Capital Structure and Firm Growth: The Case of Vietnamese Listed Firms

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Abstract

This thesis provides a wide range of research on capital structure within the context of Vietnamese listed firms through three specific empirical studies. The first study focuses on analysing the adjustment process of capital structure towards the target level. This study strongly confirms that the average adjustment speed towards the target capital structure of Vietnamese listed firms is approximately 30% per year. This result is considered slower than the expected rate of 60% based on the related literature for other emerging economies. Due to this empirical result, further examination of the factors affecting the adjustment speed sheds light on the most significant determinants that contribute to the higher speed of adjustment. Three factors are considered in this study (distance to target, firm size, and growth opportunities), and the results reveal that all of them positively correlate with the adjustment speed with different impact levels.

The second study concerns the determinants of capital structure. Specifically, six factors are specified to evaluate their impact on financial leverage. The results show that there is evidence to conclude certain effects of independent factors (firm size, liquidity, profitability, tangibility, growth opportunities, and non-debt tax shield) on financial leverage. Of these, positive correlations are reported for firm size, liquidity, and tangibility; meanwhile profitability, growth opportunities, and non-debt tax shield have negative impact on financial leverage.

The third study focuses on the impact of capital structure on firm growth (measured by the growth rate of financial indicators: sales revenue, total assets, and operating profit). Short-term debt and long-term debt were employed as proxies for capital structure. The empirical findings reveal that long-term financial leverage strongly affects the growth of Vietnamese listed firms in all aspects of business. Meanwhile, the short-term debt model shows moderate support for the sales and operating profit model, and only weak support for the total assets growth model.

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CHAPTER 1

INTRODUCTION

1.1. Research motivation

Business growth has been recognised as one of the most important elements of a business's long-term survival and is defined as the increase in a certain set of measurable indicators that considerably contribute to the health and prosperity of the company and the economy (Achtenhagen *et al.*, 2010; Davidsson *et al*., 2009; Davidsson *et al*., 2010; Leitch *et al.*, 2010). The importance of economic growth in general and firm growth in particular cannot be underestimated for developing economies such as Vietnam. Business growth is essentially the driving force for the general development of the country. In Vietnam, the role of the private sector is indispensable, especially since the new Enterprise Law was officially launched in 2000. Since then, more than 120,000 new enterprises have been registered, including both household businesses and private companies.

As Hakkala and Kokko (2007) have indicated, private-sector development is recognised as an important priority in the Vietnamese master development plan, and the Vietnamese Communist Party has acknowledged the role of the private sector. Specifically, as reported by the Vietnam Investment Review (2019), the private sector has greatly contributed to the Vietnamese economic growth, investing over 26.8 billion USD in the economy during the first nine-month period of 2019. This accounted for 45.3% of the total social investment capital, demonstrating the effects of the government promoting the private sector as an important driver of the national economy. In addition, the private sector contributed 60% to the country's gross domestic product (GDP) and 70% to state budget collection. It is also widely recognised that the Vietnamese domestic private sector has been essential in reducing the country’s unemployment rate in recent decades (World Bank, 2006).

In Vietnam, the concept of private sector usually refers to small- and medium-sized enterprises (SMEs). The General Statistics Office reported that, in 2017, Vietnam had 517,900 registered private companies, 507,860 (98.1%) of which were SMEs (General Statistic Office, 2018). In 2018, the government implemented a wide range of policies with the aim of supporting and prioritising the development of local entrepreneurship across the country, as opposed to the previous aim of attracting foreign direct investment (FDI). The driving force of economic development thus had to change from reliance on FDI flows to local private-sector growth. However, the current tendency is only to expand the private sector in terms of quantity rather than quality. Consequently, the government has currently no specific plan to encourage the growth of SMEs into larger firms. In fact, in order to support the growth potential of the private sector, it is necessary to change the relation between the state-owned sector and the private sector. Specifically, state-owned enterprises (SOEs) should come to play a complementary role in the economy rather than being competitive with the private sector.

In the literature, a study by Psenicny and Novak (2013) based on data from 15,000 enterprises in Slovenia has confirmed the impact of business growth on the whole economy’s development. The authors evaluated firm growth based on four proxies—sales revenue, added value, number of employees, and retained earnings—and found a direct positive relationship between business growth and the GDP growth of the entire Slovenian economy during the period from 1992 to 2012. In addition, in a study about the role of enterprise in the economic development of India, Lal and Clement (2005) have confirmed the effect of the growth of enterprises on the overall growth of the economy. The authors analysed the current situation of India’s economic development strategies and evaluated the results of an economic restructuring process; based on this, they made recommendations for new, centralised opportunities and a development space for the private sector based on three aspects: education in entrepreneurship skills, financing and raising capital, and expanding the network of links between businesses.

Under the concept of firm growth, the methods of raising capital significantly influence the strategic planning of businesses, as well as the long-term growth of enterprises, especially for firms listed in the stock market, which have a variety of funding sources (Vu, 2012). Capital structure must be kept in a proper proportion between long-term and short-term funding to ensure that business activity is conducted as efficiently as possible (Capon *et al.*, 1990). According to Thomas (2013), the success of a business is determined largely by the way in which capital is financed and utilised. Capital structure is simply defined as the proportion of the long-term loans and the shareholder equity a business utilises to pay for the company's assets (Swanson *et al.*, 2003). This proportion varies depending on a business' culture, the administration method, or the industry in which it operates. In fact, researchers have not found any theoretically optimum level for the proportion of debt to equity (Modigliani and Miller, 1958) because this figure depends on the characteristics of the background macroeconomy, government policies, or even the context of the specific activities of each business. Whether capital structure has an impact on the growth of enterprises in Vietnam and how to build an appropriate and sustainable capital structure are thus open questions for business managers and researchers (Bhagat *et al.*, 2011).

The Vietnamese capital market depends largely on macroeconomic issues, which can have a negative impact when, for example, the government tightens financial and monetary policies to restrain inflation and stabilise the macroeconomy. In addition, the banking system continues to play a major role in the capital market (Linh, 2013). The market also suffers from bad debts and poor performance banks, which led to the implementation of a large-scale national plan to restructure the banking system at the end of the previous decade (Vu, 2012). Regarding the equity market, after the establishment of the derivative market in August 2017 (Nguyen, 2017), which was considered a remarkable milestone of the Vietnamese stock market, the Vietnamese capital market has been considered fully functional, with a variety of financing methods for listed firms as well as investment options for investors. Table 1.1 presents some indicators of the Vietnamese equity market.

Table 1.1. Indicators of the Vietnamese equity market

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Listed firms	41	193	253	338	453	642	694	704	678	670
Market capitalisation (billion VND)	3	221	495	205	621	723	539	765	949	1121
Market capitalisation/GDP (%)	0.4	22.7	43.2	13.9	37.5	36.5	21.2	23.6	26.5	28.5

The data clearly shows that the equity market has become one of the most important sources of financing for Vietnamese firms, both listed and unlisted. Thus, being listed on the stock exchange market is regarded as a major milestone for every SME or start-up. The Vietnamese stock market was officially established in 2000 with only five enterprises listed initially and a total market capitalisation of 3 billion VND (equivalent to approximately 211,759 USD at the time). Now, 825 firms (including 12 commercial banks) are listed on two national stock exchange markets (Hanoi—HNX and Ho Chi Minh—HSX), with a market value of 3.96 quadrillion VND (equivalent to approximately 16.972 billion USD—60.8% of GDP as of 2018). Nevertheless, the Vietnamese stock market still has some characteristics of a new, underdeveloped market, such as a high level of volatility, the irrational herding behaviours of investors, and a lack of information transparency. Indeed, the stock market has been expanded quantitatively but not yet qualitatively. For example, the market quickly came to thrive in terms of number of listed firms, from only 41 in 2005 to 253 in 2007, and it reached 825 firms by the end of 2018.

Even though the global financial crisis of 2008 wiped out half of the market capitalisation value, the number of listed firms nevertheless increased in 2008.

In recent years, the interest rate in Vietnam has been extremely high, with an average of 15.4% in 2012 and 10%–12% in 2013, and a stabilised average of around 10% in 2016. Statistically, at the end of 2013, 66% of domestic businesses suffered losses, which also led to many bankruptcies or businesses dissolving in recent years (Oanh, 2017).

In the last 17 years, the stock market has come to be regarded as another source of finance for domestic firms. Indeed, the Vietnamese stock market is considered one of the fastest-growing markets in the Asia region (Phan and Zhou, 2014). At the end of 2016, the VN-INDEX rose 14.8%, and the HNX-INDEX rose 0.2% compared to 2015. The market capitalisation also increased significantly, from only 26% of GDP in 2012 to 42% of GDP in 2016, reaching 1,765 billion VND (Stockbiz, 2016).

However, there are problems, such as the lack of stability of transactions in the market and signs of slowing internal capital flows due to the lack of sufficiently strong information support, in addition to foreign investment funds divesting operations. Thus, although the market is still considered to have a relatively high growth rate, it continues to contain potential short-term risks, and liquidity remains low. The bond market remains underdeveloped, and banks are still the key participating members in this market (Phan and Zhou, 2014). These shortcomings have limited the supply of capital at competitive prices for businesses. The cause of this situation is the intrinsic weakness of the market participants (banks, securities companies, enterprises) which stem from the legal framework of the institutional market, the role of the authorities in the monitoring process, and the organisational structure of human resources, tools, and means of inspection and surveillance. Practice shows that market discipline is not tight enough to adjust, monitor, and ensure the stable and efficient development of the capital market. All of these shortcomings created significant pressure for the listed firms to effectively raise finance through the stock market.

Additionally, in 2017, the Prime Minister of Vietnam signed off the Decree No. 20/2017 about tax administration for local enterprises. Specifically, the Decree stated that total interest expenses incurred in the period will be deducted from tax only if the deductable amount does not exceed 20% of the total earnings before interest, tax, depreciation, and amortisation (EBITDA). This means that if interest expense is higher than 20% of EBITDA, the excess amount is not included in the operating costs of the business. Only commercial banks and financial institutions are excluded from the effects of such decree. Although this scheme is issued to ensure the tax evasion activities are minimised, it is still causing significant damage to the competitiveness of enterprises, especially which are operating in the areas that need large capital investment such as real estate, technology, and securities. According to Dung (2020), the rate of 20% was proposed as the average level in the range 10% - 30% recommended by the Organisation for Economic Co-operation and Development (OECD) and the World Bank. Therefore, it is regarded as a hasty step of the government that negatively affect the local firms especially during the Covid-19 pandemic period.

According to Thomas (2013), the success of a business is determined by the way in which capital is financed and utilised. However, the basic irrelevance view has been challenged on the basis of tax advantage, in which interest is a tax-deductible expense, whereas dividends paid to stockholders are not. Thus, after taxes, firms have more money to distribute to their debt and equity holders if they use more debt financing. This led Modigliani and Miller (1963) to relax the neutrality axiom and include taxation in their model. Hence, because interests are deductible from taxable profits, firms have an incentive to use debt rather than equity (Miller, 1977); this can be considered the introduction of trade-off theory in capital structure. In a later study, Myers and Majluf

(1984) identified the issue of asymmetric information and introduced the pecking-order theory, which aims to minimise the costs associated with asymmetric information, especially adverse selection, and which prefers internal financing to external financing. This theory assumes that a business manager complies with the following hierarchy: self-financing, non-risky debt issuance, risky debt issuance, and equity issuance as a last resort. It can be concluded that capital structure is still a debatable issue in empirical corporate financial management.

This contentiousness manifests in different ways in different research contexts. For example, Biswas (2019) has recently published a paper on the relationship between financial leverage and profitability in India during the period from 2008 to 2017 and found a mixed effect of the observations. In the same year, Ahmed (2019) studied the interlinkage among financial leverage, ownership structure, and corporate governance of SMEs in Ghana and presented a consistent result that both ownership structure and corporate governance have a positive impact on capital structure. In terms of capital structure choice, Ganiyu *et al.* (2018) have used the general method of moment (GMM) to analyse a dynamic panel data set in Nigeria for the period 1998–2016. The paper shows that businesses with high levels of profitability, firm risks, and dividend pay-out tend to use more financial leverage in capital structure. Meanwhile, a higher level of other explanatory variables such as asset tangibility, growth opportunities, firm size, and firm age lead to lower debt in the capital structure of Nigerian firms. Vo (2017) has also employed the GMM estimator in the Vietnamese context with a dataset of non-financial listed companies during the period from 2006 to 2015. The study concluded that there are different capital structure determinants between long-term and short-term debt.

The topic of capital structure has been extensively researched in Vietnam, and some of the most widely cited papers include those of Nguyen and Ramachandran (2006), Vo (2017), and Vo and Ellis (2017). However, since the official launch of the derivative market, a significant milestone in the Vietnamese stock market that was fully realised in August 2017 (Nguyen, 2017), there has been no empirical research about the effects of capital structure on business growth. This study is thus a leading, updated, paper to differentiate the impacts of capital structure on Vietnamese listed firms before and after the establishment of the derivative market.

These points of view lead to a practical demand for listed firms and undergird the researcher's personal motivation to conduct an empirical study to examine the impacts of capital structure (represented by financial leverage) on business growth in Vietnamese listed firms. The thesis aims to identify the impacts of the level of capital structure on the growth of Vietnamese listed firms and to propose recommendations for them in terms of the formation of capital structure. In addition, this study also contributes to the literature on empirical finance-related results on testing capital structure theories, especially in the context of emerging markets, with the case study of Vietnam.

1.2. Research aims and questions

1.2.1. Research aims

The main objective of this research project is to study the growth of Vietnamese listed firms during the 10-year period from 2009 to 2018. Capital structure is considered the primary variable that affects the growth rate of listed firms and is separated into short-term and long-term perspectives to explore the most accurate effects of using financial leverage. Other control variables are adopted to ensure the validity and reliability of the econometric model, including changes in liquidity, tangible assets, advertisement expense, and R&D expenses. In addition, the gender of the founder is employed as a dummy variable in the research model. Based on the findings of quantitative analysis, several practical options are recommended to policymakers in Vietnam. This thesis aims to identify the specific effects of financial leverage in both the short and long run. Thus, short-term debt and long-term debt are employed to distinguish the different impacts.

Based on these objectives, this thesis contributes to both practical macro governance policy and the academic literature. First, capital structure theories such as the capital structure irrelevance (Modigliani and Miller, 1958), the trade-off theory (Miller, 1977) and the pecking-order theory (Myers and Majluf, 1984) are discussed in detail in the literature review to provide a clear picture of the current theories in terms of applicability. Second, regarding the empirical component of the thesis, the success of a business is determined by the way that capital is financed and utilised, as Thomas (2013) indicated. Leary and Roberts (2005) have also empirically confirmed that each firm has an optimal level of capital structure and that firms actively rebalance their leverage to remain within the optimal range. The most significant empirical study on capital structure is that of Titman and Wessels (1988), in which the details of all kinds of debt are tested separately rather than as an aggregate measure of total debt in relation to the long-term profitability and growth of firms. Furthermore, industry-related aspects also play a role in determining the capital structure, which is also tested in this thesis.

1.2.2. Research questions

Based on the research objectives, in order to identify the differences in the methods of raising the capital of Vietnamese listed firms in different industries, to identify the effects of financial leverage on the growth of publicly listed companies in Vietnam, and to propose certain options for policymakers in terms of developing and encouraging the private sector, several research questions must be answered.

First, what is the approximate adjustment speed towards the target capital structure of Vietnamese listed firms, and what factors influence the adjustment speed?

Second, what are the determinants of the capital structure of Vietnamese listed firms?

Third, what are the separate impacts of capital structure on the business growth of Vietnamese listed firms with regards to short-term and long-term perspectives?

Fourth, how do government policymakers improve the financial market and support the domestic private sector based on the findings of this thesis?

1.3. Summary of thesis

This thesis provides a wide range of empirical findings on the capital structure of Vietnamese listed firms and related factors. Specifically, based on the literature review of theories on capital structure and previous empirical findings, this thesis includes three chapters to provide an in-depth analysis of capital structure in Vietnam. Using the full financial data collected from 813 firms listed in the HSX and HNX markets during the period from 2008 to 2018, this thesis attempts to analyse the determinants of capital structure to ascertain how Vietnamese firms construct their capital structure and which factors determine their financing decision. Based on this result, the next empirical analysis focuses on target structure and speed of adjustment. The final part of the analysis estimates the impact of capital structure on firm growth with the diversified measurement of growth. Further, different estimation approaches are discussed in details and are decided based on multiple diagnostic tests. Based on these results, the last chapter provides detailed recommendations for policymakers as well as internal business governance in terms of enhancing the efficiency of the domestic capital market.

