


# Does National Governance Affect the Capital Structure of Listed Firms during the COVID-19 Pandemic?

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## Abstract

This study estimates the macro-economic factors affecting the listed small and medium enterprises' capital structures in Vietnam from 2010 to 2020. The author conducts the quantitative method (generalized method of moments—GMM) with valid instrument variables to solve the endogeneity in regression models, which refers to the determinants of capital structures. Based on the trade-off theory and the pecking order theory, the author provides evidence of macro-economic factors and firm-specific factors in explanations for the capital choices of the Vietnamese firms, including national governance, inflation, COVID-19, firm age, and asset structure. In particular, this study highlights how national governance and COVID-19 influence the capital structure of small and medium enterprises in Vietnam.

## Keywords:

Capital Structure; COVID-19;  
National Governance; Vietnam.  
Pecking Order Theory; Trade-off Theory.

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## 1- Introduction

A business's capital structure originated from the financial resources to construct the company's assets. It is measured by leverage, primarily associated with using total debt to finance a business. Several studies deal with capital structures, including [1–12]. These studies demonstrated that some firm-specific and macro-economic factors have a statistically significant effect on the capital structure in different countries. According to previous studies, the capital structure is also influenced by specific macroeconomic factors such as the gross domestic product (GDP), inflation, industry leverage, and the institutional environment. In particular, studies [3–8] highlight the impact of national governance on the capital structure under normal economic conditions, while other studies [9–11, 13] explore the COVID-19 and capital structure relationship. Especially, Martinez et al. [12] established a systematic literature review to apply trade-off theory and pecking order theory to small and medium enterprises' (SMEs) capital structures.

The Organization for Economic Co-operation and Development (OECD) estimates that SMEs make up 90% of businesses and employ 63% of the world's workforce [14]. Hence, SMEs play an essential role in the economy. According to Vandenberg et al. [15], SMEs account for a large proportion of the total number of businesses in a country, region, or globally, potentially employing over 50% of the total. Companies have different capital structures depending on firm size to improve their business activities. Although capital structure theories have been developed, some studies have not paid more attention to SMEs [16] in developing countries because of their constraints. For that reason, the SME's capital structure needs to be emphasized to clarify the importance of accessing sources of finance.

Almost all case studies in Vietnam, a developing country, focus on firm-specific factors influencing capital structure, such as [17–23]. However, these authors have not mentioned the macro-economic factors involved in national

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governance and COVID-19 in their models. Thus, an issue is proposed that whether there is a linkage between SMEs' capital structure and national governance during the COVID-19 pandemic under trade-off and pecking order theory.

In order to solve the uncertainties, this paper estimates the effect of macro-economic factors, including national governance and COVID-19, on SMEs' capital structures that have not been implemented in developing countries, especially Vietnam. Furthermore, the author also applies the trade-off theory and the pecking order theory to explain the relationships during the pandemic period. Besides, the model addresses the endogeneity problem, which fills the gap some studies do not research. The main research question is formulated to obtain the objective as follows: "To what extent do national governance and COVID-19 affect the capital structure of listed small and medium-sized enterprises in Vietnam?".

## **2- Literature Review and Hypothesis Development**

### ***2-1- Literature Review***

#### ***2-1-1- Pecking Order Theory***

The pecking order theory is initially studied by Myers & Majluf [24]. The theory holds that managers prefer to finance investment opportunities using three sources: first through the firm's retained earnings, secondly through debt, and thirdly through equity financing. Ownership is the last resort. Hypotheses of the theory include: (i) information asymmetry exists between corporate managers and outside investors; (ii) the corporate administrator will act in the best interests of the current owners.

According to the theory, firms prefer to finance themselves with internal funds over external sources of capital. Firms will choose in a way that minimizes the cost of asymmetric information. The theory states that firms do not seek the optimal capital structure, instead of, trying to determine an order of priority in selecting capital sources in the financing decision. The pecking order theory suggests that corporate managers will have an advantage over outside investors in knowing more information about the business's prospects, risks, and values. Again, the order of priority in the selection of capital sources includes (1) internal capital, (2) debts, and (3) owner-contributed capital [25].

However, some enterprises take advantage of the owner's capital to limit the default risks because cash flows will decrease during a downturn in the economy. Therefore, according to the pecking order theory, they take the priority selection of the internal capital [26]. Besides, the theory can predict the relationship between macro-economic factors and capital structure during a financial downturn [27, 28].

#### ***2-1-2- Trade-Off Theory***

Trade-off theory refers to the idea that a firm will choose how much debt and how much equity to finance in order to balance its costs and benefits. The trade-off theory of capital structure essentially requires that the cost of debt be offset against the benefits of debt [29]. The theory explains why firms are often financed partly by debt and partly by equity. One main reason businesses cannot finance entirely with debt is that, besides the existence of tax shield benefits from debt, the usage of debt financing also incurs many costs involving financial distress, including direct and indirect costs of debt-related bankruptcy.

