Bankruptcy

H1b: The Effect of the BoD on Bankruptcy

A previous study demonstrated the effect of R&D on bankruptcy. The company's attitude towards changes in R&D investment is determined after the leverage reaches a certain amount because the company becomes riskier, increasing the default probability [15]. This study shows that research and development significantly reduce the default probability [28]. Based on previous studies, the following hypothesis is formulated:

H1c: Effect of R&D on Bankruptcy

The effect of Market Information on bankruptcy was examined by previous studies using financial ratios. The studies have been developed by adding market information as a variable to predict failure [20]. When bankruptcy risk is systematic, it implies a positive relationship between the risk and the realization of subsequent returns. However, the results document a negative relationship between default risks and realized stock returns in the post-1980 period.

This evidence suggests that the cost of equity capital decreases with default risk, a finding with important implications for corporate financial policy [35]. Based on the previous study, the following hypothesis is formulated:

H1d: The Effect of MB on Bankruptcy

The relationship between the non-financial default probabilities of firms and households and the evolution of the macroeconomic environment was examined. The results support the credit risk literature proving the importance of macroeconomic variables in determining aggregate default in non-financial corporate and

household sectors. The macro variables used are GDP, exchange rate, and inflation [36]. Based on previous studies, the following hypothesis is formulated:

H1e: The Effect of Interest on Bankruptcy

H1f: The Effect of ER on Bankruptcy

2.2.2. Indirect Effect of Non-Financial on Bankruptcy by Mediation of Financial Performance

The financial information (ratios) accurately affects defaults in developed countries, such as America, but is less accurate in emerging countries. Studies on developed and emerging markets indicate that bankruptcy predictions come from financial information. However, several other studies confirm the importance of corporate governance as a source of non-financial information [18].

Previous studies have stated that financial information is a significant ratio in predicting default [12, 37, 38]. The study used financial performance as a mediating variable from the independent variables of firm size, capital structure, GCG, and macro fundamentals affecting firm value [39]. The panel data test results show that stocks with a high bankruptcy probability have lower performance and vice versa, or there would be a market reaction to the company's financial health in case of any difference [16].

The study with 66 analysis units and 22 companies using the SEM method concluded that financial performance as a mediating governance variable could significantly affect firm value [40]. Furthermore, a study on Islamic banks from several countries examined liquidity risk, cost efficiency, profitability (ROE and PBTZ) as mediating variables.

The results showed that the profitability variable could mediate cost efficiency to liquidity risk [41]. In addition, a test was conducted on the financial performance-mediating variable from CSR to institutional investors. The panel data results showed that financial performance mediates CSR to institutional investors. In this case, CSR negatively affects financial performance, which in turn harms institutional investors. Therefore, financial performance is a significant mediation. Based on previous studies, the following hypotheses are formulated:

H2a: Indirect Effect of BoC on Bankruptcy by Financial Performance Mediation

H2b: Indirect Effect of BoD on Bankruptcy by Financial Performance Mediation

H2c: Indirect Effect of R&D on Bankruptcy with Financial Performance Mediation

H2d: Indirect Effect of MB on Bankruptcy by Financial Performance Mediation

H2e: Indirect Effect of Interest on Bankruptcy by Financial Performance Mediation

H2f: Indirect Effect of ER on Bankruptcy by Financial Performance Mediation

3. Methodology

Using the mediating variable, this study used a structural equation model to test the direct and indirect relationship between the independent and dependent variables. Additionally, logistic regression was used to determine the bankruptcy probability on the independent and non-financial variables and financial performance. The study population comprised 19 manufacturing companies listed on the Indonesia Stock Exchange in 2009 – 2019. This resulted in 209 observational data. The Altman model using discriminant analysis of bankrupt and non-bankrupt companies determines bankruptcy. Furthermore, the structural equation model analysis is used to determine whether the direct and indirect effects of the independent variables are through mediation. Logistic regression is used to determine the bankruptcy probability using coefficient values and odds ratios.

3.1. Structure Equation Model

This SEM is an estimate because it specifically processes equations with simultaneous relationships and direct and indirect effects [42]. The equation model is as follows:

$$Y_{it} = \beta_{oit} + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \dots + \epsilon_{it} \quad (1)$$

$$X_{1t} = \Omega_{oit} + \Omega_1 X_{it} + \Omega_2 X_{it} + \Omega_3 X_{it} + \dots + \epsilon_{it} \quad (2)$$

$$X_{2t} = \pi_{oit} + \pi_1 X_{it} + \pi_2 X_{it} + \pi_3 X_{it} + \dots + \epsilon_{it} \quad (3)$$

Equation (1) shows the direct impact of the independent variable, while equations (2) and (3) show an indirect impact through X1 and X2.

3.2. Logistics Panel Regression

The logistics model is shown in equation (4):

$$y_i = X_i\beta + e_i \quad (4)$$

The dependent variable is transformed to calculate the probability for y group 1 for each $X_i\beta$ value. Also, it transforms the $X\beta$ value into a value between 0 – 1 [42].

Therefore:

$$\text{Ln} \left[\frac{Pi}{1-Pi} \right] = z = X\beta = b_1X_1 + b_2X_2 + \dots \quad (5)$$

Model (5) produces equations with odd ratio analysis using probability.