1.4. Structure of thesis

This thesis is structured into eight chapters. This chapter provides the motivation for conducting research on the capital structure of the Vietnamese market with specific research questions and objectives. Chapter 2 includes an overview of the research background with essential information about the Vietnamese economy and the development of the local financial market in the last 20 years. Chapter 3 is the literature review, which enhances the feasibility of the research based on the discussion of existing theories as well as empirical studies. Chapter 4, which concerns the research methodology, details how the analysis is conducted by specifying the research approach, research strategy, significance of each diagnostic test, and estimation methods. The empirical part includes three different studies of capital structure. In Chapter 5 we provide the first empirical analysis on the dynamic capital structure adjustment speed and its determinants. Chapter 6 focuses on the empirical findings of the determinants of capital structure. Chapter 7 is the most important empirical part and analyses the impact of capital structure on firm growth. Based on the results, Chapter 8 proposes the most feasible recommendation for policymakers to improve the financial market and support the domestic private sector.

CHAPTER 2

OVERVIEW AND RESEARCH BACKGROUND

2.0. Introduction

After the end of the Vietnam War in 1975, the Vietnamese government began the process to develop the country's economy. However, until 1986, Vietnam had strictly followed a socialist orientation with a centrally planned economy based on SOEs with agriculture and the heavy industry. During this period, Vietnam's economy suffered from hyperinflation and fiscal crisis. Thus, 1986 is regarded as a milestone for the country which is widely known as the "Economic Renewal", in which the economic development orientation was transformed from a centrally planned economy to a market economy with the objective of achieving sustainable development. Accordingly, the economy has undergone remarkable changes with high and stable growth rates and has drawn the attention of the world (World Bank, 2011; 2014).

This chapter provides a discussion of Vietnam's economic development as a developing country and of the characteristics of the Vietnamese financial market in order to produce a clearer picture of the available sources of finance for Vietnamese private firms.

2.1. Overview of Vietnamese capital market

Since the economic renewal programme was launched in 1986, Vietnam has seen significant achievements in GDP growth, employment rate, and socio-cultural living standard. However, as indicated by the International Finance Corporation (2007) and Leung (2009), the financial sector remains underdeveloped, which led the financial market to be less dynamic and local businesses to struggle to access capital.

The capital market of Vietnam has been officially formed and fully functioned since the establishment of stock market in 2000. Since then, the local capital market consists of two main components: the stock exchange market and the credit market that serves the medium- and long-term leverage purposes. This is regarded as a huge milestone of Vietnam's capital market since it created an effective capital channel for the economy. After 20 years of development, the rapid growth of stock market capitalisation is crystal clear. In 2000, the market capitalisation was only 986 billion VND which is equivalent to 0.28% GDP, bank credit was still the major source of finance for local businesses. Two decades later, with the operation of two stock exchange markets, the total market capitalisation by the end of 2020 is equivalent to 83% of Vietnam's GDP in 2019. Hundreds of trillion VND have been raised by businesses and banks through stock market. Hence, along with the strong development of bank credit channel, it significantly contributes to create a better-balanced picture of Vietnamese capital market.

From the beginning of 2021, the Securities Law has been officially launched with many improved policies to enhance the efficiency of the market. However, due to complex administrative procedure, the Law is expected to be implemented slowly and the effects are not likely to impact the market in the medium-term period. Currently the domestic financial market remains led by the banking sector, with total credit to the economy reaching 131% of total GDP in 2019 (State Bank of Vietnam, 2019). The stock market and bond market are growing quickly as part of financial market and economic development, with their capitalisation and outstanding value equivalent to 89% and 25.1% of GDP, respectively, in 2019 (Thuy, 2019). In terms of the life and non-life insurance market, the premium volume accounted for 1.93% of the country's total GDP in 2017 (The Global Economy, 2017). According to Hoang (2020), Vietnam's capital market is facing many challenges. In details, in the credit market, the existing challenge is that banks will find it difficult to increase their financial capacity, while the risk of bad debts is getting more severe, because most production and business activities are affected by the pandemic Covid-19. Along with that, many forms of digital payment started to penetrate the market, while Vietnam currently has no policy to manage.

The following sub-sections thus consider and review the capital market, with a focus on the banking sector, stock market, and bond market, to reveal the current situation of the available sources of finance for Vietnamese listed firms.

2.2. The characteristics of Vietnamese capital market in the context of globalisation

According to Nguyen (2020), although Vietnamese stock market has made a huge step after 20 years of innovation and development, the attractiveness to investor is still considerably less in comparison with regional counties. This was concluded based on comparing the securities investment yields with other investment channels. As reported by the end of 2020, if the average 5-year savings interest rate of Vietnam is at 8.64%/year, the stock yield is only 8.52% while the figure in the Philippines is 2.22% compared to 10.57%; in Thailand it was 2.28% versus 7.9% and in Indonesia it was 7.24% versus 11.94% per year. Hence, the stock market in Vietnam is still the playing field for a specific group of "players", who can be, by some means, willing to take higher risks in exchange of higher returns. While most of the individual investors, who are risk-adverse, consider bank saving as a more stable and ideal destination. This makes the market less eventful and, therefore, limits the capacity for listed firms to raise finance for their demands. As a result, the share price in the regional countries is higher than that in Vietnam, reflected by a comparison of PE and PB ratios. The average PE index for the period 2011 - 2016 of Vietnam was only 12.1 times compared to Thailand's 16.8 times, the Philippines nearly 19 times, and Indonesia nearly 21 times. Vietnam's PB is nearly 2 times while Indonesia's is 2.77 times.

Thus, it can be concluded that the Vietnamese stock market has not clearly shown its role as a long-term capital channel for the economy (market capitalisation is still less than

GDP). Capital in the economy weighs more heavily on the role of the banking system (which has credit capitalisation of 131% of GDP in 2019), which causes great risks to the macro economy when there is instability in the banking system. In order to attract both domestic and foreign investors, it is necessary to increase the linkage between the banking system and the capital market, creating development opportunities for the corporate bond market. At the same time, the monetary policy should focus on stabilising the level of goods' price as the most important goal, helping to reduce interest rates to increase the health of the economy in the long term, thereby increasing the attractiveness of the stock market.

One of the most important milestone of Vietnamese capital market is the establishment of ASEAN Economic Community in 2016. Since the Asian financial crisis in 1997, Association of the Southeast Asian Nations (ASEAN) countries, including Vietnam, have made great strides in strengthening their position and macroeconomic framework. The whole region witnessed a huge increase in trade flows with the rest of Asia and the world. In that context, the establishment of the ASEAN Economic Community (AEC) is an inevitable tendency. The AEC is seen as a comprehensive solution to minimise the risk of weak financial infrastructure of the member countries, as well as providing development resources and provision against financial shocks for intra-bloc countries.

The AEC focuses on seeking to achieve a well-integrated and effective regional financial system under three strategic goals, namely: Financial integration, comprehensive finance, and financial stability, with 3 cross-cutting sectors (Capital account liberalisation, payment systems, and capacity building). Along with that, the community agreed to carry out detailed action plans with specific objectives. The first one is financial services liberalisation, which means the gradual removal of restrictions on ASEAN banks, insurance companies and investment firms in the provision of financial services in ASEAN member states will be done. The second one is capital account liberalisation, in which ASEAN aims to achieve more liberal capital flows by gradually removing restrictions on foreign exchange transactions such as payment accounts, foreign direct investment (FDI), portfolios and other flows, while applying adequate protection measures. The third is about capital market development: ASEAN also focuses on developing, linking and integrating deeper regional capital markets by building capacity and laying long-term infrastructure to achieve capital market integration. in ASEAN. Fourth, harmonization of payment and settlement systems: ASEAN aims to establish a safe, creative and efficient ASEAN payment system. The fifth objective is comprehensive finance: ASEAN considers policy options and coordinates the member countries to bring comprehensive finance into ASEAN in the areas of financial intermediation and distribution channels to protect consumers. And the final one is capacity building: ASEAN recognises the need to provide capacities and initiatives to bridge the development gap between ASEAN economies.

It can be seen that capital market development is a very important strategy of the AEC, because enhancing integration and opening up the ASEAN financial system is an indispensable and urgent need for the development of countries in the region, including Vietnam.

2.3. The Vietnamese banking sector

2.3.1. History and development of the banking system

The Vietnamese banking sector began to reform during Vietnam’s economic renewal programme in the mid-1980s. Until 1990, the local banking system included the State Bank of Vietnam (SBV), which is known as the country’s central bank, and four other state-owned commercial banks (SOCBs): The Vietnam Bank for Agriculture and Rural Development (VBARD – Agribank), the Bank for Investment and Development of Vietnam (BIDV), the Bank for Foreign Trade of Vietnam (VCB – Vietcombank), and the

Bank for Industry and Trade (previously known as Incombank, now as Vietinbank after being separated from the SBV).

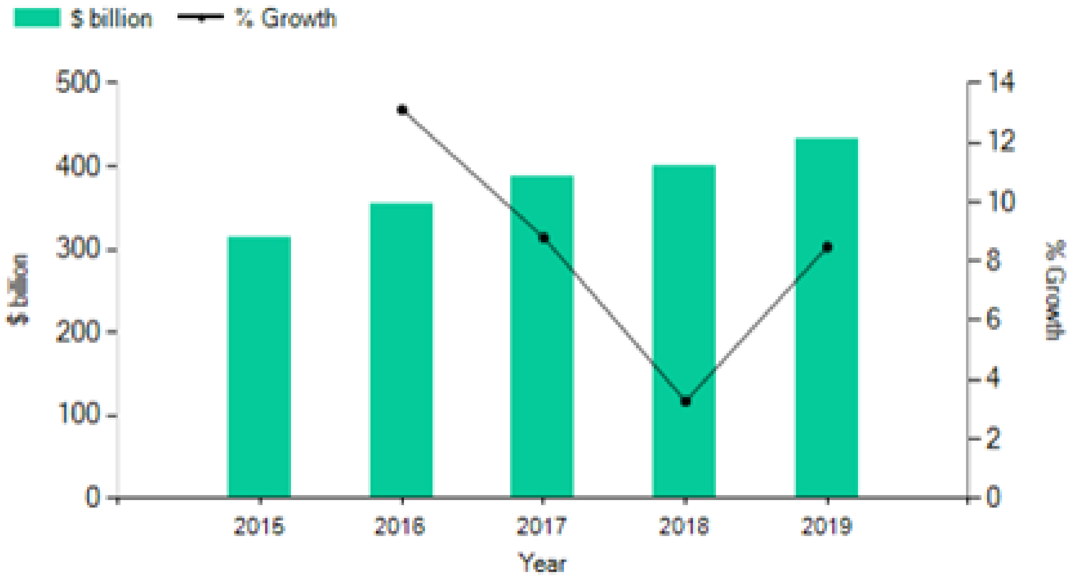
After this period, Vietnam's banking system grew rapidly and diversified in various aspects in terms of type, size, and ownership. By 2019, 45 commercial banks remained in total, including four SOCBs, 31 Joint Stock Commercial Banks (JSCBs), one joint venture bank (JVB), and nine foreign investment banks. Along with development in terms of the quantity of banks, the banking network also enlarged significantly, with 24/7 interbank services including instant balance transfers, bill-pay check, or mobile top-up. The number of branches, transaction offices, and automated teller machines (ATMs) also rose remarkably to provide a wide range of easy access to banking services (Business Monitor International, 2014).

In conjunction with the key leading development of SOCBs, the number of small and medium-sized banks, whose chartered capital requirements are around 150–250 million USD, has arisen quickly and they have come to dominate the industry in terms of quantity and have also tried their best to diversify their banking services in the current condition of extreme competition. Although there are only four SOCBs in the industry, they account for a total of 139 trillion VND of chartered capital (5.958 billion USD) and 47.9% of total credit in the economy. However, in comparison with other regional banks, the size and competitive advantages of Vietnamese banks remain at a low level (Vietcombank Securities, 2018)

2.3.2. Market value and structure

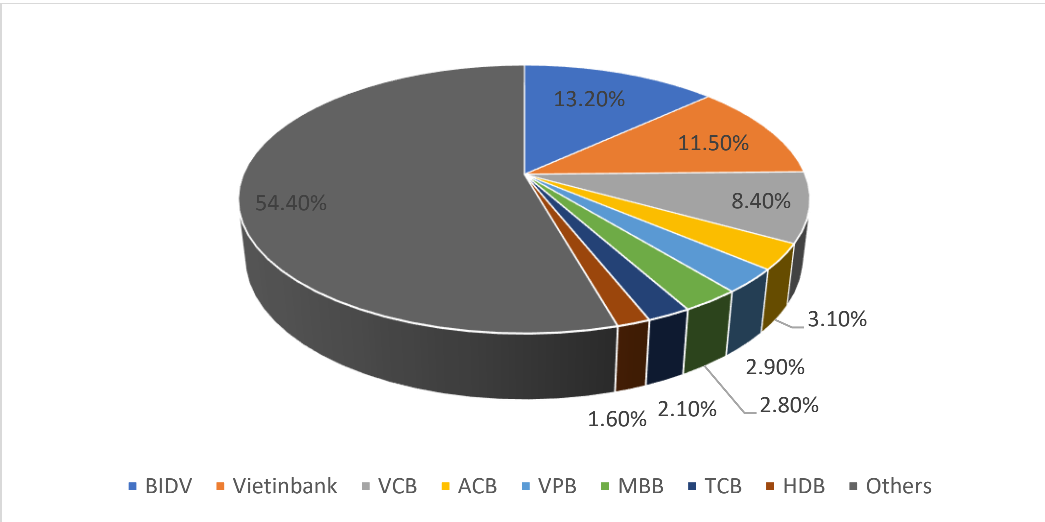
Currently, SOCBs remain the key leading forces dominating the market in terms of both quantity and quality. Figure 2.3 shows the increase in value of the Vietnamese banking industry, which reached 432.6 billion USD by the end of 2019.

According to Nguyen and Nguyen (2019), the credit market share in 2018 remained dominated by SOCBs, with 13.2% belonging to the BIDV, followed by Vietinbank at 11.5%, and VCB at 8.4%. In particular, VCB has performed remarkably successfully in the fiscal year ending in Apr. 2019, with an industry-leading net profit of 624,712,100 USD, a 61.1% increase compared to the previous year. In addition, returns on equity (ROE) reached 25.1% (an increase of 7.1%). Based on the report of Nguyen and Nguyen (2019), the SOCB sector continued to account for the largest proportion of the banking system's total assets, at 44%. Nevertheless, the growth rate of the private banking sector is also significant. Although the total growth rate of the total assets of SOCBs was impressive, at 6.42%, and made up around 208 billion USD, the private sector performed even better, with a 13.07% growth rate, reaching 194.69 billion USD.



Source: MarketLine (2020)

Figure 2.1: Vietnamese banking industry value

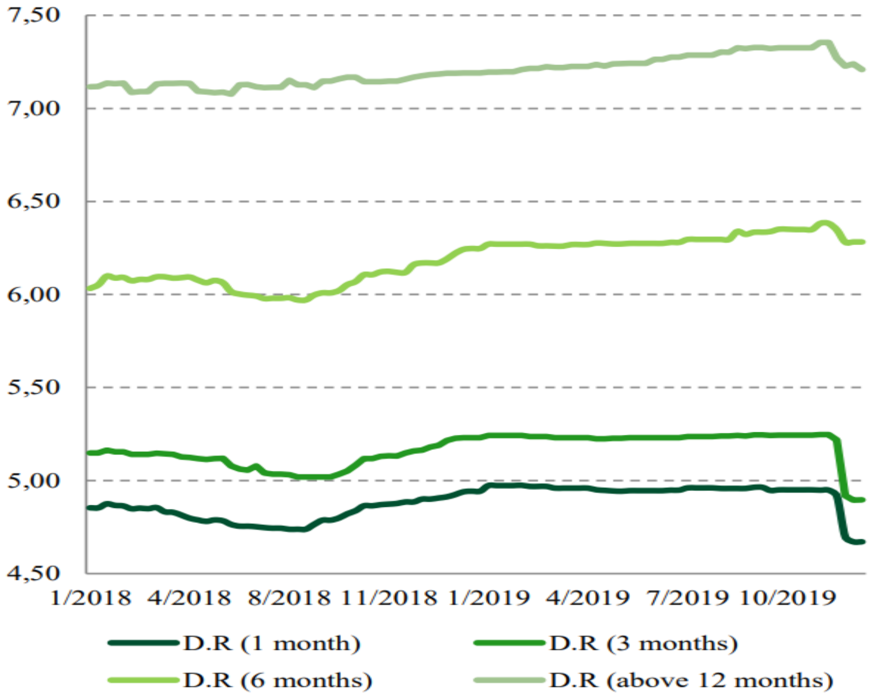


Source: Nguyen and Nguyen (2019)