According to the theory, the target capital structure is the point at which the additional costs of financial distress offset the benefits of increasing debt. Financial distress happens when a business cannot pay its debts because earnings before interest and tax (EBIT) is less than the interest it owes. Most cases of financial distress will lead to bankruptcy. The bankruptcy process will incur costs such as legal and administrative costs, and business losses due to default should force managers to forgo profitable investment opportunities. A business should only borrow when the tax benefit from an extra dollar of borrowed capital equals the extra cost of being in debt from borrowing the money. In all periods of the economy, especially during a crisis, enterprises will choose the appropriate capital structure to maximize their benefits. Firms, for example, can take advantage of the tax shield by applying the trade-off theory in determining capital structure, resulting in tax savings for the business.

According to Kraus and Litzenberger [30], the capital structure is based on a trade-off theory to clarify that firms should determine the suitable debt level by balancing the tax benefit with the costs of the debt option because they are influenced by macroeconomic conditions [26, 31]. With each additional percentage of the debt ratio, while the tax shield benefits increase, the cost of financial distress also increases. There comes a time when, for each additional debt ratio, the present value of the benefits of the tax shield is not higher than the present value of the costs of financial distress or when debt is no longer beneficial to the business. Because of this, companies are always looking to optimize the total value of the business based on balancing how much debt and equity to choose in their capital structure. The point that determines the optimal capital structure is that for each additional amount of debt, the present value of the tax shield equals the present value of the cost of financial distress.

## 2-2-Empirical Studies

Chen investigated the determinants of Chinese-listed companies' capital structures. The findings show that firm-specific factors in developed economies are also the determinants of the capital structure in China. However, the theories are used to explain their results, neither the trade-off nor the pecking order theory. Chinese firms' capital structure is determined based on the "new Pecking order" of retained earnings, equity, and long-term debt [32].

The study by Chen & Strange explored the factors that influenced the capital structure of listed firms in China in 2003. The author discovered a significant inverse relationship between profitability and capital structure. Besides, the leverage ratio is positively related to the firm's size, age, and risk, while the ownership structure negatively impacts the capital structure. Tax is a factor that has no direct effect on the leverage ratio. Companies with a higher institutional shareholding avoid debt financing [33].

Tongkong's study uses Arellano and Bond GMM estimation method to determine how quickly a target capital structure can be achieved and which factors influence capital structure decisions of listed firms in Thailand. The findings suggest that corporate leverage is related to median industry leverage in a positive way. Profitability and leverage have a negative relationship, whereas firm size and growth opportunities have a positive relationship. Their findings back up the pecking order theory, with higher profitability firms having less debt and higher growth opportunities having more leverage. Furthermore, the study found that real estate companies only adjust their capital structures to the target level capital structure at 63% [34].

Šarlija and Harc examine the fundamental factors influencing the capital structure of SMEs in Croatia from 200 to 2011. A panel dataset with random effects and a fixed-effect model is used to estimate the influence of determinants on leverage. The four capital structure determinants studied are growth, size, profitability, and tangible assets. The findings support the pecking order theory, which says SME capital is primarily funded internally [35].

Another study has identified the firm-specific determinants of the capital structure in the Gulf Cooperation Council (GCC) countries, including Bahrain, Kuwait, Qatar, Oman, Saudi Arabia, and the United Arab Emirates, from 2009 to 2017. The findings show that leverage is positively influenced by firm size, tangibility, and growth opportunities. Whereas profitability, firm age, financial constraints, liquidity, and government ownership all hurt leverage. Besides, there is weak evidence for a positive relationship between leverage and operational risk [36].

Czerwonka and Jaworski demonstrated a statistically significant negative impact on SME's debt, namely: tangibility, profitability, and liquidity, while size and growth affect leverage positively. The pecking order theory confirms the significance and direction of the influence of firm-specific factors on SME's capital structures in Central and Eastern Europe (CEE). The amount of liability in the capital structure is determined by the industry's financial risk. The country-specific factors study of CEE SMEs found that the more business-friendly the legal and institutional environment, the more willing they are to take out loans [37].

Delikanlı & Kılıç confirmed that firm size, liquidity, risk, and asset structure do not relate to SME's capital structure decisions from 2007 to 2018. However, factors such as asset growth positively impact capital structure decisions, especially long-term debt, while profitability decreases long-term borrowing. Typically, the researcher applies the pecking order theory to explore SMEs that get their financing needs from their internal resources [38].

A study conducted in Vietnamese context [17] identified the determinants influencing the capital structure of SMEs in Vietnam. According to empirical findings, SMEs finance their operations primarily with short-term liabilities. The ownership of a company impacts how a small business finances its operations. Growth, business risk, firm size, networking, and bank relationships are positively related to SMEs' capital structures in Vietnam, but tangibility is negatively related. The capital structure of Vietnamese SMEs appears to be unaffected by profitability. In a transitional economy like Vietnam, firm ownership, firm size, relationships with banks, and networking are considerable factors raising funds.

Bigger et al. examined Vietnamese firms' financing decisions and factors that impacted capital structure from 2002 to 2003. Financial leverage in Vietnamese firms increases with firm size and managerial ownership and decreases with profitability and non-debt tax shield. It also creates the connection of capital structure to the characteristics of the industry. In contrast to findings in other countries, financial leverage was negatively correlated with fixed assets and positively correlated with growth opportunities, while corporate income taxes hurt financial leverage [18].

