

## Corporate Debt, Institutional Differences and Firms' Financial Distress in Emerging Economies under Uncertainty

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### Abstract

Firms with high leverage are more vulnerable, particularly during uncertainty due to the COVID-19 pandemic. This study aims to examine the impact of leverage on firms' financial distress by capturing two countries, Indonesia and Malaysia, which have different levels of leverage and financial development that affect access to external funding. The Altman Z-score—for a rich dataset comprising quarterly data of publicly traded companies between 2015 and 2020—is calculated to measure firms' financial distress. Furthermore, the Difference-in-Differences (DiD) technique is employed to test the hypothesis that highly leveraged firms have a higher bankruptcy risk that leads to financial distress during the COVID-19 pandemic. This study finds that firms' financial distress during the pandemic is higher than prior the pandemic. Indonesian firms' financial distress was higher than Malaysian firms. Finally, highly leveraged firms are exposed to higher bankruptcy risk than firms with lower debt.

## Utang Korporasi, Perbedaan Kelembagaan dan Kesulitan Keuangan Perusahaan di Negara-Negara Berkembang dalam Periode Ketidakpastian

### Abstrak

Perusahaan dengan tingkat leverage tinggi lebih rentan pada saat pandemi COVID-19. Penelitian ini bertujuan untuk mengkaji dampak leverage terhadap kesulitan keuangan (financial distress) perusahaan di Indonesia dan Malaysia. Perusahaan di kedua negara yang memiliki tingkat leverage yang berbeda dan tingkat perkembangan sektor keuangan berbeda yang mempengaruhi akses perusahaan terhadap pendanaan eksternal. Kesulitan keuangan diukur dengan Altman Z-score—untuk kumpulan data terdiri dari data kuartalan perusahaan publik antara tahun 2015 dan 2020—dihitung untuk mengukur kesulitan keuangan perusahaan. Selanjutnya, teknik Difference-in-Differences (DiD) digunakan untuk menguji hipotesis bahwa perusahaan dengan leverage tinggi memiliki risiko kebangkrutan yang lebih tinggi yang mengarah pada kesulitan keuangan selama pandemi COVID-19. Studi ini menemukan bahwa kesulitan keuangan perusahaan selama pandemi lebih tinggi dibandingkan sebelum pandemi. Tingkat kesulitan keuangan perusahaan di Indonesia lebih tinggi daripada perusahaan Malaysia. Perusahaan dengan leverage tinggi terpapar pada risiko kebangkrutan yang lebih tinggi daripada perusahaan dengan utang yang lebih rendah.

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## INTRODUCTION

Some studies affirm concern about an increase in the corporate debt of non-financial firms in emerging economies. A publication by the International Monetary Fund (2015) reveals that the proportion of corporate debt to GDP in emerging economies doubled from 49 percent in 2003 to 75 percent in 2014. Similarly, the publication by the Bank of International Settlement (BIS) alarms the increase in non-financial corporate debt in emerging economies and shows that the rate doubles, which is higher than the ratio in advanced countries (Goyal & Packer, 2017). An increase in corporate debt is attributed to greater incentives and opportunities enjoyed by firms in emerging economies because of favorable global financial conditions (International Monetary Fund, 2015). Despite the benefit of greater access to debt that boosts investment and economic growth in emerging economies, the increasing trend of leverage level is also concerning, particularly if countries experience economic shocks, as in the previous financial crises.

An increase in the corporate debt of non-financial firms is also observed in emerging Asian countries, as shown by a study published in BIS papers that captures a longer period between 1991 and 2015. Nevertheless, this study discovers variations in leverage levels among emerging Asian countries in Asia (Goyal & Packer, 2017). The study finds that, among emerging Asian countries, there are two groups of high leverage and low leverage regarding corporate debt. Corporate debt levels in countries such as Indonesia, Korea, and Thailand are higher than the long-term average, ranging between 34% and 37% for book leverage and 31% to 36% for market leverage. Meanwhile, countries such as Malaysia, Hong Kong SAR, the Philippines, and Singapore have lower corporate debt levels of 25% – 27% for book leverage

and 25% – 29% for market leverage. This finding parallels a publication by the Central Bank of Malaysia that two neighboring countries in Southeast Asia, Indonesia, and Malaysia experienced debt growth between 2007 and 2014, in which the growth in Indonesia is higher than that in Malaysia (Bank Negara Malaysia, 2014). Previous studies by Goyal & Packer (2017) and Leary & Roberts (2014) also provide evidence that peer effect is significant in determining the leverage level committed by firms. Their studies show a significant positive influence of industry and firm leverage levels; thus, environmental factors are essential in determining the leverage level.

Differences in capital structure between firms in Indonesia and Malaysia were also observed by Ramli et al. (2019). Using 20 years of observation between 1990 and 2010, their study shows that Indonesian firms have higher leverage by 0.53 from total assets compared to 0.37 for Malaysian firms. A study by Booth et al. (2001) on capital structure in developing countries also shows that Malaysian firms have much lower leverage levels than firms in other developing countries. The total debt ratio was 41.8% between 1983 and 1990, while the corporate total debt ratio in high-debt countries such as South Korea reached 73.4%, India at 67.1%, Turkey at 59.1%, and Thailand at 49.4%. Nevertheless, Indonesian firms have higher leverage levels, as shown by Claessens et al. (2000), who found that the debt-equity ratio of Indonesian firms was 1.951 between 1988 and 1996, or twice that of Malaysian firms at 0.908. Furthermore, external debts among Malaysian firms significantly improved their performance, as shown by the return on assets and equity. This is consistent with the trade-off theory (TOT) by Miller (2005), which states that leverage incentivizes firms to benefit from interest deduction from debts, causing cor-

porate values to rise. Nevertheless, higher leverage levels among Indonesian firms do not correspond with higher performance, which may be due to the inappropriate use of debt that may lead to lower performance.