Figure 2.2: Vietnam banking credit market share

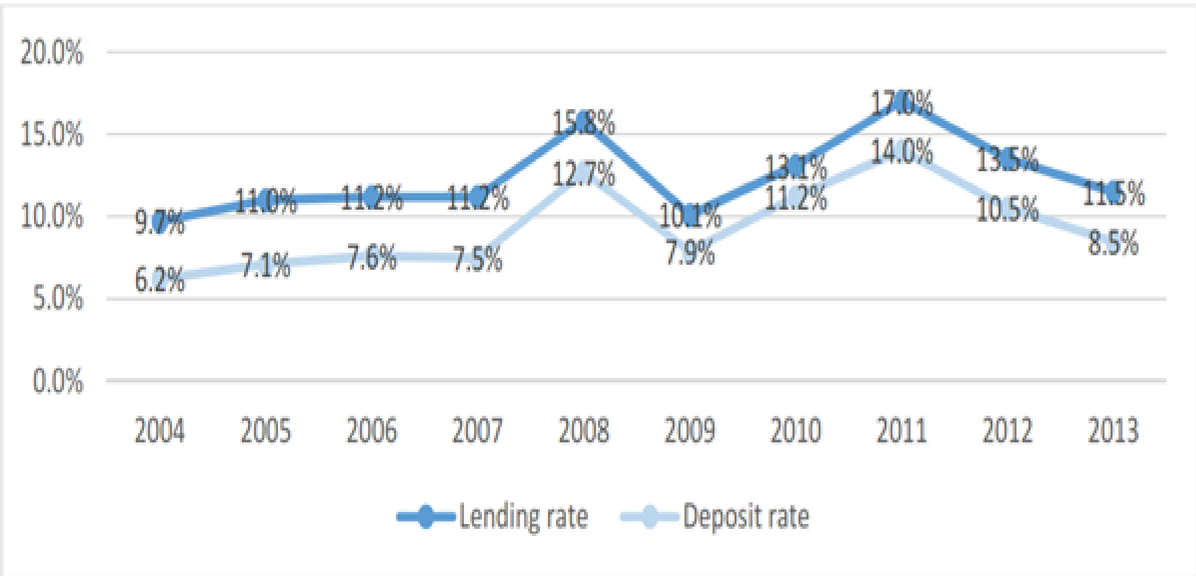
2.3.3. Interest rates

In 2018, the SBV issued a variety of policies to reduce the interest rate and ensure country’s economic growth and stabilise the exchange rate. Decision No. 1870, released by the SBV, reduced the refinancing interest rate to 6%, the rediscounted interest to 4%, the interbank overnight lending interest rate to 7%, and the offering interest rate of valuable papers through open market operations to 4.5%. After that, the SBV also lowered the interest rate of seven-day bills from 2.75% to 2.50%. Near the end of the year, the SBV released a combination of Decision No. 2415 and 2416 to control the deposit interest rate, which included the policy to reduce the ceiling deposit interest rate for each period – 1 month and 1–6 month – to 0.8% and 5%, respectively, although the rate had fluctuated very slightly in almost financial year. For periods above 6 months, interest rates were higher compared to the same period last year. For periods above 12 months, interest rates eased the seasonal pressure thanks to the operator's policy.



Source: Vietcombank Securities (2019)

Figure 2.3: Average deposit rate (%)



Source: VCCI (2013)

Figure 2.4: Interest rate (%)

2.3.4. Credit distribution

Recently in Vietnam, external sources of finance for the private sector have predominantly been loans issued by banks or financial institutions (International Finance Corporation, 2007), in which SOCBs significantly dominated this market. This situation brought about an imbalance of external finance allocation in the market, thereby lowering accessibility to capital, especially for the private sector (Vuong and Tran, 2010). Furthermore, the main customers of the SOCBs, in terms of both the deposit and the credit market, are currently SOEs, which are believed to display inefficient financial performance and tend to have higher risks for non-performance loans (NPLs) than the private sector. According to Nguyen and Nguyen (2019), the BIDV, Vietinbank, and the Vietnam Prosperity Joint-Stock Commercial Bank (VPB) are currently under huge pressure to cope with NPLs. For example, in the case of the BIDV, which is known as the local bank that had the largest pre-provision operating profit, of more than 1.2 billion USD in 2019 (up 20.6% from previous year), the bank had to proactively set aside its provision amount of around 807.6 million USD in 2018 to address legacy assets. This rendered the net profit of the BIDV lower than that of the industry (with a ROE of 14.2% compared to 19.6% in the industry).

Table 2.2: Proportion of registered Vietnamese firms by ownership (%)

Year	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)
SOEs	2.71	2.24	1.60	1.43	1.15	1	0.90
Non-SOEs	94.09	94.57	95.57	95.76	96.35	96.30	96.60
FDI enterprises	3.20	3.18	2.74	2.81	2.50	2.70	2.50

Source: VCCI (2011, 2012, 2013)

Table 2.3: Credit to economy (%)

Year	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)
Claims on SOEs	31	31	31	29	19	17	17	16.5
Claims on others	69	69	69	71	81	83	83	82.5
Total credit to the economy	100	100	100	100	100	100	100	100

Source: International Monetary Fund (2014)

2.4. Vietnamese bond market

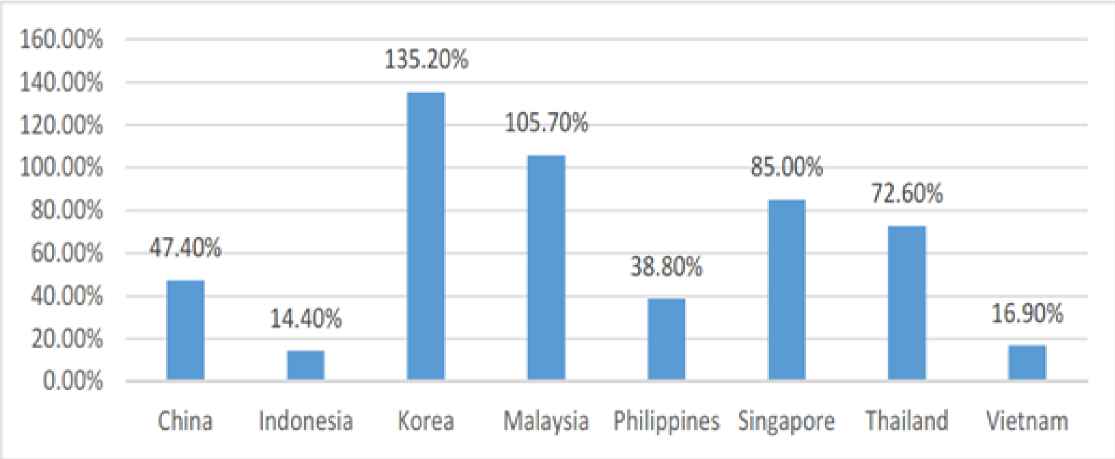
2.4.1. Market value

Since the economic renewal of 1986, the bond market has undergone 33 years of remarkable development and has also transformed into a more modernised model, so that the local market might have more financing options. The securities market was first introduced in 2000, during which the government bond was regarded as the main product for market trading. In 2014, the total value of the bond market reached 20% of the country's GDP. However, compared to the markets in other regional countries, the size of the Vietnamese bond market remained small, and the outstanding value each year was much less than GDP; for instance, it is 70% in Thailand and 30% in Philippines.

Currently in Vietnam, the government bond continues to account for the largest amount of market share of the debt market, followed by corporate bonds, government-guaranteed bonds, and finally municipal bonds, as shown in figure 2.7.

As mentioned in the introduction, the listed derivatives market was officially launched in mid-2017 with the aim of complementing the capital market in Vietnam and supporting the local market in gaining a better investor base and attracting more foreign institutional investors in order to promote liquidity in the underlying market. In terms of derivatives trading, seven securities firms were given approval to become members of the Derivatives

Market of HNX and to be able to apply and synchronise the market data to their derivatives trading system.



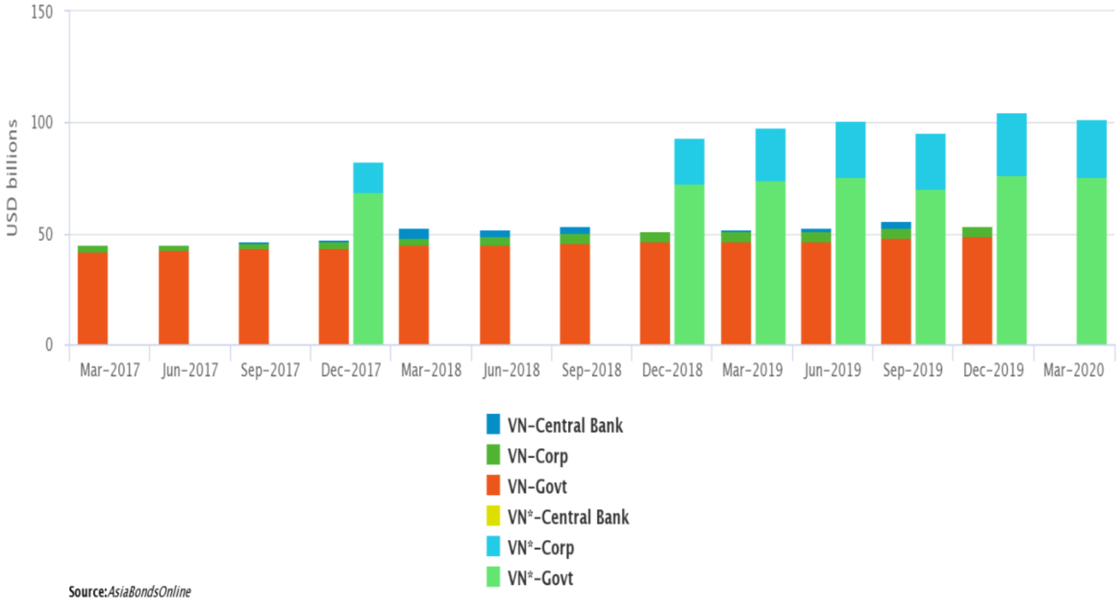
Source: Asian Development Bank (2014)

Figure 2.5: Bonds outstanding in major markets (% of GDP) in 2013

2.4.2. Local currency bond market

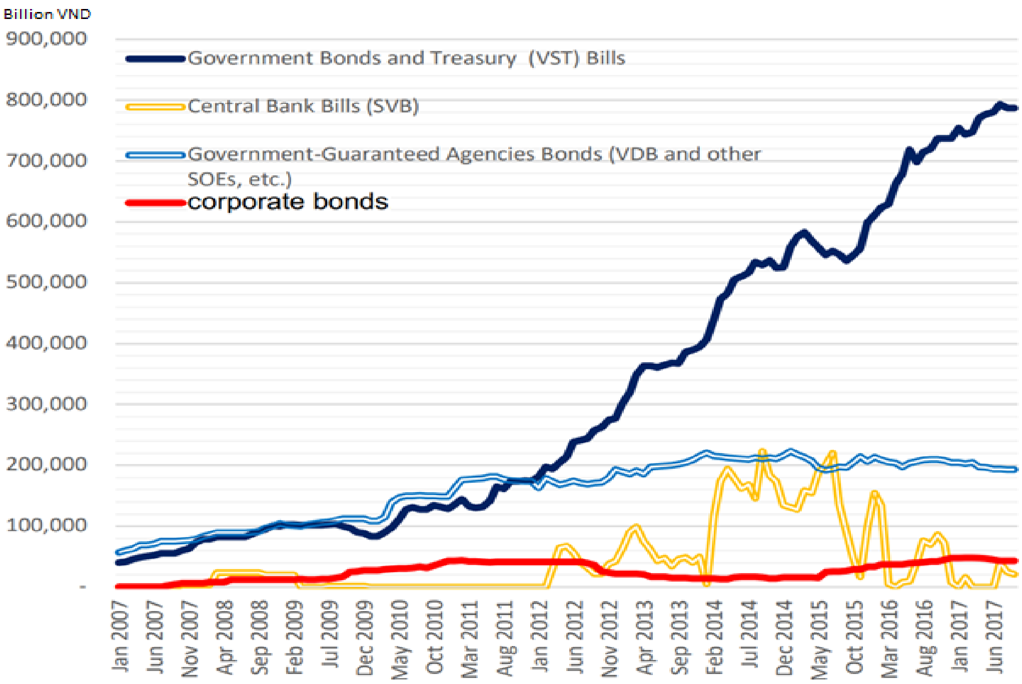
Although the bonds market in Vietnam is relatively small compared to other countries in the region, the growth rate of the local currency bonds market has been particularly significant over the last decade, at around 13.5 billion USD by the end of 2008 and reaching approximately 49 billion USD by the end of 2019. However, since 2014, the increasing trend has stopped and stabilised.

Regarding the market share, the government sector continues to hold the upper hand with the majority of value, as shown in Figure 2.9. By early 2007, the outstanding value of corporate bonds was almost zero and began to increase slowly along with the breakout of the stock market during this year, and hitting a peak in 2017 with 43,067 billion VND (around 1.86 billion USD), which accounted for 4% of the market; meanwhile, government bonds reached 786,957 billion VND (around 33.9 billion USD), or 75% of the total market outstanding value.



Source: Asian Development Bank data (2020.)

Figure 2.6: Local currency bonds outstanding (billion USD)



Source: Asian Development Bank (2018)

Figure 2.7: Local currency bonds outstanding by issuer type

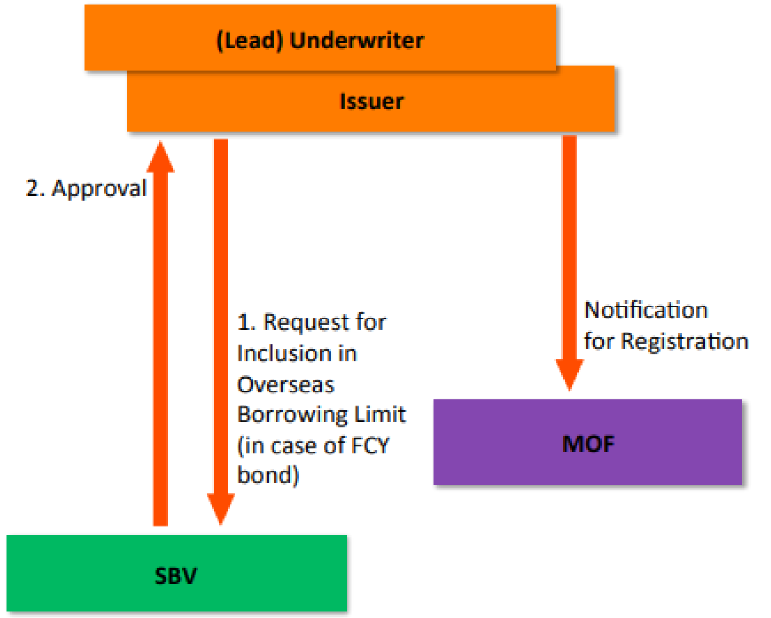
2.4.3. Foreign currency bonds market

The foreign currency bonds market was officially launched in 2009 as government-issued USD-denominated bonds with a nominal value 300 million USD and was listed on HNX. In 2015, the government-issued 1 billion USD of government bonds, but these bonds were not listed on the exchange.

In terms of market size, the Vietnamese foreign currency bonds market remains relatively small compared to other countries in the region in terms of both outstanding value and proportion to GDP. However, the growth rate is impressive, with only 3.53 billion USD issued in 2013 compared to 40 billion USD by the end of financial year 2017 (Oxford Business Group, 2018), which is equivalent to 17.9% of the country's GDP.

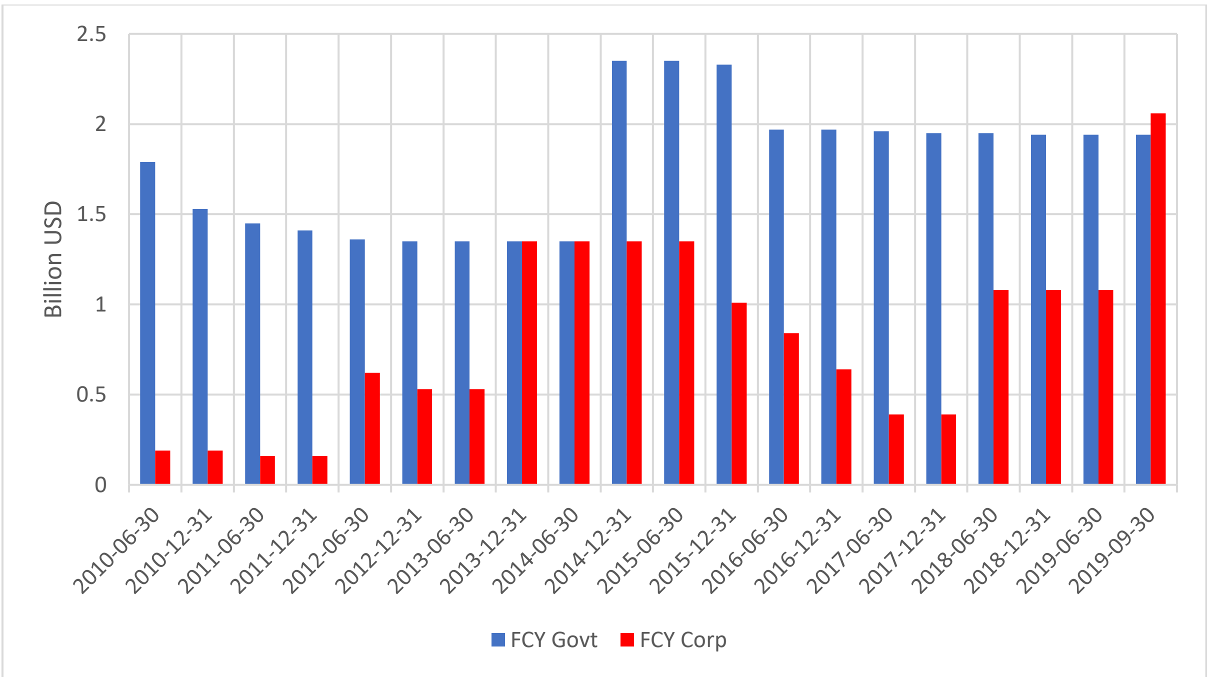
In 2011, the government issued Decree No. 90, which provides a detailed framework for the private placements of bonds. The regulatory process is described in figure 2.10.