3.3. Empirical Models

This study examines the direct and indirect effects of non-financial variables, comprising BoC, BoD, R&D, MB, Interest, and ER, on financial performance variables consisting of DAR and ROE on Bankruptcy (B). The measurement of the variables is shown in Table 1.

Table 1 Measurements of variable

Variable	Proxy	Formula
----------	-------	---------

Variable	Proxy	Formula
Dependent: Bankruptcy (B)	Bankruptcy = 1	Separate value $= \frac{(n1C0+n2C1)}{n1+n2}$ n1= number of sample bankruptcy n2 = number of sample non – bankruptcy
	Non-Bankruptcy = 0	C0 = function at group centroids bankruptcy C1= function at group centroids non - bankruptcy
Independent: DAR	Debt to Asset Ratio	$DAR = \frac{\text{Total Debt}}{\text{Total Assets}}$
ROE	Return on Equity	$ROE = \frac{EAT}{\text{Equity}}$
BoC	Board of Commissioners	Number of BoC
BoD	Board of Directors	Number of BoD
RD	Research & Development	Investment on R&D
MB	Market to Book Ratio	$MB = \frac{\text{share price}}{\text{Net book value per share}}$
INT	Interest	Interest rate
ER	Exchange Rates	US \$

4. Results

Table 2 describes the data from each variable, showing the mean, standard deviation, minimum and maximum values. The results show that the DAR variable has an average value of 0.1788224, close to the minimum value of 0.1263847. This means that most companies in this study only use a little debt, the average ROE is 0.2981245, and other companies have an ROE reaching 1.916163 and a negative ROE of -0.0546823. Governance is proxied with an average BoC of 5 and BoD of 6. Furthermore, for R&D companies, the average investment is 153,486.1, while the market ratio proxied by MB has an average of 6.366839. The macro factor consisting of INT has an average of 0.0629545 or about 6%, while ER has an average of 11,901.73 US\$.

Table 2 Descriptive data

Variables	Obs	Mean	Std. Dev.	Min	Max
DAR	209	0.3568964	0.1788224	0.1263847	0.9444644
ROE	209	0.2981245	0.3765234	-0.0546823	1.916163
BoC	209	5.220096	2.121179	2.000	11.000
BoD	209	5.736842	2.312722	2.000	12.000
RD	209	153486.1	581718.9	0.000	3092853
MB	209	6.366839	12.04083	0.177636	82.44443
INT	209	0.0629545	0.0102392	0.0425	0.0775
ER	209	11901.73	2081.089	8991	14481
B	209	0.8708134	0.3362117	0.000	1.000

Note: n = 209

The data processing results in SEM analysis are in Table 3. They consist of three equations, with the dependent variables being bankruptcy (B) and financial performance (DAR and ROE). These results show that the variable coefficients in the structural equation model are significant with a p-value < 0.05. The direct effect for all non-financial and financial performance variables is that only the ROE variable is directly significant to bankruptcy (B). The financial performance (DAR and

ROE) is then the dependent variable to mediate non-financial variables (BoC, BoD, RD, MB, INT, and ER). The significant dependent variables of DAR are BoC, BoD, RD, and MB, while the significant ROE dependent variables are BoC, BoD, RD, MB, and ER.

Table 3 Structural equation model

Variable	Coefficient	P> z
Structural		
Dependent: Bankruptcy (B)		
Independent: DAR	0.089445	0.368
ROE	-0.6865767***	0.000
BoC	-0.0151395	0.142
BoD	0.0132911	0.215
RD	7.76e-08	0.176
MB	-0.0049007*	0.086
INT	-0.7098159	0.637
ER	-1.75e-06	0.821
CONS	1.131115***	0.000
Dependent: DAR		
Independent: BoC	0.0178838***	0.009
BoD	-0.0325993***	0.000
RD	8.73e-08**	0.018
MB	0.0043602**	0.014
INT	-0.7852745	0.453
ER	5.73e-06	0.267
CONS	0.3905926***	0.000
Dependent: ROE		
Independent BoC	-0.0302999***	0.000
BoD	0.0367264***	0.000
RD	2.38e-07***	0.000
MB	0.014011***	0.000
INT	0.984653	0.399
ER	-0.0000227***	0.000
CONS	0.3284421***	0.003

Note: n = 209 sample; Significant Levels: *p < 0.1, **p < 0.05, ***p < 0.01

The indirect effect of the financial performance variables (DAR and ROE) in Table 4 was determined using the Delta, Sobel, and Monte Carlo tests. The results show that the variables BoC, BoD, RD, MB, INT, and ER towards B through DAR are insignificant with a p-value > 0.05. These results are reinforced by the conclusions of the Baron and Kenny Approach. However, Zhao, Lynch, and Chen's Approach conclude that DAR mediates BoC by 12%, BoD by 28%, RD by 9%, MB by 9%, INT by 9%, and ER by 42 %.

