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Prediction Financial Distress: The Pro-Technology Technique of Altman Z-Score Model

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Abstract

The Covid-19 outbreak has had a severe effect on the world economy. The company's business operations and profitability are damaged during the covid 19 outbreak. This deterioration is not only threatening the company's survival position but also destroy the investor's investment return. Therefore, it is vital to establish an effective early prediction technical method to foresee a corporate distress by a Pro-technical measurement to enhance the corporate sustainability. This study applies Altman Z-Score Model to as a Pro-Technology technique to the financial distress prediction of Malaysia's Government Linked Plantation Companies (GLC-P) over a period of 10 years starting from 2012 to 2021. The significant contribution of the study is that the Z-Score Model provides an advanced indication tool regarding the financial stability of the respective GLC-P companies. The findings indicate that Financial Distress Prediction was dependent via in-time application of leverage, liquidity, activity, and profitability to the Altman Z-Score Model. Profitability and leverage were found to be superior prediction tool to financial distress.

Keywords: Investment, Pro-Technology, Altman Z-Score Model, Prediction Tool, Sustainability.

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Introduction

Corporate financial failures appear to be an alarming problem in the global market due to the unprecedented impact of the Covid-19 outbreak. The announcement of movement control order in most of the countries had led to a slow economic cycle that forced many of the companies to temporarily stop their core business operation. The performance of the companies was severely disrupted which could put them in a danger position, either bankruptcy or nearing bankruptcy. Many of the news reported that companies are facing a difficult situation to continue their operations and to settle their financial obligations to creditors. During this period, companies are likely to face financial difficulties, particularly if the company's fixed costs are high, assets are illiquid, or earnings are too sensitive to generate in a stressed economy. Additionally, failing to take the essential strategic steps to improve performance or failing to deal with the situation effectively right away when a company is likely to be in financial difficulties could damage the firm's reputation since investors may view the company as being inept. Due to this, the company's market value of equity is expected to decline dramatically as investors refrain from purchasing the company's shares"If no corrective measures are made, a buy over of the company may occur. This study analyses the financial health of Malaysian GLCs and investigates the level of financial distress using Altman Z-score statistics. The health crisis due to Covid 19 considerably affects the business involved in export and import such that companies face the risk of financial distress. Many large companies are unable to implement their risk management action due to stringent movement and/or operation control regulations imposed by the government to all companies. The Covid-19 outbreak had huge crash on the Malaysia's macroeconomic, effecting almost all sectors such as private sector, education sector, economic sector, health sector, and agricultural sector (Farique and Fauzi, 2021).

In Malaysia, Government Linked Companies (GLCs) refers to entities with commercial objectives that have government interest through direct stake control in them (i.e. entities). The controlling stakes allow the Government to make major decisions such as contract awards, strategy, restricting and financing, acquisitions and investment for their funds to GLCs investment for either Government Linked companies or else (Lau & Tong, 2008). GLCs are operating in many sectors amongst others are utilities, which is the most dominant sector, and transportation and warehousing (Menon, 2017). Further, GLCs share is greater than 50% in agriculture, banking, information communications, and retail trade.

Problems related to GLCs have been occurring since 1997, when several major economies in many neighbouring countries such as Indonesia, Korea, and Thailand, were severely affected by the concurrent and significant economic crisis affecting their economies and financial markets. Recently, due to the Covid-19 outbreak, the global economy is facing a sharp weakening price in oil supply, declining in the number of export crude palm oil (CPO), falling in dividend from GLCs companies and decrease in total percentage of income from taxes compared to Gross Domestic Product (GDP) (Farique and Fauzi, 2021).

GLCs play a key role in Malaysia's economic development, although many detractors claim that because of their strong ties to the government, GLCs may outperform private businesses. Due to this association, GLCs have special access to resources and business development prospects. Nevertheless, GLCs may also perform worse than private firms because of various factors (Ting and Lean, 2011). Although the GLCs are established business entities with commercial objectives, their business decisions are not entirely free from political interference. The decision-making of management in the GLCs is sometimes subjected to balancing the economy, social and political motives. Another preferential treatment enjoyed by the GLCs is the financial bailout given by the government to rescue GLCs which are financially distressed. For instance, in the Proton case in 2016, a bailout of RM1.5 billion, a bailout was made by the government to secure the company. It is vital for the government to ensure the strategic GLCs continuously survive, on the other hand this action has resulted in a fiscal burden on the country. Even if a company has been in business for a long time, there is still a risk of financial difficulties or bankruptcy (Mia 2019). Previous studies on GLCs' performance such as Mohamad and Said (2013), reports that relationship-based capitalism can be used to describe the intimate ties between business and politics in Malaysia. Others brought out the fact that Malaysian businesses with political favour sometimes have higher debt loads. This study focuses on the financial difficulty experienced by GLCs businesses in Malaysia's plantation industries. an examination of the companies' capacity to handle both their long-term and short-term financial commitments.