In terms of market structure, the government sector has tended to dominate the market, with the vast majority of outstanding bond value in the last decade. However, the proportion occupied by the corporate sector has increased significantly since 2013, making up 50% of the total market value, only to decrease in the next few years before a remarkable increase by the end of 2019 to overcome government sector for the first time, with 2.06 billion USD, compared with 1.94 billion USD held by the government.



Source: Asian Development Bank (2018)

Figure 2.8: Regulatory process for the private placements of bonds



Source: Asian Development Bank data (n.d.)

Figure 2.9: Foreign currency bonds outstanding

2.4.4. Current situation of the market

The listed scale of the bond market reached 1,184 trillion VND, an increase of 5.6% compared to the end of 2018 (equivalent to 21.4% of GDP). The average transaction value reached 9,139 billion VND, an increase of 3.4% compared to the average of 2018, in which the repo transaction rate tended to increase more than the proportion of pine trading. This shows that the bond market has grown in depth. The year 2019 also saw great success in the corporate bond market. According to the Ministry of Finance, by the end of Sept. 2019, the size of the corporate bond market reached 9.91% of GDP, and the market size in 2019 is expected to have increased by 29% compared to the end of 2018 and to be 9.6 times higher than in 2012. In particular, in October of 2018, according to statistics from the Vietnam Bond Market Association, nearly 10,000 billion VND was issued, with interest rates ranging from 6.5% to 11% per year, depending on the duration and financial capacity of each enterprise.

2.5 The stock market

2.5.1. History of establishment and significant milestones

The history of Vietnam's stock exchange market began at the end of 1996 with the formation of the State Securities Commission of Vietnam. This organisation was established based on Decree No. 75, signed by the prime minister and issued by the Vietnamese government. After two years of preparation and progression, the Ho Chi Minh Security Trading Centre was established officially on 11 July 1998. However, the first trading days of the Ho Chi Minh Securities Trading Centre had operated with no listed ticker yet and had to wait for a further two years, until 28 July 2000, with the first two tickers named REE and SAM. From this milestone, this market is known as Ho Chi Minh Stock Exchange market (HOSE). After five years of gaining experience with the HOSE, on 8 Mar. 2005, the Hanoi Securities Trading Centre, known as the Hanoi Stock Exchange Market (HNX) officially went into operation. According to Robinson (2012), if HOSE is the market in which large companies are listed, then HNX is the listing market for SMEs.

Vietnam’s stock market has experienced strong and solid growth in size over the years and has gradually come to play a role as an important capital distribution channel for medium- and long-term perspectives. It has also greatly contributed to the industrialisation and modernisation of the country. During the period 2000–2005, market capitalisation accounted for only around 1% of GDP. However, the size of the market experienced a strong leap, to 22.7% of GDP, in 2006 and continued to increase to more than 43% in 2007. At this stage, due to fluctuation in the world financial market and difficulties in the domestic economy, the market index dropped continuously in 2008, causing market capitalisation to decrease by over 50% compared to the previous year, to 18% of GDP. When the domestic and global economy began to recover slightly from the second quarter of 2009, the market index began to increase again along with the number of companies listed on the market, which increased rapidly, and the market capitalisation by the end of 2009 reached 37.71% of GDP. Moreover, the last decade is regarded as the most remarkable time for the growth of Vietnam stock market. According to the State Securities Commission of Vietnam, the market capitalisation by June 2020 reached 5,500 trillion VND, accounting for over 104% of GDP in 2019. Additionally, by the second half of 2017, the derivatives market was officially launched, making the Vietnamese stock exchange market fully functional and leading it to become a crucial capital attraction and distribution channel for investors.

2.5.2. Regulation framework

Decree No. 14, issued by the government in 2007, clearly outlined the administrative procedure and financial requirements for a company to be listed. The details are below.

a) The company must be a joint-stock company with chartered capital of 80 billion VND or more at the time of registration for listing according to the value inscribed in the accounting books.

b) The company must continue to have generated profit in the last two years prior to the listing registration date, and there must be no accumulated losses up to the year of listing registration.

c) There must be no overdue debts not provisioned as prescribed by law; all debts of the company must be publicised to members of the Board of Directors, Board of Controllers, Director or General Director, Deputy Director or Deputy General Director, Chief Accountant, major shareholders, and related persons.

d) At least 20% of the voting shares of the company must be held by at least 100 shareholders.

e) Shareholders who are members of the Board of Directors, Board of Supervisors, Director or General Director, Deputy Director or Deputy General Director, and Chief Accountant of the company must commit to holding 100% of his/her own shares within six months of the listing date and 50% of these shares during the next six months, excluding the number of state-owned shares held by the individuals above as representatives of the state.

f) The company must have a valid dossier for stock listing registration according to regulations.

(Robinson, 2012)

The administrative requirements for a company dossier for listing registration are the following:

a) A registration form for stock listing.

b) A decision from the General Board of Shareholders approving the stock listing.

c) A register book of shareholders of the listing organisation made within one month of the stock listing registration date.

d) Prospectus as prescribed in Article 15 of the Securities Law.

e) Commitments of shareholders who are members of the Board of Directors, Board of Supervisors, Director or General Director, Deputy Director or Deputy General Director, and Chief Accountant to hold 100% of the shares that they own within six months of the listing date and 50% of these stocks for the next six months.

f) Listing consultancy contract (if any).

g) The certificate of the Securities Depository Centre that the stocks of the company have been registered for centralised custody.

After receiving the application, within 30 days of receiving and validating the dossier, the Stock Exchange or the Securities Trading Centre must give the results to approve or refuse the registration for listing. In case of refusal to be listed, the Stock Exchange or the Securities Trading Centre must provide written feedback and clearly state the reasons.

2.5.3. Market overview and capitalisation

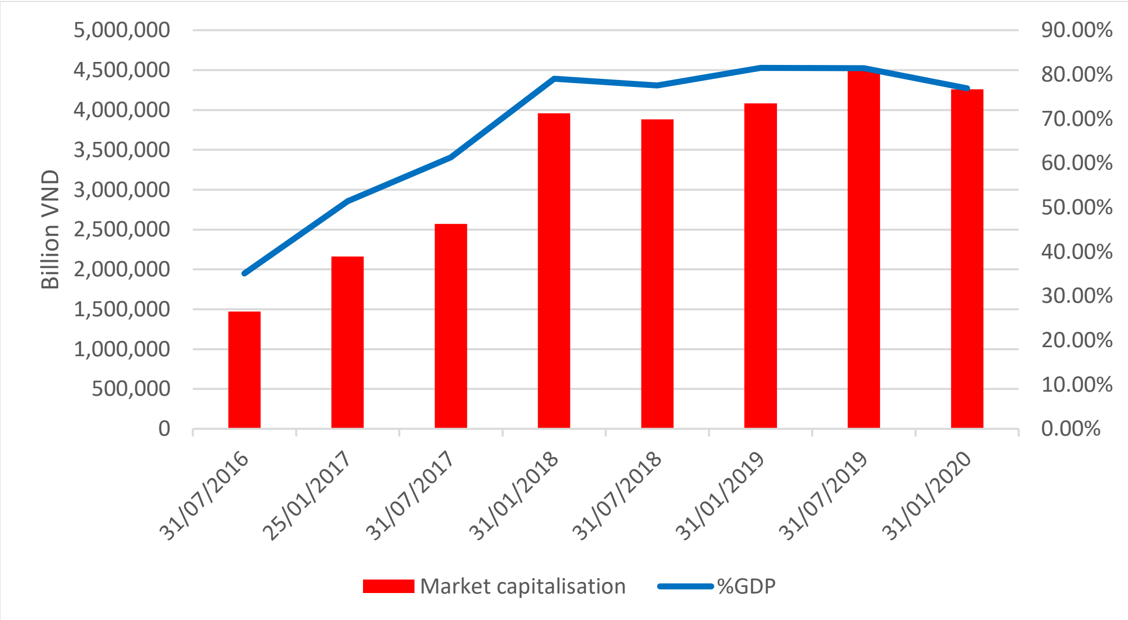
By the end of 2019, the VN-index closed at 960.99, with an average P/E of 15.7 times, the lowest in the last three years.

At this P/E in 2017, the market created positive momentum for the stock market in late 2017 and early 2018 for quick development. Compared with regional countries, such as Indonesia at 20 times, Thailand and Malaysia at 18 times, and the Philippines at 17 times, the P/E of Vietnam's stock market is very attractive.

The capitalisation of the stock market as of 6 Dec. 2019 reached 4,383 trillion VND, up 10.7% compared to the end of 2018 (equivalent to 79.2% of GDP). Currently, there are

748 stocks and fund certificates listed on two Stock Exchange Markets and 826 registered stocks traded on Upcom (an unlisted market), with the total value of listing and trading registrations reaching nearly 1,385 billion VND, up 14.8% compared to 2018.

In 2019, the total capital raised on the stock market is estimated at 302.6 trillion VND, up 37.3% compared to the same period last year. In 2019 in particular, huge successful premium stocks offering deals such as Techcomnbank (0.9 billion USD), Vinhomes (1.35 billion USD), and VinGroup (1 billion USD) also attracted the participation of many foreign investors, helping maintain foreign capital inflows to invest in the Vietnamese market. These factors helped the 2019 stock market continue to be an attractive destination for foreign investors. As of 6 Dec. 2019, the net purchases of foreign investors of stocks was 7,983 billion VND and of bonds was 13,034 billion VND.



Source: State Securities Commission Data (n.d.)

Figure 2.10: Market capitalisation of the Vietnamese stock market (% GDP)

2.5.4. Number of listed firms

In 2005, the HNX officially launched and received its first listings, with nine companies. This was a milestone for Vietnam's stock exchange market, and after this point, the number of listed firms skyrocketed, with 152 successful initial public offerings (IPOs) in

2006, increasing the number of total listed firms to 193 (an increase of 371%). The following years witnessed significant growth, at 35–40% every year, until 2010, despite of the global financial crisis in 2008 and 2009. An increase in the inflation rate in 2011 was the main factor causing a negative impact on the stock market, causing the value of the two main indices and stocks to plummet. The largest increase of the consumer price index (CPI) was in April 2011, with an increase of 3.32%, leading the entire year's CPI to increase by 18.58%. Cash flow into the stock market had already been tightened due to Circular No. 13, which was issued in 2010 by the Ministry of Finance, and was then even tighter with the rapid increase in inflation, as a result of which the loan interest rate for 2011 reached 22–25%. All these macroeconomic factors made 2011 the worst period for Vietnam stock exchange market and halted the rapid growth rate. However, Circular No. 226 on financial safety supervision for securities companies and fund management companies was issued by the Ministry of Finance and took effect from 1 Apr. 2011. Accordingly, any cases that did not meet the financial safety criteria (calculated based on the proportion of available capital) would be put into control or even special control. Thanks to these actions, the number of listed firms remained stable, and gradual growth rate is at 1–3% per year.

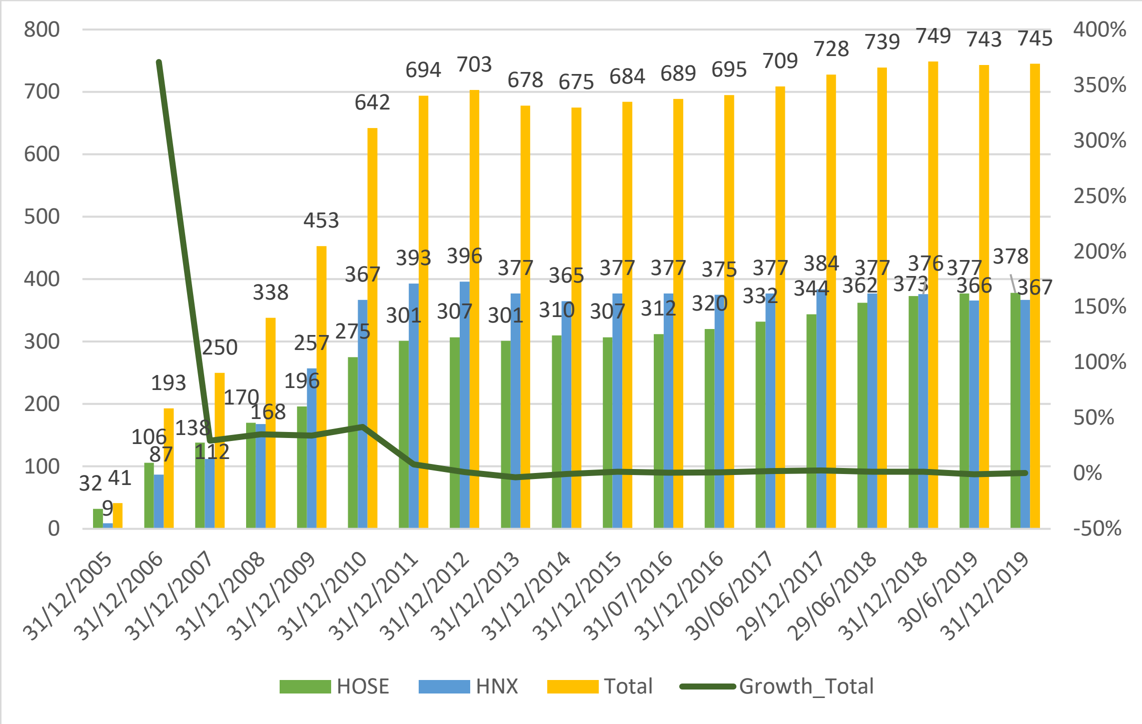


Figure 2.11: Number of listed firms

2.5.5. The current situation of the stock market

The instability of the global economy and of Vietnam's economy in recent years are considered to be multidimensional impact factors on the underlying stock market and to have resulted in complicated movements in the market in 2019. In the first six months, although there are positive growing signals, in general, the market only recovered slightly when the VN-Index stopped at 949.94 on 30 June 2019, up 6.4% compared to the end of 2018. However, in the last six months of 2019, market development changed remarkably, with the VN-Index sometimes exceeding 1,000 and peaking at 1024.91 on 6 November 2019. By early December, although the market was tending to decrease compared to the previous months, it still achieved a higher growth rate than during the first six months. At the close of the session on the 6 December 2019, the VN-Index reached 963.56, an increase of 8% compared to the end of 2018. Thus, although the VN-Index displays complicated movements, Vietnam's stock market still recovered relatively, compared to the end of 2018. The capitalisation of the stock market as of 6 December 2019 reached

4,383 trillion VND, up 10.7% compared to the end of 2018 (equivalent to 79.2% of GDP). Currently, there are 745 shares listed on two stock exchanges and 826 registered stocks traded on Upcom, with the total value of listing and trading registrations reaching nearly 1,385 billion VND, up 14.8% compared to 2018. This shows that the stock market has gradually become an effective channel for raising capital for businesses and the economy.

In 2019, the Vietnam National Assembly officially approved the amended Securities Law 2019, which specifies the functions and duties of the two stock exchanges, the Hanoi Stock Exchange (HNX) and the Ho Chi Minh City Stock Exchange (HSX). The amended Securities Law 2019 will take effect from 1 Jan. 2021 and includes many new points, notably the following:

a) Another stock exchange will be established.

b) More prohibited acts will be added.

c) Shares and bonds must be published when the offering ends.

d) Securities offerings will be closely connected with the Enterprise Law.

e) The conditions for selling shares of the company will be strictly regulated.

f) More shares will be sold only if the company is profitable.

g) The Vietnam Securities Depository and Clearing Corporation will be established.