Table 4 Significance Testing of Indirect Effect Dar-Med (Unstandardized)

Estimates	Delta	Sobel	Monte Carlo	Baron and Kenny Approach	Zhao, Lynch & Chen's Approach
BoC p-value	0.002	0.002	0.002	BoC →	RIT: BoC→B
	0.395	0.395	0.375	DAR not significant	med DAR=12%
BoD p-value	-	-	-0.003	DAR → B not significant	RID: med DAR
	0.003	0.003	0.354	BoD →	0.1x BoC→B
RD p-value	0.376	0.376	0.354	DAR not significant	RIT: BoD→B
	0.000	0.000	0.000	DAR → B not significant	med DAR=28%
ER p-value	0.000	0.000	0.000	RD → DAR	RID: med DAR
	0.000	0.000	0.000	RD → DAR	0.2x BoD→B
INT p-value	0.000	0.000	0.000	ER → DAR	RIT: RD→B
	0.000	0.000	0.000	ER → DAR	

Estimates	Delta	Sobel	Monte Carlo	Baron and Kenny Approach	Zhao, Lynch & Chen's Approach						
p-value	0.400	0.400	0.387	not significant	med DAR=9% RID: med DAR 0.1x RD→B		0.000	0.000	0.000	significant ROE → B significant MB → B not significant	med ROE=66% RID: med ROE 2.0x MB→B
MB p-value	0.000 0.398	0.000 0.398	0.000 0.383	MB → DAR not significant	RIT: MB→B med DAR=9% RID: med DAR 0.1x MB→B	INT p-value	-0.676 0.402	-0.676 0.402	-0.615 0.443	INT → ROE not significant ROE → B significant INT → B not significant	RIT: INT→B med ROE=49% RID: med ROE 1.0x INT→B
INT p-value	-0.070 0.565	-0.070 0.565	-0.078 0.651	INT → DAR not significant	RIT: INT→B med DAR=9% RID: med DAR 0.1x INT→B	ER p-value	0.000*** 0.000	0.000*** 0.000	0.000*** 0.000	KUR → ROE significant ROE → B significant ER → B not significant	RIT: ER → B med ROE = 113% RID: med ROE 8.9x ER→B
ER p-value	0.000 0.485	0.000 0.485	0.000 0.539	ER → DAR not significant	RIT:ER→B med DAR=42% RID: med DAR 0.3x ER→B						

Note: n = 209 sample; Significant Levels: *p < 0.1, **p < 0.05, ***p < 0.01

The indirect effect on the ROE variable is shown in Table 5. The Delta, Sobel, and Monte Carlo test results showed that the variables BoC, BoD, RD, MB, and ER toward B through ROE were significant with a p-value < 0.05. The variable INT to B through ROE is insignificant with a p-value > 0.05. The Baron and Kenny Approach and Zhao, Lynch and Chen's Approach, with ROE mediating BoC by 367%, BoD by 211%, RD by 190%, MB by 66%, and ER by 113%, while insignificant at INT by 49%, reinforce these results.

Table 5 Significance Testing of Indirect Effect Roe-Med (Unstandardized)

Estimates	Delta	Sobel	Monte Carlo	Baron and Kenny Approach	Zhao, Lynch & Chen's Approach
BoC p-value	0.021*** 0.000	0.021*** 0.000	0.021*** 0.000	BoC → ROE significant	RIT: BoC→B med ROE=367% RID: med ROE 1.4x BoC→B not significant
BoD p-value	0.025*** 0.000	0.025*** 0.000	0.025*** 0.000	BoD → ROE significant	RIT: BoD→B med ROE=211% RID: med ROE 1.9x BoD→B not significant
RD p-value	0.000*** 0.000	0.000*** 0.000	0.000*** 0.000	RD → ROE significant	RIT: RD→B med ROE=190% RID: med ROE 2.1x RD→B not significant
MB p-value	0.010***	0.010***	0.010***	MB → ROE significant	RIT: MB→B

Note: n = 209 sample; Significant Levels: *p < 0.1, **p < 0.05, ***p < 0.01

Logistic regression in Table 6 was used to determine the bankruptcy probability in each variable directly or indirectly through the mediation of financial performance (DAR and ROE). The first-stage logistic regression results show that the direct effect of non-financial variables on the bankruptcy probability (B) is significant only on the MB variable. BoD, RD, INT, and ER variables have no significant effect on probability B. Moreover, the financial performance variable DAR is insignificant on probability B, while the ROE variable is significant. The second-stage logistic regression determined the indirect effect through financial performance variables (DAR and ROE) to \overline{DAR} and \overline{ROE} . The results showed that \overline{DAR} is insignificant to probability B as a mediating variable, while \overline{ROE} is significant as mediation. Furthermore, there is a direction of the relationship between the independent and dependent variables in the regression coefficient. ROE negatively affects probability B, meaning that its increase decreases the probability.

Table 6 Logistic regression

Variable	Coefficient	P> z	Odds Ratio	P> z
Structural				
Dependent: Bankruptcy (B)				
Step I:				
Independent: DAR	2.660626	0.319	14.30524	0.319
ROE	-6.333577***	0.000	0.0017757***	0.000
BoC	-0.4001784	0.146	0.6702005	0.146
BoD	0.3535672	0.270	1.424139	0.270
RD	-8.73e-07	0.777	0.9999991	0.777
MB	0.1173172**	0.023	0.8893031**	0.023
INT	-14.39304	0.679	05.61e-07	0.679
ER	-0.000159	0.438	0.999841	0.438
CONS	7.361098*	0.059	1573.564*	0.059
Step II:				
Independent: \overline{DAR}	-2.519777	0.842	0.0804775	0.842
\overline{ROE}	-17.98218**	0.040	1.55e-08**	0.040

Note: n = 209 sample; Significant Levels: *p < 0.1, **p < 0.05, ***p < 0.01

5. Discussion

The DAR variable does not affect the bankruptcy probability, supported by the SEM and logistic regression results that $p\text{-value} > 0.05$. The data description shows that the manufacturing companies in this study hardly use debt, as evidenced by the average DAR of 0.3568964 in Table 2. In this case, management still acts conservatively even though some companies have a DAR of 0.9444644. These results are supported by previous studies where DAR is insignificant on financial distress [43], [44].