Capturing the emerging economies of Indonesia and Malaysia also enables us to control for institutional differences that may affect debt level and firm performance. According to the financial development index developed by the International Monetary Fund (IMF), Malaysia performs well and is among the countries with the highest level of financial development in the world (0.65). Meanwhile, Indonesia's index (0.36) is grouped in the third level with other developing countries. The index reflects the development level of both financial institutions and financial markets. For each financial service, the index captures information related to the depth of services, access to services, and efficiency level of service providers. Having a more developed financial sector provides non-financial corporations with accessible and more varied external funding with the most efficient resource allocation.

Other publications confirm that non-financial corporations in Malaysia have more access to external funding, benefitting from the rapid development of corporate bonds and sukuk markets after the Asian Financial Crises (Bank Negara Malaysia, 2014). The proportion of loans from the banking sector is lower by 30 percent in Malaysia, and this portion remains high in Indonesia at 45 percent (International Monetary Fund, 2015). Higher access to external funding from the capital market is consistent with the growing performance of the capital market in Malaysia. The share of the capital market in Malaysia is more than 121.6%, while in Indonesia, it is much less, that is, 45.9% of the GDP in 2020 (CEIC data). Malaysia is also perceived to have better institutio-

nal quality than Indonesia. McGee (2008) measures the corporate governance score of Southeast Asian countries and finds that Malaysia has the highest score of 85, followed by Thailand (80), Indonesia (66), and Vietnam (56); the differences between Malaysia and Indonesia scores are statistically significant. Different levels of institutional quality affect the lender's behavior. The literature suggests that, in an economy with lower institutional quality, lenders have limited monitoring ability and rely on the availability of fixed assets in determining lending. Meanwhile, working in an economy with a strong institution that provides creditor rights, political stability, and investor protection, lenders rely not only on firms' characteristics in determining lending because they have access to more information on debtors' capacity (Leary & Roberts, 2014; Goyal & Packer, 2017).

Some studies also suggest that firms with high leverage in their capital structures are more vulnerable during a crisis (Claessens et al., 2000). A study on the Great Depression in the United States from 1928 to 1938 revealed that the probability of financial distress increases for firms with high leverage. Another study by Graham et al. (2011) also suggested that the likelihood and expected costs of distress had also increased as firms committed more debt. The trend of increasing corporate debt in emerging economies is particularly concerning during periods of uncertainty due to the COVID-19 pandemic.

The pandemic has created an exogenous shock that severely affects the business sector worldwide. The latter has to manage service debts and bear a higher borrowing cost due to uncertainty and deal with an increase in bankruptcy risks (World Bank, 2020). A recent study by Guerrieri et al. (2022) described how the COVID-19 pandemic created a shock to

the business sector that resulted in business shutdowns, layoffs, and bankruptcy. Bloom (2007) study on the impact of uncertainty shocks shows that firms are forced to lower productivity during an economic shock because they suspend investment and hiring due to uncertainty. Furthermore, an economic shock disrupts production, which increases costs. The shock also lowers demand, which reduces firms' ability to generate profit (Shapiro, 1987).

During the COVID-19 pandemic, the government imposed strict physical distancing to prevent viral infection. The limitation to people's mobility has a significant impact on the economy, since people are prohibited from going to school, work, and pursue other activities outside their residence. Mobility restrictions trigger the disruption of both the supply and demand sides of the economy. Some studies have attempted to measure the impact of the COVID-19 pandemic on the global economy. A preliminary study by the Asian Development Bank (ADB) in March 2020 showed that the pandemic affected Asian countries, starting from China, and spreading to other developing countries in Asia. The ADB study predicts that the global impact of the COVID-19 pandemic will be USD 77 billion to USD 347 billion or 0.1% to 0.4% of global GDP.<sup>1</sup>

The impact of the pandemic on the economy is significant, as shown by the negative economic growth of many sectors in both Indonesia and Malaysia.

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1 The economic loss is due to significant decline of domestic and overseas demand and travel in business and tourism, disruption of trade and production that further lower the supply of goods and services. In addition, the pandemic affects health by increasing disease and mortality, so the government budget is reallocated to the health sector. Another estimate by the International Monetary Fund economics shows that the predicted loss of global output over the next 5 years due to the pandemic will be up to USD 28 trillion.