According to Bank Negara Malaysia (2020), the plantation sector is one of the principal participants to national gross domestic product; wherein the gross domestic product of the plantation sector in 2020 was RM36.9 billion. Besides that, in line with the 12th Malaysia plan (2021 – 2025), the plantation sector has a great potential to propagate in Malaysia. In the 12th Malaysia plan (2021 -2025), about RM500 million is allocated to the plantation sector for enhancing productivity and forest plantations. From this, it indicates that the plantation sector has robust support from the Malaysian government. In line with the continual support from government, it is in best interest of this study to find out whether or not Leverage, Liquidity, Activity, and Profitability can contribute to early prediction signal of financial distress for Malaysian GLCs in plantation sector (which are called GLC-P in the later part). The study additionally intended to identify what are the determinants which will signify the financial status of GLC-P. To the knowledge of the authors, analytical studies are lacking in

the case of Malaysian GLCs particularly under the Covid-19 setting. Thus, it is significant for this study to be carried out by employing Altman Z-score and financial ratio to predict the signal of financial distress.

The remainder of the paper is organized as follows. Section 2 discusses the literature review of financial distress prediction. Section 3 describes the independent variables, methodology and data analysis procedures that are used in this study. Section 4 provides the results and also the findings of the study. Section 5 presents the conclusion and a few suggestions for future research.

Literature Review

Financial crisis prediction has attracted the interest of researchers during the last 50 years due to its huge importance to the trade industries, the financial system, and also other interest groups (Wanke et al. 2015). This section will discuss the previous literature on financial distress into six parts. The first part deals with financial distress, the second part discusses the Altman z-score, and the third until sixth part will discuss on the four independent variables that are leverage, liquidity, efficiency, and profitability.

Financial Distress

Financial distress, according to Khaliq et al. (2014), is a condition in which a company is experiencing difficulties and is unable to pay its creditors, and normally because of high fixed costs, illiquid assets, or revenues that are sensitive to economic downturns (Mia 2019). The impacts of financial distress can be discovered in advance by observing a decline in the value of the company prior to the company's actual default (Whitaker 1999). It could be an early indication that there is a problem at the company that needs to be addressed (Setiawan, 2021). Financial distress occurs before a company enters into insolvency or liquidation. This normally happen because a company suffers massive losses. It begins when a company is unable to fulfil its payment schedule or when cash flow estimates reveal that the company would be unable to meet its debt obligations (Brigham & Daves 2004). This debt tends to have a detrimental impact on all stakeholders, including the staff, shareholders, management, investors, and creditors (Chen & Merville 1999). As a result, financial distress is critical for rating agencies, managers, investors, bankers, and firm shareholders, as well as the overall economy of the country (Alaka et al., 2018). Furthermore, financial instability may suggest that the company is not generating enough money to meet its expenses (Hayes 2020). Therefore, it is critical to a company's success, and thus the company must take corrective action (Ross, Westerfield, Jaffe and Jordan, 2008).

Normally, projecting financial distress in a company plays a significant part in predicting the worst case scenarios (Platt and Platt, 2002). It is critical for businesses since it can prevent any unwanted bad effects from occurring. As a result, businesses should take proactive steps

to anticipate financial trouble. This is because knowledge about financial hardship conditions can be extremely beneficial to a variety of parties. For example, knowing which companies are in financial crisis might be utilised as a decision-making tool or action to improve the situation and avoid a company from going bankrupt (Ratnawaty 2022). Furthermore, by employing business failure prediction models, several businesses have witnessed a major improvement in their financial stability and have even been able to reduce their possibility of bankruptcy (Sumaira et al. 2019). According to Pindado and Rodrigues (2005), organisations both locally and globally have suffered as a result of ignoring warning indications of financial distress and the effects it has on a company's stability and growth.