Le's study conducts a study based on capital structure theories (trade-off, pecking order, and market timing) to test the factors influencing capital structure decisions of listed companies on the Vietnam stock exchange from 2007 to 2010. Research results show that tax factors, industry leverage, and management behavior positively impact the capital structure. At the same time, inflation, the ratio of market value to book price, and ROA have a negative impact on capital structure. The findings are supported by the pecking order theory but not based on the trade-off theory [19].

Another study verifies the factors' influence on the capital structure of cement enterprises listed on the Vietnamese stock exchange (HOSE and HNX) from 2007 to 2013. According to the findings, profitability, business age, and the ownership percentage of state shares all have adverse effects on their capital structure. The studies also show that the larger the cement company, the higher the long-term debt ratio of total assets, indicating that large-scale cement companies have a more remarkable ability to obtain credit from financial institutions. The study's findings also highlight the impact of solvency and fixed asset value on the capital structure, particularly the long-term debt-to-total-assets ratio. Because of the depreciation tax shield, the debt ratio and long-term debt ratio of assets are affected differently [20].

The study conducted by Pham [21] identified factors affecting the capital structure of Vietnamese state-owned enterprises after their equitization based on the Modigliani and Miller theory, trade-off theory of capital structure, pecking order theory. The research found that six factors affect the capital structure of state-owned businesses after equitizing: profitability, firm size, tangible assets, growth rate, income tax rate, and loan interest rate.

Nguyen examines the factors that influence the capital structure of dealers and manufacturers in Vietnam. Secondary data from annual financial statements of 38 dealers and manufacturers on two Vietnamese stock exchange markets (HOSE and HNX) from 2009 to 2016. The results show that size, fixed assets, liquidity, and state ownership influence the capital structure of Vietnam's trading companies, using fixed effects. Empirical findings show that the capital structure is positively correlated with firm size and fixed assets, while the capital structure is negatively correlated with liquidity and state ownership [22].

Tran & Nguyen [23] investigated the major determinants of capital structure of listed enterprises. By using Pool OLS, FEM, REM and FGLS, the findings show profitability, the fixed assets to total assets ratio and the firm age are statistically significant negative impact on capital structure of listed enterprises in Vietnam. From listing the previous studies, the author summarizes the factors affect capital structure which were implemented by many researchers in the world. The results are presented in Table 1 as follows.

**Table 1. Summary empirical studies**

Author(s)	Factors affect capital structure		Country
	Firm-specific factors	Macro-economic factors	
Chen [32]	Firm-specific factors		China
Chen et al. [33]	Profitability, firm size, age, risk, ownership structure		China
Hanousek & Shamshur [39]		Corruption perception index, industry median leverage, expected inflation, gdp growth, substantial economic transformation	Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovak Republic
Tongkong [34]	Median industry leverage, profitability, firm size, growth opportunities		Thailand
Duan et al. [40]		Government intervention degree, non-state-owned economic structure, market structure, financial structure of commercialization, legal system	China
Mokhova and Zinecker [41]		Fiscal, monetary policies of a country	European countries
Sarlija & Hrc [35]	Growth, size, profitability, and tangible assets		Croatia
Khaki & Akin [36]	Firm size, tangibility, growth opportunities, operational risk		Gulf Cooperation Council (GCC) countries
Czerwonka & Jaworski [37]	Tangibility, profitability, liquidity, size and growth	Legal and institutional environment	Central and Eastern Europe (CEE)
Delikanlı & Kılıç [38]	firm size, liquidity, risk, and asset structure, asset growth, profitability		Turkey
Nguyen & Ramachandran [17]	Growth, business risk, firm size, networking, bank relationships, tangible assets		Vietnam
Biger et al. [18]	Firm size, managerial ownership, profitability, corporate tax, industry characteristics, fixed assets, and growth opportunities		Vietnam
Tien et al. [19]	Tax, industry leverage, management behavior, ROA, the ratio of market value to book price	Inflation	Vietnam
Dang et al. [20]	Profitability, business age, the ownership percentage of state shares, solvency and fixed asset value		Vietnam
Pham [21]	profitability, firm size, tangible assets, growth rate, income tax rate, and loan interest rate		Vietnam
Suu et al. [22]	Size, fixed assets, liquidity, and state ownership		Vietnam
Tran [23]	Profitability, the fixed assets to total assets ratio and firm age		Vietnam

In summary, through a review of previous studies, most of them focus on the impact of firm-specific factors on firms' capital structures. Meanwhile, macro factors are also statistically significant in some studies, such as gross domestic products, inflation, legal and institutional environment. These factors belong to the external environment that businesses cannot control, especially national governance and COVID from the end of 2019 to the present. Therefore, based on empirical studies, the author recommends examining external factors, such as national governance and COVID, which affect Vietnamese listed SMEs' capital structures in pandemic conditions since no studies examine the impact of national governance and COVID-19 on capital structure. Besides, the authors use trade-off theory and pecking order theory to explain the obtained findings.

