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**THE IMPACT OF THE COVID-19 PANDEMIC ON CORPORATE FINANCIAL  
FRAGILITY IN THE VIETNAMESE MANUFACTURING INDUSTRY**

by

Trang Q. Nguyen

A Thesis Submitted to the Honors Council

For Honors in Accounting Department

May 11<sup>th</sup>, 2022

Approved by:

Email approval received 2022/05/11

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## Abstract

In the past decades, under the government's export-led growth strategy, the Vietnamese manufacturing sector – the backbone of the whole Vietnamese economy – has established a deep tie with the international market and the reliance on foreign buyers has fueled the growth of the sector before COVID-19. However, during the pandemic, when the global market contracted at 3.5 percent and demand slumped globally, this existing growth model and the manufacturing sector's reliance on the foreign buyers induced significant risks to this sector from both the demand and supply side. Using the firm-level data on 41 manufacturing exporting companies from the *Vietstock* database and national-level data on the development of COVID-19 and the magnitude of fiscal policies enacted from the IMF and World bank, this paper investigates the impact of the COVID-19 situation in significant trading partners and in Vietnam on the bankruptcy risks of manufacturing companies. Using a fixed-effect regression model, we found that the COVID-19 pandemic introduced great revenue volatility but did not undermine the solvency levels of Vietnamese manufacturers. Further examination of firm-level financial ratios elucidates that a decade of high growth has built up the necessary firm-level financial resilience that allows these manufacturers to withstand massive macroeconomic shocks.

**Keywords:** export-led growth model, corporate bankruptcy risk, COVID-19, manufacturing industry.

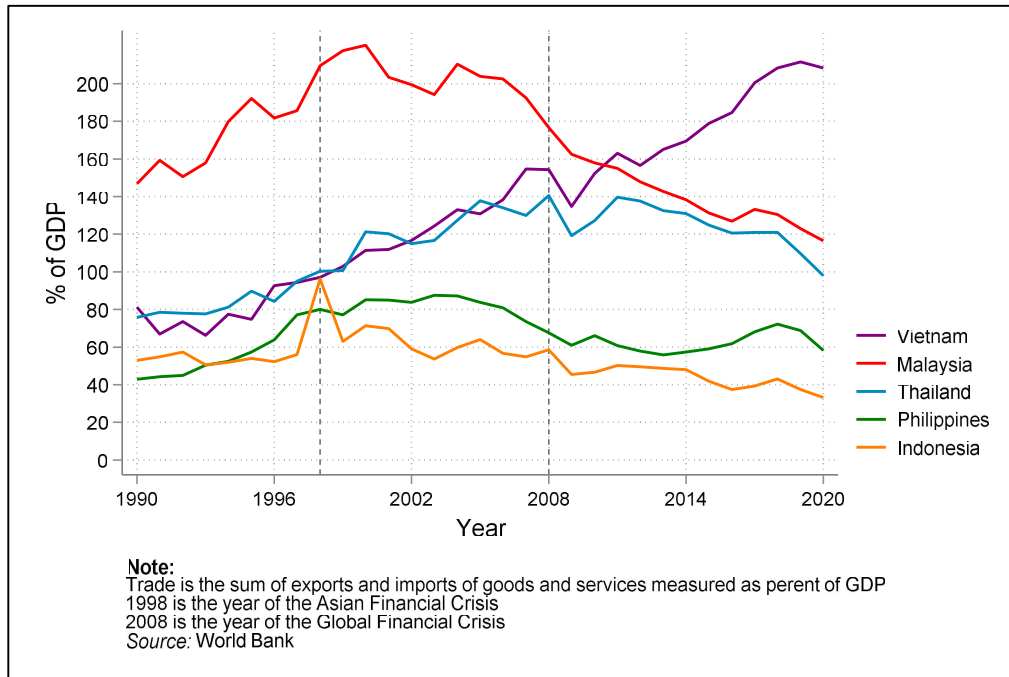
## **I. Introduction**

This section provides background information about the manufacturing sector in Vietnam and its role and performance before and during the pandemic. Subsequently, the section will elaborate on the contribution of the thesis and the questions this research seeks to answer.

### **Background**

Export-led growth is an economic development strategy that aims to open up the economy and utilize the nation's competitive advantages, cheap labor as an example, to produce and supply exports to external markets for economic growth. Since the 1990s, the impressive growth of the Vietnamese manufacturing sector and volume of trade has exemplified the power of the prominent export-led growth model that many developing Asian countries follow (see Fig. 1). Different factors that formulate this development include a reserve of low-cost workers for the labor-intensive manufacturing process and the strategic geographical location in the center of Southeast Asia with 2,000 miles of coastlines convenient for international freight transport. Furthermore, at the heart of the export-led growth of model is the Vietnamese government's effort to welcome foreign direct investments (FDI) and to immerse the country into the global value chain with 27 unilateral and bilateral trade agreements (Asian Development Bank, 2022) – which open up a lucrative foreign market for Vietnamese manufacturers and serve as a key for the growth of this industry. Altogether, the expanding international market has been a major revenue generator and Vietnam has become the fifth and sixth largest source of imports to Korea and the U.S., respectively (United Nation ComTrade, 2022).

**Figure 1: Trade as % of GDP in Five Asian Countries from 1990 to 2020**



Under the government’s guidance and the abundance of labor resources for growth, during the period from 2011 to 2019, the manufacturing sector rose to become the economic powerhouse of Vietnam with a stellar annual growth rate of 10.44% and took up approximately 20% of the national GDP structure (General Statistics Office of Vietnam, 2021). More importantly, manufacturing activities provide 7.5 million jobs (Ministry of Industry and Trade of Vietnam, 2021), approximately 15% of Vietnam’s working-age population, and generate the demand for various sectors in the economy, such as hospitality, financial services, and logistics (Ministry of Industry and Trade of Vietnam, 2021). In other words, the manufacturing sector has a critical role in the Vietnamese economic landscape, and the health of different sectors and the whole economy is highly contingent on the performance of the manufacturing industry.

Given such a solid growth prospect and critical role, nonetheless, the unprecedented shocks that the COVID-19 pandemic brought about may have put an end to the decade of high growth of

this sector. The pandemic put many corporations on the verge of a financial crisis and with the export-led growth model, Vietnam's deep ties to external markets and reliance on foreign buyers amplified the distress that the manufacturing sector faced during this crisis time. On the demand side, the gloomy global economic environment which contracted at -3.5% in 2020 (IMF, 2021), and the associated decline in consumption in absence of government support no longer promised increasing revenue and even induced great volatility and risk to Vietnamese manufacturers. On the supply side, supply chain disruptions and factory shutdowns in many parts of the world blocked the flows of inputs to the manufacturing production and the shipment of output, which imposed significant operational risks to this sector. Altogether, similar to the peer country, Malaysia, which was forced to reconsider its export-led growth model due to the demand shock in the aftermath of the 2008 Global Financial Crisis (Nambiar, 2009), the pandemic can undermine the growth prospect of Vietnam's manufacturing sector. In particular, after the 2008 Financial Crisis, the income and demand drop in advanced economies created an impact on developing countries in Asia through contraction of trade and FDI flows (Nambiar, 2009). On top of the possibility that a similar pattern of outflow of FDI capital – a crucial pillar for the growth of the Vietnamese manufacturing sector – can occur after the pandemic, the trade environment in the post-COVID-19 era is also getting complicated and challenging. Supply chain disruptions and the difficulty in getting goods delivered from developing countries, such as China, during the pandemic breed a question of current trade strategy, and, to a lesser extent, of economic self-sufficiency<sup>1</sup> for many countries. Altogether, the uncertain and complicated global trade environment in the post-COVID period can significantly influence the growth prospect of the manufacturing industry. Thus, this

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<sup>1</sup> Hintze, *Milken Institute*, "How the COVID-19 Crisis Could Spark an Era of Economic Self-Sufficiency", April 14, 2020, available for access at <https://milkeninstitute.org/article/how-covid-19-crisis-could-spark-era-economic-self-sufficiency>

period would act as a stress test to validate if this growth model and the associated over-reliance on foreign buyers can still sustain the growth of the manufacturing industry in particular and the Vietnamese economy in general.

### **Significance**

Given the contribution of the manufacturing sector to the whole Vietnamese economy and its highly contagious and interdependent relationship with other sectors, it is important to understand the performance of these exporting manufacturers during the pandemic. This research contributes timely and novel knowledge of the impact of the pandemic on the financial health of the manufacturing sector - the backbone of the Vietnamese economy – with a focus on the bankruptcy risk. Furthermore, the paper seeks to provide deeper insights into the current weak spots of corporate balance sheets and the essentiality of supporting policies at both the government and firm level to address the vulnerabilities that this sector faced during the pandemic. Altogether, answering how manufacturers handle the pandemic gives us a hint of a broader picture: whether the industry can withstand the external shock or if the pandemic could reshape the economic orientation of Vietnam.

### **Research Question**

Given the manufacturing sector's role as the backbone of Vietnam's economy and the multi-faceted distress that the sector suffered amid the pandemic, this thesis aims to answer three main questions:

- (1) How does the development of the COVID-19 pandemic internationally and domestically impact the bankruptcy risk of the manufacturing sector?

(2) Does the export-led growth model that once laid a solid basis for the growth of this sector continue to sustain the sector? Or, on the contrary, does it induce greater revenue volatility and risk?

(3) At a firm level, what factors on the balance sheet make the companies financially fragile?

In terms of financial fragility, the resilience of companies against the risks of bankruptcy during the pandemic will be evaluated through the analysis of the corporate Altman Z-score, developed by New York University professor Edward I. Altman in 1968. Taking into consideration the level of profitability, leverage, and liquidity, the Altman Z-score is a well-tested and widely used model that measures corporate credit risk level and the likelihood of bankruptcy. The global and domestic development of COVID-19 will be reflected in the number of new cases and the cumulative amount of stimulus packages issued in different countries in each quarter.