2.6. Conclusion

In a recent national project of “Restructuring the securities market and insurance market till 2020 and orientation to 2025”, issued by the prime minister, together with Decision No. 242, the government has set several targets for the stock market: (1) Stock market size is to reach 100% of GDP and the bond market size 47% of GDP and (2) the number of listed companies by 2020 is to increase by 20% compared to 2017. These goals set for the stock market are likely to be achieved due to the forecast of some positive impacts on the market, which are considered to be driving forces for the development of the market in 2020, specifically the following:

First, regarding the international stock exchange markets, when the Covid-19 epidemic broke out around the world and the World Health Organisation announced the pandemic, the global stock market fell rapidly and strongly. In just a week from March 9 to March 16 of 2020, the US stock market experienced the strongest decline since 1987 and had to activate the “circuit breaker” mechanism for times (Bui, 2020). On March 12 of 2020, there were 10 other countries that activated the mechanism of suspending stock market transactions. In particular, the Philippines’ on March 17 of 2020 decided to suspend the stock market to deal with the epidemic. In April of 2020, the world stock market was back to grow since the Covid-19 had been somewhat controlled. The uptrend continued in May and June 2020 as many countries began to loosen their social distance rules to re-start the post-epidemic economy and put in place measures to stimulate the economy (Bui, 2020). As a result, the better macroeconomic indicators as well as the expectation of a potential vaccine to deal with Covid-19 also helped stock markets in many countries flourish. As of June 22 of 2020, the US stock market increased by 2.5%, the UK increased by 2.8%, France increased by 5.4%, Japan increased by 2.5%, and South Korea increased by 4.8%, and China increased by 4%, Thailand rose 0.69%, Philippines increased 8.7% compared to the end of last month (Bui, 2020). Similar to the situation of the global stock market, the Covid-19 pandemic also had a strong impact on Vietnamese stock market. In March of 2020, when the pandemic broke out in Vietnam and around the world, Vietnamese stock market continuously witnessed sharp decline sessions (especially sessions on March 9, March 11, and March 12 of 2020 experienced the decreases of 6.28%, 3.12% and 5.19%, respectively). However, the market liquidity continuously remained at a high level, about 260 million USD per session on average.

In addition, the impact of loosening monetary policies from major countries and economies in 2019 combined with positive forecasts for the world economic growth will make capital flows in 2020 likely to follow a trend of shifting from the bank credit channel – in which there is low interest – to other investment channels such as securities and valuable assets including gold and real estate. In that context, stocks are considered to be a potential investment channel in traditional investment channels due to loosening monetary policy in most countries, resulting in low capital costs, increasing the risk tolerance of investors when considering asset distribution strategies. Thus, the trend of recovering growth of the world economy and the trend of international capital flows is forecasted to be a factor to promote the global stock market in general, including that of Vietnam. The most attractive country in Southeast Asia, Vietnam continues to be considered by international organisations to be a promising destination for investment and is forecasted to achieve economic growth in 2020 from 6.5–7%.

Second, the domestic economic environment has been creating favourable conditions for the stock market to develop. In 2020, based on the great success in 2019, the Vietnamese government expects the GDP growth target to be about 6.8%, inflation to be below 4%, total import-export turnover to increase by about 7%, and total development investment capital to reach about 33–34% of GDP. It can be said that maintaining a high growth rate, ensuring macroeconomic balances, increasing competitiveness of the economy[1] will be the driving forces to support the stock market in 2020. Besides, for the first time in 14

[1] Vietnam's national competitiveness has been assessed by the World Economic Forum and is said to show remarkable improvement on all three key aspects, namely, political institutions, national infrastructure, and labour skills, ranking 67 out of 141 world countries and territories, up 10 places compared to 2018.

years, Vietnam's monetary policy, which was adjusted in a relaxed manner by reducing key interest rates in the last few months of 2019, has also been causing the flows of credit capital to shift to other investment channels, including securities. This is also considered to be one of the positive factors for the stock market in the coming period.

Third, in order to accomplish the goals that the government has set for the stock market as well as to support the market as a whole, the securities industry has enumerated specific tasks and solutions for market development, focusing on implementing the following: (i) Develop a system of legal documents regulating the Securities Law 2019 to improve the legal framework and improve management and supervision capacity to ensure effective, safe, and transparent market operation. (ii) Increase the supply of securities products and improve their quality by promoting equitisation and divestment from SOEs under the list approved by the prime minister; diversify bond products to meet the market needs according to appropriate roadmaps; restructure the portfolio of government bonds through mergers and acquisitions; encourage businesses to get listed and publicly issue bonds to the market; issue green bonds; and research and develop derivative securities products such as futures contracts based on new index sets, option contracts, and futures contracts on individual stocks. (iii) Develop the competence of the securities market intermediaries system by promoting the restructure of securities companies and fund management companies, strengthen risk monitoring, assess securities companies, fund management on the basis of perfecting the risk classification system, and closely supervise the compliance with legal regulations of these organisations. (iv) Restructure market infrastructure organisations, including the stock exchanges and the Vietnam Securities Depository, to comply with the provisions of the Securities Law 2019 and meet the market development needs. (v) Complete and implement new information technology systems, and create a technological platform for safe, smooth, and secure market operation and a basis for developing new products and services according to international standards. (vi) Issue criteria and standards for professional investors, restructure products and markets according to the group of investors, encourage foreign investment in the market by perfecting the legal framework of foreign ownership in enterprises in the direction of expanding foreign ownership in the state sector without holding in accordance with the law and in accordance with international commitments. (vii) Actively deploy solutions to upgrade Vietnam's stock market from marginal class to emerging class to attract stable foreign capital flows to the market.

The above solutions of the securities industry are intended to be important motivations and the foundation for the stock market to develop sustainably in 2020 and subsequent years. As a result of the economic and political renewal process, Vietnam’s economy began to grow strongly and to occupy a major position in the Southeast Asian market. After the milestone in 1986, Vietnam witnessed high growth rates in GDP and is one of the developing Asian countries that has the highest economic growth rate (IMF, 2010). Additionally, it is also one of the biggest recipients of FDI, which averaged more than 7% of Vietnam’s GDP during 2005 to 2013 (World Bank, 2011, 2014). With respect to the equitisation process, it resulted in a number of privatised firms, at a somewhat modest level. State ownership continues to be a popular ownership structure in Vietnam (World Bank, 2011).

CHAPTER 3

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.0. Introduction

Modigliani and Miller (1958) is regarded as the first study conducted in the field of capital structure, and its initial conclusion is that there is no impact of financial leverage on firm value. Nevertheless, the Modigliani and Miller (M&M) theory required several restrictive assumptions of a perfect capital market that were later criticised by scholars. Alternatively, the imperfect market theory, the agency theory of capital structure, the trade-off theory of debt, and the pecking-order theory have been suggested to have better practical application in terms of capital structure recommendations. In general, the trade-off theory proposed by Miller and Modigliani (1963) and Myers (1984) simply concluded that firms may decide to trade off the cost of debt financing for the benefit gained from it (tax shields help decrease income via interest payment) to maximise firm value (Miller and Modigliani, 1963). Meanwhile, the costs of debt increase the financial risk via direct and indirect bankruptcy costs (Kim, 1978; Kraus and Litzenberger, 1973).

Another capital structure theory articulated by Myers and Majluf (1984) and Ross (1977), the pecking-order theory clearly indicates the hierarchy of capital raised by using internal financing first, followed by debt, and finally equity issuance as the last option. Agency cost theory, developed by Jensen and Meckling (1976), Jensen (1986), and Hart and Moore (1994), stated that there are conflicts among the stakeholders of a business (managers, shareholders, and debt holders) and that the optimal capital structure is the one that can minimise such total agency cost.

The aim of this chapter is to provide a detailed framework of capital structure theories and concepts. In addition, the chapter carries out an in-depth review of related studies on capital structure and business growth to clarify the research gap proposed in Chapter 1.

In specific, Section 3.1 provides detailed discussion on the theories of capital and attempts to conceptualise capital structure and firm growth. Section 3.2 is dedicated to review the capital structure theories. After that, Section 3.3 critically reviews the empirical research on capital structure and firm growth to develop research hypotheses. Based on the detailed capital structure theories' discussion and related studies' review, this thesis will conduct three different empirical studies corresponding to twelve hypotheses to be tested for the whole research outcome of the thesis.

3.1. Capital theories and the conceptualisation of capital structure and firm growth

3.1.1. The concept of capital

Piketty (2014) attempted to provide a clear introduction to the concept of capital, defining the term based on three primary perspectives, discussed as follows.

First, the conceptualisation of capital is about personal wealth, defined as the total amount of physical assets which can be used in exchange for other products or cash. Based on this definition, capital refers to all kinds of property, including real-estate possessions; professional property such as business infrastructure, plants, or equipment; and intangible property such as a company's trademark or patents (Piketty, 2014).

Second, capital can be understood to refer to assets and the market, which consist of all kinds of wealth owned by individuals or groups of individuals and that can be brought to the market for transferring or transacting between traders on a permanent basis. In reality, capital can be differentiated into private capital, which is owned by private individuals, and public capital, which is owned by the government or other governmental authorities. There are also several special types of collective real-estate assets which are owned by religious group, such as churches or temples. According to international morality and regulations, the restriction of what a private individual can or cannot own has changed overtime and throughout the world, for example, extreme case of slavery, as well as other objects of ownership such as the sea, mountains, monuments, or intellectual property. Indeed, there are certainly people who desire to own these types of capital and try their best to justify their ambition based on the grounds of efficiency rather than desire; denying that such ownership would not correspond with the common social interests (Piketty, 2014). Capital simply reflects the state of development and prevailing social relations of each society.

The final conceptualisation of capital concerns accumulation, in which capital is understood as a stock. This aspect of capital refers to the total wealth owned by an individual at a specific point of time and which has been accumulated from all previous years. Other scholars have also attempted to define capital in order to be applied only to the wealth that resulted directly from the product manufacturing process. For example, gold can be regarded as an element of wealth, yet not as a kind of capital since it is simply a reference of value. Thus, capital on the perspective of Piketty (2014) should always have a double role, as both a reference of value and as an element for production.

In the literature, scholars provide different meanings of capital. Corporate capital, the main focus of this study, can be regarded as the assets that a business possesses that can be seen as profit gained by relevant stakeholders who own the stocks in the cash flows of the business (Kane, 1995). As mentioned by Kane (1995), capital plays a role as the aggregate of accounts that absorbs the increase or decrease in the companies' income. The main characteristic of the definition proposed by Kane (1995) is that the elements of corporate capital are conceptually different for different stakeholders.

According to Virnimmen *et al.* (2014), firm value is considered to be the sum of the value of net debt and equity. This raises an important question for researchers and the financial management world: Does an optimal capital structure exist? Which means of finding the correct combination of debt financing and equity issuance can allow the business manager to minimise the weighted average cost of capital and thereby maximise the firm value? In support of the optimal capital structure concept, Kane (1995) also considered the concept of capital to be the source of finance that is funded not only by the companies' current shareholders but also by potential future relevant stakeholders, in which case capital can be divided into equity capital and debtholder capital. Kane (1995) mentioned equity capital as the total value of the stocks that currently accrue to a specific firm's owners, or, in other words, the difference between the total value of the firm's assets and the total value of its non-ownership liabilities.

As defined by Virnimmen *et al.* (2014) and Agarwal *et al.* (2015), the basic differences between debt financing and equity issuance should be made crystal clear. In terms of debt financing, the investors required investment returns via interest payment without dependence on firm performance, which means that apart from the extreme cases such as being defaulted or announcing bankruptcy, whether the business makes a profit or not, it is obligated by the defined contracts to pay interest, which must be agreed to be fixed on the issuance. Furthermore, debt repayment is prioritised in terms of the company receiving liquidation over equity holders in the same way that the sales of assets are first and primarily paid to creditors; only after the full debt borrowings have been paid off is the remainder processed to shareholders.

Meanwhile, equity holders benefit from the profitability of the firm in case the company operates well and realises a good profit. In addition, the business managers are flexible for dividends payment, as there is no repayment commitment when the company accrues loss or in the event of a financial crisis. The only exit strategy for shareholders is to sell their own shares to new investors. Especially in case of bankruptcy or default and business liquidation, equity holders only receive their repayment after 100% of the borrowings have been paid to creditors. Obviously, for this reason, in the extreme case that sales of assets are not enough to fully repay the creditors, shareholders are left with zero cash, as the firm is in insolvent status.

3.1.2. The concept of capital structure

Capital structure is simply understood as the firm's mix of debt and equity (Miglo, 2016). Similarly, Swanson *et al.* (2003) defined capital structure as the percentage of debt as financial leverage in the total capital increase of a business to fund its assets and operation. This proportion increases differently regarding business tradition, structure, culture, or management style. The goal of a company's capital structure decision is to determine the financial leverage or capital structure that maximises the value of the company by minimising the weighted average cost of capital (Agarwal *et al.*, 2015). Theoretically, there is no optimal proportion of financial leverage in the capital structure, in which such proportion depends largely on the assumptions made by researchers who proposed the theories based on their specific study context. According to Korajczyk and Levy (2003), the choice of capital financing method will change significantly over time with different companies. For instance, in the case of companies that have access to the public financial market, equity issuance can change and increase capital pro-cyclically, while debt financing can change and be issued counter-cyclically. Additionally, as mentioned by Korajczyk *et al.* (1990), when the stock price witnesses an abnormal increase, companies are more likely to issue more shares to the market. From these points, it can be concluded that either macroeconomic status or firm-specific issues can significantly affect the financing options of public listed firms and can have further differences in terms of the degree of financial market accessibility.

Although capital structure choice and its determinants have been widely discussed in the academic literature by scholars, the practical implications of this issue have not attracted much attention from policy makers or business managers. Traditionally, financing methods are limited, especially in developing market economies due to the lack of accessibility of the financial market or the lack of a fully mature financial market, compared to investment project choices. However, in the last decade, this has been taken into account more seriously in terms of practical finance by business managers. For example, in 2009, former Google CFO Patrick Pichette mentioned the importance of low leverage in capital structure as able to bring flexibility in business strategy and optimise the balance sheet (Miglo, 2016). The most famous fast-food chain, McDonalds', meanwhile, has no problem raising more debt in its capital structure. Unlike Google, McDonalds' has special business characteristics, with a high proportion of current assets and a high speed of inventory liquidation, which made financial leverage more affordable and useful. Additionally, McDonalds' business model is largely based on franchising, which means that most company investments arise depending on the company's franchisees. This also makes the company less likely to be able to issue equity for capital financing, and thus, financial leverage is regarded as the most logical and suitable choice. Debt financing reliance obviously results in the issue of additional financial obligation, which is well known as "debt and discipline" theory (Miglo, 2016).

In the last decade, the attention of academic researchers has been drawn to capital structure, with start-ups and SMEs as the main objects. SMEs, in particular start-ups, are believed to have financing options around founders' friends, relatives, or family; the next feasible options include venture capitalists. Banks and other related financial institutions do not significantly affect such companies, as their requirements for lending are high. Several recent papers have indicated that SMEs which acquired external debt in capital structure tend to experience better financial performance than others. For instance, Robb and Robinson (2014) suggested that apart from the traditional sources of funds from friends or relatives, SMEs and start-up businesses tend to use several types of outside debt, such as credit cards, short-term bank borrowings, etc. as the crucial sources of financing for firms' operation.

In a more recent study, Graham *et al.* (2015) conducted an extremely wide range of research with the objective of producing a theoretical framework for understanding why leverage has changed significantly in US firms in the twentieth century, with the sample of 91 firms listed in the CRSP, NYSE, and Amex. The authors indicated that they found remarkably different outcomes for two specific groups of companies: regulated and unregulated sectors. The authors also pointed out some similarities between unregulated firms of any size and showed that a traditional empirical financial model of capital structure based mainly on the specific characteristics of the firms has proven that the internal characteristics of firms are not likely to affect the financing choice. Indeed, the change in macroeconomic environments have had a larger impact on the capital structure choice and financial policy of the listed companies in the last decade.

3.1.3. Concept of firm growth

In the literature on firm growth, entrepreneurial companies are the primary focus for assessing the elements of growth and the factors affecting business growth. As indicated by Mehrjerdi and Talebi (2018) the principal differentiating element between entrepreneurial firms is the way in which they take advantage of innovation to grow business. The authors employ innovation as the main growth indicator with focus on the start-up businesses. According to Carland *et al.* (1984), the innovation process of a business is significantly driven by the behavioural and sociological features of the firm. Therefore, management knowledge and skills should be taken into account to minimise market uncertainties and keep the company operating well (Langlois, 2003). Indeed, the operation inclination of entrepreneurial firms distinguishes them completely from other mature companies. In fact, they have tendency to take drastic measures and make full use of their competitive advantage to best exploit any market penetration or product innovation opportunity available (Wiklund and Shepherd, 2005). As indicated by Correa *et al.* (2008), the concept of firm growth, especially entrepreneurial growth, is complex and remains difficult to define due to the various aspects that contribute to growth. Many researchers have contributed to research on firm growth and its indicators (Talebi *et al.*, 2016). The fundamental concept originated in classical economic theory, in which the basic production function of an economy in general and a business in particular is how it makes best use of its available resources to deliver its products and services to the market (Foss, 1998). This theory of production function simply pays attention to the product's price and other economic outputs, while ignoring other factors. In addition, classic economists argued that any firm tends to grow and reach a specific size, which can be referred to as optimal firm value. Based on this argument, firm growth is simply a process by which a specific goal is accomplished, and the predicted optimal size reached. From this point, as mentioned in the theory, the firm is at the efficient state and there is no further demand for growth, which is believed to be reasonable (Wiklund and Shepherd, 2005; Foss, 1998).