The recent Covid-19 pandemic has been one of the external causes that have weakened and damaged the financial health of firms from all industries around the world, including Malaysian companies. As a result, it is critical to investigate financial distress among Malaysian companies.

Altman Z-Score

Financial ratios have long been used by researchers to forecast the financial failure of the companies. The research on prediction failures is based on the work of Beaver (1966) and Altman (1968). Altman (1968) used multiple discriminant analysis (MDA) with five ratios to estimate possible company failure, and this method became one of the pioneering and most widely used models for predicting financial distress in companies. Altman (1968) was the first to apply multiple discriminant analysis to forecast company failure using various ratios at the same time. Beaver employed univariate analysis, while Altman used multivariate analysis, often known as the Z-score model, according to Laitinen (1991). When all financial ratios are merged in a specific way to get a single number, this single figure is the Z-score, which measures the overall financial health of the organisation. As a result, the Altman Z-score model provides an effective and reliable assessment of a company's financial health.

Furthermore, Altman created a Z-score model, a linear combination of the selected ratios, that allows the company to be assigned to the group to which it is closest (failing firms or non-failing enterprises) (Zizi et al. 2021). Based on their Altman Z-score, the company will be divided into three zones:

safe zone, distress zone, and grey zone. As stated by Altman (2000), the Altman Z-score Index Zone is when the Z value is greater than 2.99, the company is categorised as non-bankrupt (safe zone), once the index value in between 1.81 to 2.99, the company is categorised as in the grey area, and once the index value is lesser than 1.81, the company is categorised as in the difficult situation which is bankrupt (distress zone). As discussed above, the Altman Z-score model is a method that can be utilised as a tool in determining the company's financial distress. Gerantonis et al. (2009) revealed that the Z-score is deemed to be a precise mean to foresee the company’s failure. This is because the Z-score model can

predict any possible financial failure. Previous studies (Toly et. al., 2020; Ranjbar & Amanollahi, 2018; Abdulkareem, 2015; Cho & Yu, 2012) have used this method to determine the financial distress. In addition, this method has been shown by many studies to have a superior financial distress predictive ability compared to other models (Gunardi and Octavia, 2017; Machek, 2014). For example, Hayes et al. (2010); Thakor (2018); Anser et al. (2020) did a study about the construction of the Z-score, and proved that the model gives a correct prediction of bankruptcy at a level of 94%. Altman (2013) stated that financial ratios that were important indicators for financial distress and possibility of bankruptcy were profitability, liquidity and solvency ratios. Thus, the Altman Z-score model is chosen as the most appropriate statistical technique in this study.

Financial Leverage

Alifiah, Salamudin, and Ahmad (2013) established three independent indicators, leverage, total asset turnover, and working capital ratio, that can be used to predict a company's financial difficulty in Malaysia. Leverage is one of the primary explanations for financial trouble, which can pose a significant risk to the organisation due to its high costs (Brealey & Myers 2003). Leverage has an impact on investment rates and investment prospects in companies where a company's degree of debt has an indirect impact on investors' interest and confidence in investing (Rohmadini, Saifi, & Darmawan, 2018). This proxy displays a company's risk and capital structure. The debt ratio, which is determined by dividing total debt by total assets, is the most widely utilised leverage ratio in financial distress prediction. It is the ratio utilised to calculate how much of a company's assets are financed by debt (Kasmir, 2016). Some researchers have determined that the debt ratio is an important component in determining the firm's assets to satisfy its obligations (Abdullah et al. 2014). The level of the risk of financial hardship that the company will bear is affected by the amount of corporate debt. If a financing corporation uses debt more frequently, it faces future repayment challenges since the debt exceeds the assets owned. If this scenario is not managed well, there is possibility that the risk of financial distress will increases (Idawati, 2020).

In their research, Syuhada and Muda (2020) discovered that leverage has a negative effect on financial distress. This suggests that in the case the leverage value of a company is high, the company's financial distress value will be lower and result in greater the risk of bankruptcy. Other research studies have also indicated that leverage is negatively connected to financial distress in studies such as Hsu and Jang (2008), Malik (2013), Hanifah & Purwanto (2013), Rohmadini (2018), Curry & Banjarnahor (2018) and Dirman (2021). Meanwhile, as Sari (2018) discovered, leverage has a major impact on financial difficulty. According to Sayidah et al. (2019) and Salehi et al. (2017), there is no clear evidence that leverage corresponds with financial distress. Furthermore, Bernardin and Tifani (2019) discovered that leverage had no effect on financial distress. Due to the conflicting data about

the relationship between leverage and financial distress, the following theory has been proposed:

H1: There is a significant relationship between leverage and financial distress.