BoC negatively affects ROE with a coefficient of -0.0302999. This means that an increase in BoC decreases ROE, implying that the BoC is less functional in management supervision, as supported by [45]. BoD positively affects ROE with a coefficient of 0.0367264. This shows that BoD is more effective and efficient than BoC in achieving company goals for shareholders' welfare. In line with this, a previous study stated that BoD size positively affects the company's financial performance [46].

RD positively affects ROE with a coefficient of $2.38e-07$. This means that an increase in R&D investment raises ROE due to increased technology use and innovation. Therefore, it improves efficiency, supporting a previous study that R&D investment positively affects financial performance [47]. MB positively affects ROE with a coefficient of 0.014011 and increases investor interest because the company has good prospects in the future, affecting profit productivity. These results are supported by previous studies that MB positively affects ROE. ER negatively affects ROE with a coefficient of -0.0000227. This means that an increase in the exchange rate reduces ROE due to increased expenses for using foreign currencies (US\$).

In line with Charles (2012), the exchange rate negatively affects ROA financial performance [48]. The INT variable is insignificant because the interest rate has not changed much within 11 years. Therefore, the data is less varied and applies equally to all companies.

The logistic regression in Table 6 shows that the non-financial independent variables have no direct effect on the bankruptcy probability. However, the market information variable (MB) has a direct negative effect, meaning that its increase reduces the bankruptcy probability. This is because the company has good prospects and can attract more investors. Furthermore, as an estimation result of a mediating variable, \overline{ROE} has a significant negative effect, meaning that its increase reduces the bankruptcy probability.

Therefore, \overline{ROE} as a financial performance variable provide effective mediation to non-financial independent variables. The mediation is provided through BoC and ER, which decrease ROE, and BoD, R&D, and MB, which increase ROE. Furthermore, ER also increases \overline{ROE} as mediation that reduces the

probability. The odds ratio result on \overline{ROE} is $1.55e-08 < 1$, implying a negative effect as shown in the coefficient of -17.98218. Therefore, the ratio of the probability of bankruptcy to not going bankrupt decreases 1.55e-08 times with an increase in \overline{ROE} .

6. Conclusion

Studies on bankruptcy have been carried out, starting with Fitzpatrick. Bankruptcy is calculated using financial performance ratios. This study developed non-financial variables, such as governance, market information, and macro factors [13, 49]. Accommodating previous research, the novelty of this study combines non-financial information as an independent variable and financial performance as a mediating variable in determining the bankruptcy probability.

Previous research on bankruptcy variables generally makes various financial performance variables in financial ratios as independent variables. Another study tested non-financial variables as independent variables with financial ratios and bankruptcy as dependent variables. Based on the previous research models, this study tries to integrate the previous model comprehensively, thus making financial performance a mediating variable.

The next test determined whether non-financial factors directly affect bankruptcy or through financial performance as a mediating variable. The test results showed that financial performance (ROE) significantly mediates non-financial variables as an independent variable. However, other independent variables do not directly and significantly affect the bankruptcy probability. Therefore, ROE is increased by non-financial information independent variables (BoD, RD, MB) with stronger advantage and positive effects than negative impacts, such as BoC and ER.

These results show that various non-financial information independent variables are inseparable from financial performance as a determinant of a company's health. Innovation is generated from R&D, and innovation strategy is very important to develop the organization to improve company performance to compete efficiently to avoid bankruptcy [50]. The limitations of this research are on Non-Financial Variables consisting of the Board of Commissioners, Directors, Research & Development, Market Book, Interest and Exchange Rate against Bankruptcy. Therefore, further studies could add non-financial information, such as CSR, and other macro variables, including unemployment and GDP [51]. Additionally, the studies could use financial performance mediating variables with many ratios based on their objectives.

Acknowledgement

The authors are grateful to the and Universitas Trisakti and Directorate of Research and funded by:

Directorate of Resources, Directorate General of Higher Education, Ministry of Education, Culture, Research, and Technology following the Research Contact for the Implementation of the Research Program Number 309/SP2H/LT/DRPM/2021 Dated 18 March 2021 and Agreement/Contract Number 3524/LL3/KR/2021 dated 9 July 2021 for the Doctoral Dissertation Research Grant 2021.