Based on the year-on-year data published by Statistics Indonesia, the growth of the travel industry in Q-2/2020 was -80.23% (-63.88% in Q-3) for airline and -63.75% (-51.11% in Q-3) for railway; of leisure industry was -44.23% (-28.03% in Q-3) for accommodation and -22.02 percent (-11.86% in Q-3) for restaurants; of information and communication industry was 10.88% (10.61% in Q-3); of retailer was -7.57% (-5.05% in Q-3); of industrial transportation was -30,80% (-16.70% in Q-3) and of construction was -5.39% (-4.52% in Q-3); of manufacturing was -6.19% (4.31% in Q-3); of health care equipment and services was 3.71% (15.33% in Q-3); whereas the growth of pharmaceuticals and biotechnology industry was 8.65% (14.96% in Q-3). The Malaysian economy has shrunk deeply by -17.1% in Q-2/2020. In Q-3 and Q-4, economic growth was still negative, but the drop was less severe by -2.7% in Q-3 and -3.4% in Q-4. The pandemic hit some sectors severely, such as construction, which dropped by -12.4% in Q-3 (-13.9% in Q-4), mining by -6.8% in Q-3 (-10.8% in Q-4), and the service sector dropped by -4% in Q-3 (-4.9% in Q-4).

Considering the importance of leverage in understanding firms' financial distress during the COVID-19 pandemic, this study investigates the impact of higher debt on firms' financial distress. In other words, it examines the impact of the COVID-19 pandemic on corporate distress by considering firms' leverage levels, firm characteristics, and macroeconomic factors. This study aims to contribute to the literature, particularly by disentangling the relationship between economic shock due to the COVID-19 pandemic, leverage level, and financial distress for non-financial corporations that are mostly affected by mobility restrictions due to the pandemic. It is essential to examine this issue of financial distress and leverage, as the literature suggests that during the COVID-19

pandemic, access to external finance is getting tighter, and this may harm high-leverage firms more than those with lower leverage (Famiglietti & Leibovici, 2020). Moreover, their study suggests that environmental factors contribute to financial distress and that the risk of closing financially distressed firms is higher if they operate in a high-debt environment. Therefore, it is essential to test the hypothesis of a negative relationship between leverage level and financial distress in the two different environments of Indonesia and Malaysia with different levels of debt, diversity of loan sources, and institutional quality.

This study employed the Difference-in-Difference (DiD) approach to capture the effect of the COVID-19 pandemic, environmental factors, and level of leverage. The approach allows the inclusion of three variables that capture the effect of the pandemic on firms' financial distress: pandemic year (TT), country (TC), and leverage level (TS) into the model. The literature review briefly discusses the theory and empirical research on financial distress, followed by the third and fourth sections, describing the research methodology and empirical results, respectively. The conclusions and policy implications are presented in the final section of this paper.

### **Hypothesis Development**

Corporate leverage levels vary across countries, where countries in Asia, such as South Korea, Japan, Thailand, Indonesia, and Hong Kong, had higher leverage levels than other Asian countries and developed countries, such as Germany and the United States (Claessens et al., 2000; Goyal & Packer, 2017). Their study also shows that the corporate leverage levels of Asian countries such as Malaysia, Singapore, and Taiwan are much lower. Other studies suggest that the leverage level is determined by both firms' internal and

external factors. Haron (2016) shows that Indonesian firms practice both trade-off theory (TOT) and pecking-order theory (POT). Regarding corporate structure, the study provides evidence that there is a rapid adjustment towards the target leverage of Indonesian firms, which shows the existence of TOT dynamics. This implies that Indonesian firms have chosen the level of leverage that generates optimal returns from debt. Furthermore, in determining the level of leverage, Indonesian firms are concerned about the trade-off between the cost of debt in terms of bankruptcy costs and the benefits of debt resulting from the tax deduct on the interest of debt. This theory is known as the Modigliani and Miller (M&M) proposition.

According to the Modigliani and Miller (M&M) proposition, the value of leveraged firms is higher than that of unleveraged firms due to interest tax shields, which causes the taxation policy to have a substantial influence on corporate capital structure. In the debt bias taxation regime, the interest paid on debt is tax-deductible, which adds to the benefit of debt financing compared to equity financing. This implies that a higher corporate tax rate induces firms to increase their debt level to benefit from interest tax shields, which subsequently increases firm value. Claessens et al. (2000) show evidence that Malaysian firms do not enjoy the tax benefit of debt, as shown by the negative impact of the tax shield. A study by (Shahida & Saharah, 2013) on Malaysian corporate structure also suggests that government tax incentives in the equity market, such as tax exemption of income generated from Sukuk, influence corporate financing decisions. Furthermore, Claessens et al. (2000) empirical estimation presents supporting evidence that there is a positive correlation between the existence of tax shields and leverage levels.

The literature suggests that bank

loans are a preferable source of funding because they provide more efficient monitoring, which limits adverse selection and moral hazards (Diamond, 1984; Diamond, 1991).

In addition, by using loans from banks, the cost of renegotiation can be minimized (Gertner & Scharfstein, 1991; Chemmanur & Fulghieri, 1994; Rajan & Winton, 1995). Moreover, studies such as James (1987) and Kang & Liu (2008) find that announcements of bank loan arrangements have a positive effect on the stock market. The positive relationship between bank loans and stock returns is prominent for firms that receive loans from banks with high lender quality and better reputation (Billett et al., 1995; Bushman & Wittenberg-Moerman, 2012). Furthermore, some studies find supporting evidence that bank loans are superior to bonds. A study by Godlewski et al. (2011) found a positive effect of bank loan announcements on stock price reaction even during the crisis period. In addition, several studies, such as Eckbo (1986), Spiess & Affleck-Graves (1999), Gilson & Warner (2000), and Godlewski et al. (2011), showed that the announcement of bond issues had a negative effect on stock returns.