Liquidity

Liquidity ratio is calculated by dividing Current assets by Current liabilities. When a company has a high liquidity ratio, it can pay off its commitments on time and show that its performance has improved (Ali et al. 2020). In other words, it assessed the company's ability to pay off its present liabilities because Gopalan et al. (2012) defined a liquid asset as one that can be converted into cash quickly and cheaply. Companies with relatively strong liquidity can so convert their assets into cash quickly and pay their short-term obligations (Amoa-Gyarteng 2021). Furthermore, liquidity analyses the company's ability to match cash outflows with acceptable cash inflows, as well as its ability to resist unexpected occurrences such as an increase in expenses or a decrease in cash outflows (Doina & Mircea 2008).

In fact, the company may even pay dividends to shareholders during operations (DeAngelo et al. 2002). As a result, if the company is able to adequately fund and pay off its short-term obligations, the likelihood of financial trouble will be much lower. However, if the company continuously incurs operating losses, its current liquidity in relation to total assets may diminish, potentially leading to financial hardship. Thus, liquidity is one of the most important markers of financial trouble of firms (Ali et al. 2020).

Furthermore, Lin et al. (2011) discovered that liquidity is a key driver of financial distress prediction. According to Khani and Guruli (2015), liquidity ratios can forecast bankruptcy up to two years before liquidation. According to Khaliq et al. (2014) and Santoso & Wibowo (2018), the liquidity ratio has a favourable impact on financial distress. Yap et al. (2012) revealed that the most significant predictor of financial distress is the financial ratio assessing liquidity. However, the liquidity ratio as measured by the current ratio has no effect on the financial distress (Nurfajrina et al., 2016) Based on the above deliberation, we developed our second hypothesis as follows:

H2: There is a significant relationship between liquidity and financial distress.

Activity

The efficiency ratio, which evaluates a company's efficacy in employing its assets, is also known as operating capacity (Kasmir 2016). Total asset turnover can be used to calculate efficiency ratios (TATO). Total revenues divided by total assets owned by the company yields this ratio. It displays overall asset turnover as defined by sales volume, or how far all assets' ability to generate revenue extends (Ratna & Marwati, 2018). TATO measures how efficiently a business uses its assets to create sales. This can demonstrate that if a corporation

manages its assets efficiently and rotates its assets well, the likelihood of a company experiencing financial issues is reduced (Sasongko et al. 2021). Thus, the high activity ratio demonstrates the company's high effectiveness in employing its assets to generate money in the form of sales. The likelihood of financial hardship is quite minimal when sales e high.

In terms of financial distress, the firm's high effectiveness in asset utilisation results in a decreased probability of financial distress in the company since the company is capable to generate revenues that exceed the amount of assets bought by the company. Kartika and Hasanudin (2019), Stevannie (2019), Ratna and Marwati (2018), Yudiawati and Indriani (2016), and Noviandri (2015) established that total asset turnover has a negative and significant effect on the risk of financial distress in a company. Their studies show that the higher the company's TATO, the lower is the possibility for the company to experience financial distress. Nonetheless, Dirman (2021), Idawati (2020), and Ramadhani & Nisa (2019) found that operating capacity has no influence on financial distress. While, Aisyah (2017) and Mas'ud & Srengga (2014), for example, reveal that total asset turnover has little impact on financial distress. As a result, the following third hypothesis has been proposed:

H3: There is a significant relationship between efficiency and financial distress.

Profitability

The profitability of a company will determine its survival in the future. Trivedi (2010) defined profitability as company's ability to earn profits from its operations. Aghaie and Saeedi (2009) suggested that improved profitability leads to increased efficiency and liquidity, minimising default risk. This is because, profitable businesses are more tolerant of debt because they can easily repay it on

Time. As a result, creditors are confident that their interest expenses in a company with a high profitability level will be met (Aghaie & Saeedi, 2009; Etemadi & Rostamy, 2009).

Profitability ratios, according to Syamsuddin (2016), are ratios that measure a company's ability to generate net income at a given level of sales, assets and share capital. The return on assets (ROA) normally used to indicate this profitability ratio. It shows how well a company performed during the fiscal year (Ali et al. 2020). This profitability ratio helps assess financial distress by demonstrating the

Efficiency with which firm assets are used to decrease costs, obtain savings, and ensure that the company has enough finances to run its operations. With the sufficiency of these funds, the likelihood of companies encountering financial distress in the future will be reduced (Andre & Taqwa, 2014).