## ***2-3-Macro-Economic Factors Affect capital Structure and Hypotheses Development***

### ***2-3-1- National Governance***

National governance is one of the three levels of governance, namely global governance, national governance, and local governance [42]. The paper focuses on national governance and considers its effect on the capital structure of listed SMEs in Vietnam. National governance is measured by the Worldwide Governance Indicators (WGI) based on the study by Kaufmann et al [43]. WGI includes six indicators meant to capture different concepts, such as Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. The effect of specific governance indicators (e.g., regulatory effectiveness, the rule of law, and corruption) has been studied by [3–6].

In developing countries, however, legal enforcement appears to be critical [7] because it measures judicial independence and bribery, the quality of the legal framework, the protection of private property, and the effectiveness of both the parliament and police. So, legal enforcement is considered an important indicator that impacts the capital structure, especially in developing countries. Among the WGI indicators, only one reflects the legal enforcement applied to the private firm sector. All things considered, national governance, which is measured by Regulatory Quality, is used to examine its effect on the capital structure of Vietnamese SMEs.

The national governance-capital structure relationship has been confirmed by the empirical studies [1–5]. Concretely, Alves and Ferreira demonstrated the important role of institutional variables, such as the corruption index, in the relationship to a firm's capital structure [3]. In more detail, firms in more corrupt countries and those with weaker laws, according to Fan et al. [6], tend to use more debt. According to Awartani et al. [4], the more usage of long-term borrowing by MENA firms is associated with a powerful rule of law, regulatory effectiveness, and better legal protection of creditors. In support of these arguments, a well-developed institution lowers the barriers to acquiring external financing and gives businesses many chances to finance their activities using leverage [5]. However, Çam and Özer [8] find that firms operating in countries with stronger national governance decrease their leverage.

***Hypothesis 1 (H1): National governance negatively affects the capital structure of SMEs in Vietnam.***

### ***2-3-2- Gross Domestic Product***

Some studies reveal that gross domestic product is one of the most common outside factors that affect the capital structure of a company [44–46]. The percentage change in GDP measures the economic growth rate. When predicting a high growth rate, the financial manager increases capital mobilization to invest in expanding investment projects and vice versa. These authors determined that the corporate capital structure and GDP have a significant negative relationship. In detail, Gajurel also claims that GDP negatively affects the total debt ratio and the short-term debt ratio, while GDP positively influences the long-term debt ratio [47]. According to the pecking order theory, companies will prefer internal sources of retained earnings to debt.

However, the studies by [27, 39, 48] demonstrate the positive effect of GDP on the capital structure of firms. They argue that businesses prefer higher levels of debt financing because, in periods of strong economic growth, they can generate higher cash flows and reduce the probability of defaults. From the above arguments, the hypothesis is proposed:

***Hypothesis 2 (H2): Gross domestic product affects the capital structure of SMEs in Vietnam.***

### ***2-3-3- Inflation***

The next widely investigated external factor is the inflation rate. Inflation increases a company's expenditure and cost of capital. It is also an important part that changes the expected rate of return and affects the company's value. Typically, inflation affects the capital structure of enterprises through the interest rate path. According to Toader et al. [49], the trade-off theory predicts a positive relationship between debt and inflation. Frank and Goyal find a direct linkage between inflation and leverage to support the arguments [27]. Other studies' findings also support the relationship [39, 50].



In contrast, according to the pecking order theory, it is difficult to observe the effect of inflation on financial decisions [27]. Because of high inflation, regulators have to raise interest rates, making it hard to get money from financial institutions because of the high-interest costs. The studies have given evidence to convince the negative relationship between inflation and capital structure [51–53]. Based on debt structure, Gajurel finds that inflation hurts total leverage and the short-term debt ratio but positively impacts the long-term debt ratio [47]. However, according to Dias Basto et al. [44], inflation does not affect the capital structure. From the discussions, the proposed hypothesis is as follows:

**Hypothesis 3 (H3): Inflation affects the capital structure of SMEs in Vietnam.**

#### 2-3-4- COVID-19

A crisis creates an adverse effect on the operations, the capital structure, and the financing decisions of firms. According to the trade-off theory, in unstable economic conditions such as a pandemic or financial distress, companies' demand for debts decreases because they lack the funds to repay them. So, there is proof that the 2008 financial crisis affected leverage [54, 55]. Besides, empirical evidence suggests that small nonfinancial firms deleverage during pandemic recessions [9, 56]. They explore whether capital structure changes are significant among firms most affected by the pandemic. Similarly, the effects of COVID-19 on the capital structures of European companies are confirmed by Turkki [11]. COVID-19 has a statistically and economically significant effect on the company's capital structure. It could also mean that COVID-19 has less impact on listed companies' operations than on smaller private companies' operations. This shows that despite the increasing economic uncertainty caused by the pandemic, private companies are not financially constrained and could raise capital.

Furthermore, agency costs rise as the conflict of interest between shareholders and debt holders increases. Based on information transparency and collateral, debt holders, who are outsiders, are afraid of lending money [29, 57], whereas companies' insiders want to use outside resources to fund their activities. As a result, the cost of asymmetric information between insiders and outsiders rises. Other studies examined the negative impact of the global financial crisis on capital structures in different countries [9, 10, 56, 58]. Varghese and Haque show variation in corporate leverage in both developed and emerging economies. Concretely, a drop in the optimal level of corporate leverage leads to a trending downward of the expected growth rate of cash flow in pre-Covid while the leverage is over in post-Covid because the company faces its business risks [13].