Despite the positive effect of bank loans on firm performance, other studies suggest that highly leveraged firms have a higher risk of experiencing financial distress. During the pandemic, firms were more prone to financial distress, particularly if they had large loan burdens. Many studies have referred to a highly cited paper by Opler & Titman (1994) to explain firm performance during an economic downturn, particularly by comparing the performance of highly leveraged firms and their more conservatively financed counterparts. Their study finds that economic downturns fare highly leveraged firms differently than during downturns; those firms lose their market share as the

sales volume decreases and further slashes firms' earnings. The loss of market share during the downturn is consumer-driven, competitor-driven, or manager-driven. Their study suggests that consumers are reluctant to do business with distressed firms, particularly during uncertainty, which may lead to a reduction in sales. Regarding the competitor-driven channel, their study explains that financially stronger competitors may act more aggressively to advertise their products to attract vulnerable consumers. Finally, highly leveraged firms that experience distress may quickly downsize their production in response to an industrial downturn.

Firms are financially distressed if they fail to generate sufficient income, which makes them unable to fulfill their financial obligations. Other studies also refer to financial distress as firms being insolvent, in which their assets are not sufficient to fulfill their debt and liabilities (Graham et al., 2011). A popular bankruptcy prediction model that uses the Altman Z-score is frequently used to measure firms' financial distress. Altman (1968) and Altman et al. (2014) created a Z-score using a multiple discriminant analysis to predict firms' bankruptcy risk using a set of predictors, namely the ratio of working capital to assets, the ratio of retained earnings to assets, the ratio of earnings before interest and taxes to assets, and the ratio of equity to liability (De Mooij & Hebous, 2018). A larger Z-score implies that firms have a lower probability of experiencing financial distress and vice versa. The cutoff value to determine whether firms experience financial distress is 4.5.

Firms' financial distress is determined by their leverage, as larger corporate debt may generate a burden for companies to pay interest and debt. Nevertheless, debt may also provide a mechanism to monitor management and incentives for restructuring operations to be more efficient

when firms experience negative economic shocks, so that these mechanisms may lower firms' financial distress (Graham et al., 2011). In addition to firms' leverage, some studies also suggest that firms' characteristics, such as liquidity, profitability, investment, and firms' age, determine firms' leverage. In addition, macroeconomic factors such as industry composition and economic growth also influence firms' financial distress (Graham et al., 2011).

Shen et al. (2020) investigated the impact of the COVID-19 pandemic on the corporate performance of China's listed companies. Their study shows that the pandemic has a negative impact on firms' performance, as measured by net profit return during the observation periods of 2014 and 2020. In particular, the study suggests that the pandemic has lowered firms' revenue, which further worsens their financial condition. Their study also implied that a lack of investment and revenue increases the risk of financial problems. In addition, the pandemic also lowers the production capacity, operation, and sales of the industry, which reduces profit and records negative returns. Moreover, by using the difference-in-differences (DiD) technique, the study finds that the impact of the pandemic is larger for companies located in highly affected areas and working in services-oriented sectors, such as tourism and film entertainment.

A highly cited paper by Bernanke (1981) argues that shocks to the economy increase bankruptcy risk, which may trigger recessions. Specifically, the study explains that during a recession, firms might experience financial distress due to the lower margin between cash flow and debt services. The lack of margins lowers cash flow to meet short-term obligations. Additionally, firms may face liquidity problems and increase fixed expenses. The study also reveals that during a recession, the cost of new financing may increase fi-

xed expenses, which puts a greater financial burden on firms. Banks, as financial intermediaries, also experience financial difficulties because of an increase in insolvency risks that affect the value of banks' portfolios. Therefore, banks will be less keen to lend to (lower-liquidity) firms, and firms have to find other financing alternatives that cost more.

A recent study by Famiglietti & Leibovici (2020) describe the impact of the COVID-19 pandemic shock on firms' liquidity and bankruptcy using data from the Great Recession from 2008 to 2009. Their study shows that during the COVID-19 pandemic, firms' short-term debt increased to a level close to the Great Recession in 2009 by 20-24% of the GDP. This study also shows that during the pandemic, access to external finance became tighter. The financial stress index considers current credit conditions, equity valuations, access to funding, the value of safe assets, and market volatility increases in 2020. This implies that the financial market was also affected by the pandemic. Furthermore, firms' leverage levels significantly contribute to increasing their financial distress. By using ratings of trade credit transactions in the US during the Great Depression, the article shows that the "delinquent" firms that pay their credit liabilities more than 30 days later were more likely to close down during the recession. Thus, financially vulnerable firms with high debt may be more prone to financial distress during a pandemic.

Another study by Tan (2012) investigates the impact of the financial distress of Asian financial crisis in the late 1990s on firm performance. Using 277 sample firms from eight East Asian economies, this study finds evidence of a significant impact of the crisis on corporate performance. The crisis generated exogenous shocks to firms, which had a more severe impact on firms with high leverage levels. The study

reveals that the crisis created a shock on the demand side by lowering the demand for both products and services. In addition, the crisis lowered investors' confidence in the economy. Thus, highly leveraged firms are more exposed to distress and are most affected by the crisis. Finally, using the US firms' dataset, González (2013) and Opler & Titman (1994) showed that the costs of loans outweighed the benefits of loans. Highly leveraged firms experienced a significant reduction in their market share and operational profits compared to their competitors. The reduction in firm performance is larger than the benefits generated by the disciplinary role of debt.