The existing studies on the prediction of financial distress discovered a significant association between profitability and financial distress (Bharath & Shumway, 2008; Duan, 2012). According to Amoa-Gyarteng (2019), profitability is the most important factor in forecasting financial distress. One year before bankruptcy, profitability and the Altman Z-score have a statistically significant relationship and a strong positive correlation (Amoa-Gyarteng, 2021). Previous research by Gobenvy (2014), Andre & Taqwa (2014), and Aisyah et al. (2017) discovered that return on assets influences financial distress. Wulandari and Burhanudin (2017), on the other hand, showed that return on assets has no influence on financial distress. Based on the foregoing discussion, the fifth hypothesis is as follows:

H5: There is a significant relationship between profitability and financial distress.

Based on the above discussion, the research model is:

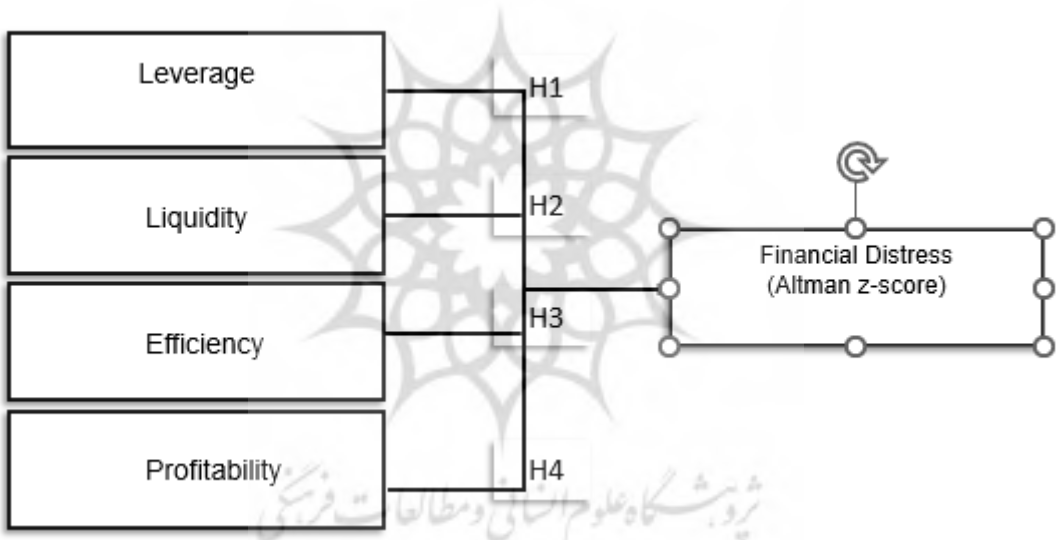

Figure 1. Research Model

Methodology

Sample and Data Collection

The objective of this study is to determine the financial distress signal of GLC-P companies listed in Bursa Malaysia. This study uses a quantitative approach along with empirical review. Quantitative method is used to predict an early signal of financial distress and to discover whether ifnancial indicators, such as Leverage, Liquidity, Activity, and Profitability play an important role in predicting the financial distress that measured by Altman Z-score Model. The relevant financial data is collected from the company's financial statement published in Eikon Datastreams to test the hypotheses of this study.

Out of four (4) GLP-P companies there are three (3) plantation companies listed in Bursa Malaysia that meet the requirements for the study. The first requirement for the study is that the company must be listed in Bursa Malaysia with complete financial data accessible for 10 years, from 2012 to 2021, and second is that it must be classified as a government-affiliated company. The three (3) companies that fulfil this requirement are Felda Global Venture Berhad, Tabung Haji Plantation Berhad and Boustead Plantation Berhad.

Variables and Measurement Scale

Four independent variables are used to assess one dependent variable. These four independent variables are chosen based on the relevancy to this study and commonly retrieved in past literatures as a significant sign of corporate financial failure. Table 1, illustrate the variables and measurement scale of the independent variables used in the study. All the independent variables are quantified in ratio scale.