References

- [1] NURAINI, A. *Probability of Default in Manufacturing Companies in Indonesia*. Purwokerto: CV. Pena Persada, 2021.
- [2] HILL, K., and DOHERTY, J. *Pandemic Spurs Most Bankruptcy Filings since 2009*. Bloomberg, 2021.
- [3] NURAINI, A., LEON, F.M., and USMAN, B. Analysis of the Effect of Governance and Research and Development on Probability of Default. *International Journal of Science and Society*, 2020, 2(4): 492–506.
- [4] MEMON, M.A., CHEAH, J., RAMAYAH, T., TING, H., and CHUAH, F. Mediation Analysis Issues and Recommendations. *Structural Equation Modeling*, 2018, 2(January): i–ix, 2018.
- [5] FATIMAH, B., MARDANI, RONNY, and WAHONO, M. The Effect of Good Corporate Governance on Company Value with Financial Performance as an Intervening Variable. *E-journal*, 2019, 8(15): 51–69.
- [6] OF, J., and KABLAN, A. Altman's Z-Score to Predict Accounting Based Financial Distress of Municipalities: Bankruptcy Risk Map for Metropolitan Municipalities in Turkey. *Journal of Business Research*, 2020, 12(1): 498–509.
- [7] CINDIK, Z., and ARMUTLULU, I.H. A revision of the Altman Z-Score model and a comparative analysis of Turkish companies' financial distress prediction. *National Accounting Review*, 2021, 3(2): 237–255.
- [8] ULLAH, H., WANG, Z., ABBAS, M.G., ZHANG, F., SHAHAD, U., and MAHMOOD, M.R. Association of Financial Distress and Predicted Bankruptcy: The Case of Pakistani Banking Sector. *Journal of Asian Finance, Economics, and Business*, 2021, 8(1): 573–585.
- [9] HIONG, H.K., JALIL, M.F., TIONG, A., and SENG, H. Estimation and Prediction of Financial Distress: Non-Financial Firms in Bursa Malaysia. *Journal of Asian Finance, Economics, and Business*, 2021, 8(8): 1–12.
- [10] NAJIB, A.S., and CAHYANINGDYAH, D. Analysis of the Bankruptcy of Companies with Altman Model and Ohlson Model. *Management Analysis*, 2020, 9(3): 243–251.
- [11] SRIVASTAVA, S., SARANYA, G., PRATAP, A., and AGRAWAL, R. Loan Default Prediction Using Artificial Neural Networks. *International Journal of Advanced Science and Technology*, 2020, 29(6): 2761–2769.
- [12] DHAR, S.P., BAIDYA, B., DAS, B., and BOSE. Financial Health of Select Indian It Companies - a Study Concerning Z-Score Analysis. *Resources Explorer*, 2019, VII(23): 1–7.
- [13] GONZALES, H., EDUARDO, A., RODRIGUEZ, F., and GANGA, F. Predicting Corporate Financial Failure Using Macroeconomic Variables and Accounting Data. *Computational Economics*, 2019, 53(1): 227–257.
- [14] AKBAR, M.A., AKBAR, A., TANG, M., and QURESHI, W. Is bankruptcy risk tied to the corporate life cycle? Evidence from Pakistan. *Sustainability*, 2019, 11(3): 1–22.
- [15] BRAGOLI, G., CORTELEZZI, D., and GIANNOCOLO, P.M. R&D Investment timing, default and capital structure. *Review of Quantitative Finance and Accounting*, 2019, 0123456789.
- [16] APERGIS, N., BHATTACHARYA, M., and INEKWE, M. Prediction of financial distress for multinational corporations: Panel estimations across countries. *Applied Economics*, 2019, 51(39): 4255–4269.
- [17] HILALIYA, T., and MARGARETHA, F. The Role of Corporate Governance in Reducing Bankruptcy in Companies in Indonesia. *Journal of Accountancy*, 2017, 21(3): 391.
- [18] FERNANDO, G., RUWANI, J.M., and LI, L. Financial versus Non-Financial Information for Default Prediction: Evidence from Sri Lanka and the USA. *Emerging Markets Finance and Trade*, 2019, 00(00): 1–20.
- [19] BALASUBRAMNIAN, B., PALVIA, A.A., and PATRO, D.K. Can the Book-to-Market Ratio Signal Banks' Earnings and Default Risk? Evidence around the Great Recession. *Journal of Financial Services Research*, 2019, 56(2): 119–143.
- [20] LI, L., and FAFF, R. Predicting corporate bankruptcy: What matters? *International Review of Economics & Finance*, 2019, 62: 1–19.
- [21] ZUTTER, S.B., and SMART, S.J. *Principles of Managerial Finance, Fifteenth*. United Kingdom: Pearson, 2019.
- [22] MUNIRA, M., SATRIA, I., and AYUN, I.Q. The Effectiveness of The Altman Z-Score and Springate Methods in Analyzing The Potential for Company Bankruptcy. *International Journal of Business and Information Technology*, 2021, 3(1): 63–78.
- [23] PUSPITASARI, D.M., FEBRIAN, E., ANWAR, M., SUDARSONO, R., and NAPITUPULU, S. Determinants of Default Risks and Risk Management: Evidence from Rural Banks in Indonesia. *Journal of Asian Finance, Economics, and Business*, 2021, 8(8): 497–502.
- [24] FERNANDO, J.M.R., LI, L., and HOU, Y. Corporate governance and default prediction: a reality test. *Applied Economics*, 2018, 51(24): 2669–2686.
- [25] PRAMUDENA, S.M. The Impact of Good Corporate Governance on Financial Distress in the Consumer Goods Sector. *Journal of Finance and Banking Review*, 2017, 2(100): 46–55.
- [26] UD-DIN, S., KHAN, M.Y., JAVEED, A., and PHAM, H. Board Structure and Likelihood of Financial Distress: An Emerging Asian Market Perspective. *Journal of Asian Finance, Economics, and Business*, 2020, 7(11): 241–250.
- [27] USHEVA, M., VAGNER, L., and WEST, S. Earnings Management as a Tool of Bankruptcy Prevention during Global Pandemic of COVID-19. *The 20th International Scientific Conference Globalization and its Socio-Economic Consequences 2020*, 2020: 92.
- [28] CHERKASOVA, V., and KURLYANOVA, A. Does corporate R&D investment support to decrease in default probability of Asian firms? *Borsa İstanbul Review*, 2019, 19(4): 344–356.
- [29] ROHIMAN, S.F., and DAMAYANTI, C.R. Effect of Inflation, Exchange Rates and Interest Rates on Financial Distress. *Journal of Business and Administration*, 2019, 72(2): 186–195.
- [30] XING, K., and YANG, X. Predicting default rates by capturing critical transitions in the macroeconomic system.