A recent study by Demmou et al. (2021) aims to explain the impact of the COVID-19 pandemic on firms' financial distress by testing the channels of economic shock, volume of sales, firms' profitability, and firms' financial distress. Their study confirms that the economic shock following the pandemic contributed to lower actual and expected sales, which further reduced firms' profitability. Their simulation shows that the pandemic causes a reduction in firms' profits by 40 to 50 percent of average values prior to the pandemic. The lack of sales and profits is significant, further lowering the value of firms' assets. Lower profits cause declining equity by 7-9 percent. If equity is negative, then firms experience financial distress.

The hypotheses tested are available below:

- H1 : The financial distress level during the pandemic was higher than prior pandemic.
- H2 : Indonesian firms experienced higher financial distress than Malaysian firms.
- H3 : The economic shock due to the pandemic has induced higher distress levels.
- H4 : Highly leveraged firms experience a higher level of financial distress.

## METHOD

This study focuses on two ASEAN countries, Indonesia and Malaysia, that significantly contribute to the region's economy. The difference-in-differences (DiD) technique is used to examine the impact of firms' leverage and recession on firms' financial distress. Three variables capture the effect of the pandemic on firms' financial distress: TT, TC, and TS. TT is a binary variable that captures the 2020 pandemic. TC is a binary variable that captures the effect of a country on financial distress, whereas TS is a binary variable differentiating between highly leveraged firms and those that have lower leverage levels. Meanwhile, the interaction variables (i.e., TTTC, TTTS, and TTTCTS) are included in the model to represent the interaction between year of pandemic, country effect, and leverage level. The operational definitions of these variables are listed in Table 1.

The empirical equation used to estimate the determinants of financial distress is as follows: The cross-sectional unit is firm ( $i$ ) and the time unit is quarter ( $t$ ).

## RESULT AND DISCUSSION

### Results

This section presents the descriptive statistics of the variables, two-sample t-test, and empirical estimations using the DiD technique. Table 2 indicates information regarding the total number of observations and observations across periods of non-pandemic and during pandemic, observations across countries, and leverage levels. There were 5,612 observations for quarterly data of firms in two countries of Indonesia and Malaysia between 2015 and 2020. The observations in 2020 comprised two quarters (Q-1 and Q-2), which are defined as years during the COVID-19 pandemic. This study collects 732



**Table 1.** Operational Definition of the Variables

<b>Variables</b>	<b>Operational Definition</b>
Dependent variable	
Distress	The Z-score of firm bankruptcy risk calculated using below formula: $Z = 3.25 + 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4$ $Z = \text{Z-score (default risk)}$ $X1 = \text{ratio of working capital to total assets}$ $X2 = \text{ratio of the retained earnings to total assets}$ $X3 = \text{ratio of earnings before interest and taxes to total assets}$ $X4 = \text{ratio of book value of equity to book value of total liabilities}$
Independent variables	
TT	Binary variable; 1 if t=2020 and 0=otherwise
TC	Binary variable; 1 if country=Indonesia and 0=Malaysia
TS	Binary variable; 1 if the firms' leverage level is on the fourth quartile (highly leverage) and 0 is for firms that the leverage level in the third, second and first quartile. Leverage is defined as the ratio of book value of total debt to book value of assets
TTTC	Binary variable; 1 if year of observation (t)=2020 and country (i)=Indonesia and 0=otherwise
TTTS	Binary variable; 1 if year of observation (t)=2020 and firms' leverage is the fourth quartile (highly leverage) and 0=otherwise
TTTCTS	Binary variable; 1 if 1 if year of observation (t)=2020, country (i)=Indonesia, firms' leverage is the fourth quartile (highly leverage) and 0=otherwise
Control variables	
Investment	The ratio of difference of gross fixed assets at the beginning and at the end of the year to fixed assets at the beginning of the year
Liquidity	The ratio of firm's cash + inventory + receivables to total assets
Age	The number of years since the firm was initially formed.
Growth	The quarterly economic growth

observations of firm-level data during the COVID-19 pandemic, or 13.04% of the total observations.

The proportion of observations is relatively equal between Indonesian and Malaysian firms; the proportion of the former is slightly higher, comprising 3,082 firms or 54.92% of the total observations. Regarding leverage level, 1,035 firms (18.44%) are categorized as highly leveraged firms. As explained in Table 1, highly leveraged firms are in the fourth quartile

of the leverage distribution level. There are 402 observations or 7.16% quarterly data of firms in Indonesia during the COVID-19 pandemic and 141 observations or 2.51% quarterly data of highly leveraged firms during the COVID-19 pandemic. Furthermore, there are 90 observations of quarterly firm-level data categorized as highly leveraged firms in Indonesia during the COVID-19 pandemic.