Table 1. Independent variable measurement scale

Variables	Formula
Leverage Debt to Assets Ratio (DAR)	$\frac{Total\ Debt\ (book\ value)}{\text{Total Assets}}$
Liquidity Current Ratio (CL)	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
Activity Total Assets Turnover (TATO)	$\frac{\text{Total Sales}}{\text{Total Assets}}$
Profitability Return on Assets (ROA)	$\frac{\text{Earnings After Tax}}{\text{Total Assets}}$

While the Modified Altman Z-score equation (1995) is used as the measurement for dependent variable (financial distress). Altman's Z-score Model is a numeric score which is used to forecast a company's probability of bankruptcy. The model was named after the Edward Altman that devised the approach as a tool to assess a business's financial health. According to Altman (2000), the modified Altman Z-score (1995) is useful to analyse within an industry with greatly different type of financing among the company, where significant adjustments, such as lease capitalization, are not done.

The model was claimed to be accurately proving of 80-90% towards the predictions for bankruptcies (Hallas, 2020). The modified Altman Z- Score equation is based on the key financial ratios to derive the overall Z-score index which is presented as below:

$Z = 6.56 (X_1) + 3.26 (X_2) + 6.72 (X_3) + 1.05 (X_4)$

where ;

X_1 = Working Capital / total assets,

[measure liquidity]

X_2 = Retained Earning / total assets,

[measure reinvested earnings capacity, higher indicate less reliance of using external funding-equity or debt]

X_3 = Earnings before interest and tax / total assets,

[measure true productivity]

X_4 = Equity market value / Book value of Debt

[measure solvency]

Z = Overall Z-score Index

The overall Z-score index will denote the financial condition of the company, whether it fall under the "Alert Zone", "Safe zone" or "Distress zone" that heading toward financial distress condition. The description of the score is summarized in table 2:

Table 2. Altman Z-score Index Zone

Range of Overall Z-score Index	Description
Safe zone Above 2.99	Safe zone in which the company is in the good financial condition
Alert zone Between 2.99 and 1.81	Alert zone in which the company has a potential to face the bankruptcy condition if correction action is not taken.
Financial distress zone Less than 1.81	Financial distress zone, in which the company is most likely heading to toward financial distress condition. Comprehensive improvement action needs to be undertaken.

Source: Altman (2000)

Descriptive Statistics and Multiple Regression Analysis

Descriptive statistical analysis is the technique of converting a collection of data into a form of information that can be easily described and grasped. It is also a subset of preliminary analysis of this study. Based on the descriptive statistical analysis, this study can observe the overall characteristics of all variables and differences of financial condition among GLC-P company.

Whereas, Multiple regression analysis is used to test the hypotheses (H1-H4) that whether the four ifnancial indicators (predictors): leverage, liquidity, activity, and profitability of the company are useful in predicting Financial Distress (dependent variable).

The multiple regression equation is presented as below:

Y = B0+ B1(leverage) + B2(liquidity) + B3(efficiency) + B4 (profitability) + €

Where;

Y : Dependent variable to be predicted (Financial distress measured by Z-score)

B0 : Is the regression constant representing a value of financial distress if all predictor factors (leverage, liquidity, efficiency, and profitability) is equal to zero.

B1- B4 : Is the beta coefficient that indicate the magnitude and movement of the predictor factors ((leverage, liquidity, efficiency, and profitability) on Financial distress.

€ : represent error terms that simply account for all other factors that account variance in the dependent variable (financial distress).

Results and Discussion

Descriptive statistics

The result obtained from the preliminary analysis of this study is presented in Table 3. that indicate the dependent variable which is the value of financial distressed for GLC-P's companies, measured by Z-score, the independent variables which are leverage, liquidity, activity and profitability ratio. While table 4 indicate the Z-score value for ten years from 2011 to 2021.

Table 3. Descriptive statistics of GLC-P for 10 years (2012-2021)

GLC-P companies	Altman Z-score	Debt to Assets Ratio (DAR)	Current Ratio (CR)	Total Assets Turn Over (TATO)	Return on Assets (ROA)
FGV					
Min	.0574	.1479	1.0028	.6021	-.0610
Max	9.7502	.3045	3.0348	1.0897	.0655
Mean	2.974855	.250243	1.485903	.794198	.015500
Std Deviation	2.9726885	.0465328	.6521690	.1229034	.0382137
THP					
Min	.5072	.1941	.5687	.1320	-.2295
Max	3.4153	.5073	2.9413	.2658	.0663
Mean	1.524359	.377599	1.504577	.174452	-.011481
Std Deviation	1.0183584	.0983512	.7272839	.0410830	.0881008
BOUSTEAD					
Min	.0264	0406	.1877	.1374	-.0375
Max	24.4647	.3280	1.0226	.3766	.1780
Mean	4.004809	.258648	.520770	.217117	.045992
Std Deviation	7.2656233	.0803459	.2478971	.0678640	.0623418