This fundamental theory of production function was criticised by economists and researchers, who argued that companies can be free to adjust their product line or change the target market (Penrose, 1959). Based on this argument, the firm theory discussed above is believed to be unrealistic in the market. Instead, the theory of firm growth proposed by Penrose (1959) has been considered to be the most controversial idea in the economics literature, strongly focusing on the role of human and related human capital in terms of raising and allocating a firm's resource for future growth. As such, the author proposed that firm growth is the result of making full use of the firm's specific economic advantages, which is believed to be the origin of growth and not related to the competitive edge gained from its size (Penrose, 1959). However, the idea proposed by Penrose (1959) remains coherent in the context of the classic firm theory of an optimal firm size value at which companies have no further demand for growth, which is more likely considering the micro strategic management field. During the 1970s, the attention of academic scholars shifted to SMEs. As stated by Davidsson (1989) and Wiklund (1998), the definition of firm growth and its measurement indicators have been carefully reviewed and more behavioural and entrepreneurial elements have been added to best match the research objects and deliver most precise recommendation. Because of this change in research stream, since 1980, the subject of growth attracted the participation of other field researchers in entrepreneurship and strategic management (Delmar *et al.*, 2003; Ostgaard and Birley, 1995; Siegel *et al.*, 1993). Scholars began to examine the role of human capital in relation to entrepreneurial firm growth. A wide range of researchers such as Boone *et al.* (1996) and Rotter (1966) indicated that the specific characteristics of the start-up founders – for instance, their attitudes, intention, and other psychological drivers – are the main forces driving the rapid growth of entrepreneurial firms. In addition to human capital, with the main attention placed on founders, different production functions of various types of firm growth have also been taken into consideration to clearly identify the speed of growth and the process of growth for each type. Types of growth include internal growth, in which the progress that involves the introduction and processing of the product occurs inside the company and immediately reflects on the sales revenue, and external growth, which refers to the merger and acquisition process. Indeed, the internal growth simply results in sales boosted. Meanwhile, external growth is made via merger and acquisition, with other firms simultaneously increasing not only sales revenue but also market share and employed labour workforce (McKelvie and Wiklund, 2010).

In the literature, most business growth studies have been based on the work of Penrose (1959), who proposed the theory of firm growth. Economists, however, have added many potential factors to explain business growth and have used regression models to examine the impact of these factors on the growth of businesses. Many factors affect business growth. These include internal factors within the enterprise, such as the quality of products/services, management ability, enterprise scale, and technological level, and external factors, such as legal frameworks, policies, and markets (Ta *et al.*, 2006). In terms of internal factors, capital is always mentioned as the most important. In the production function theory of macroeconomics, capital is considered to be one of the factors contributing inputs directly to national economic growth. In the study by Ngo *et al.* (2014), capital contributed around 33% to economic growth in Vietnam in 2014.

From the perspective of the macroeconomy, SMEs are crucial job-creation units (Carrer and Klomp, 1996), especially when it comes to a developing economy such as Vietnam, in which SMEs account for the majority of registered companies. Therefore, supporting and gaining insight into the issue of firm growth is essential for policy planners and makers. In the literature, firm growth and related topics have been researched and discussed widely in various disciplines, such as economics, strategy, psychology, network theory, and business innovation (Zhou and de Wit, 2009). However, the knowledge and empirical results remain limited (Davidsson & Wiklund, 2000; Wiklund *et al.*, 2007), as the current literature is highly fragmented, with different approaches being used to define, measure, and determine firm growth. For example, regarding the psychological approach, scholars focused on the characteristics and behaviour of entrepreneurs and attempted to justify firm growth based on this determinant (Begley and Boyd, 1987). Several studies focusing on the strategy approach have concentrated on the relationship between the local environment, company strategies, and the company's growth potential (McDougall *et al.*, 1992); these types of research tend to answer questions regarding the sustainable development of business. Meanwhile, macroeconomics studies have focused on the correlation between firm growth and firm size (Audretsch *et al*., 2004).

Based on these reviews, there are various points of view regarding the determinants of firm growth; however, none has been able to produce a holistic conclusion. According to Nelson and Winter (1982), firm growth can simply be understood as the business performance outcomes resulting from the combination of resources specific to the company level, of capacity, and of routines. Coad (2009) also stated that opportunities for business growth are significantly related to the business's own organisational production activities, and path-dependency was mentioned as a crucial background of business growth. Whether a business can grow in a specific period of time is also uncertain and dependent on external factors such as environmental conditions, global economic crisis, global pandemic, rivalry, or market dynamics. In the case of small firms, business growth is also largely affected by the personal vision and ambition of their entrepreneurs or founders. For example, Mosselman *et al*. (2002) believes that not every entrepreneur aims for their business to grow. The authors conducted a survey and concluded that only 16% of small-business owners in Netherlands desired their companies to grow bigger, while the others had various other reasons to run their business, such as for extra income or simply to live comfortably. Although most studies have attempted to explain and link the capital structure determinants on the basis of different contexts or measures (Baum *et al.*, 2001; Covin and Slevin, 1997; Lumpkin and Dess, 1996), their explanatory capacity is low due to the relatively limited number of variables (Davidsson, *et al.*, 2006). Thus, Zhou and de Wit (2009) suggested that the best way to make a holistic and concrete indication for determinants of capital structure is to classify them into three measures: individual, organisational, and environmental aspects (Baum *et al.*, 2001).

Mehrjerdi and Talebi (2018) said that in order to provide the best definition of business growth, the overall goals of the firm should be taken into consideration; in other words, the authors believe that each business has its own means of defining growth. These different definitions could also influence the choice of business growth assessment method. This conclusion is consistent with Lumpkin and Dess (1996) in terms of measuring firm growth based on predetermined methods but they might lead to conflict with each other. Dess and Robinson (1984) and Covin and Slevin (1989) suggested measurements of growth using several financial metrics, such as the level of sales revenue, changes in sales between financial years, changes in ROE, changes in operating profit and net profit, and changes in returns on shareholder investment. Nevertheless, Zahra (1991) noted that an issue with these measures is that firms sometimes sacrify long-term growth for short-term growth, which might misdirect the analysis and recommendation of researchers; in addition, taking performance indicators as a growth measurement can be challenging and lead to certain mistakes in econometric models. Entrepreneurial firm growth is considered under operational perspectives by the way that the business makes specific decision for firm growth process. Thus, in order to measure this, researchers tend to assess the amount gained from either financial or non-financial aspects of business as the results of those management decisions.

The measurement of business growth has been discussed and adapted by researchers in various ways. Beck *et al.* (2005) used a unique firm-level survey database covering 54 countries to investigate the effect of financial, legal, and corruption problems on firm growth rates, measuring firm growth by the percentage change in firm sales over a period of time. This is consistent with the definition of Bei and Wijewardana (2012) and Huynh and Petrunia (2010), who described the growth of business as the expansion of total assets, sales, and operating profit. Based on the work of Gupta (1968) and Hampton (1993), two types of firm growth have been identified in the field of financial management, namely, internal growth and external growth. Both of these are believed to be directly influenced by the financial policies of the management.

Lang *et al.* (1996) provided a definition of firm growth focusing on three aspects of how the firm manages the resource input. The first aspect is about net investment, which is measured as capital expenditure in year t with depreciation deducted. The calculation takes net investment from year t and divides it by the book value of fixed assets of the previous year. The second approach is to measure growth by the changes in the percentage of capital expenditure of the company. The final approach concerns the changes in percentage in terms of number of employees between a specific year and those of the next year. Although such measurements were proposed in the mid-1900s, the literature remains contentious regarding business growth and development (Wiklund *et al*., 2007), especially in the case of small firms. Most studies have focused mainly on the factors leading to business growth with the aim of providing exploratory indication for growth, especially for entrepreneurs. Those mentioned factors include the size or the resources of company (Connor, 1991; Alvarez and Busenitz, 2001), its strategic orientation (Lumpkin and Dess, 1996), or the characteristics of the environment (Barney, 1991; Davidsson *et al.*, 2002). Additionally, there are three primary research streams regarding the literature of firm growth (McKelvie and Wiklund, 2010). First, firm growth is believed to be a business performance outcome. As mentioned previously, this research stream focuses on the above-mentioned factors that lead to firm growth, which are treated as independent variables in econometric models, and growth is dependent on those factors (Barron, 1999; Batt, 2002; Baum *et al.*, 2001). Another research stream considers the results and consequences of growth. In this case, growth is the main focus and is believed to be the factor that influences other variables such as business decision-making or expertise. Researchers believe that firm growth/shrink is the cause of other business activities (Ketchen *et al.*, 1993; Phelps *et al.*, 2007; Short *et al.*, 2008). The final research stream is simply about the firm growth process, which means the factors that lead to growth.

3.2. Theoretical framework of capital structure

3.2.1. Traditional capital structure theory

According to the traditional capital structure model mentioned in the literature, financial leverage and firm value are correlated. This means that the optimal level of financial leverage is reached when the weighted average cost of capital (WACC) is minimised (McMenamin, 2002). In this case, the firm value is measured based on the discounted value of cash flows at the rate of WACC (Kruschwitz and Loeffler, 2006). Figure 3.1 presents this idea, with K_e representing the cost of equity and K_d the cost of debt.

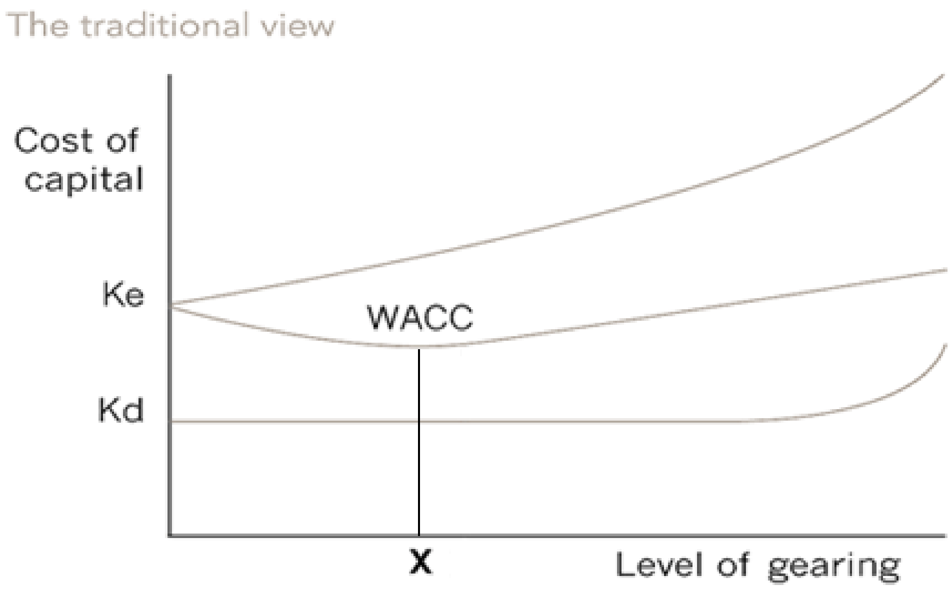


Figure 3.1: The traditional view of the weighted cost of capital

As shown in Figure 3.1, the optimal level of debt in capital structure is reached at the point where WACC is lowest, which means that the firm value is maximised (McMenamin, 2002).

According to Leland (1994) and Leland and Toft (1996), given certain assumptions, there is an optimal capital structure at which the firm value is maximised. They examined a firm's value by assuming that the present value of the business disruption costs and tax shield losses are influenced by the company's capital structure. Given this assumption, they found that the value gained from the tax shield of financial leverage is traded off by the loss from the present value of the business disruption expenses and lost tax shields.

Additionally, based on agency cost theory, Jensen and Meckling (1976) developed a special capital structure model that can help firms to maximise firm value . As defined by Ang *et al.* (2000), agency cost refers to the conflict between internal stakeholders and the joint ownership of external stakeholders, such as creditors and external equity owners. Jensen and Meckling (1976) also assumed the probability distribution of the cash flows of the company to depend significantly on the company's ownership structure due to the existence of agency costs of debt as well as agency costs of external equity. As such, the agency costs of debt will increase along with debt financing, and the same goes for external equity. Thus, the authors found that there is an optimal proportion of debt and equity that can minimise the agency costs and thereby maximise the firm's value and concluded that this optimal capital structure exists without assuming taxes and bankruptcy costs.

Ross (1977) is the first scholar to mention the effect of signalling on capital structure. In his research, Ross (1977) focused on the capital structure irrelevance theory proposed by Modigliani and Miller (1958) with the assumption of a perfect market, with all investors having enough information to expect a future cashflow stream, and used this to determine the firm's value. Ross argued that investors evaluate the "perceived" value of future cash flows stream instead. Hence, changes in business capital structure might alter the market perception as well. In other words, if the capital structure of the firm changes, risk class of the firm perceived by the market changes accordingly, although the actual risk class of the business remains unchanged. Indeed, the management of the company might have full information to predict the firm's expected future cash flows precisely. By contrast, the external investors may have misleading information as a result of receiving unambiguous signals via their changes in financial leverage. Based on this assumption, it is possible for the managers' choice to realise a higher level of debt in capital structure to be able to deliver an optimistic signal regarding the future value of the firm in the market.

3.2.2. Modigliani and Miller theory on capital structure

In the literature regarding capital structure research, Modigliani and Miller (1958) are considered as some of the pioneer researchers to attempt to theorise and model the concept of capital structure and propose recommendations for business financing options. Accordingly, the capital structure irrelevance theory was created based on the assumption of a perfect market, in which there is no income tax and distress cost and all investors share the same opportunities to access the information and are therefore equivalent in making investment decision. As such, the proportion of debt financing in the capital structure of a single business has no effect on the firm value. The authors argued that under the assumption of a perfect capital market, the company's total cost of capital and the market firm value are independent of financial leverage. This argument can be redefined as stating that the capital structure has no impact on the firm value and that it is not necessary to consider whether to raise finance using debt Among the assumptions of the theory, a tax-free market is considered to be the most crucial. Modigliani and Miller (1963) published another paper several years later, this time considering the effect of income taxes for their revised theory, which has several conditions. First, the capital market is perfect, which means that all investment and financial information is available to and accessible by all investors, transaction costs can be ignored, and there is no concept of irrational investment behaviours, as all investors expect the same future profits and same assessment of the business risk. Second, the sources of finance for companies are only shares and bonds. Third, debt financing is not considered to be risky, as the interest rate applied to the debt is considered risk-free and the costs of financial distress are not taken into account. Fourth, income taxation is unavailable, which means that tax shield benefits from debt are also unavailable. Fifth, the primary objective of the company's management team is to maximise stockholders' wealth via balancing the capital structure. Sixth, the authors divided the companies in the market into groups based on the level of operational risks, which means that companies in the same group have the same returns on investment. Finally, the feasibility of being approved for a loan and the requirement for lending from financial institutions in the market is the same for all agents (Modigliani and Miller, 1963).

Brealey and Myers (1992) examined the first argument of Modigliani and Miller's (1958) model to simplify of the ideas proposed in the theory of irrelevant capital structure, which is known as the principle of value additivity. This argument involves determining the real value of the companies, which should be decided by the total assets on one side of the balance sheet rather than by the proportion between debt and equity. Hence, based on the statement, if the companies have two cash flow streams A and B, each of which represents the flow of equity and debt (stocks and bonds respectively), then the sum of the present value of those two cash flow streams must be equivalent to the present value of the equity cashflow plus debt cashflow. Modigliani and Miller (1958) presented the equation as follows:

$$V_j = \left(S_j + D_j\right) = \frac{\bar{X}_j}{\rho_k} \tag{1}$$

or

$$\frac{\bar{X}_j}{\left(S_j + D_j\right)} = \frac{\bar{X}_j}{V_j} = \rho_k \tag{2}$$

where V_j is the firm market value for firm j, S_j is market value of stock equity, and D_j is the market value of debt for firm j. $\bar{X}_j$ represents the expected returns on company's asset of firm j, ρ_k is the expected rate of returns of any share within class k.

As can be seen from equation (2), Modigliani and Miller (1958) found that the average cost of capital of a specific company has no mathematical and economic relevance to the business' financial leverage. Therefore, the firm value is determined largely by the value of the total assets rather than by the combination of equity and liability. As discussed by Brealey and Myers (1992), the principle of value additivity suggested for the choice between preferred shares and ordinary shares or any related combinations. Indeed, Brealey and Myers (1992) stated that "if the total value of the stock 'cake' (preferred and ordinary stocks together) is fixed, the owners of the company (usually shareholders) do not care how the cake is cut".