In summary, unprecedented crises, such as the COVID-19 pandemic have negative consequences for the business. Along with previous studies, Ding et al. concluded that firms using their equity for operations perform better than those using leverage during the pandemic [59]. From the discussions, the proposed hypothesis is as follows:

**Hypothesis 4 (H4): COVID-19 affects the capital structure of SMEs in Vietnam.**

**Table 2. Summary variables**

Variable	Code	Fomula	Theory	References
<i>Dependent variable</i>				
Leverage	$lev_{i,t}$			
<i>Independent variables</i>				
National Governance	$ngov_t$	Regulatory quality (WGI indicators)		[3–8]
Gross domestic product	$gdp_t$	Worldbank		[44–47]
Inflation	$inf_t$	Worldbank	Trade-off theory	[27, 44, 47, 51–53, 60]
COVID-19	$cov_t$	cov is dummy variable; cov = 1: the year has covid-19; cov = 0 otherwise	Trade-off theory	[9–11, 13]
<i>Control variables</i>				
Firm size	$size_{i,t}$	$\ln(\text{total assets})$	Trade-off theory, Pecking order theory	[27, 32, 34, 36, 38, 61–63]
Firm age	$age_{i,t}$	Logarithm the difference between the investigation year and the firm's birth year.	Pecking order theory	[64–66]
Asset structure	$tang_{i,t}$	$\frac{\text{tangible assets}_{i,t}}{\text{total assets}_{i,t}}$	Trade-off theory, Pecking order theory	[17, 27, 36, 63, 67–71]
Tax	$tax_{i,t}$	$\frac{\text{Income tax expenses}_{i,t}}{\text{Earnings before interest and taxes}_{i,t}}$	M&M, trade-off theory	[72–75]
<i>Instrument variable</i>				
Leverage <sub>t-1</sub>	$lev_{i,t-1}$			[61, 76]

### 3- Methodology and Proposed Model

#### 3-1- Sample

SMEs are according to different criteria in each country. In Vietnam, however, an SME is defined as follows: annual average number of employees contributing to Social Insurance and total capital or total revenue, according to Decree 39/2018/ND-CP issued by the government on 11 March 2018 [77].

The number of SMEs collected from the FiinPro database is 75 because of the availability of information connected to SMEs listed on the Hanoi Stock Exchange (HNX) and Ho Chi Minh City Stock Exchange (HOSE). The Arellano Bond estimator, according to Arellano and Bond (1991), is also appropriate for a dataset with a large number of enterprises and a limited number of years. The paper is based on the data collected over eleven years (2010–2020) for a set of 75 listed SMEs on the stock market. As a result, after deleting some missing data, the total number of observations is 825.

#### 3-2- Proposed Model

Based on previous studies [3–13], the proposed model Booth et al. [1] is built in generally, under pecking order and trade off theory. However, this study clarifies the macro-economic factors, specifically national governance and COVID-19, affecting capital structure of SMEs in Vietnam.

$$lev_{i,t} = \beta_0 + \beta_i \sum_{i=1}^n macro\_factor_t + \beta_j \sum_{j=1}^m control\_variables_{i,t} + \varepsilon \quad (1)$$

Because of the endogeneity problem, Arellano-Bond's two-step SGMM estimation is applied [78] with the valid instrument variables. Hence, Model Booth et al. [1] is modified into Model Korajczyk and Levy [2]. All factors are measured and described briefly in Table 1.

$$lev_{i,t} = \beta_0 + \beta_1 lev_{i,t-1} + \beta_2 ngov_t + \beta_3 gdp_t + \beta_4 inf_t + \beta_5 covid_t + \beta_6 size_{i,t} + \beta_7 age_{i,t} + \beta_8 tang_{i,t} + \beta_9 tax_{i,t} + \varepsilon \quad (2)$$

where lev is leverage which measures capital structure;  $lev_{i,t-1}$  is the lag of leverage; ngov is national governance; gdp is gross domestic product growth; inf is inflation rate; covid is covid-19; size is SMEs' size; age is the SMEs' age; tang is the asset structure; tax is tax.