Table 4. Z-score Value of GLC-P from 2011-2021

Year	Z-score FGV	Z-score THP	Z-score Boustead
2012	9.750150009	3.415285972	2.107003947
2013	6.626416988	2.053851682	1.864258593
2014	3.358466051	1.509497959	2.725896994
2015	2.506680959	0.684133075	2.374145628
2016	1.574016344	1.352676941	3.455289606
2017	1.605422484	1.31891768	24.46471673
2018	0.057406399	0.50717379	0.839709516
2019	0.999431359	1.341615644	0.026377614
2020	1.42720101	1.957661216	0.480338119
2021	1.843356084	2.117118758	1.763107914

For FGV, it shown the mean value for financial distress is 2.975, in which the minimum and maximum value between 0.574 and 9.750 respectively. To further elaborate the Z-score for the 10 years period it shown that in 2012 till 2015, FGV is in the "Safe zone" which the Z-score value is between 2.5 to 9.75. However, in 2016 to 2020, FGV is heading toward financial distress zone, and it is believed FGV has taken necessary action to improve it financial health, resulting it Z-score improve to 1.84 (alert zone) in 2021.

Similarly, for THP it shown the mean value for financial distress is 1.524359, in which the minimum and maximum value between .507 and 3.415 respectively. The Z-score for the 10 years period it shown that in 2012 till 2013, THP is in the "Safe zone" which the Z-score value is between 2.54 to 3.45. Conversely, in 2016 to 2020, THP is heading toward financial distress zone, and in 2020 and 2021 it shown that THP has make a remarkable action to improve its financial health, resulting it Z-score improve to 1.95 (alert zone) and 2.12 (almost toward safe zone) respectively.

For Boustead it shown the mean value for financial distress is 4.00, in which the minimum and maximum value between .0264 and 24.467 respectively. The Z-score for the 10 years period it shown that in 2012 till 2017, Boustead is in the " Safe zone" and "alert zone" which the Z-score value is between 1.864 to 24.467. Interestingly, in 2017 Z-score value is at the highest value of 24.467 (safe zone) as compared to FGV and THP. Further investigation was made to confirm the cause of drastic increase in Z-score, it is noticed in the financial position shown that in 2017 Boustead had made a full repayment of it long term debt resulting to tremendous improvement of its Z-score value. However, new long-term debt was added in 2018 which lead to further reduction in Z-score value heading toward financial distress zone.

Overall, the descriptive statistical analysis indicates leverage seemed to prevail as an indicator that affect the value of Z-score (financial distress position). Multiple Regression Analysis is performed to further investigate which predictor variables (leverage, liquidity, activity, profitability) are statistically significant in predicting the financial health of the GLC-P companies.

Multiple Regression Analysis

The Multiple Regression Analysis was aimed to test the study hypotheses (H1-H4), that to identify which prediction indicators (leverage, liquidity, activity, profitability) are the most significant in identifying the financial distress of the GLC-P companies. The dependent variable (Z-score to indicate financial distress position) was regress on predicting variables of (leverage, liquidity, activity, profitability). The result of the Multiple Regression Analysis is presented in Table 5. The result in table 5 shown that the independent variables are significant as a predictor of financial distress, $p < 0.001$ (1%), which indicates that the four prediction factors in this study have a significant effect on financial distress of GLC-P companies. Furthermore, the R2 = 0.725 depicts that the model explains 72.5% of the variance in financial distress.

Table 5. The result of the Multiple Regression Analysis

Indicators (Hypothesis)	Standardised Beta coefficient	t	P-value	Hypothesis supported
Leverage (H_1: Lev → FD)	-28.085	-4.126	.000	supported
Liquidity (H2: Lq → FD)	3.256	4.422	.000	supported
Activity(H3: Act → FD)	5.073	2.815	.009	supported
Profitability (H4: P → FD)	29.065	3.086	.005	supported
R Square : .725				