## **Structure**

This paper is organized as follows: Section I provides context and the contribution of this thesis. Section II discusses the existing literature on the common micro and macro factors that contribute to the risk of bankruptcy of exporting manufacturing companies. Due to the recency of the pandemic, this section focuses mostly on bankruptcy-related literature during a regular economic cycle and the 2008 financial crisis. Section III explains the conceptual framework that elaborates how international and domestic COVID-19 situations impact the financial standing of Vietnamese manufacturers. Section IV provides information on the dataset and section V introduces the econometric model employed to quantify the impact of the pandemic on the corporate risk of bankruptcy. Section VI discusses the empirical results, followed by Section VII, in which we analyze how the pre-existing financial characteristics of the Vietnamese



manufacturers strengthen their resilience against external shocks and suggest several firm- and government-level policies. Section VIII concludes this thesis by summarizing our findings.

## **II. Literature Review**

Financial performance of corporations can be measured by three different dimensions, including profitability, market value, and risk of bankruptcy (Tuzcuoglu, 2020). Given that COVID-19 pushed all companies into a widespread liquidity crisis and to the verge of bankruptcy (Acharya and Steffen, 2020), this project focuses on the risk of corporate bankruptcy, gauged through the Altman Z-score. The central argument of this paper rests on the impact of macro conditions and the COVID-19 pandemic's development on the bankruptcy risk of manufacturing firms. However, existing literature on bankruptcy risks often focuses on firm-level, accounting-based causes rather than macroeconomic reasons (Tuzcuoglu, 2020). Furthermore, as to be explained further in this section, even though the macroeconomic environment, on average, undermines all corporations' solvency status, several key firm-level factors can explain bankruptcy risk and intervene in the transmission of the macroeconomic shocks. Therefore, reviewing the definition and roles of these firm-level factors provides a solid foundation for the understanding of corporate bankruptcy risk and the results of the econometric model discussed in this paper. As an overview, this section first defines the concept of bankruptcy and its measurement, the Altman Z-score, and then considers the existing literature on how firm-level and macroeconomic factors impact firms' financial health during the financial crisis and the pandemic.

### **II.1. Financial Vulnerability & Altman Z-score defined**

Financial vulnerability refers to the degree to which a company is affected by a financial crisis and the "ability to recover from sudden financial shocks, which include sudden and unexpected loss of income and/or a sudden and uncontrollable increase in expenditure" (IGI Global, 2022). When facing financial distress for an extended period, vulnerabilities can lead to bankruptcy, a financial situation when corporations are unable to pay their long-term debts,

become insolvent, and are forced to exit markets. On the contrary, companies which manage to pay their long-term debts are considered solvent. During a financial crisis, economic fluctuation often disturbs the financial structure of the company, creating an imbalance between revenues and expenses and inducing a greater likelihood of bankruptcy. For this reason, voluminous studies have employed the Altman Z-score to gauge the level of financial resilience of companies, their ability to maintain a solvent status, and the risk of default during hardship (see Acharya and Steffen, 2020; Aasen, 2011; Alfaro, Asis, Chari & Panizza 2019). Mathematically, Altman Z-score is a linear combination of five business financial ratios, including the ratio of working capital to total assets, the ratio of retained earnings to total assets, the ratio of earnings before interest, and taxes to total assets, and the ratio of market capitalization to total liabilities, and the ratio of sales to assets (Altman, 1968) (see Box 1). These component variables respectively represent the liquidity, the portion of total assets that are funded by accumulated earnings, the effectiveness of using assets for profit generation, the company's market value relative to total assets, and the efficiency of using assets for sales. These financial data are available on financial statements of publicly listed and private companies.

**Box 1: Altman Z-score Formula**

$$\text{Altman Z-score} = 1.2 \frac{\text{Working capital}}{\text{Total Assets}} + 1.4 \frac{\text{Retained Earning}}{\text{Total Assets}} + 3.3 \frac{\text{Earnings before Interest \& Taxes}}{\text{Total Assets}} + 0.6 \frac{\text{Market Capitalization}}{\text{Total Liabilities}} + 1.0 \frac{\text{Sales}}{\text{Total Assets}}$$

A higher Z-score means a more financially sound business. In his original paper, Professor Altman decided that 1.8 was a cutoff point and a Z-score below which signals that a company is likely to head for bankruptcy within two years (Altman, 1968). However, in today's market condition, a Z-score that falls below the threshold of 0 signals the likelihood that a company is

heading for bankruptcy within the next 2 years. On the other hand, a Z-score that is above 1.8 implies the company is in a solid financial position (Altman, 2020). Even though a Z-score often ranges from 0 to 10, companies with specific situations can have a Z-score out of this range. As an example, during the pandemic, international aviation was paralyzed as countries closed their borders and imposed strict traveling restrictions. As revenue froze while depreciation and other fixed costs such as airplane rental and parking expenses continued to incur, airlines around the world struggled to obtain sufficient capital to meet their long-term debts. As a result, major airlines around the world faced higher bankruptcy risks and recorded considerably low Z-scores. AirAsia X, a Malaysian budget airline, had its Z-score reached -71.9 while other major airlines including Pakistan International, Thai Airways, and Philippine Airlines saw their Z-scores deteriorated and reached -8.3, -3.4, and -1.7, respectively.

Factors that give rise to corporate bankruptcy can be sliced into two levels: micro (firm) level and macro level. In the following paragraphs, different firm-level and macroeconomic causes of bankruptcy will be presented. However, given the interrelated connections between variables in each category and also across two categories, each factor will not be completely and exclusively different from the others.

## **II.2. Microeconomic causes defined**

For corporations in general and manufacturing companies in particular, the causes of financial distress involve the issues of profitability, liquidity, leverage, and working capital management. The definition of these concepts and their contributions to bankruptcy risk are as follows:

### **II.2.a. Profitability**

Profitability, often calculated as profit (as the net difference between revenue and expense) relative to the size of the company, is a measure of corporate operational efficiency and the ability to generate cash flow from operating activities to cover costs. Low profitability can be a result of either declining revenues or increasing costs of operations. As profit is the main cash generator for business, companies with a low level of profitability and associated cash flow are reasonably expected to face payment difficulties and a higher risk of bankruptcy (Brindescu, 2016).

### **II.2.b. Liquidity**

Liquidity measures a firm's capacity to fulfill its current obligations such as payable to suppliers and employees and other short-term operating expenses. Liquidity is often gauged through the current ratio - a ratio of current liabilities over current assets - and quick ratio - a ratio of the most liquid assets over current liabilities. Often time, cash generated from profits is typically the main sponsor for liquidity, and thus, the two concepts of liquidity and profitability are closely related; however, in some situations, firms can have low profits but are liquid. For example, during the COVID-19 period, when economic activities dampened and consumer confidence and demand plunged, on average, corporations have a significant deterioration in their profit levels and are unable to generate sales to cover their costs. However, with the aid of the government through several stimulus programs and/or other financing sources of equity and debt, companies can avoid a liquidity crisis.

### **II.2.c. Leverage**

Leverage measures the portion of long-term debt as a source of capital to fund the expansion of assets (i.e., acquiring machinery and initiating new projects) to increase return.

Companies prefer debt over equity as a source of funding due to the cheaper cost, but a high level of leverage can increase the chance of bankruptcy. In particular, holding too much debt during a period of struggling operations and declining cash flows prevents the company from paying the interest expenses on the large loan principal, the amount that the company originally borrowed. Observing the rapid surge in the debt positions and leverage taken by companies in emerging markets, Alfaro et al. (2019) hypothesized that firms in emerging markets are vulnerable to significant capital outflow and studied the relationship between leverage, exchange rate depreciation, firm size, and corporate financial distress. Studying a sample of 2,986 firms in more than 10 emerging countries from 1992 to 2014, the author group sheds light on the negative but time-variant impacts of leverage on financial fragility. In other words, the magnitude and significance of the impacts of having additional debts on the risk of bankruptcy are contingent on the macroeconomic environment, such as the market interest rate as the cost of borrowing and the prospect of future cash flow of the company and the industry.

#### **II.2.d. Working Capital Management**

Effective working capital management, with a focus on the management of inventories, can improve short-term liquidity. Working capital management is the management of different short-term assets, including cash, accounts receivable, and inventories, to fulfill short-term liabilities (Deloof, 2003) and is a trade-off between liquidity and profitability (see: Bellouma, 2011; Rasyid, 2017). Working capital cycle, also called the cash conversion cycle, is the average period for a company to pay for and sell inventories and a measure of operational efficiencies. Management of working capital with a focus on inventories and working capital cycle are particularly important factors for manufacturing firms due to their business model with a high level of inventories in hand. An aggressive working capital management policy, which aims to maintain

a high level of short-term liabilities and a low level of current assets compared to the total assets, provides low liquidity but higher profitability and higher risk. A conservative policy, on the other hand, ensures ample liquidity but low profits due to the under-utilization of resources (cash) that can be invested elsewhere to maximize earnings. In certain times, a conservative management policy, which advocates for the investment in current assets and inventories, can hedge the company against supply chain disruption, input shortage, and price fluctuation (Blinder and Maccini, 1991). In a study of working capital management and corporate financial performance of the manufacturing sector in Pakistan, Aymen (2013) studied a sample of over 204 publicly listed manufacturing firms in 10 different sectors from 1998 to 2007. Using a fixed-effect regression model, the author concludes that all else equal, a high working capital ratio with a lean toward a conservative policy can increase firms' profitability. Importantly, the longer cash conversion cycle and a higher level of financial debt reduce profitability.

As a note, all firm-level factors mentioned above are financial variables. The analysis of the impact of non-financial factors on the risk of bankruptcy such as the types of the business, and the capability of the management level (Altman, 2006) is beyond the scope of this paper.