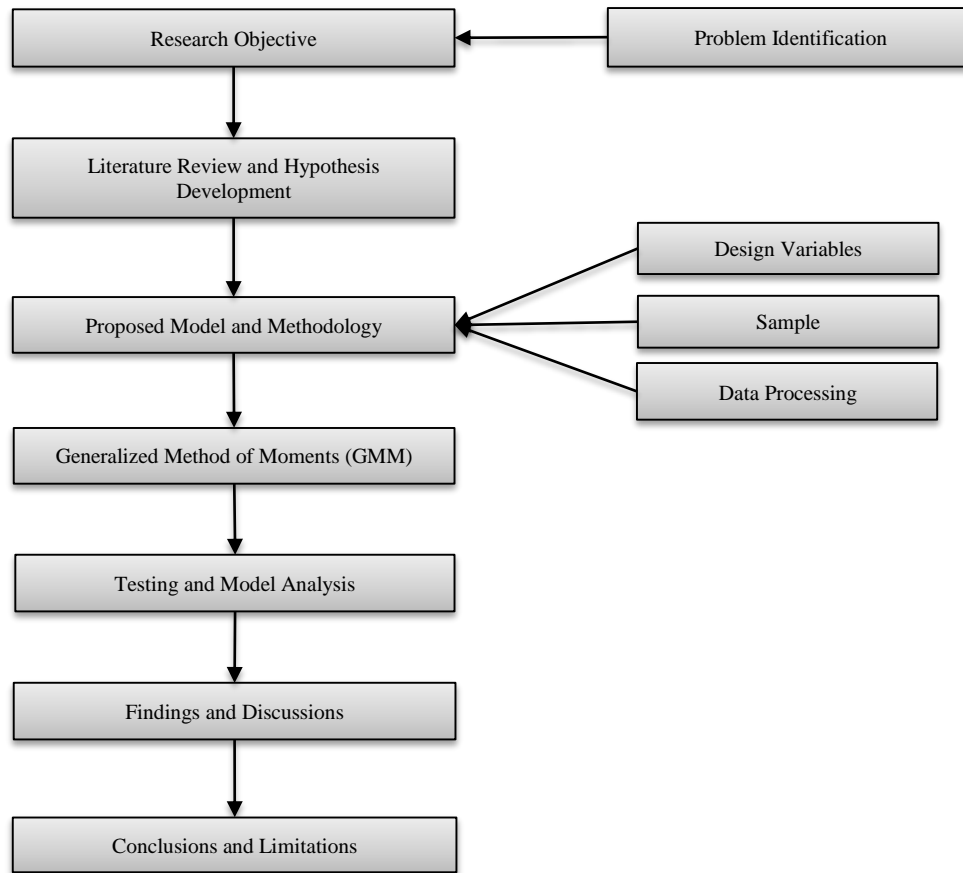
#### 3-3- Research Methods and Procedures

According to Forte et al. [61], the endogeneity exists when conducting the relationship between the proxies for the determinants of capital structure and the leverage ratio. Besides, potential endogeneity between leverage and tangibility is addressed in the study by Campello & Giambona [76].

To eliminate the endogeneity in the model, the author conducts the Arellano-Bond two-step SGMM estimation with robust standard errors [78], which was adopted and developed by Blundell & Bond [79] because this method has an advantage in identifying the strong instrument variables to solve the endogeneity. The Arellano Bond estimation combines the lags of the dependent variables  $lev_{i,t}$  as instrument variable. The number of instruments is always kept below the number of groups in all our SGMM specifications [80]. AR(1) and AR(2) are the Arellano-Bond tests for first- and second-order autocorrelations of residuals. The rule of thumb reveals that it is recommended to reject the null hypothesis of no first-order serial correlation and not reject the null hypothesis of no second-order serial correlation of the residuals.

According to the Sargan test statistics, the null hypothesis "over-identifying restrictions are valid" cannot be rejected to ensure the model is well-specified, which show that the instruments are uncorrelated with the errors, or the variables are not omitted in the model [81]. Finally, the significant Sargan p-values and Hansen p-values must be tested for the endogeneity to be solved, and the model specifications are valid.

The research procedures are described briefly in Figure 1. It includes the steps to implement the study, which starting the research objective is defined based on the problem identification. Second, literature reviews and previous studies are analyzed to build the proposed model. Third, the author applies quantitative research methods (GMM) to estimate the regression model and test hypotheses. Finally, according to the findings, the discussions and conclusions are drawn to achieve the research objective.



**Figure 1. Research methodology flowchart**

## 4- Results and Discussion

### 4-1- Model Analysis

Table 3 presents the descriptive statistics of all factors in model Booth et al. [1]. The descriptive statistics analysis includes the mean value, the minimum and maximum values of each factor.

**Table 3. Descriptive statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
lev	825	0.529	0.363	0.001	0.995
ngov	825	34.490	5.734	27.960	46.630
gdp	825	0.060	0.011	0.029	0.071
inf	825	0.058	0.048	0.006	0.187
covid	825	0.182	0.386	0.000	1.000
size	825	27.375	3.457	11.227	30.282
age	825	9.252	3.485	5.000	23.000
tang	825	0.726	0.179	0.035	0.995
tax	825	0.148	0.168	0.000	0.652

The mean value of leverage is 0.529 with a standard deviation of 0.363. Its minimum and maximum values are in order 0.001 and 0.995. The factors are classified into two groups: macro-economic factors and control factors.

For macro-economic factors, the minimum and maximum values of the national governance factor are in the order of 27.960 and 46.630. It means that regulatory quality in 2012 has the lowest value while in 2020, regulatory quality takes the highest value. Moreover, the minimum value of GDP is 0.029 and its maximum value is 0.071. The minimum and maximum values of inflation are 0.006 and 0.187, respectively. Finally, the COVID factor is also a dummy variable with a minimum value of 0 and a maximum value of 1. It means the years that have the occurrence of COVID-19 will take the value of 1, and they are the years 2019 and 2020. Otherwise, the remaining years with no effect from COVID-19 have a value of 0.



Concerning the control factors (firm-specific factors), they are firm size, firm age, tangible assets, tax. For firm size and firm age, they minimum and maximum values are 11.227, 30.282 and 5.000, 23.000 respectively.