Finance Research Letters, 2019, February.

- [31] BARBOZA, E., KIMURA, F., and ALTMAN, H. Machine learning models and bankruptcy prediction. *Expert Systems with Applications*, 2017, 83: 405–417.
- [32] JABEUR, S.B. Bankruptcy prediction using Partial Least Squares Logistic Regression. *Journal of Retailing and Consumer Services*, 2017, 36(February): 197–202.
- [33] CHARALAMBAKIS, I., EVANGELOS, C., and GARRETT. On corporate financial distress prediction: What can we learn from private firms in a developing economy? Evidence from Greece. *Review of Quantitative Finance and Accounting*, 2019, 52(2): 467–491.
- [34] DUC HONG, M.V., PHAM, B.N.V., PHAM, T., and MCALEER, V.T. Corporate Financial Distress of Industry Level Listings in an Emerging Market. *Australian Research Council – Ministry of Science and Technologies*, 2019, March: 1–31.
- [35] MERKLE, C., and SEXTROH, C.J. Value and momentum from investors' perspective: Evidence from. *Journal of Empirical Finance*, 2021, 62: 159–178.
- [36] CEYLAN, I.E. The Impact of Firm-Specific and Macroeconomic Factors on Financial Distress Risk: A Case Study from Turkey. *Universal Journal of Accounting and Finance*, 2021, 9(3): 506–517.
- [37] BEAVER, W.H., CASCINO, S., CORREIA, M., and MCNICHOLS, M.F. Group affiliation and default prediction. *Management Science*, 2019, 65(8): 3559–3584.
- [38] RAHAYU, S.M. Mediation effects financial performance toward influences of corporate growth and assets utilization. *International Journal of Productivity and Performance Management*, 2019, 68(5): 981–996.
- [39] HERLIANSYAH, Y.S. The Effect of Capital Expenditure, Company Growth, and Company Size on Firm Value through Financial Performance Moderated By Capital Structure. *Corporate Ownership and Control*, 2019, 17(1): 236–244.
- [40] BAROROH, N., AGUSTINA, L., and SURYARINI, T. The Role of Financial Performance to Mediate the Effect of Corporate Governance on Firm Value. *INTCESS 2017-4th International Conference on Education and Social Sciences*, 2017, 4(February): 981–985.
- [41] GANIYY, A.A., AHMAD, N.H., and ZAINOL, Z. The Mediating Effects of Profitability on the Liquidity Risk and Cost Efficiency of Islamic Banks in Selected Countries. *Journal of Islamic Economics, Finance, and Banking*, 2017, 13(3): 130–150.
- [42] EKANANDA, M. *Basic Econometrics, 2nd ed.* Jakarta: Mitra Wacana Media, 2019.
- [43] ARISKA, P.R.T., and ARIEF, M. The Effect of Gender Diversity and Financial Ratios on Financial Distress in Manufacturing Companies Indonesia. *International Journal of Economics, Business, and Accounting Research*, 2021, 1: 324–338.
- [44] NURFAJRINA, A., SIREGAR, H., and SAPTONO, I.T. Analysis of Financial Distress on Agribusiness Companies on the Indonesia Stock Exchange. *Jurnal Keuangan dan Perbankan*, 2016, 20(3): 448–457.
- [45] SHIVANI, S.S., JAIN, M.V., and YADAV, P.K. Governance Structure and Accounting Returns: Study of Nifty500 of Corporates. *Business Analysis*, 2017, 37(2): 179–194.
- [46] KALYANI, N., and MATHUR, S. Does Corporate Governance Affect the Financial Performance and Quality of Financial Reporting of Companies? A Study on Selected Indian Companies. *Business Governance and Society*, 2019, 2019: 105–125.
- [47] HUAJING, J.L. Technological human capital, firm innovativeness, and entrepreneurial success: the moderating role of seeking and receiving external funding. *World Review of Entrepreneurship Management and Sustainable Development*, 2017, 13(1).
- [48] EGBUNIKE, C.F. Macroeconomic factors, firm characteristics and financial performance a study of selected quoted manufacturing firms in Nigeria. *Asian Journal of Accounting Research*, 2018, 3(2): 142–168.
- [49] HANDRIANI, E., and GHOZALI, I. Corporate governance on financial distress: Evidence from Indonesia. *Management Science Letters*, 2021, 11: 1833–1844.
- [50] THATRAK, D. The Effect of Strategic Innovation on Company Performance: A Case Study of the Industrial Estate of Thailand. *Journal of Asian Finance, Economics, and Business*, 2021, 8(8): 37–45.
- [51] MANKIW, N.G. *Principles of Macroeconomics, Eighth.* Boston: Cengage Learning, 2018.