Table 3 presents the descriptive statistics of the dependent variables of the z-

**Table 2.** Observations across Periods, Countries, and Leverage Levels

Observation	Number of obser- vations	Proportion (%)
All observation	5,612	100
Year 2020	732	13.04
Indonesia	3,082	54.92
Highly Leverage	1,035	18.44
Year 2020 & Indonesian firms	402	7.16
Year 2020 & Highly leveraged firms	141	2.51
Year 2020 & Indonesia & Highly leveraged firms	90	1.60

Notes: Highly leveraged firms are those in the fourth quartile. Leverage is defined as the ratio of book value of total debt to book value of assets.

score of the financial distress measure and a set of control variables that capture both firms' characteristics and country characteristics. During the observation period, the mean z-score was 6.965. The score is lower for Indonesian firms (6.353) than for Malaysian firms (7.541). This implies that on average, the level of financial distress is higher in Indonesian firms than in Malaysian firms. Regarding the leverage level, using the ratio of book value of total debt to book value of assets, the data show that Indonesian firms have a higher leverage level of 0.257 than Malaysian firms (0.215).

The investment level measured by the ratio of the difference in gross fixed assets is 0.132 on average, and the invest-

ment rate is much higher among Indonesian firms (2.66) than that for Malaysian firms (0.034). In terms of liquidity, on average, firms' liquidity is 0.391, and liquidity is higher in Malaysia at 0.41 than in Indonesia at 0.375. The profitability level is higher for Malaysian firms (0.19) than Indonesian firms (0.016). The collected data on firms' level of publicly trading companies show that listed firms in Malaysia have been in operation (i.e., 21 years) than Indonesian firms (i.e., 13 years). Finally, this study also observes quarterly economic growth to control for the country-level characteristics of macroeconomic conditions. During the observation period, both countries grew positively by 3.84%, where

**Table 3.** Firms' Characteristics and Country Characteristics

Variable	All country			Indonesia			Malaysia		
	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev
z_score	4,053	6.965	7.45	1,965	6.353	7.26	2,088	7.541	7.58
Leverage	4,141	0.236	0.198	2,018	0.257	0.226	2,123	0.215	0.164
Investment	3,760	0.132	1.889	1,766	0.242	2.66	1,994	0.034	0.65
Liquidity	4,094	0.391	0.275	1,992	0.375	0.33	2,102	0.41	0.206
Age	4,755	17	12.52	2,400	13.54	10.08	2,355	21.14	13.56
Growth	5,591	3.84	3.76	3,082	4.19	2.698	2,509	3.42	3.417

**Table 4.** Firms' Performance prior to and during the COVID-19 Pandemic

Variable	Prior to the COVID-19 Pandemic			COVID-19 Pandemic		
	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev
z_score	3,564	7.056	7.465	489	6.305	7.314
Leverage	3,643	0.232	0.193	498	0.259	0.228
Investment	3,272	0.136	1.982	488	0.104	1.081
Liquidity	3,601	0.396	0.281	493	0.360	0.225
Age	4,116	17.36	12.46	639	17	12.91
Growth	4,880	4.98	0.503	711	-3.949	6.33

Notes: Z-score is financial distress; Leverage is defined as the ratio of book value of total debt to book value of assets Investment is the ratio of difference of gross fixed assets; Liquidity is the ratio of liquid assets to total assets; Age is the number of years of firms since it was formed; and Growth is the quarterly economic growth.

Indonesia's economic growth at 4.19% is higher than Malaysian growth at 3.42%.

As shown in Table 4, the level of financial distress increased during the pandemic, as indicated by the lower z-score. Before the COVID-19 pandemic, the z-score on average was 7.056, and during the pandemic, the z-score was 6.305. Furthermore, firms' dependency on external funding is higher during the pandemic, with the leverage level increasing from 0.232 before the pandemic to 0.259 during the pandemic. Firms also experience lower liquidity and investment during pandemics. Subsequently, the economic slowdown during the pandemic is shown by a reduction in economic growth from 4.98 prior to the pandemic, to minus 3.949 during the pandemic.

To examine the effect of the COVID-19 pandemic and firms' leverage on financial distress, this study compares the level of financial distress measured by z-scores for firms across firms in Indonesia and Malaysia, across periods of the prior pandemic and during the pandemic, and across levels of leverage. Tables 5 and 6 show the results of the t-test statistics to determine whether the financial distress level differs across periods, countries, and

leverage levels. Table 5 shows that financial distress was significantly different among highly leveraged firms in Malaysia prior to the COVID-19 pandemic. Highly leveraged firms have a higher distress level, as shown by a lower z-score of 4.35, than firms with lower leverage levels of 8.41. Correspondingly, the financial distress of highly leveraged firms in Malaysia was higher during the COVID-19 pandemic (4.35 prior to the pandemic vs. 3.503 during the pandemic). These findings show that highly leveraged firms experienced higher levels of financial distress both before and during the pandemic.