### **II.3. Macroeconomic causes defined**

The literature below elaborates on how unfavorable macroeconomic conditions can increase the risk of bankruptcy for firms. In particular, some papers explain how companies with deteriorating (or healthy) firm-level indicators are less (or more) resilient or insulating against macroeconomic shocks.

### II.3.a. Macroeconomic environment

In general, during a crisis period, companies, especially those who heavily participate in trade, have a higher risk of bankruptcy. Employing the Altman Z-score as a measure of insolvency risk, Aasen (2011) investigated the impact of the 2008 financial crisis on the financial distress level of 180 companies listed on the Oslo Stock Exchange. In this research, after performing a Chow test<sup>2</sup> to compare the average Z-scores of the sample during and before the financial crisis, Aasen (2011) validates that during the financial crisis, corporations faced substantial distresses as the average Z-score deteriorated significantly. To investigate further the levels of distress across various sectors, employing a Mann-Whitney test<sup>3</sup>, the author discovers that manufacturing companies have a lower average Z-score and were more financially distressed as compared to non-manufacturing firms. In particular, the most affected companies are those who operate in the consumer durable goods sector and actively engage in international trade and offshore activities.

At a deeper level, contracting macroeconomic conditions as the result of COVID-19 create a liquidity crisis for many corporations (Acharya and Steffen, 2020). In a paper studying a sample of 1,857 U.S. firms in 2021, Fahlenbrach, Rageth, and Stulz (2020) present the severe impacts of COVID-19 on firms' financial performance and propose that having financial flexibility can mitigate the issue. In this research, corporate financial performance is measured by stock prices, and financial flexibility is defined as holding more cash and less short-term and long-term debt. The authors postulate that firms with a higher portion of variable cost and costs of goods sold can

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<sup>2</sup> Definition of Chow Test: A test to “indicates if the regression coefficients are different for split data sets. Basically, it tests whether one regression line or two separate regression lines best fit two different groups in a data set.” (IGI Global, 2022)

<sup>3</sup> Definition of Mann-Whitney Test: A non-parametric statistical techniques to test “the equality of means in two independent samples” (Boston University School of Public Health, 2017) – available for access at [https://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704\\_nonparametric/bs704\\_nonparametric4.html](https://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704_nonparametric/bs704_nonparametric4.html)



adjust the scale of their operations and cut costs more easily. Thereby, in contrast to the companies with high capital expenditures, research & development, and selling, general, & administrative costs, these firms can obtain more financial flexibility and be less affected by a temporary revenue shortfall. Thus, while focusing on the impact of the macroeconomic situation on a firm's performance, the paper highlights how microeconomic factors, namely liquidity, can intervene in the transmission of macroeconomic shocks. This conclusion also implies that during distress times when financial flexibility is valued, low ex-ante leverage is preferred because a company can increase its leverage if needed, instead of facing the distress of interest payments. Additionally, during the pandemic, when every company experienced a "dash for cash", their choice of funding for liquidity, either through credit draw-down, or short-term/long-term debt and equity can speak about their pre-existing financial strengths (Acharya and Steffen, 2020).

Tightening macroeconomic conditions also increase the likelihood of bankruptcy for companies by requiring a lower optimal leverage level. In a recent analysis of what gives rise to corporate insolvencies in the aftermath of COVID-19, Haque and Varghese (2020) assess the unparalleled impact of the COVID-19 public health crisis on firm's capital structure, the optimal level of leverage, and default risks. First, the authors differentiate between two exogenous risks that firms face amid the pandemic: financial risk, measured by the portion of long-term debt due in one year over total debt, and business risk, measured by sales growth. During the pandemic, firms with greater financial risks were more likely to de-lever while those who experienced higher business risks did not. The increasing volatility of asset return, the tightening liquidity conditions, and the severe drop in the future cash flow as a result of dampening demand, sales, and business environment, altogether, suggest the optimal leverage level of 31.5%, which is 13% lower than the pre-COVID optimal level. In other words, to safely emerge out of the pandemic and avoid facing

bankruptcy, firms should keep their debt at a healthy level of 31.5% so that they can meet the interest payment obligations. In general, the paper concludes that an unfavorable macroeconomic environment, with the consequent lower optimal leverage level, amplifies insolvency risks for operationally unstable firms, especially those who experienced a significant sales drop and did not de-lever.

In another research, Kharroubi and Banerjee (2020) examine how financial vulnerabilities increase firms' likelihood of exiting the market in the aftermath of the 2008 financial crisis and how low leverage, rather than high liquidity, is the key protection against bankruptcy. Using the information on companies from seven European economies between 2008 and 2016, the author groups find out that financially vulnerable firms are more likely to face bankruptcy and exit the market when the economy is sluggish with low activities and tight liquidity conditions. In particular, having a great amount of short-term debt with a poor ability to fulfill the interest payment, evidenced by low earnings and cash flow related to interest expenses, can predict bankruptcy. Additionally, holdings of cash and liquid assets, while they may protect corporations against a liquidity crisis, provide little support in mitigating insolvency.

### **II.3.b. Exchange rate**

Since trade-related activities and transactions involve foreign currency, exchange rate fluctuation has a critical impact on the financial health of exporting companies. In many cases, countries often employ currency devaluation to make their exports cheaper and more attractive in the international market and thereby, boost export performance (Nguyen and Do, 2020). In the same paper that examines the impact of leverage on corporate solvency, Alfaro et al. (2019) shed light on the negative but time-variant impacts of exchange rate fluctuation and leverage on corporate financial fragility. Holding other effects constant, currency depreciation amplifies the

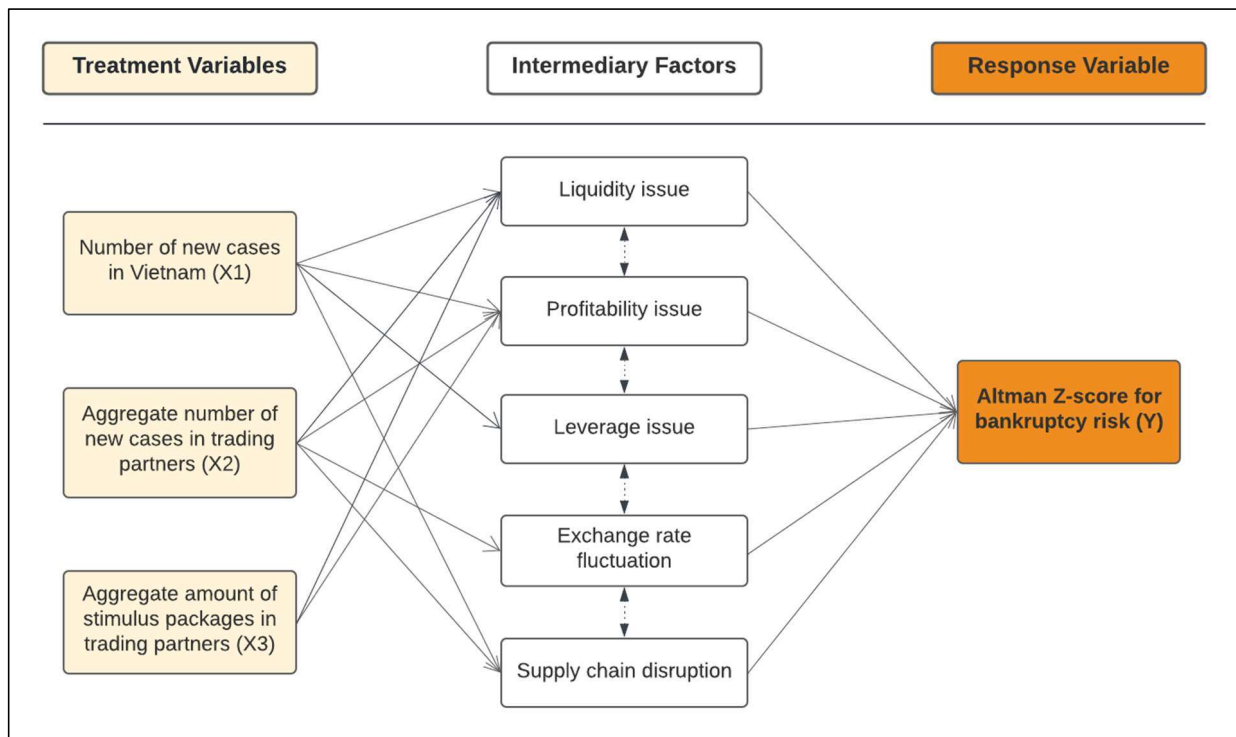
unfavorable impact of leverage on financial vulnerability for larger firms in emerging markets during an economic crisis. In another study, Tuzcuoglu (2020) studies the relationship between macroeconomic indicators of financial stability and corporate financial performance. Using a sample of 4,193 Turkish publicly listed businesses over the period 2005-2017, the author performs three distinct fixed-effect regression analyses of nine macroeconomic variables on three dimensions of financial performance, namely profitability, solvency, and market value, measured by earning per share (EPS), the Altman Z-score, and share price, respectively. From the model outputs, Tuzcuoglu (2020) discovers that the firm's Altman Z-score is negatively impacted by currency appreciation, the rising ratio of exports to imports, and the growth of public debt and short-term foreign debt. In general, this research shed new light on the impact of macroeconomic factors on firms' likelihood of bankruptcy, which previous studies about corporate financial failures have not commonly addressed.

To summarize, there has been little literature that studies the impact of the global development of COVID-19 as a macro variable on the bankruptcy risk of firms and this project seeks to fill in this gap of knowledge. Even though previous research often studies the performance of firms in the general context of the pandemic instead of directly employing any specific COVID-19-related variables, the existing literatures show that an unstable macroeconomic environment can influence the corporate risk of bankruptcy by undermining several firm-level features such as profitability and liquidity. The next section, Conceptual Framework, will elaborate on how the COVID-19 pandemic situation and Vietnamese's export-led growth model together set up the macro environment for exporting manufactures and thereby, influence their corporate risk of bankruptcy.