The results supported the hypotheses of this study. It shows that there is strong relationship between leverage and Z-score with coefficient of -28.085 giving the P-value less than 0.001. As expected, Leverage to have negative relationship with Z-score. This signifies that the higher the value of the leverage, the lower the Z-score of the GLC-P companies. As discussed in the earlier section, lower Z-score (less than 1.88) denotes unhealthy financial conditions which lead to high exposure to financial distress. In other words, at the higher debt levels of GLC-P companies, the risk of financial distress rises. It is noticeable, the finding emerges to support literatures on capital structure (see example Altman. 2002; Almeida et. al. 2011; Zainudin et. al 2017a; Zainudin et. al 2017b; Haider, Qayyum, Zainudin 2021) that financial leverage had significant predictive ability of company financial failure. GLC-P companies may suffer the direct risk of default if too much debt use in their capital structure.

The regression result for Liquidity suggests that Liquidity has a significant positive relationship with Z-score. This indicates the GLC-P company with high liquidity have a better capacity to meet their financial obligation (higher Z-score), in turn, will face less potentiol of financial distress. Similarly, the result for Profitability reveals significant positive relationship with Z-score. The higher coefficient of 29.065 suggests that the Profitability of GLC-P companies is greatly influenced the Z-score value, implies that the increase in profitability by 1 point gives a large (29.065) increase in Z-score and vice versa. As known, company with high profitability appears to have sufficient earnings to support their operations and investment growth needs, thus less likely to face financial distress.

Furthermore, the result provides a remark that Activity, has a significant positive relationship with Z-score. Explanation for the positive relationship is that GLC-P's operating with higher financially efficient, have higher Z-score and are less potential to experience financial distress (high Z-score). Although the coefficient value for Activity as a predictor variable for financial distress is not as high as Leverage and Profitability, it is worthwhile for GLC-P company to maintain a constant sale to attain optimum asset utilization.

The overall finding indicates that an increase in financial leverage may reflect a strategic financial decision by GLC-P companies to finance its investment requirement, however, holding everything else constant, a GLC-P with higher financial leverage has a greater risk of failing to repay its creditors, thus will lead to experience financial distress. When a GLC-P finance more of its investment by borrowing, they need to ensure that there will be greater magnitude increase in return of the said investment to avoid any default payment of its contractual obligation. The finding indicates Leverage and Profitability are main predictors of financial distress and its evidence that there is always a trade-off between risk and return.

Conclusion

This study analyses the financial health of Malaysian GLC-P companies and investigates whether ifnancial predictor, which are Leverage, Liquidity, Activity, and Profitability play an important role in predicting early signal of the financial distress. Modified Altman Z-score model is used to measure the financial distress of Malaysian GLC-P companies. The finding from the analysis indicates that there is significant relationship between all the four financial predictor and the financial distress of GLC-P companies. Among all the important predictor variables, Profitability is found to have strongest relationship with financial distress followed by Leverage, Activity and Liquidity. This study contributes important implications for the empirical literature that Leverage, Liquidity, Activity, and Profitability are a useful tool in predicting financial distress in the GLC-P companies. The modified Altman Z-score model to measure financial distress and the predictor variables not only relevant to other industry as reported in past literatures but appear to be relevant to Malaysian GLC-P companies as well.

Practical implication emerges from this study that the top management of GLC-P companies could use the prediction model as a tool to take necessary strategic actions in improving its financial performance prior to severely disrupted which could put them in a danger position; either bankruptcy or nearing bankruptcy. GLC-P top management needs to pay attention for not to be over expanded or too optimistic on their investment decision thus, ignore the quality of their investment which could lead to "value destroy investment" (overinvestment problem). Most important remark, the decision to use a high level of debt to finance the investment growth should be carefully examined. This is because, although it will provide funds to support the business expansion needs, it will also increase the risk of financial distress especially when the revenue is highly correlated to economic condition.

Over geared for the company's expansion will expose to a great financial risk. If no remedial action is taken, the situation could bring bad reputation for the GLC-P because investors would perceive the company as an incompetent, thus, is likely to face a dramatic drop in its market value of equity and buy-over company might happen. Similarly, the finding of this study could assist both investors and stakeholders for the investment decision and monitoring of the company performance. Although this study is inclined to limitation as any other research which is not exclusively perfect, the limitations of this study may offer inspiration for future research. Future research may use different model or analysis such as include non-financial variables or artificial neutral networks (ANNs) respectively. Also, could use the similar model from this study but extend the sample size that include all the GLC companies of all industry and non GLC companies of all industry in Malaysia for comparison purposes.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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