參考文:

- [1] NURAINI, A. 印度尼西亞製造公司的違約概率。普禾加多：簡歷。佩納·佩薩達，2021。
- [2] HILL, K., 和 DOHERTY, J. 大流行馬刺自 2009 年以來最多的破產申請。彭博社，2021。
- [3] NURAINI, A., LEON, F.M., 和 USMAN, B. 治理和研發對違約概率的影響分析。國際科學與社會雜誌，2020，2(4)：492–506。
- [4] MEMON, M.A., CHEAH, J., RAMAYAH, T., TING, H., 和 CHUAH, F. 調解分析問題和建議。結構方程建模，2018，2(1月)：i-ix，2018。
- [5] FATIMAH, B., MARDANI, RONNY, 和 WAHONO, M. 以財務業績作為乾預變量的良好公司治理對公司價值的影響。管理。水庫電子期刊，2019，8(15)：51-69。
- [6] OF, J., 和 KABLAN, A. 奧特曼的- 預測基於會計的市政財政困境的評分：土耳其大城市的破產風險圖。商業研究雜誌，2020，12(1)：498–509。
- [7] CINDIK, Z., 和 ARMUTLULU, I.H. 奧特曼分數模型的修正與土耳其公司財務困境預測的比較分析。國家會計評論，2021，3(2)：237-255。
- [8] ULLAH, H., WANG, Z., ABBAS, M.G., ZHANG, F., SHAHAD, U., 和 MAHMOOD, M.R. 金融危機和預測破產協會：巴基斯坦銀行業案例。亞洲金融、經濟與商業雜誌，2021，8(1)：573–585。
- [9] HIONG, H.K., JALIL, M.F., TIONG, A., 和 SENG, H. 財務困境的估計和預測：馬來西亞交易所的非金融公司。亞洲金融、經濟與商業雜誌，2021，8(8)：1-12。

- [10] NAJIB, A.S., 和 CAHYANINGDYAH, D. 使用 奧特曼模型和 奧爾森模型分析公司破產。管理分析, 2020, 9(3) : 243–251。
- [11] SRIVASTAVA, S., SARANYA, G., PRATAP, A., 和 AGRAWAL, R. 使用人工神經網絡的貸款違約預測。國際先進科學與技術雜誌, 2020, 29(6) : 2761–2769。
- [12] DHAR, S.P., BAIDYA, B., DAS, B., 和 BOSE。精選印度 IT 公司的財務健康狀況 - 一項參考 Z 分數分析的研究。資源瀏覽器, 2019, VII(23) : 1-7。
- [13] GONZALES, H., EDUARDO, A., RODRIGUEZ, F., 和 GANGA, F. 使用宏觀經濟變量和會計數據預測公司財務失敗。計算經濟學, 2019, 53 (1) : 227-257。
- [14] AKBAR, M.A.、AKBAR, A.、TANG, M., 和 QURESHI, W. 破產風險是否與公司生命週期有關? 來自巴基斯坦的證據。可持續性, 2019, 11(3) : 1-22。
- [15] BRAGOLI, G.、CORTELEZZI, D., 和 GIANNOCOLO, P.M. 研發投資時機、違約和資本結構。定量金融與會計評論, 2019, 0123456789。
- [16] APERGIS, N., BHATTACHARYA, M., 和 INEKWE, M. 跨國公司財務困境預測: 各國面板估計。應用經濟學, 2019, 51(39): 4255–4269。
- [17] HILALIYA, T., 和 MARGARETHA, F. 公司治理在減少印度尼西亞公司破產方面的作用。會計學報, 2017, 21(3): 391。
- [18] FERNANDO, G., RUWANI, J.M., 和 LI, L. 用於默認預測的財務信息與非財務信息: 來自斯里蘭卡和美國的證據。新興市場金融與貿易, 2019, 00(00) : 1–20。
- [19] BALASUBRAMNIAN, B., PALVIA, A.A., 和 PATRO, D.K. 賬面市值比能否預示銀行的盈利和違約風險? 大蕭條的證據。金融服務研究雜誌, 2019, 56(2) : 119–143。
- [20] LI, L., 和 FAFF, R. 預測公司破產: 什麼重要? 國際經濟與金融評論, 2019, 62 : 1-19。
- [21] ZUTTER, S.B., 和 SMART, S.J. 管理財務原理, 第十五。英國: 皮爾遜, 2019。
- [22] MUNIRA, M., SATRIA, I., 和 AYUN, I.Q. 奧特曼分數和 彈跳方法在分析公司破產可能性方面的有效性。國際商業與信息技術雜誌, 2021, 3(1) : 63–78。
- [23] PUSPITASARI, D.M., FEBRIAN, E., ANWAR, M., SUDARSONO, R., 和 NAPITUPULU, S. 違約風險和風險管理的決定因素: 來自印度尼西亞農村銀行的證據。亞洲金融、經濟與商業雜誌, 2021, 8(8) : 497–502。
- [24] FERNANDO, J.M.R., LI, L., 和 HOU, Y. 公司治理和違約預測: 現實測試。應用經濟學, 2018, 51(24): 2669–2686。
- [25] PRAMUDENA, S.M. 良好的公司治理對消費品行業財務困境的影響。金融與銀行評論雜誌, 2017, 2(100) : 46-55。
- [26] UD-DIN, S., KHAN, M.Y., JAVEED, A., 和 PHAM, H. 財務困境的董事會結構和可能性: 新興亞洲市場的觀點。亞洲金融、經濟和商業雜誌, 2020, 7(11) : 241–250。
- [27] USHEVA, M., VAGNER, L., 和 WEST, S. 盈餘管理作為 新冠肺炎全球大流行期間預防破產的工具。第 20 屆國際科學會議全球化及其社會經濟後果 2020, 2020: 92。
- [28] CHERKASOVA, V., 和 KURLYANOVA, A. 企業研發投資是否支持降低亞洲企業的違約概率? 伊斯坦布爾證券交易所評論, 2019, 19(4) : 344–356。
- [29] ROHIMAN, S.F., 和 DAMAYANTI, C.R. 通貨膨脹、匯率和利率對金融危機的影響。商業與管理雜誌, 2019, 72 (2) : 186-195。
- [30] XING, K., 和 YANG, X. 通過捕捉宏觀經濟系統中的關鍵轉變來預測違約率。金融研究快報, 2019, 2 月。
- [31] BARBOZA, E., KIMURA, F., 和 ALTMAN, H. 機器學習模型和破產預測。具有應用程序的專家系統, 2017, 83 : 405-417。
- [32] JABEUR, S.B. 使用偏最小二乘邏輯回歸進行破產預測。零售和消費者服務雜誌, 2017, 36 (二月) : 197–202。
- [33] CHARALAMBAKIS, I., EVANGELOS, C., 和 GARRETT. 關於企業財務困境預測: 我們可以從發展中經濟體的私營企業身上學到什麼? 來自希臘的證據。定量金融與會計評論, 2019, 52 (2) : 467-491。
- [34] DUC HONG, M.V., PHAM, B.N.V., PHAM, T., 和 MCALEER, V.T. 新興市場行業級上市的企業財務困境。澳大利亞研究委員會 - 科技部, 2019, 3 月 : 1-31。
- [35] MERKLE, C., 和 SESTROH, C.J. 從投資者的角度看價值和動量: 證據來自。實證金融雜誌, 2021, 62 : 159-178。
- [36] CEYLAN, I.E. 企業特定因素和宏觀經濟因素對金融困境風險的影響: 來自土耳其的案例研究。會計與金融環球雜誌, 2021, 9(3) : 506-517。
- [37] BEAVER, W.H., CASCINO, S., CORREIA, M., 和 MCNICHOLS, M.F. 組從屬關係和默認預測。管理科學, 2019, 65(8): 3559–3584。
- [38] RAHAYU, S.M. 中介作用於財務業績對公司增長和資產利用的影響。國際生產力與績效管理雜誌, 2019, 68(5) : 981–996。