### III. Conceptual Framework

This paper will analyze the multi-faceted impacts of the COVID-19 pandemic on corporate bankruptcy risk through several intermediary factors (see Fig. 2), with a focus on the demand-side shock. Since little literature has studied and established the direct relationship between the pandemic and the performance of manufacturers in a developing, export-led economy such as Vietnam, this conceptual framework explains how COVID-19-related macroeconomic variables can influence the manufacturing firms' Z-scores through different factors, including but not limited to, firm-level liquidity, profitability, and leverage ratios, supply chain disruption, and exchange rate. As mentioned in the literature review section, these intermediary firm-level factors are not exclusively independent from each other.

**Figure 2: Conceptual Framework**



As a defining characteristic and also a potential weakness of the export-led growth model, the manufacturing sector in a small, open developing country is highly dependent on the demand of developed economies and the decline in consumption in these economies can hit the exporting country significantly (Nambiar, 2009). Therefore, the paper analyzes the solvency risk of Vietnamese manufacturing companies under the evolution of COVID-19 and subsequent government measures both domestically and internationally. COVID-19 situation is gauged through three variables: the number of new cases and the magnitude of stimulus packages injected into the economy in Vietnam's four major trading partners, namely the United States, Japan, China, and Korea.

First, the spike in the number of new COVID-19 cases in Vietnam's four significant trading partner countries can undermine the financial strength of exporting firms through several different intermediary factors (see Fig. 2). Even though COVID-19 generated both demand and supply shock, the manufacturing industry is more affected by the demand slump (Brinca, Duarte, and Castro, 2020). On the demand side, in advanced economies, as the outbreak occurred, service sector workers lost their jobs, were refrained from consumption, and created a sectoral demand shock (Brinca, et al., 2020). Thus, the decline in demand can directly create a significant revenue loss for Vietnamese manufacturers, which undermined the profitability level and dried up the liquidity level of these companies.<sup>4</sup> For example, the 2008 Global Financial Crisis serves as an example of how international demand had a significant influence on the manufacturing sector in developing countries with an export-led growth model such as Malaysia and Thailand (Nambiar,

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<sup>4</sup> As an example, according to Reuters, on March 24, 2020, the Vietnam Association of Seafood Exporters and Processors Vietnam mentioned in a statement that "seafood exporters have seen up to 50% of their export contracts cancelled or delayed due to the coronavirus outbreak".

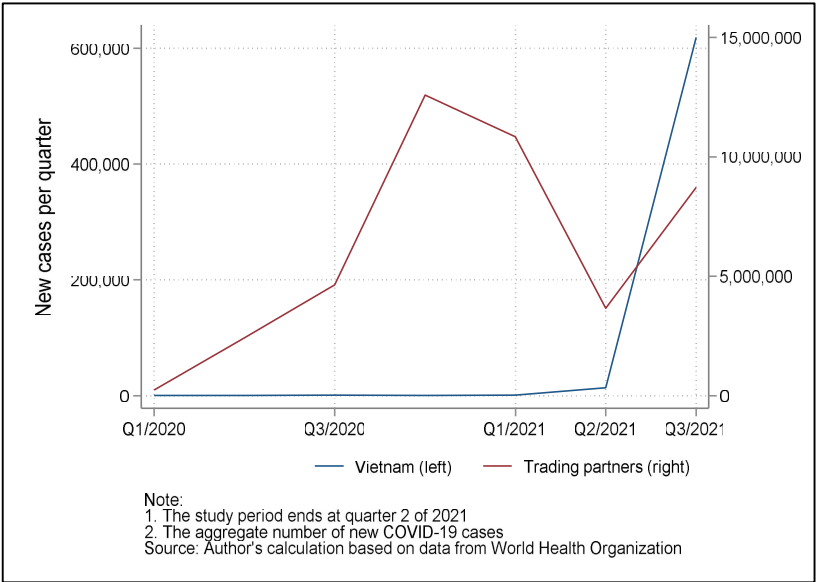
2009). On the supply side, with the supply chain disruption, the shutdown of factories that manufacture essential upstream inputs, such as those in China notably, strained the international flow of goods and materials for global production. Since Vietnamese firms also rely on imported inputs, this blockage not only hinders the production process but also increases the cost of inputs and shipment services, shaking the cost structure and profitability of Vietnamese firms (World Bank, 2021). Altogether, these fluctuations weaken the position of corporate balance sheets and the manufacturers' ability to fulfill short-term obligations, make high leverage riskier, and thus, induce greater bankruptcy risks.

On the other hand, the issuance of fiscal stimulus that both encourages consumer demand and restrains the outbreak to protect public health and restart business activity in advanced economies creates positive signs for Vietnamese manufacturers. As the government in advanced economies implemented several immense stimulus packages to mitigate the demand shock, this thesis hypothesizes that the stimulus packages and the associated reviving demand can increase profits for Vietnamese exporting firms. This hypothesis agrees with the claim that the resilient economic recovery, coupled with bolstering demand from advanced economies, promises a positive influence on the economic growth of developing countries including Vietnam (Asian Development Bank, 2021).

Lastly, the worsening evolution of the COVID-19 situation in Vietnam can create a supply-sided shock and undermine the risk of insolvency of manufacturing firms. Theoretically, as the number of new COVID-19 cases spikes, given the labor-intensive nature of the manufacturing process, many companies have to shut down and suspend production to comply with the social distancing and lockdown orders from the government. As the production of a good often serves as the input for another manufacturing process, the shutdown of a production hub can postpone and

disrupt sector-wide activities. Inability to produce and fulfill orders and the associated loss of revenue, which undermine profitability and liquidity level (see Fig. 2), can deteriorate the bankruptcy risk of firms. Additionally, significant outbreaks in a country can cause depreciation of the domestic currency (Aquilante and Masolo, 2022), and the fluctuation of which can impact the profitability level of exporting manufacturers. However, in reality, since Vietnam did not experience any significant outbreak until Q3, 2021 and the study period of this thesis is from Q1, 2017 to Q2, 2021, manufacturers did not need to shut down their factories and experience a significant labor supply shock during the study period covered in this thesis (see Fig. 3). Thus, this thesis focuses on the demand shock from the international market suffered by firms.

**Figure 3: Number of new COVID-19 cases in Vietnam and four significant trading partner countries, from Quarter 1, 2020 to Quarter 3, 2021**



In general, this central hypothesis that the negative development of COVID-19 worldwide, in absence of government support, can undermine the financial health of Vietnamese manufacturing companies supports the viewpoint expressed in an article issued by the World Bank that COVID-19 has left firms with declining sales and profitability, a thirst for liquidity, and a

looming picture of widespread insolvency (World Bank, 2020). Moreover, based on this conceptual framework, the ultimate answer of whether the export-led growth orientation and the dependence on the foreign market would hurt or help the manufacturing sector is contingent on whether the positive impact of international stimulus packages and increasing revenue outweighs the negative consequences of the COVID-19 development and the associated costs.



## IV. Data

The research is conducted using a panel data set which consists of 41 firms in the manufacturing industry in Vietnam during the period from 2017 to 2021. The quarterly firm-level data are from *Vietstock*, a Vietnamese financial database. Additional data was collected relating to significant financial indicators which measure corporate vulnerability and performance, including current and total assets, current and total liabilities, revenue, earnings before interests and taxes, retained earnings, and market capitalization.

For the response variable, the Altman Z-score for each company during each quarter are calculated based on the given formula (see Section II. Literature Review – Box 1) and the available firm-level financial data. In particular, while other component variables for the Altman Z-score calculation are available in the imported dataset, the working capital variable is calculated as the difference between current assets and current liabilities.

In terms of the treatment variables, there are three country-level COVID-19 variables, including (1) number of quarterly new COVID-19 cases in Vietnam (Quarter 1, 2017 to Quarter 2, 2021), (2) aggregate number of quarterly new COVID-19 cases in five significant trading partners (Quarter 1, 2017 to Quarter 2, 2021), and (2) aggregate amount of accumulated fiscal stimulus<sup>5</sup> packages in four significant trading partners, measured at the end of each quarter, from

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<sup>5</sup> The figure of fiscal packages is the sum of two measures: (1) above-the-line measures and (2) below-the-line measure. **Above-the-line (ATL)** measures include policies that require direct and upfront cash payments that are funded by issuances of additional government debt. Thus, above-the-line measures increase spending, deplete budget balance, and increase liabilities for the government's balance sheet. Examples of ATL measures are increases in expenses such as additional spending for health services and unemployment benefits, capital

Quarter 2, 2020 to Quarter 2, 2021. The data on new COVID-19 cases and cumulative outstanding fiscal packages in four countries in each quarter are from the World Health Organization (WHO) and the International Monetary Fund (IMF), respectively. The data on the exchange rate is also from the IMF. After importing this data, we filtered and added the data of four significant trading countries together to obtain two aggregate variables that represent the development of COVID-19 internationally.

Merging these data sets produces a final panel dataset consisting of 41 firms, spanning 18 quarters (from Quarter 1, 2017 to Quarter 2, 2021), and encompassing both firm-level financial indicators and Altman Z-scores, and macro-level variables related to the development of COVID-19 (see Table 1). For the data cleaning and visualization process, we used Stata, a general-purpose statistical software package. Regarding the treatment of missing values, two types of missing values are present and discarded. For companies whose initial public offering (IPO) occurred during the pandemic, their financial data before the IPO date is unavailable and appears in the dataset as missing values. Since these companies received a significant influx of capital and had unrepresentative financial ratios, they are removed from the sample to avoid bias and misleading results. Other than that, we also removed companies that did not consistently report their financial

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grants including direct payments and wage subsidies for affected workers, households, and companies, or decreases in revenue including tax cuts, tax relief, and tax and social security contributions deferral.