Regarding to tangible assets (tang), it takes the minimum and maximum value of 0.035 and 0.995. While the mean value of tax and revenue growth factors is 0.148 and 0.969, respectively. The minimum and maximum values of tax correspond to 0.0001 and 0.652.

The following section shows the test of multi-collinear phenomenon, autocorrelation and heteroskedasticity after running the OLS between leverage (dependent variable) and all independent variables. Based on the OLS results, the author test the multicollinearity phenomenon. According to Hair et al. [82], a VIF coefficient of less than 10 is acceptable. As a rule of thumb, if a VIF value exceeds 10, it means the estimated regression coefficients are underestimated because of the multicollinearity phenomenon [83]. Likewise, VIF values are less than 5, there is a confirmation that multicollinearity does not exist in the model [84, 85].

According to Table 4, all VIF coefficients of variables are smaller than 10. Thus, there is evidence of the absence of multicollinearity phenomenon. Besides, to confirm the problem does not exist in the model, the author examines the correlation coefficient matrix.

**Table 4. Test of the multi-collinear phenomenon**

	lev	ngov	gdp	inf	covid	size	age	tang	tax	VIF
lev	1									
ngov	0.386	1								4.13
gdp	-0.030	-0.156	1							1.28
inf	0.139	-0.036	0.519	1						1.62
covid	-0.458	-0.775	0.045	-0.210	1					3.51
size	-0.190	-0.219	0.078	-0.371	0.298	1				1.07
age	0.104	0.062	-0.022	0.100	-0.052	-0.183	1			1.01
tang	0.010	0.080	-0.208	-0.239	0.019	0.199	0.035	1		1.06
tax	-0.004	0.031	0.006	-0.038	-0.044	0.069	-0.016	0.013	1	1.01

Besides, as shown in Table 4, after removing the variables that have correlation coefficients greater than 0.8 and the remaining correlation coefficients are all less than 0.8, the model has no defects of multicollinearity phenomenon. The results are in line with [85], who confirmed that the multicollinearity problem does not exist if the correlation coefficient is less than 0.80 or 0.90. From this argument, it confirms the multicollinearity phenomenon does not exist in the model. The tests for autocorrelation and heteroscedasticity will be used to support the claim that the residuals are independent of each other, and no systematic change occurred in the spread of the residuals over the range of measured values [81].

Table 5 shows the Wooldridge test for autocorrelation in panel data, the p-value is smaller than 5%, and thus, we have enough evidence to reject H0: "There is no autocorrelation". It means the model contains the autocorrelation problem. Furthermore, the p-value of variance change test (Breusch-Pagan/ Cook-Weisberg test) has a value larger than 5%, and thus, H0: "Residuals with variance unchanged" has insufficient evidence to be rejected. Therefore, the heteroskedasticity phenomenon does not exist.

**Table 5. Test of autocorrelation and heteroskedasticity**

No.	Test	F-statistic	p-values	H <sub>0</sub>
1	Wooldridge test for autocorrelation in panel data	317.770	0.000	Reject
2	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	0.74	0.390	Accept

As mentioned above, the SGMM model will be used in the estimation with instrument variables. According to Arellano & Bond [78], the autocorrelation phenomena between the lag of dependent variable and error can be fixed by adding instrument variables into the dynamic panel data [77]. The author uses the Arellano and Bond tests to check the condition of no correlation in the error term, with the null hypothesis (H0) being "Autocorrelation does not exist." The AR(2) error test in the Arellano-Bond model has a p-value of 0.951, which is higher than 0.05. As a result, the model can confirm the absence of serial autocorrelation in the errors [77].

The following section examines the Sargan and Hansen tests (Table 6), which aim to detect an overidentifying restriction problem related to the heterogeneity of the subsets of the instrumental variables and support the validity and reliability of the SGMM 2-step results. In this model, the p-value in the Sargan test (under the "H0: overidentifying restrictions are valid" hypothesis) is significant (p-value = 0.996). Therefore, no sufficient evidence could be found to

reject hypothesis H0. Besides, in this paper, the number of instruments is 52, which is less than the number of observations at 75 (Table 6). Therefore, the rule of thumb is satisfied [80, 86]. Hence, the instrument variables adequately deal with the endogeneity [77].

**Table 6. Results of two-step system GMM**

lev	Coef.	P>z
llev	0.099	0.317
ngov	0.025	0.012*
gdp	-0.076	0.574
inf	1.977	0.005**
covid	-0.249	0.000***
size	0.004	0.829
age	0.022	0.001***
tang	1.934	0.010**
tax	-1.718	0.393

legend: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Arellano-Bond test for AR(1) in first differences:  $z = -1.06$   $Pr > z = 0.287$

Arellano-Bond test for AR(2) in first differences:  $z = -0.06$   $Pr > z = 0.951$

Sargan test of overid. restrictions:  $\chi^2(42) = 21.84$   $Prob > \chi^2 = 0.996$

Hansen test of overid. restrictions:  $\chi^2(42) = 8.82$   $Prob > \chi^2 = 1.000$

Number of instruments = 52

Number of groups = 75

Where lev is leverage which measures capital structure; llev is the latency of leverage; size is SMEs' size; tang is the asset structure; roa is profitability; tax is tax; gro is revenue growth; age is the SMEs' age; indus is the industry; own is ownership; risk is business risk; ngov is national governance; gdp is gross domestic product growth; inf is inflation rate; covid is covid-19.