- [39] HERLIANSYAH, Y.S. 資本支出、公司增長和公司規模通過資本結構調節的財務業績對公司價值的影響。公司所有權和控制權, 2019, 17(1) : 236-244。
- [40] BAROROH, N., AGUSTINA, L., 和 SURYARINI, T. 財務績效的作用中介了公司治理對公司價值的影響。2017-第四屆教育與社會科學國際會議, 2017, 4 (二月) : 981-985。
- [41] GANIYY, A.A., AHMAD, N.H., 和 ZAINOL, Z. 盈利能力對選定國家伊斯蘭銀行流動性風險和成本效率的中介作用。伊斯蘭經濟學、金融和銀行業雜誌, 2017, 13(3) : 130-150。
- [42] EKANANDA, M. 基本計量經濟學, 第 2 版。雅加達 : 媒體話語夥伴, 2019。
- [43] ARISKA, P.R.T., 和 ARIEF, M. 性別多樣性和財務比率對印度尼西亞製造公司財務困境的影響。國際經濟、商業和會計研究雜誌, 2021, 1 : 324-338。
- [44] NURFAJRINA, A., SIREGAR, H., 和 SAPTONO, I.T. 印度尼西亞證券交易所農業綜合企業的財務困境分析。期刊 金融和銀行, 2016, 20(3): 448-457。
- [45] SHIVANI, S.S., JAIN, M.V., 和 YADAV, P.K. 治理結構和會計回報 : 漂亮的 500 公司研究。商業分析, 2017, 37 (2) : 179-194。
- [46] KALYANI, N., 和 MATHUR, S. 公司治理是否影響公司財務業績和財務報告質量? 對選定的印度公司的研究。企業治理與社會, 2019, 2019 年 : 105-125。
- [47] HUAJING, J.L. 技術人力資本、企業創新和創業成功 : 尋求和接受外部資金的調節作用。創業管理與可持續發展世界評論, 2017, 13(1)。
- [48] EGBUNIKE, C.F. 宏觀經濟因素、公司特徵和財務業績對尼日利亞選定的報價製造公司的研究。亞洲會計研究雜誌, 2018, 3(2) : 142-168。
- [49] HANDRIANI, E., 和 GHOZALI, I. 財務困境中的公司治理 : 來自印度尼西亞的證據。管理科學快報, 2021, 11 : 1833-1844。
- [50] THATRAK, D. 戰略創新對公司績效的影響 : 泰國工業園區的案例研究。亞洲金融、經濟和商業雜誌, 2021, 8(8) : 37-45。
- [51] MANKIW, N.G. 宏觀經濟學原理, 第八。波士頓 : 聖智學習, 2018。