**Below-the-line (BTL)** measures do not require cash payment from the government's budget as an expense and typically require “creation of assets” instead of payment from the government as an expense. Examples of BTL measures include loans, and guarantees, equity rejection, and asset purchases. Loans and equity purchases are investments with future returns. Therefore, these measures do not decrease the government's budget balance but may increase government debt or contingent liabilities and the risk of the government portfolio. For example, governments are at risk if corporations default on loans or failed to generate a return for equity holders, and when guarantees on loans are called.

*Source:* Fiscal Monitor – April 2020, Chapter 1: Policies to Support People During the COVID-19 Pandemic. Available for access at <https://www.imf.org/en/Publications/FM/Issues/2020/04/06/fiscal-monitor-april-2020>

information during the sampling period. Thus, the total number of selected companies in the final dataset was trimmed down from 56 to 41 firms.

**Table 1: Definition of variables and summary statistics**

| Variable   | Mean      | Std.de    | Min       | Max        |
|--|-----------|-----------|-----------|------------|
| Altman Z-score   | 2.15      | 2.08      | 0.3       | 11.82      |
| New COVID-19 cases in Vietnam per quarter                            | 917       | 3,169     | 0         | 13,913     |
| Aggregate new COVID-19 cases in trading partners per quarter         | 1,910,635 | 3,737,587 | 0         | 12,600,000 |
| Cumulative fiscal packages enacted in trading partners (billion USD) | 2,198.96  | 3,640.39  | 0         | 9,744      |
| Exchange rate (VND/USD)  | 22,847.11 | 347.19    | 22,216.04 | 23,245     |
| Total asset (billion VND)  | 5,809.01  | 14,766.15 | 149.07    | 159,809    |

In terms of the observation, the selected firms are selected from the “List of prominent exporting enterprises in 2018, 2019, and 2020”, issued by Vietnam’s Ministry of Investment and Trade. In total, this list encompasses more than 200 companies whose ownership types include non-state-owned, state-owned<sup>6</sup>, and foreign-owned<sup>7</sup>. Even though a large portion of manufacturing

<sup>6</sup> According to the updated Enterprise Law in 2015, state-owned enterprises are entities with 100% of capital from the government. Before that, according to the Enterprise Law in 2003, SOE comprises of both 100% state-owned, non-listed limited liability enterprise, and enterprises where government owns a majority of more than 50% of stakes and capital contribution (Knutsen and Khanh, 2020). 100% state-owned companies are not selected in this thesis. Partially state-owned enterprises can be publicly listed or privately held.

<sup>7</sup> According to Foreign Investment Law of Vietnam, foreign direct investment (FDI) enterprises can conduct their activities in Vietnam in three forms: joint venture; enterprise with 100 percent foreign-owned capital; and operation under a business cooperation contract (BCC). Joint venture requires the minimum contribution of foreign party of 30% to prescribed capital and is an attractive form of investment as foreign corporations can easily have access to the Vietnamese’s market and insights. Enterprise with 100 percent foreign-owned capital (also called wholly foreign-owned enterprise) are often served as a vertical expansion, or a manufacturing hub which supplies inputs or products to the parent company. A wholly foreign-owned enterprise and joint venture are both required to establish as a limited liability company. Lastly, investments under a BCC often serve as a production-sharing contracts with established and mature Vietnamese entities who does not need substantial

companies in Vietnam are foreign direct investment (FDI) enterprises, this research focuses on non-state publicly listed companies for both data and liquidity reasons. For state-owned enterprises (SOEs), since 100% SOEs are not publicly listed, their data cannot be obtained. From a financial standpoint, given that Vietnamese SOEs are not under as much investors' scrutiny as public companies and have a not-always-straightforward relationship with the government (IMF, 2020), they often receive liquidity support despite their inefficiency to stay afloat and meet their designated goals. Thus, there can be an unrepresentative mismatch and discrepancy between internal performance, the risk of bankruptcy, and external shocks. For FDI enterprises, which are mostly privately held, their financial information is also not publicly available. From a financial standpoint, foreign-owned companies<sup>8</sup> have a potential access to both cash and the guaranteed demand of output from the parent multinational companies (MNCs), whose balance sheets are relatively strong. Therefore, foreign ownership provides various advantages to hedge firms against liquidity risk, revenue fluctuation, and thus the possibility of insolvency during the COVID-19 period. On the contrary, before COVID-19, non-state, non-foreign Vietnamese companies had a lower level of gross profitability and a weaker interest coverage ratio as compared to FDI enterprises and SOEs (IMF, 2020). Not to mention, in terms of operational performance, with the limited capital for investment in technology, Vietnamese manufacturers are often less cost-

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equity injection. Besides that, BBC also include large-scale projects with the Vietnamese Government or a state-owned enterprise as the local partner, such as infrastructure development projects. ([Nguyen, 1994](#))

Additionally, since foreign direct investment (FDI) represents a long-term relationship and lasting interest between foreign investors and local entities, FDI is measured as “the net inflows of investment to acquire a lasting management interest”, which distinguish FDI from passively managed form of portfolio investments such as stocks, bonds, and other financial instruments. (Ngo, Dao, Nguyen, and Dao, 2017)

<sup>8</sup> As mentioned in note 6, manufacturing companies with foreign ownership in Vietnam are often subsidiaries of multinational companies (MNCs), and are set up to produce and supply processed material or finished goods to the parent MNCs.

efficient and productive as compared to foreign-owned enterprises (Tarp, Newman, and Narciso, 2009). Not receiving any management and capital support from foreign investors or the state demands these companies to be adaptive and self-reliant in their capital management and operational strategy to navigate the external supply and demand shock caused by COVID-19. Altogether, given the financial disadvantages faced by non-state Vietnamese companies, this paper focuses on investigating the financial health of non-state, medium-to-large Vietnamese public listed manufacturers with leading and strong exporting activities<sup>9</sup>.

## **Limitations**

I acknowledge the limitations of this thesis concerning the representativeness of the selected observations and the comprehensiveness of study period. In terms of the observations, studying the impact of the COVID-19 pandemic from the global market on Vietnamese exporting manufacturers requires a large and comprehensive dataset of manufacturers of all sizes, including both public listed and privately held companies. However, since a large portion of small manufacturers is privately held, their data are often publicly unavailable and thus, the companies in my sample are medium and large enterprises.

In terms of the study period, since the first significant COVID-19 outbreak in Vietnam did happen until quarter 3 of 2021 (see Appendix – Fig.3) and corporate financial data in this quarter were unavailable at the point of collection, the variable which measures the number of new cases in each quarter in Vietnam did not represent the effect of factory shutdowns and the associated supply shock in Vietnam during the pandemic. Therefore, a longer study period that encompasses

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<sup>9</sup> Even though the manufacturing sector in Vietnam faced several challenges due to the global supply chain disruptions, there is no evidence showing a scene of widespread bankruptcy in this sector during the pandemic and bankruptcy in the manufacturing industry was rarer as compared to other services sector in Vietnam.

the first major outbreak can be a question for further research, and instead, this thesis will focus on the impact of the demand-side fluctuation in the international market on the financial performance of the Vietnamese manufacturers.

## V. Econometric Model

In order to evaluate of COVID-19 on corporate financial health, the following model will be estimated:

$$\log(\text{Altman Z-score}) = \beta_0 + \beta_1 \log(\text{casevietnam})_t + \beta_2 \log(\text{caseinter})_t + \beta_3 \log(\text{stimulusinter})_{t-1} + \beta_4 \log(\text{total\_asset})_{i,t} + \beta_5 \text{exr}_t + a_i + \mu_{i,t}$$

The dependent variable to measure corporate financial fragility is the Altman Z-score, which is calculated based on the available quarterly firm-level data.

In terms of the treatment variables, three different COVID-19 treatment variables are employed: the log of the number of new COVID-19 cases per population in Vietnam in each quarter,  $\log(\text{casevietnam})_t$ ; the log of number of new COVID-19 cases per population in significant trading partner countries, including the United States, China, Japan, and Korea, in each quarter,  $\log(\text{caseinter})_t$ ; and the log of the magnitude of international stimulus packages from significant trading partner countries,  $\log(\text{stimulusinter})_{t-1}$ . Even though the three COVID-19 treatment variables are relatively exogenous, both random-effects and fixed-effects estimators are employed. In general, having exogenous treatment variables is preferred since they allow us to estimate an unbiased causal relationship of interest. The result of the Hausman test (see Appendix – Box 1) suggests that there is a correlation between the unobserved time-invariant firm effect and the independent variables, which can refute our initial hypothesis that COVID-19 treatment variables are exogenous. However, since the variations between the coefficients generated by the random and fixed effects model occur in other controlling variables such as size and exchange rate, the

Hausman test<sup>10</sup> result does not imply that COVID-19 treatment variables are endogenous. Results from both fixed-effect and random-effect regressions are present (see Appendix – Table 3), but this paper will only discuss the outputs of fixed effects model.

At the firm level, the model will also account for firm size ( $\log(\text{total\_asset})$ ), measured by the logged value of total assets on a corporate balance sheet. The potential impact of exchange rate fluctuation is also captured with the variable *exr*.

In terms of the expected direction of estimated coefficients, given the conceptual argument presented in Section III, coefficients on the variables that measure the increase in number of new COVID-19 cases, both in Vietnam and significant trading partners, are expected to be negative. In contrast, the coefficient on the variable that measures the cumulative amount of stimulus packages is expected to be positive.