The comparison of the level of financial distress among Indonesian firms across periods and leverage levels is shown in Table 6. Consistent with the Malaysian data, the financial distress level is higher among highly leveraged Indonesian firms than among their counterparts, and the difference in the z-score is statistically significant. The z-score of highly leveraged firms is 3.234, lower than that of highly leveraged firms (7.818). The financial distress level among highly leveraged firms in Indonesia during the COVID-19 pandemic increases, as shown by the lower z-score of 2.505. Compared with the lower leve-

**Table 5.** Two-Sample t-test of Z-score among Malaysian Firms (Financial Distress Indicator)

	TT=0&TC=0			TT==1&TC==0		
	Obs.	Means	Std.error	Obs.	Means	Std.error
TS==0	1,526	8.41	0.196	158	7.63	0.353
TS==1	353	4.35	0.250	51	3.503	2.348
Combined	1,879	7.643	0.169	209	6.624	0.640
Difference of means		4.056	0.424		4.129	1.466
t-statistics		9.546			2.816	
df (degree of freedom)		1,877			207	
Prob (T>t)		0.000			0.0027	

Notes: TT is year dummy of the pandemic 2020; TC is country dummy (Indonesia=1; Malaysia=0); TS is leverage level dummy (highly leverage in fourth quartile=1).

rated firms (z-score = 7.670), the z-score of highly leveraged firms (i.e., 2.505) is lower, which is statistically significant.

**Discussion**

The estimations of the Difference-in-Differences (DiD) models are presented in Table 7. Six estimations show the basic models without control variables and a complete model controlling for firm and country characteristics. The first model estimates the effect of two binary variables, TT for the COVID-19 pandemic period and TC for the country effect. Both variables have a negative coefficient, implying

that the financial distress level during the pandemic was higher and that Indonesian firms experienced higher financial distress. The second, third, and fourth models present the estimations using three variables representing the effect of the pandemic, whether firms are located in Indonesia, and whether they have higher debt levels on financial distress. The estimations provide evidence that the three variables have a negative coefficient, which is consistent with the literature that the economic shock due to the pandemic has induced higher distress levels, Indonesian firms have higher distress levels, and highly leveraged

**Table 6.** Two-Sample t-test of Z-score among Indonesian Firms (Financial Distress Indicator)

	TT=0&TC=1			TT==1&TC==1		
	Obs.	Means	Std.error	Obs.	Means	Std.error
TS==0	1,164	7.818	0.228	193	7.670	0.374
TS==1	521	3.234	0.253	87	2.505	0.441
Combined	1,685	6.400	0.183	280	6.065	0.325
Difference of means		4.583	0.381		5.164	0.632
t-statistics		12.044			8.171	
df (degree of freedom)		1,683			278	
Prob (T>t)		0.000			0.000	

Notes: TT is year dummy of the pandemic 2020; TC is country dummy (Indonesia=1; Malaysia=0); TS is leverage level dummy (highly leverage in fourth quartile=1).

firms experience a higher level of financial distress. Nevertheless, only two variables are statistically significant for TC (country effect) and TS (highly leveraged firm dummy variable). These two variables of the country effect (TC) and leverage level (TS) remain significant after controlling for firms and country-specific characteristics in Model 6. The results also indicate that

firms with higher liquidity are less prone to financial distress. In addition, firms with longer operation periods tend to have lower z-scores, implying higher levels of financial distress. Hence, high economic growth is important for lowering the level of financial distress in the business sector.

Some main findings generated from this study are as follows: (1) Indonesi-

**Table 7.** Estimation Results of Difference in Differences Models

Z-score as dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
TT	-0.846 (0.951)	-0.771 (0.524)	-0.421 (0.408)	-0.442 (0.379)	-0.773 (0.600)	0.480 (0.788)
TC	-1.115** (0.438)	-0.709** (0.243)	-0.658*** (0.228)	-0.642*** (0.229)	-0.588** (0.279)	-1.144*** (0.269)
TS		-4.404*** (0.263)	-4.359*** (0.282)	-4.371*** (0.272)	-4.056*** (0.424)	-3.479*** (0.388)
TTTC	0.118 (1.202)	0.443 (0.699)			0.625 (0.820)	0.354 (0.798)
TTTS		-0.366 (0.774)	-0.366 (0.774)		-0.073 (1.232)	0.135 (1.099)
TCTS					-0.527 (0.569)	-0.104 (0.533)
TTTCTS				-0.470 (0.887)	-0.508 (1.588)	-1.432 (1.435)
Investment						0.005 (0.057)
Liquidity						6.067*** (0.403)
Age						-0.013*** (0.002)
Growth						0.089** (0.044)
_cons	4.349*** (0.338)	8.471*** (0.173)	8.436*** (0.170)	8.431*** (0.171)	8.406*** (0.184)	6.546*** (0.367)
Observation	1,012	4,053	4,053	4,053	4,053	3,640
F test	3.07	78.05	78.01	78.02	44.82	51.24
Prob > F	0.027	0.000	0.000	0.000	0.000	0.000
R <sup>2</sup>	0.0091	0.0072	0.0072	0.0072	0.072	0.13

Notes: Z-score is financial distress; TT is year dummy of the pandemic 2020; TC is country dummy (Indonesia=1; Malaysia=0); TS is leverage level dummy (highly leverage in fourth quartile=1); TTTC is interaction variable of year dummy and country dummy; TTTS is interaction variable of year dummy and highly leverage dummy; TTTCTS is interaction dummy of year dummy, country dummy and highly leverage dummy; Investment is the ratio of difference of gross fixed assets; Liquidity is the ratio of liquid assets to total assets; Age is the number of years of firms since it was formed; and Growth is the quarterly economic growth.

an firms have a higher level of financial distress compared to Malaysian firms; (2) the leverage level showing the contribution of external funding to the capital structure of Indonesian firms is higher than Malaysian firms; and (3) shock and profitability channels are useful in explaining the impact of the pandemic on firms' financial distress.