Another argument of Modigliani and Miller (1958, p.268) states that "*the market value of any firm is independent of its capital structure and is given by capitalising its expected return at the rate* ρ_k *appropriate to its class*", plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρ_k and τ. This argument can be presented mathematically as follows:

$$i_j = \rho_k + \frac{D_j}{S_j}(\rho_k - \tau)$$

where i_j is the expected rate of returns on equity of company j, and τ is the interest rate. This argument demonstrates that any changes to debt financing in the business capital structure have no impact on the market value of the firm, as the savings from the cheaper cost of debt will be completely offset by the rise in the cost of issuing equity. From this point, Modigliani and Miller (1958) argued that in the case of a perfect market without the existence of taxes, neither the market value of the firm nor the cost of raising capital are influenced by capital structure. The authors have also provided an example along with the above assumption that if there are two similar companies differing only in their financing methods and firm values, one will be overvalued and the other undervalued. As such, the shareholders and investors will tend to sell the stocks of the overvalued firm and buy the stocks of the undervalued firm, and this process will continue as the market values of those firms grow closer to each other and then stop when the values are identical.

From the proposition above and the additional assumption that all investors are rational, Modigliani and Miller (1958) argued that the expected returns on equity are linearly correlated with the rise of financial leverage in capital structure. Moreover, the expected returns on equity are also compensated by the benefit of a lower debt finance cost of capital, which means that the WACC remains unaffected, as shown in Figure 3.2 (Alifani & Nugroho, 2013).

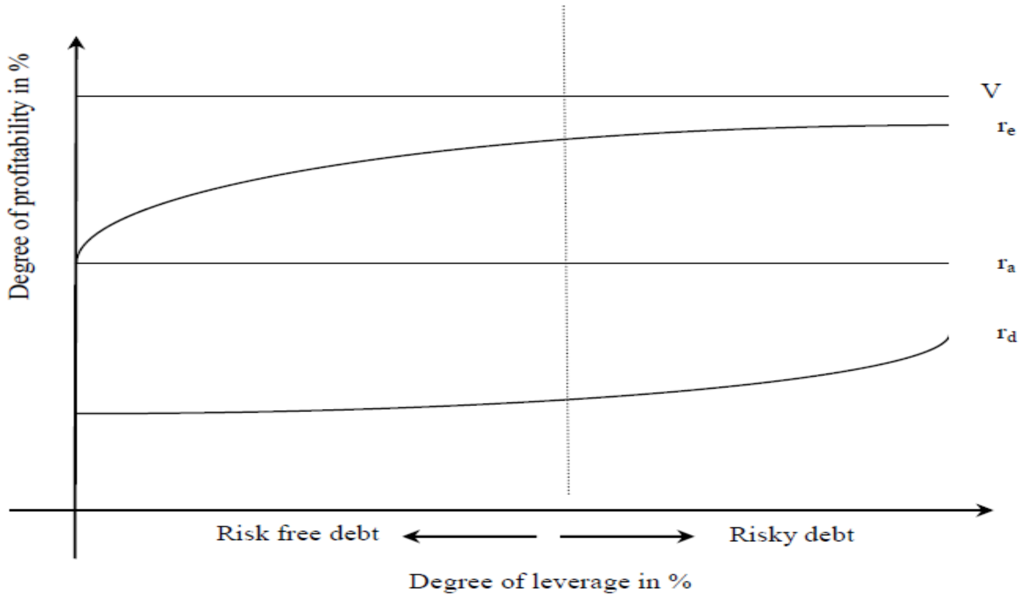


Figure 3.2: The Modigliani and Miller result

where V represents the company market value, r_e represents cost of equity (profit for shareholders in percentage), r_d represents the cost of debt (interest paid to creditors in percentage), r_a represents the total cost of capital.

3.2.3. The trade-off theory on capital structure

Modigliani and Miller (1963) included taxes in their model estimating the impact of financial leverage on firm value. The authors then indicated that the market value of the indebted firm is equivalent to that of non-corporate debt, plus the present value of the tax benefit saved from the tax shield of debt financing and minus the present value of other relevant costs which can result from future financial distress. Therefore, as interest payments bring the benefit of being deductible from income tax, firms are encouraged to use debt financing rather than equity issuance (Miller, 1977).

The trade-off theory strongly asserts that each company has specific characteristics for its own optimal capital structure, where the benefits and costs of debt financing are adjusted appropriately, and the firm tends to move its capital structure towards this structure over time. According to Frank and Goyal (2003), the trade-off theory concentrates on three aspects, including (i) the trade-off of taxes and bankruptcy, (ii) agency costs for conflicts between managers and stockholders, and (iii) stakeholders' co-investments. The first aspect, that is, taxes paid versus bankruptcy, attempts to compare the benefits generated from tax deductibility from debt financing to the higher level of risk and vulnerability of the company due to higher financial leverage. To make the best use of debt, the theory suggests that debt should only be issued to the extent that the benefit gained from the tax shield is equal to the forecasted bankruptcy cost. The second aspect of agency-cost theory indicates that debt issuance might help solve the problems of a firm's over-outflows of cash as the business is committed and obligated to pay interest payments. In terms of the third aspect, trade-off theory indicates that using stock options for business financing is considered to be the best way to encourage all relevant stakeholders to do their best for the survival of the firm.

Consistent with the study of Frank and Goyal (2003), Gurcharan (2010) mentioned the trade-off theory of capital structure in his paper and stated that the board of management of firms should make their own decision for the choice of capital financing as long as the benefits and costs resulting from each form of funding are well balanced based on the specific characteristics of the firms. Additionally, Gurcharan (2010) emphasised the first aspect of trade-off theory, as mentioned above, in that the advantages gained from debt financing (tax shield benefit) should be taken into consideration along with the costs of financial distress (bankruptcy costs and non-bankruptcy costs), which are, to some extent, an impediment to business. Hence, the empirical relevance of trade-off theory to capital structure is still questionable (Frank and Goyal, 2003). However, some researchers, such as Miller (1977) and Graham (2003), found that capital gained from tax shield benefits appears to be large and significant, while the bankruptcy costs seem to be smaller and minor, which means that they support debt financing where possible for each business.

Supporting the idea of Miller (1977), Myers (1984) concluded that along with an increase in financial borrowings, the cost of financial distress would rise as well (bankruptcy cost, agency cost, and so on). Myers (1984) thus argued that the increase of benefits from tax shields and the costs of financial distress will offset each other at a certain point, at which the firm value is maximised, or, in other words, the cost of capital minimised. Therefore, Myers (1984) proposed that the existence of financial distress costs implies a certain level of optimal capital structure for business, which occurs when tax benefits are completely traded off against the likelihood of incurring those financial distress costs.

Bradley *et al.* (1984) further considered, regarding the trade-off theory, how the financial leverage of a firm may vary from time to time and how a specific target debt ratio can also vary from firm to firm. Hence, there is a pitfall to this theory in the way that it usually fails to explain the indirect relationship between profitability and gearing level. Indeed, according to the theory, it is practically expected for profitable firms to have a higher level of debt in their capital structure. This is due to higher profits, which allow business to have more cash for debt service and more income to shield. However, Bradley *et al.* (1984) concluded that firms with higher profits tend to have fewer borrowings, while those with less profit tend to borrow more.

In the literature, Taggart (1977) and Jalilvand and Harris (1984) also indicated the idea of mean reversion of leverage, which significantly supports the trade-off theory. More recently, Miguel and Pindado (2001), and Fama and French (2002) reported mixed results, while Ozkan (2001), Bhaduri (2002), Loof (2004), and Flannery and Rangan (2006) observed that leverage adjusts partially to target leverage, thus supporting the prediction of the trade-off theory.

According to Titman *et al*. (2014), two factors can have a material impact on the role of capital structure in determining firm value. First, interest expense is tax deductible. This fact makes the use of debt financing less costly and lowers the firm's weighted average cost of capital. Second, debt makes it more likely that firms will experience financial distress costs. The contractual interest and principal payment that accompanies the use of debt financing increases the likelihood that the firm will go into bankruptcy some time in the future, which can lead to losses that reduce the cash flows of the firm. When firms make financing decisions, they must trade off these positive and negative factors. Firms with substantial amounts of taxable income that they can eliminate by taking on debt while facing relatively modest risks of incurring the costs of financial distress tend to choose relatively high debt ratios. Firms that are not generating a lot of taxable income and that would be subject to substantial costs of financial distress if they had financial difficulties, meanwhile, pursue relatively low debt ratios.

Regarding the arguments of trade-off theory, it remains debatable whether the use of debt financing brings advantages or disadvantages; scholars thus strongly recommended that business balance the two sides of effects in order to maintain an optimal structure of firm capital. For instance, Modigliani and Miller (1963) and Shyam-Sunder and Myers (1999) both discussed the benefits of tax shields from debt financing and the cost of financial distress over the optimal capital structure. Additionally, Jensen and Meckling (1976), Myers (1977), Stulz (1990), Hart and Moore (1995), and Morellec *et al.* (2012) discussed the agency-cost problems from the perspective of business managers by indicating that the debt ratio should be kept at the appropriate level to balance the benefits and costs to maximise firm performance. Fisher *et al.* (1989), Leary and Roberts (2005), Hennessy and Whited (2005), Flannery and Rangan (2006), Hennessy and Whited (2007), Strebulaev (2007), Huang and Ritter (2009), and Elsas and Florysiak (2015), by contrast, forwarded several recommendations towards an appropriate level of debt borrowings in capital structure to optimise the firm's benefit and thereby maximise its use of capital to enhance performance, which implied support to the trade-off theory. Specifically, the authors used different dynamic capital structure models to determine the speed of such adjustments, revealing that firms indeed converge towards their own debt targets.

According to another perspective, due to the significant arguments in the literature regarding the relevance of the static trade-off theory, researchers changed the orientation to dynamic versions of trade-off theory. Fisher *et al.* (1989) clearly confirmed that the cost of capital structure adjustment should be taken into consideration, as the benefits of recapitalisation might not outweigh the costs that arise from such action. Hence, they recommended that recapitalisation should only be taken if its benefits outweigh its costs. This research can produce multiple empirical predictions from the static case. For instance, if there are no capital adjustment costs, the trade-off theory suggests a positive relationship between firm performance and financial leverage. Hennessy and Whited (2005) and Strebulaey (2007) clearly indicated that capital adjustment costs under dynamic trade-off theory can be used to forecast a negative correlation between market leverage ratios and profitability. These findings demonstrate significant challenges which are inherent to empirical finance research regarding dynamic trade-off theory, as its forecasts might be remarkably dependent on the exact measure of adjustment costs, which is difficult due to the numerous assumptions that are required.

3.2.4. The pecking-order theory of capital structure

The pecking-order theory was developed by Myers and Majluf (1984) based on the issue of information asymmetry between internal stakeholders such as business managers or employees and external capital providers such as financial institutions (banks, lenders, etc.). Indeed, each business employed its special financial policy with the primary objective of minimising the accrued cost from asymmetric information, especially the issue of adverse selection. The authors thus suggested prioritising the use of the internal financing method, followed by external financing. This is known as the pecking-order theory on capital structure, which recommends that the company which has a certain demand for financing a new project investment follow the hierarchy: first is internal sources of finance (self-financing), second is non-risky debt raising, third is risky debt raising, and finally, in the extreme case, extra equity issuance is used as a last resort. The overall purpose of the theory is to avoid share price reduction by sometimes combining the activities, such as restricting dividend issuance so that the company can have more cash flow and limit the accessibility to loan. Therefore, the firm can have relaxed availability of internal capital to use.

The authors also argued that the financing also delivers a certain message to the business stakeholders. For instance, the debt financing decision signals the message of managers' confidence regarding the profitability of the project, and as such the share price is undervalued. With extra equity issuance, meanwhile, the signalling message is understood as a lack of confidence, and the share price is overvalued, which means that the company stock price will witness a significant drop. The approach of this theory is thus not to balance the proportion of debt and equity in the capital structure to find the best optimal structure with the lowest WACC. Instead, the theory suggests that the board of management should seek the least costly financing method in terms of both time and energy.

In the capital structure theory literature, Donaldson (1961) is considered to be the pioneer of the pecking-order theory of capital structure, stating that business board of management is likely to prioritise the use of internal funds such as retained earnings and fund investment, followed by debt financing as an external source of funding, and finally by equity issuance as an external source of funding. After that, Myers and Majluf (1984) and Myers (1984) conducted further studies and proposed a modified pecking-order theory of capital structure, revealing that due to the existence of information asymmetry between better-informed internal stakeholders (managers, employees, etc.) and less-informed external stakeholders (outside investors), the equity financing method is believed to be an unfavourable investment signal for external stakeholders. To eliminate the unnecessary negative impacts resulting from such signals, the business's board of management should prioritise the financing decision as follows: the first option is retained earnings, the second option debt financing, and the final option equity financing.

As concluded by Dacosta and Adusei (2016), the pecking-order theory is contrary to the discussed trade-off theory. However, both pecking-order theory and trade-off theory of capital structure have a common natural wisdom that firms should choose the least expensive financing method. In general, Dacosta and Adusei (2016) observed that in terms of further capital required, most firms consider first using retained earnings, then debt and equity. The trade-off model, meanwhile, requires much detailed information for analysis and forecasting in order to evaluate the expected benefits and costs to make the final decision of whether to borrow more debts for business financing (taxes, free cash flow, agency problems, bankruptcy costs, etc.); that is sometimes difficult to measure (Fama and French, 2002). Thus, Dacosta and Adusei (2016) observed that most firms first consider using retained earnings, followed by debt and equity.

In the literature, as researched by Lumby and Jones (2011), a company should make use of all retained earnings first, where possible, and external sources of finance should only be used when the board of management determines that a positive net present value (NPV) project cannot be financed using retained earnings. At that point, debt is suggested to be issued until the debt capacity is fulfilled, and only if the project had not been financed enough will equity issuance be considered. In this study, following the implications of the pecking-order theory, firms with a high growth rate and large financing necessities must have a high level of debt in the capital structure, as the management team is reluctant to issue equity. However, studies by Smith and Watts

(1992) and Barclay *et al.* (2001) came to a contradictory conclusion, finding that high-growth firms tend to use less debt for capital financing.

As mentioned by Dacosta and Adusei (2016), the pecking-order theory is one of the most efficient capital structure theories, as it helps predict and determine the structure of debt. Due to information asymmetry, the theory suggests that funds with the lowest information costs should be raised first, and the sources of funding with highest information costs should be raised later. In a further detail of the theory, Frank and Goyal (2003) recommended that regarding the external sources of funding, short-term debt should be considered before considering long-term debt. The authors also indicated that pecking-order theory is in line with their observation that financing behaviour is mostly driven by adverse selection (differences in perceived information between buyer and seller in the market) costs.

Myers (1984) concluded that companies follow a hierarchy of financing methods determined by agency issue, while asymmetric information and the signalling considerations have been reported by Myers and Majluf (1984). Myers (1984) specifically supported the theory, identifying three main sources of financing available to any firm: business retained earnings, debt borrowings, and equity issuance. In this case, retained earnings encounter no problem with the adverse selection issue. Equity, meanwhile, is believed to have a serious adverse selection problem, while debt borrowings only suffer an adverse selection problem at a limited level. Furthermore, from the point of view of external investors, equity share issuance would be riskier and will also result in a larger premium, and as such investors would expect a higher rate of ROE. From the point of view of internal stakeholders (managers, board of management), by contrast, retained earnings, without the problem of adverse selection, are a better source of finance than debt borrowings, and debt borrowings are better than equity financing. Therefore, the pecking-order theory is significantly supported, and only in extreme cases will the company decide to issue new equity to the market.

Frank and Goyal (2003) conducted a study to test the theory using data from 1971 to 1998 and found that, in general, most companies cannot raise finance for any project with internal sources alone, which means that external sources of finance are required in any case and that debt and equity are thus always considerable options. However, the authors still pointed out that retained earnings are always used first, which provides support for pecking-order theory. Regarding the issue of determinants of capital structure, Bancel and Mittoo (2004) indicated that bankruptcy costs are not considered by most large enterprises, and high-growth companies take ordinary stock as the lowest source of funds and take any chance to issue ordinary stocks. This means that pecking-order theory is not supported for all cases and that capital structure choice would be specific for each circumstance.

In a study by Chen (2004) of the Chinese market, local companies were more likely to focus on the short-term finance perspective, thus not considering long-term debt. Supporting this conclusion, Hovakimian *et al.* (2004) found that regarding the issue of business financing choices, targeted financial leverage is not influenced by stock returns and is more likely to be supported by pecking-order theory. Based on the research by Rao *et al.* (2007), unrewarding firms issue equity to counterbalance the excess leverage because of the accumulated losses. It is thus clear that each business has its own target capital structure. However, the preference for the use of internal sources of finance and the likelihood of issuing extra equity when the share price is high enough are relatively significant and interfere with the objective of maintaining a debt ratio close to the target.