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<sup>10</sup> A note on Hausman Test: Under the assumption that the unobserved, time-invariant firm fixed effects,  $a_i$ , are correlated with COVID-19 explanatory variables, fixed effects estimates interested coefficients based on time-demeaned data to eliminate  $a_i$ . In contrast, under the assumption that  $a_i$  is uncorrelated with COVID-19 explanatory variables, random estimators would be employed. The benefits of employing random effects estimators is that random effects estimator allow time-constant explanatory/control variables (such as sub-industries) under the assumption that unobserved errors are uncorrelated to explanatory variables, regardless of being fixed over time or not.



## VI. Empirical result

As mentioned in Section II, a Z-score that falls below the threshold of 0 signals the likelihood that a company is heading for bankruptcy within two years. In contrast, a Z-score that is greater than 1.89 implies that a company is in a solid financial position. For the readers' convenience, the incremental effects obtained from the coefficients will be referred to the change in one of the Altman Z-score components whose movement yields the same impact on the Z-score.

**Table 2: Empirical Result**

| Variables                         | Estimated coefficients   |
|-----------------------------------|--------------------------|
| log(casevietnam) <sub>t</sub>     | 0.0105<br>(0.0130)       |
| log(caseinter) <sub>t</sub>       | -0.0178***<br>(0.00543)  |
| log(stimulusinter) <sub>t-1</sub> | 0.0291***<br>(0.00489)   |
| log(total_asset) <sub>i,t</sub>   | -0.299***<br>(0.0604)    |
| exr <sub>t</sub>                  | 0.000107**<br>(4.28e-05) |
| Constant                          | 6.539***<br>(1.748)      |
| Observations                      | 686                      |
| Number of no                      | 41                       |
| R-squared                         | 0.096                    |

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This econometric model employs a fixed effects estimator to measure the short-term impact intensity of three COVID-19 treatment variables on corporate fragility. In general, a positive coefficient means an increase in treatment variables creates an increase in the firm's Altman Z-scores, signaling a decrease in the risk of bankruptcy. Vice versa, a negative coefficient implies that an increase in the treatment variables leads to a deterioration in the firm's Altman Z-scores and heightens the likelihood of bankruptcy.

The coefficient on  $\log(\text{casesvietnam})$  is 0.0105, meaning that a 100 percent increase or a double of the number of new COVID-19 in each quarter in Vietnam would create an increase of 1.05 percent in the Altman Z-score. Even though the direction of the coefficient is not as expected, the standard error of the coefficient is large and the coefficient is insignificant. As a comparison to other component variables in the Z-score equation, a combination of 1% growth in working capital, retained earnings, earnings before interest and taxes (EBIT), market capitalization, and sales, keeping total assets unchanged, *ceteris paribus*, would yield the same effect of 0.0105 percent increase in the Z-score. This result suggests that the increase in the number of new COVID-19 cases in Vietnam does not impact the financial position of Vietnamese exporting manufacturing firms and is in contrast to the original assumption in this research, which can be explained from two perspectives. From a data standpoint, since the study period does not cover the quarter when the first outbreak occurred in Q3/2021, this coefficient cannot capture the comprehensive impact of outbreaks on firms. To a lesser extent, from an economic standpoint, as exporting manufacturers are more affected by the demand shock, firms are possibly more resilient against supply shock and thus, the increasing number of cases does not worsen the Altman Z-score and bankruptcy risk of firms as much as the demand-side crisis. Additionally, during Q2/2020, even though the

Vietnamese government issued Directive 16 to enforce strict social distancing orders in major cities in Vietnam, manufacturing companies were still allowed to operate with necessary safety requirements. Therefore, during the study period, even when the number of cases increased in major cities, industrial manufacturing hubs operated with caution and were not majorly impacted by social distancing orders.

The coefficient on  $\log(\text{casesinter})$  is -0.0178, meaning doubling the number of new COVID-19 cases in four significant trading partners in each quarter is associated with a decrease of -1.78 percent in the Altman Z-score. The coefficient is significant at a 0.001 level. As a reference, a comparison to other component variables in the Z-score equation, a combination of 2% decline in working capital, retained earnings, market capitalization, and sales and 1.5% in EBIT, holding total assets constant, ceteris paribus, would yield the same effect of lowering the Z-score by -1.78 percent. The direction of the coefficient is as expected while the coefficient is significant. This result sheds light on the negative and statistically significant impact that the international COVID-19 situation has on the financial health of the exporting firms in the sample.

In terms of the impact of international stimulus packages on Vietnamese manufacturers' corporate fragility,  $\log(\text{stimulusinter})$  measures the cumulative amount of fiscal packages from governments in different significant trading partners countries from Q1, 2020 to Q2, 2021. To account for both the policy implementation lag during the pandemic and the time gap between when the demand surges and when new orders from Vietnam's manufacturers are placed, the policy variable is lagged by one quarter. The coefficient on  $\log(\text{stimulusinter})$  is 0.0291 and is significant at 0.001 level. This result implies that doubling the cumulative stimulus packages in

four significant trading partner countries creates a statistically significant increase of 2.91 percent in corporate Altman Z-scores. As a reference, while keeping total assets unchanged, a combination of 3% growth in working capital, retained earnings, EBIT, market capitalization, and sales, ceteris paribus, would yield the same effect of lowering corporate bankruptcy risk and lifting the Z-score by 2.91 percent. The result is as expected because a significant amount of stimulus in advanced economies, which came in the form of direct payment to households and individuals, can boost consumption and recover demand, which translated into increasing orders and revenue for Vietnamese manufacturers.

The coefficient on size, or log of the firm's total assets, signals that each percent increase in the value of the total asset is associated with -0.299 percent in the Altman Z-score. The model's result and the average Z-scores of the selected firms by size during the study period (see Appendix – Fig. 9) agree with the central finding of the research conducted by Alfaro et al. (2019) that bigger firms are more financially fragile with lower Altman Z-scores. In particular, comparing the average leverage ratios of the selected companies across different sizes also reveals that bigger companies tend to have more debt, and, during a challenging time, can have a higher risk of bankruptcy (see Appendix – Fig. 10). The depreciation of the exchange rate also has a positive and significant yet small impact on the Altman Z-score.

In general, this empirical result parses out the impact of the development of COVID-19 internationally and domestically on manufacturing firms. The finding is consistent with the hypothesis that manufacturing firms derive a significant portion, if not most, of their revenue

streams on the international market and therefore, are more impacted by the international market performance rather than the minor spreading of COVID-19 in Vietnam in the study period.

## VII. Discussion & Policy Recommendations

### VII.1. Discussion

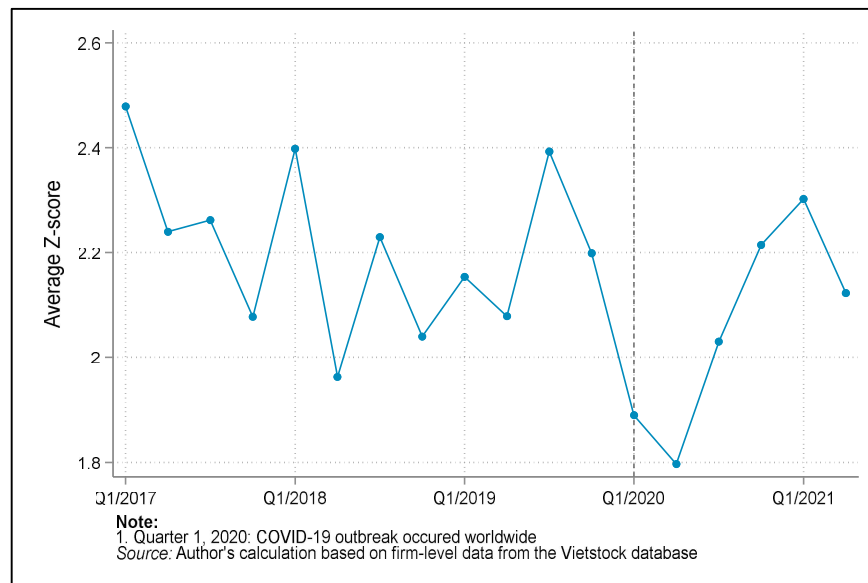
Amid the looming picture of the global economy contracting at -4.4 percent (IMF, 2020) and widespread corporate insolvencies during the pandemic, Vietnam and the manufacturing sector emerged as stellar outliers of economic growth with a rate of 2.9 percent (World Bank, 2020) and 5.82 percent (General Statistics Office of Vietnam, 2021). However, being deeply integrated into the highly volatile global market during the pandemic, as a result of the export-led model, raised the question of if the volatility brought about by COVID-19 can harm these manufacturing companies. This section addresses the questions put forth at the beginning of this paper (see Section I. Introduction – Research Question) and presents several findings of the Z-scores.

*(1) How does the development of the COVID-19 pandemic internationally and domestically impact the bankruptcy risk of the manufacturing sector?*

The statistically significant coefficients on two key treatment variables imply that consumer demand in four different significant trading partners, which are hypothesized to decrease with the spike of new COVID-19 cases and increase with the issuance of stimulus packages (see Section IV - Conceptual Framework), impact the insolvency risk of manufacturing companies. The magnitude of the relationship is not as visible as expected. This result can be attributed to the fact that sampling firms' average Altman Z-scores during 18 quarters (see Fig. 4) showed minimal sign of deterioration and that the manufacturing sector surprisingly remained resilient when it comes to solvency risk during the pandemic. This prospect is more positive than the initial hypothesis in this research that since the Vietnamese manufacturing sector has been put under

multi-faceted stresses from both the demand and supply side, it could experience higher insolvency risk. Therefore, the export-led growth model and a decade of high growth may have built up the resilience for this sector, which is a part of the answer to question 2.