#### 4-2- Discussions

The findings show five statistically significant variables at 5%, including three macro-economic factors: national governance (ngov), inflation rate (inf) and COVID-19 (covid). The remaining factors are control variables, such as firm age (age) and tangible asset (tang).

National governance, which is measured by regulatory quality, influences the capital structure of Vietnamese SMEs positively. Other factors remain constant when national governance rises by one unit and the capital structure of SMEs in Vietnam increases by 0.025 units. According to Kaufmann et al. [43], regulatory quality reflects perceptions of the government's ability to formulate and implement sound policies and regulations that allow and promote private sector development, including SMEs. In Vietnam, the legal corridor has always been improved over the years, especially for listed SMEs. The government is concerned with SMEs' development, so there are incentive policies for their business growth, such as Decree elaboration of some articles of the law on the provision of assistance for small and medium enterprises, No. 80/2021/ND-CP, August 26, 2021; and Circular on guidelines for information disclosure on the securities market, No. 155/2015/TT-BTC, October 6, 2015. Typically, Circular 155 emphasizes that the quality of information disclosure has been increasing gradually over the years in the stock market, indicating the reduction of information asymmetry for enterprises. Thus, the interests of investors are protected, especially those of banks. This makes it easier for businesses to access external loans, and businesses are given many chances to finance their activities using leverage [5].

Second, inflation is another external factor whose relationship with the capital structure has been widely investigated. The findings show an increase in inflation by one unit; the capital structure of SMEs in Vietnam increased by 1.977 units. The findings are in line with the studies [27, 39, 50]. They have found a direct linkage between inflation and leverage. Also, the positive relationship between inflation and capital structure is supported by the trade-off theory [49].

Third, an unpredictable and uncontrollable external factor that has a statistically significant adverse effect on the capital structure of SMEs in Vietnam is COVID-19. Other factors remain constant when COVID-19 rises by one unit, leading to a decrease in the SME capital structure in Vietnam by 0.249 units. The results are in line with the studies [9, 10, 56, 58, 59]. Furthermore, the trade-off theory explains the reverse relationship in the pandemic period. The theory asserts that SMEs cannot repay loans when their cash flows have deteriorated. Besides, according to Demirgüç-Kunt [9], because of the ambiguity of information, SMEs rely on specific banking relationships to access loans granted by commercial banks, which are more affected during economic shocks such as COVID-19.

Regarding control variables, firm age and tangible assets are statistically significant factors that positively affect the capital structure of listed SMEs in Vietnam. Firm age is found to have a positive relationship with the capital structure of SMEs in Vietnam. Because it can be seen from the regression results that its coefficient is 0.022, higher than 0. Other factors remain constant when firm age increases by one unit, the capital structure of SMEs in Vietnam rises by 0.022 units. Because of their long-standing reputation, older firms, unlike newer ones, may limit adverse selection and moral hazard issues. Petersen and Rajan mentioned that older businesses should keep their leverage high because they have an advantage in a lender-borrower relationship [64]. For the tangible assets factor, it has a coefficient of 1.934, which is higher than 0, so it positively affects the capital structure of SMEs in Vietnam. Other factors remain constant, when tangible assets increase by one unit, the capital structure of SMEs in Vietnam rises by 1.934 units. The findings are supported by the pecking order theory. Also, the previous research studies by Khaki & Akin [36] and Camisón et al. [71] are in line with the work's results. They confirm that firms with a high share of tangible fixed assets can obtain loans on relatively more favorable terms than those with low collateral. When tangible assets are provided as collateral, it will create a positive signal for creditors. Because of their inherent limitations (limited capital, small fixed-assets, low reputation, low management level...), SMEs, in particular, must have more fixed assets to secure debts in order to access external loans.

## 5- Conclusion

This paper bridges the gap by estimating the macro-economic factors that affected the capital structure of listed SMEs in Vietnam from 2010 to 2020 during the pandemic. The author implements a 2-step SGMM regression and explores that national governance, inflation, and COVID-19 are the determinants of the capital structure of those firms. The findings are explained based on the trade-off theory and the pecking order theory to clarify the connection between macro-economic factors and firms' capital structures in developing countries, such as Vietnam.

Although the paper provides a significant contribution, it has some limitations. First, only four macro-economic factors are considered for their effect on the capital structure. Second, the capital structure could be split into the ratios of short-term debt to total assets and long-term debt to total assets instead of the total debt indicator. Third, the study has not classified SMEs by different sectors to have a more detailed view of how each industry group uses capital structures. Finally, the study recommends using six Worldwide Governance Indicators (WGI) indicators, while this study has just covered one indicator—Regulatory Quality for the national governance measurement.

## 6- Declarations

### 6-1-Data Availability Statement

The data presented in this study are available in the article.

### 6-2-Funding

The author received no financial support for the research, authorship, and/or publication of this article.

### 6-3-Institutional Review Board Statement

Not applicable.

### 6-4-Informed Consent Statement

Not applicable.

### 6-5-Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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