The findings regarding leverage level are consistent with those of previous studies that Indonesian firms committed with higher levels of debt than Malaysian firms (Claessens et al., 2000; Goyal & Packer, 2017). Malaysian firms' debt levels are lower because firms have less incentive to extend debt due to the lack of the tax benefit of debt as the tax shield is negative, as found by Claessens et al. (2000). In addition, firms tend to diversify their capital of debt and equity as the capital market is more developed, and the government provides tax incentives on the equity market for tax exemption of income generated by Sukuk, as suggested by Shahida & Saharah (2013).

The impact of shock due to mobility restrictions during the COVID-19 pandemic on financial distress for both Indonesian and Malaysian firms align with the findings of previous studies, particularly using shock and profitability channels. The pandemic lowered firms' revenue, which further reduced firms' profits. A lack of profits worsens firms' financial conditions, which may lead to distress if the corporate loss shrinks their equity and leads firms to be insolvent, as Shen et al. (2020) find. The shock and profitability channel is also documented by Demmou et al. (2021): economic shocks lead to lower actual and expected sales, further reducing firms' profitability by about 40 to 50 percent of average values prior to the pandemic and declining equity by 7-9 percent. The data in Table 5 show that during the pandemic, firms' demand for external

funding increases, which is consistent with the prediction of Bernanke (1981) that during recession, firms have lower margins while fixed expenses remain as in the normal conditions, and this pushes firms to look for external funding.

The COVID-19 pandemic put the economy into recession, as shown by the negative economic growth in 2020 in both Indonesia and Malaysia. As suggested by the literature, during a recession, firms' financial distress increases because of lower demand and disruption on the supply side (Shen et al., 2020). This study shows that firms' dependency on external funding increases, as shown by their higher leverage. In addition, these firms experienced lower liquidity and could not expand their business. Furthermore, the sample t-tests show that firms' financial distress is higher for highly leveraged firms before and during the pandemic.

The empirical findings generated from the DiD models also provide supporting evidence that the coefficients of TT and TS are statistically significant across the models. This finding is consistent with the literature that highly leveraged firms are more vulnerable during a crisis (Claessens et al., 2000). As Graham et al. (2011) suggested, the likelihood and expected costs of distress also increased as firms were committed with higher debt, as debt may generate a burden for companies to pay the interest. This finding also corresponds with those of Famiglietti & Leibovici (2020), Tan (2012), González (2013), and Opler & Titman (1994) that financially vulnerable firms with high debt may be more prone to experiencing financial distress during the pandemic, and that the costs of loans might outweigh the benefits of loans, particularly during the pandemic.

Finally, this study finds supporting evidence that country differences should be controlled for to understand the impact of the pandemic on firms' financial

distress. The analysis reveals that financial distress among Indonesian firms is higher than among Malaysian firms. These findings support the literature that environmental factors contribute to firms' financial distress Famiglietti & Leibovici (2020). Specifically, this study provides evidence that firms operating in a high-debt environment are at a higher risk of financial distress because they are less able to pay off short-term debt. We also find supporting evidence for the peer effect, as suggested by Leary & Roberts (2014) and (Goyal & Packer, 2017), that the debt behavior of firms in the same environment (e.g., in the same industry and the same country) influences firms' leverage levels. A higher level of financial distress among Indonesian firms can also be explained by their dependency on the banking industry as the main source of lending.

Malaysian firms have more options to look for external funding from the equity market and select which one is more competitive. Malaysian firms enjoy rapid development of the capital market, which provides access to corporate bonds and sukuk. As the government offers tax incentives in the form of tax exemption of income generated from Sukuk, Malaysian firms may have lower costs of funds generation compared to Indonesian firms that rely on bank lending. Finally, the higher financial distress among Indonesian firms can be explained by low institutional levels, as suggested by McGee (2008). Having lower institutional quality, lenders' behavior in Indonesia has limited monitoring ability and relies on firms' information, such as the availability of fixed assets, in determining lending. Meanwhile, operating in a stronger institutional environment, lenders in Malaysia not only rely on firms' characteristics in determining lending, because they have access to more information about firms in Malaysia (Leary & Roberts, 2014; Goyal & Packer, 2017).

## CONCLUSION AND RECOMMENDATION

This study examines the effect of economic shock due to the COVID-19 pandemic on firms' financial distress in Indonesia and Malaysia, two neighboring countries with different capital structures and levels of financial development. The findings showed that, during the observation period, the average z-score was 6.965. The score for Indonesian firms is lower at 6.353 than that for Malaysian firms at 7.541. The results show that Indonesian firms are more financially distressed than Malaysian firms and that Indonesian firms have higher leverage levels and lower liquidity.

Second, Indonesian firms experience higher financial distress than Malaysian firms, confirming that the environmental factors of financial development and peer effects contribute to firms' performance. The financial distress level was also higher during the pandemic, showing that a business is slowing down, reducing sales, lowering profits, and triggering financial distress. Finally, highly leveraged firms have a higher level of financial distress, and regression using the DiD technique provides robust estimations that highly leveraged firms are more financially distressed. Highly leveraged firms are exposed to higher bankruptcy risk than firms with lower debt due to an increase in the financial burden of loans.

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