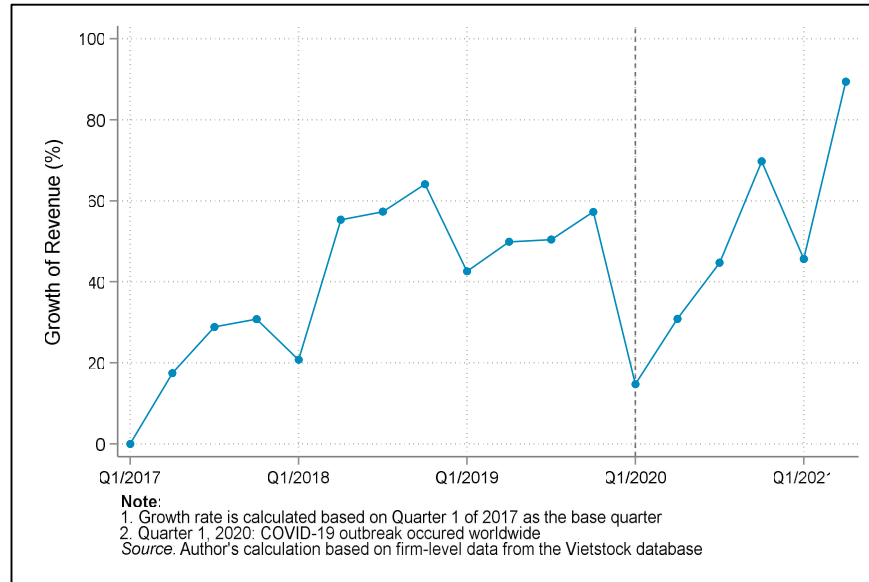
**Figure 4: Average Z-score of 41 Manufacturing Companies  
from Quarter 1, 2017 to Quarter 2, 2021**



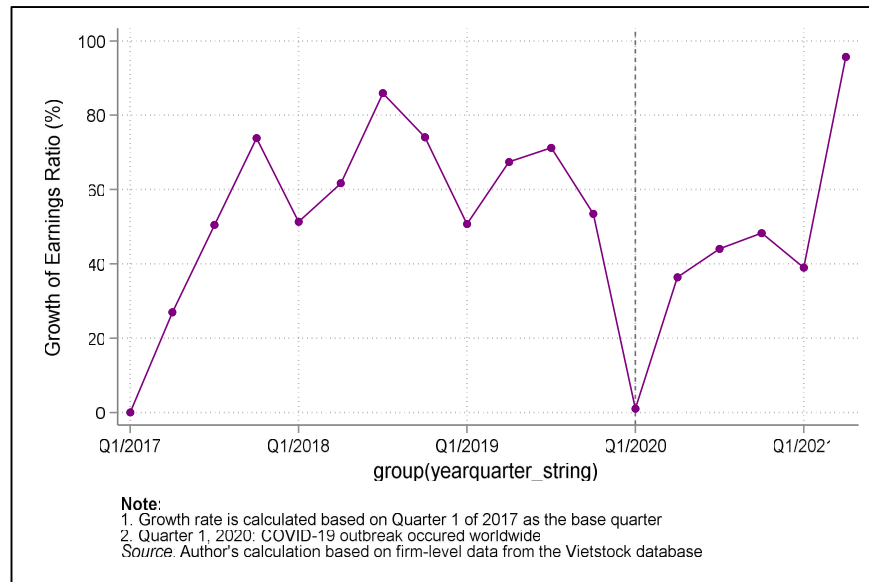
*(2) Does the export-led growth model and deep ties with international markets that once laid a solid basis for the growth of this sector induce greater revenue volatility and risk? Or do these characteristics continue to sustain the sector?*

The export-led growth model has deepened the Vietnamese manufacturing sector's integration into the global economy for the past decades. The significant exposure to international trades induces visible revenue volatility for the manufacturing sector in Vietnam, evidenced by the deep drop in average revenue and earnings experienced by selected companies when the pandemic began (see Fig. 5 and Fig. 6), but interestingly did not undermine the Z-scores.

**Figure 5: Average Growth of Revenue of 41 Manufacturing Companies from Quarter 1, 2017 to Quarter 2, 2021**



**Figure 6: Average Growth of Earnings (before interests and taxes) of 41 Manufacturing Companies from Quarter 1, 2017 to Quarter 2, 2021**

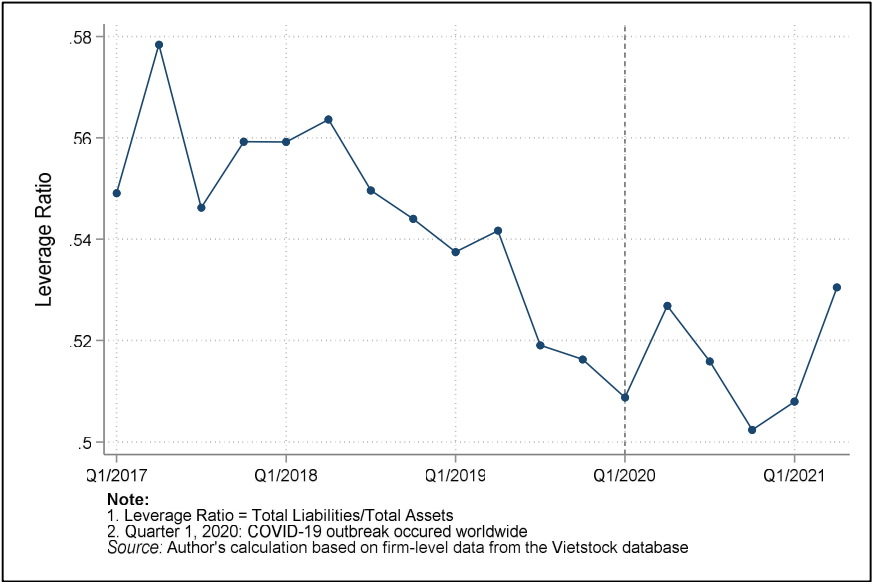


Based on further examination into firm-level ratios, it can be hypothesized that a decade of high growth and benefiting from actively engaging in global trade allows these manufacturers to accumulate robust firm-level tools to hedge themselves against macroeconomic shocks. During

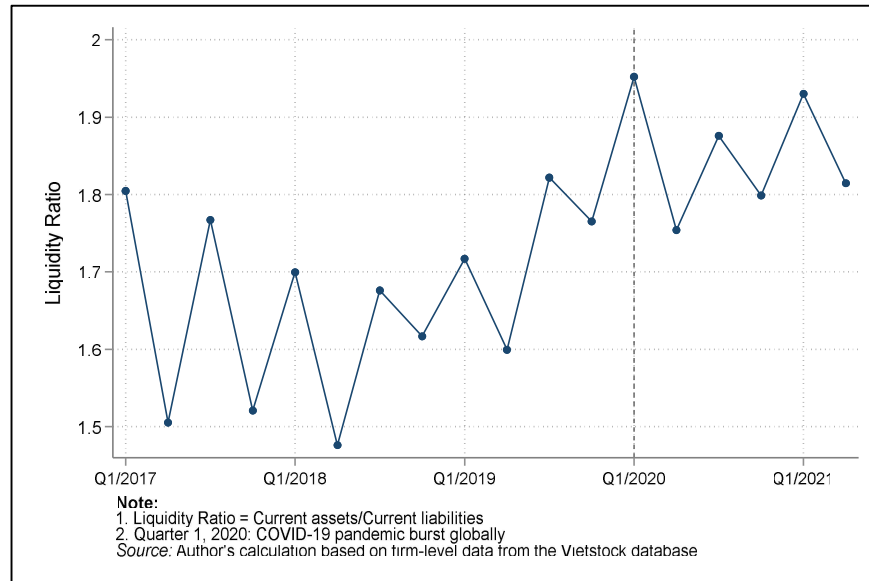


the pandemic, the selected firms' average liquidity and leverage ratios, important pillars buttressing firms against a tightening macroeconomic environment and deteriorating profits, show strong performance. We observe a general trend that the average liquidity ratio increases and the leverage ratio decreases (see Fig. 7 & Fig. 8). Altogether, these firm-level factors explain the mismatch between stable solvency risk and declining earnings, despite that earnings often serve as a cash generator for companies. In other words, the decades of high growth from export-led growth and global trade sustain the sector during the pandemic by building up financial resilience and providing these companies a crucial basis to withstand the shocks.

**Figure 7: Average Leverage Ratio of 41 Manufacturing Companies from Quarter 1, 2017 to Quarter 2, 2021**



**Figure 8: Average Liquidity Ratio of 41 Manufacturing Companies from Quarter 1, 2017 to Quarter 2, 2021**



*(3) In terms of firm-level factors, what line items on the balance sheet make the companies financially fragile?*

Even though high liquidity and low leverage ratios provide optimistic prospects for Vietnamese manufacturers, vulnerability can still stem from fluctuation in revenue stream and extended operating cash conversion cycle due to supply chain disruption and difficulties in order fulfillment and material replenishment. With the rising cost of inputs and shipment, it is important for manufacturers to be proactive in planning and managing short-term assets, including the purchase of inventories, and production rate to effectively match the demand of consumers. This period is potentially a good time to employ a conservative management policy to hedge firms against input price fluctuation.

## VII.2. Policy Recommendations

The result of this thesis suggests that under the export-led growth model and the significant exposure to the volatile international markets, selected exporting manufacturers are not vulnerable to the higher risk of bankruptcy during the pandemic, given their pre-existing financial resilience. However, given the manufacturing industry's deep integration into the global market and revenue risk in response to external demand, the volatile trade environment and macroeconomic conditions can impact the solvency status of these exporting manufacturers, as the firm-level tools of liquidity and leverage get weaker if the pandemic extends. Thus, the question of how to sustain the growth of this sector in the post-COVID period involves both macroeconomic and firm-level policies.

At a government level, several trade policies can be considered to limit the risks faced by exporting manufacturers given the unpredictable international trade landscape. The government can implement several policies to both take advantage of the current export-led growth model and hedge the sector against external volatility. For the first goal, the government can continue to establish trade relationships with other countries and effectively implement the existing free trade agreements (FTAs). For example, the most recently ratified FTA with the European Union is expected to boost Vietnamese export volumes amid the pandemic (Ministry of Industry and Trade of the Socialist Republic of Vietnam, 2021)<sup>11</sup>. For the second goal, by cooperating with more countries for trade, the government diversifies the market for the manufacturing industry, allowing the sector to be less vulnerable when a demand shock happens to any trading partner. Besides that, the Vietnamese government can also foster domestic consumption as a source of demand for the

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<sup>11</sup> “Growth of exports to the European market after more than 1 year of implementing EVFTA”, *Ministry of Industry and Trade of the Socialist Republic of Vietnam*, 12/24/2021, available for access at <https://moit.gov.vn/bao-ve-nen-tang-tu-tuong-cua-dang/tang-truong-xuat-khau-sang-thi-truong-chau-au-sau-hon-01-nam-thuc-thi-evfta.html>

manufacturing industry so that this sector can be more insulated against external shock (Chatib and Rahardja, 2010).

At a firm level, several financial management policies can be implemented to protect exporting companies. First, in terms of liquidity and leverage, manufacturers can maintain a high level of liquidity and low level of leverage to avoid a potential liquidity crisis. Most importantly, in terms of working capital management – the management of current assets including cash, inventories, and accounts receivable from customers – manufacturers can consider keeping a high level of inventories to safeguard them against the fluctuation of input price due to supply chain disruption.

## **VIII. Conclusion**

In the past decades, under the export-oriented growth strategy, the manufacturing sector, the most important engine for Vietnam's economic growth, has benefited from the globalization process and expanding demand from advanced economies. During COVID-19, however, through the strong tie with the global market, fluctuation in demands in Vietnam's significant trading partners was expected to breed significant vulnerabilities for exporting manufacturers.

Our findings suggest that exporting manufacturers have been financially resilient to macroeconomic shock amid the pandemic without showing deterioration in risk of bankruptcy. Their Altman Z-scores were not visibly affected by the COVID-19 situation and the associated demand fluctuation in advanced economies. A closer examination of firm-level financial ratios reveals that these manufacturers experienced significant revenue drop but were able to utilize other financial tools to safeguard them against the COVID-19 shocks. However, since revenue fluctuation which stems from instability in the macro and trade environment can always impact the financial performance and solvency status of these firms, it is important for the Vietnamese government to implement necessary policies to safeguard this sector against external shocks. Together with the support from the government, exporting manufacturers can utilize different financial management strategies, namely conservative working capital management, to ensure the robust growth of this sector during and in the post-COVID period.

## Appendix

### Box 2: Hausman Test Result

| ---- Coefficients ---- |           |           |            |                     |
|------------------------|-----------|-----------|------------|---------------------|
|                        | (b)       | (B)       | (b-B)      | sqrt(diag(V_b-V_B)) |
|                        | fixed2    | random2   | Difference | Std. err.           |
| casesviet~og           | .0131316  | .0117793  | .0013522   | .0007136            |
| casesinte~og           | -.0181554 | -.0174114 | -.0007441  | .0003526            |
| inter_~g_lag           | .0271329  | .0267969  | .000336    | .0001651            |
| size                   | -.3077751 | -.2429778 | -.0647973  | .0345723            |
| exr                    | .0001074  | .0000939  | .0000136   | 6.37e-06            |

b = Consistent under H0 and Ha; obtained from xtreg.  
 B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

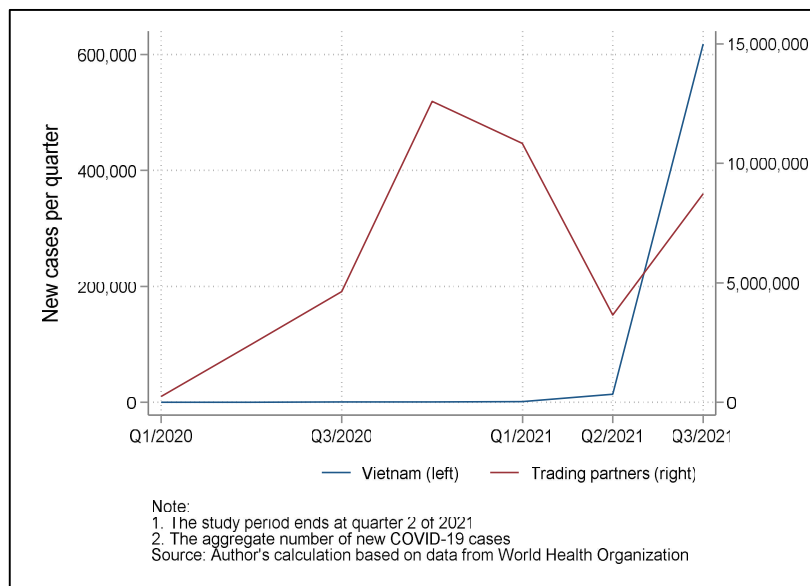
chi2(4) = (b-B)' [(V\_b-V\_B)^(-1)] (b-B)  
 = 14.71  
**Prob > chi2 = 0.0053**

**Table 3: Empirical Result – Random Effect Model**

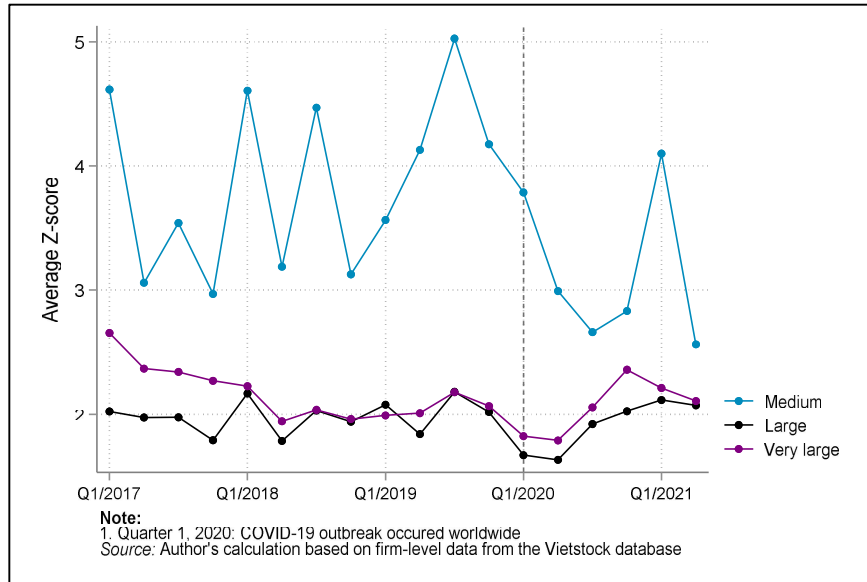
| VARIABLES                         | Estimated Coefficients   |
|-----------------------------------|--------------------------|
| log(casevietnam) <sub>t</sub>     | 0.00885<br>(0.0130)      |
| log(caseinter) <sub>t</sub>       | -0.0170***<br>(0.00545)  |
| log(stimulusinter) <sub>t-1</sub> | 0.0288***<br>(0.00492)   |
| log(total_asset) <sub>i,t</sub>   | -0.227***<br>(0.0509)    |
| exr <sub>t</sub>                  | 9.22e-05**<br>(4.26e-05) |
| sect1                             | 2.206***<br>(0.820)      |
| sect2                             | 0.489<br>(0.485)         |
| Constant                          | 4.282***<br>(1.604)      |
| Observations                      | 686                      |
| Number of no                      | 41                       |

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

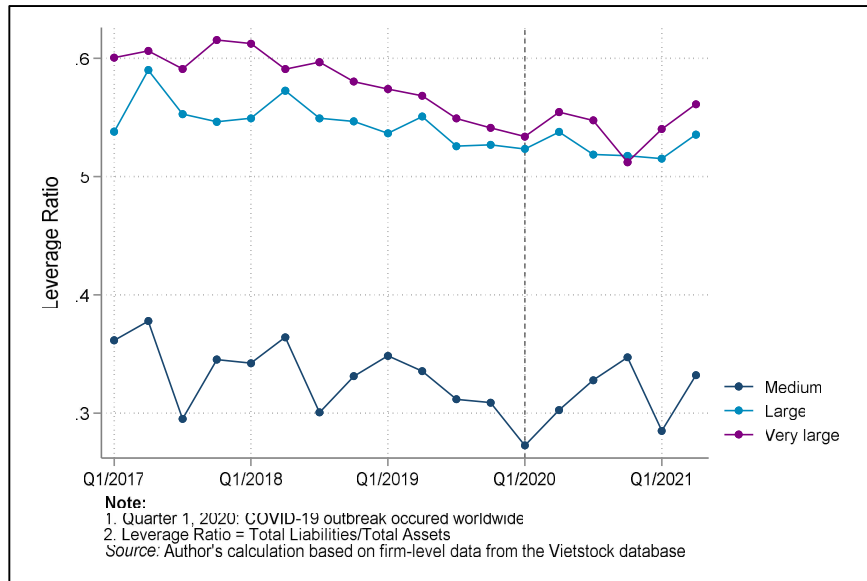
**Figure 3: Number of new COVID-19 cases in Vietnam and four significant trading partner countries, from Quarter 1, 2020 to Quarter 3, 2021**



**Figure 9: Average Z-score of 41 Manufacturing Companies (by size)**  
**from Quarter 1, 2017 to Quarter 2, 2021**



**Figure 10: Average Leverage Ratio of 41 Manufacturing Companies by Size**  
**from Quarter 1, 2017 to Quarter 2, 2021**





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