3.3. Empirical research on capital structure and firm growth

3.3.1. Testing capital structure theory

In the literature, capital structure has drawn the attention of scholars with regard to financial constraints since 1950, as noted by Forte *et al.* (2013). Modigliani and Miller (1958) are considered to be the pioneers in researching the subject of capital structure in the consideration of business value. A few years later, Modigliani and Miller (1963) revisited the theory to eliminate their original assumption of the irrelevant assumption of perfect market competition, in which all investors have enough information and are equal in terms of investment opportunity and decision. They admitted that indebtedness holds tax shield advantages for enterprises in the manner in which interest expenses help achieve income tax deductibility. However, the authors did not suggest that debt financing can be the only option to raise capital, as the risk and bankruptcy cost rise accordingly. Modigliani and Miller (1963) also highlighted the existence of other relevant factors in the financing decisions that are not fully covered within the context of the static equilibrium models.

Based on the framework of Modigliani and Miller (1963), the trade-off theory was proposed by Miller (1977), which considers the industry effects, such as bankruptcy costs, income taxes, and the agency-cost problem. The optimal structure of business capital is described as the result of considering the balance between the costs and benefits of debt issuance in order to maximise firm value. In this theory, under certain market conditions, financial leverage is regarded as an advantageous method to raise capital that is worth considering, even if the internal funds remain available (retained earnings). However, Briozzo *et al.* (2016) also stated that when adopting debt financing, tax savings are expected to be higher, and the bankruptcy costs and risk of default increase as well. Thus, balancing the cost and benefits of debt is a significant way to avoid the abuse of financial leverage in a capital structure and rationalises the indebtedness indexes (Brealey *et al.*, 2006).

Based on the previous literature on capital structure, Miller (1977) proposed a new financial model, into which taxes on the income received by investors were incorporated, either in the form of dividends for shareholders or interest paid to creditors (Godoy, 2002). Due to the existence of this factor in the financial model, both sides of taxes are considered together, which means that the advantages of a tax shield are mostly compensated for. In other words, the author indicated the irrelevance of capital structure in business value.

Developing from the previous studies, Myers (1984) and Myers and Majluf (1984) proposed the pecking-order theory, which clearly simplifies the capital structure choice for business managers/owners due to the existence of information asymmetry, in which the hierarchy of sources of finance is as follows: first, take full use of internal sources of finance where available (mainly retained earnings of previous financial year), followed by external sources, with debt issuance being more prioritised; equity issuance is regarded as the last option. The authors explain that internal stakeholders (managers/owners) are believed to hold much more accurate information on the company than external ones, especially lenders, which leads to the demand for the management of borrowing costs. Thus, internal funds are preferable to be used first by the managers/owners. This is known as the adverse selection problem, which is avoidable if companies reinvest their retained earnings for the following years (Myers, 1984). The author strongly confirmed that the proposed hierarchical order of financing choices is the result of greater flexibility and lower transaction costs of internal versus external sources.

Along this academic stream, internal sources of funding are believed to be superior to external sources, which can be secured through, among other methods, the financial leverage method. External sources will only be used as a last resort to avoid losing the market opportunity in case internal funds are depleted and the demand for further investment remains. As such, as long as the internal funds remains available, they should be used, and any additional internal funds should be used to pay off any debt as soon as possible (Briozzo *et al.*, 2016; Martinez *et al.*, 2017).

The recapitalisation aspect was mentioned in a dynamic financial model proposed by Fisher *et al.* (1989), in which the debt ratio is affected by the share price. This model served to provide a solution for the firm's capital value in which recapitalisation is taken into consideration carefully. This is known as the dynamic trade-off model. Based on their assumptions and findings, the authors suggested that it is significantly difficult to confirm an observed optimal debt ratio due to the range of probability that the company will allow that ratio to fluctuate over time because ofthe high transaction costs of recapitalisation.

Berger and Udell (1998) provided another theory regarding how capital structure might be adjusted over time and how much the firm is growing (firm age and size matter), known as the growth cycle model. The authors argued that during the entrepreneurship period, companies are young and small, and their financial information is less transparent, which makes it difficult to gain access to external sources of finance, especially debt. Thus, most of their funds are raised from internal sources (self-funding, family, and friends) or business angels. Nevertheless, when the businesses progress to a higher stage of growth development, companies can gain access to a variety of sources of finance, such as institutions of risk capital, financial markets, or credit banks. This means that their capital structure will change significantly based on their age and size through their development process.

Many scholars have said that trade-off theory and pecking-order theory cannot both be used to explain and determine the financing options and capital structure of the same company (López-Gracia and Sogorb-Mira, 2008; Degryse et al., 2012; Aybar-Arias et al., 2012; Serrasqueiro and Maças Nunes, 2012). Titman and Tsyplakov (2007) researched the capital structure model and critically argued that most enterprises will hold back to see the fluctuation of investment opportunities and changes in project details to make any proper adjustment to make the best financing decision. Hence, the authors indicated that pecking-order and trade-off theory are not mutually exclusive.

Moreover, Dewaelheyns *et al.* (2017) mention a group of studies that combine both theories (Gaud *et al.*, 2007; Hovakimian and Li, 2011; Titman and Tsyplakov, 2007). The authors took into account that the existence of trade-off theory that targets optimal capital structure will be the common objective of firms in the long-run, which allows the companies to act according to pecking-order theory in the short-run. It is strongly believed that firms' convergence with the financial leverage target will be slow due to market imperfection factors such as transaction costs, agency problem, and others.

There is also a debate in the literature regarding the comparison between the pecking-order model and the trade-off model of capital structure, in terms of which model better fits with reality (Myers and Majluf, 1984). The similarities of these competing models have been mentioned by Fama and French (2002) who argue that both are constructed with the same set of variables, namely, the financial leverage variables and their related independent variables. The scholars indicate a debatable two-sided comparative conclusion in which each holds advantage in specific cases (Prasad *et al.*, 2001; Ghosh and Cai 1999; Kochhari and Michael, 1998). For example, Kochhari and Michael (1998) strongly argued that the pecking-order theory might be a significant explanation for firm growth by the way that the company can proactively determine the capital structure of the business. In other words, the internal funds are always easily dictated, which means that the company can minimise the investment risk as much as possible. Shyam-Sunder and Myers (1994), meanwhile, aimed to determine which theory has more practical implications. The authors argued that based on the theory of pecking-order for capital structure choice, the financing deficit of the company should be minimised. However, the study results and the research approach have been criticised by other researchers. For instance, regarding the results, Frank and Goyal (2003) conducted a study to examine the impact of the pecking-order theory and the trade-off theory with a large database and found significant support for trade-off theory instead, while the impact of the pecking-order model was relatively limited. In terms of the research approach, meanwhile, Chirinko and Singha (2000) strongly criticised the conclusion of Shyam-Sunder and Myers (1994) and pointed out that the financing deficit coefficient of 1 might be spurious, as it can be extremely close to 1 even if the pecking-order model is not followed by companies.

Additionally, many other papers have studied the issues related to the impacts and determinants of capital structure. Some of the most influential conclusions include the classic version of optimal capital structure (Kraus and Litzenberger, 1973); the agency-cost theory proposed by Fama and Miller (1972) and reconsidered by Jensen and Meckling (1976) and Harris and Raviv (1991); the theory of capital structure signalling by Ross (1977); the trade-off theory proposed by Modigliani and Miller (1963); the credit-rationing issue studied by Stiglitz and Weiss (1981); and especially the series of papers contributing to the theories of corporate strategy in which capital structure is mentioned as the principal consideration, conducted by Brander and Lewis (1986), Mishra and McConaughy (1999), and Barton and Gordon (1987). These papers have created the foundation for the different propositions related to capital structure, serving as orientation for future studies.

Among several determinants of capital structure mentioned in the literature, the tax system is regarded as one of the most important elements, especially in terms of the relation between tax and interest payment. This was first mentioned by Modigliani and Miller (1958). However, the authors excluded the existence of tax in their assumptions in modelling the capital structure theory. The implication of Modigliani and Miller (1958) have been inherited and explored in many subsequent empirical papers. For instance, the study by Kashyap *et al.* (2010) used that of Modigliani and Miller (1958) as its fundamental framework to study the principle of the conservation of business risk. Here, the authors found that the banks in their sample tended to decrease the proportion of financial leverage in their capital structure and shift to an equity-based structure of capital, thus reducing the operating risks of the business and, accordingly, the expected returns of shareholders. Based on this observation, the authors estimated the business risks using beta coefficients, which are used in the capital asset pricing model (CAPM) on the basis of the covariance between the rates of return on companies' shares and overall returns of the market, of the US banks sample and analysed their correlation with the ratio of book equity to book assets and the book-to-market equity ratio. The regression model was applied with the inclusion of time-fixed effects. Their alternative hypothesis was confirmed, as the findings show a significant negative correlation between beta and the book equity-to-asset ratio. In addition, Kashyap *et al.* (2010) also examined the changes in equity acquired by the US bank over time to determine whether there is any impact on the cost of funds. The authors applied three specific measures for a targeted profit mark-up, which is also the amount that the banks tend to charge customers for their borrowings, such as (i) net interest margin, (ii) the income yield on loans provided, and (iii) the prime interest rate minus the rate of short-run treasury bills. Each of these measures has been considered in the panel regression model along with the control variable as additional determinants of profit mark-up to find the correlation with capital structure, represented by the equity-to-assets ratio. The results given by this model show that there is no firm evidence to conclude any significant relationship between the equity-to-assets ratio and the lending costs.

The banking sector continued to draw the attention of Miles *et al.* (2011), who examined a sample of UK banks from 1997 to 2010 within the framework of Modigliani and Miller's (1958) theory of capital structure. In this paper, business operational risk was taken into account using beta coefficients as the independent variable to assess the relationship with financial leverage, measured by total debt over total assets. Three types of estimation have been applied together to compare and contrast the overall results: pooled ordinary least square (OLS) estimators, a bank-specific fixed-effect estimator, and a random-effect estimator, with the main focus placed on the fixed-effect model. The overall findings concluded that the beta coefficient witnessed a positive relationship with financial leverage in the UK banking sector. In addition, the authors indicated that although the bank capital scale increased greatly, it would just lead to a minor long-term effect on cost of debt for borrowers. For example, even if the bank capital increases doubled, the econometric estimation predicted that the cost of lending would increase only by 10–40 basis points on average. Nevertheless, higher capital acquired by banks also produced benefit by reducing the chance of systematic crises. The European Central Bank (ECB; 2011) issued a Financial Stability Review which provided an in-depth empirical analysis of the correlation between equity, business risk, and required ROE with a dataset including 54 observations of international banks during the period 1995–2011. This can be regarded as another attempt to analyse the relationship between business risks and ROE based on the historical theory of Modigliani and Miller (1958). This study inherited and employed the hypotheses and methodology of Kashyap *et al.*, (2010) and Miles *et al.*, (2011) with the fixed-effect panel regression model, in which beta coefficient was taken as an independent variable to be regressed on the financial leverage represented by equity to banks' total assets. Additionally, returns on assets (ROA), total assets, and risk-weighted assets are also included in the model as control and explanatory variables which are believed to have an effect on bank risks. The ROA represented the bank profitability, total assets accounted for business size, and the risk-weighted asset was used as a controlling measure for balance-sheet risk. The econometric model revealed that along with the increase in the equity-to-assets ratio, the bank risk, measured by beta coefficients, will decrease, which means that the negative correlation was confirmed. The econometric results indicate that a higher level of equity in the capital structure will lead to a reduction in business risk of returns, which is completely consistent with the historical theory. The policy implication of this paper has successfully erased the market concern about the rise of lending costs and further reinforced the policy makers' attention to the higher level of banks' equity requirements (along with Basel III).

The theory of Modigliani and Miller (1958) was also tested in the paper by Nordam and Kontic (2012) within the context of the US market. The authors carried out this study by assuming the absence of market distortion and again employed the beta coefficient derived from the CAPM model as the determinant to be regressed on the financial leverage of US banks. The result is consistent with the previous papers, confirming the positive ratio between beta and leverage. Bowen *et al.* (1982), by contrast, proposed a special technique to determine the optimal level of capital structure. The authors indicated that each firm's proportion of debt will tend to converge with the industrial mean value by time. Marsh (1982) stated that "companies do appear to make the choice of financing instrument as though they had target levels in mind for both long-term debt ratios and the ratio of short-term to total debt". Taggart (1986) tested the pecking-order theory in a study about capital structure and revealed that pecking-order theory of capital structure would be more valid and reliable than the optimal one hypothesis. Additionally, in a more recent study, Claggett (1991) attempted to test the optimal capital structure theory and produced a finding consistent with Bowen *et al.* (1982) that the financial leverage ratio has the tendency to move towards the industrial mean value within only a year. The authors also provided a further detailed conclusion that the firms that have a long-term-debt–to–total-asset ratio higher than the industrial average tend to adjust more rapidly than the ones below the average rate. In addition, the authors found that pecking-order theory tends to have more practical implications in their research; however, in a severe crisis, firms might not adjust accordingly.

Ghosh and Cai (1999) conducted another study testing theory of capital structure, with the central focus on the optimal-capital-structure hypothesis and the pecking-order hypothesis. The authors agreed with the above-mentioned papers that companies tend to adapt their capital structure towards the industrial average structure, more rapidly in firms with higher financial leverage. However, Ghosh and Cai (1999) also indicate that optimal-structure theory and pecking-order theory are both present among their data sample of the largest 500 US companies during the period 1974–1992.

3.3.2. Empirical studies on target capital structure

As discussed in the section 3.2, the traditional view of capital structure says that companies tend to have their target structure which can balance the costs and benefits of debt financing. The existence of debt target level was confirmed by multiple studies such as Bradley *et al.* (1984), Stulz (1990), Rajan and Zingales (1995), Hovakimian *et al.* (2001), and DeAngelo *et al.* (2011). However, according to Leary and Roberts (2005) and Frank and Goyal (2003), most firms will deviate their capital structure from their target level due to different situational reasons, which significantly affect the businesses' ability to issue further debt. The trade-off theory also proposed that companies have their target debt level by hypothesising that the optimal capital structure is when the firms can trade off the benefits gained from tax reduction against the cost of financial distress (Bradley *et al.*, 1984; Myers, 1984; Fischer *et al.*, 1989). Based on this argument, Uysal (2011) indicated that capital structure deviation can be divided into being overleverage or underleverage and this can significantly affect the process of adjustment towards target level of firms. Therefore, from the empirical view, the adjustment towards target capital structure is a crucial research field that attracted the attention of scholars (Tao *et al.,* 2017). In specific, in terms of researching on target capital structure and adjustment process towards the target level, there are two major topics that have drawn the attention of scholars. First, a large number of researchers attempted to test the business adjustment speed towards target level (Tao *et al.*, 2017; Jalilvand and Harris, 1984; Roberts, 2001; and Fama and French, 2002). Specifically, Leary and Roberts (2005) confirmed the presence of target level of financial leverage and that companies will have a tendency to rebalance their capital structure towards their targets. Furthermore, Leary and Roberts (2005) also examined whether costly adjustment will be a factor preventing firms from rebalancing their capital structure and figured out that adjustment cost exists but firms will rebalance leverage level to stay within the optimal level regardless of the costs. In terms of adjustment speed, Haron (2015) conducted a study with a context of Indonesian firms during the period from 2000 to 2011 and concluded the average speed of adjustment was 62.74% per year, which means that it would take roughly 1.594 years for Indonesian firms to reach the target level. Tzang *et al.* (2013) also indicated a similar result based on a study of Indonesian manufacturing and non-manufacturing firms during 1992 to 2010 and figured out the average adjustment rate of 61.77% per year. Additionally, Ameer (2010) with a research for the southeast Asian and south American countries also concluded that the average adjustment speed was 61.92% per year. Some other scholars reported a slower speed of adjustment. For instance, Fama and French (2002) found that on average, firm can close 15% of their gap to target capital structure per year. Flannery and Rangan (2006) and Drobetz *et al.* (2015) reported an approximate speed of closing gap between actual and target debt level by 33% and 25% per year, respectively. Based on these studies, this thesis will use the capital structure adjustment speed model to estimate the financial leverage adjustment speed of Vietnamese firms. Since the current literature of Haron (2015), Tzang *et al.* (2013), Ameer (2010) for developing and emerging markets show that the approximate speed is around 60% per year. Thus, this would be the expected rate for the case of Vietnam.

Regarding the empirical perspective of factors affecting capital structure adjustment speed, this has been discussed by a number of scholars such as Banerjee *et al.* (2004), Loof (2004), Yeh (2011), Drobetz and Wanzenried (2006), and Qian *et al.* (2007). The most important determinants that are mentioned in their studies are distance to target level, firm size, and growth opportunities. Among them, firm size was mentioned in the paper of Banerjee *et al.* (2004) and indicated a strong impact on speed of firms' adjustment speed towards target capital structure, followed by growth opportunities and distance to target. The general effect of these factors is expected as positive. As far as distance to target level is concerned, Drobetz and Wanzenried (2006) concluded that there is a positive relationship with the speed of adjustment since the authors indicated that if the capital structure of a firm deviates far from the target level, the manager tend to make financial decision to quickly close the gap as soon as possible. Besides, if the distance is already close to the target level, firms are not likely to make any adjustment. This is also consistent with the findings of Haas and Peeters (2006) for a positive correlation. Therefore, this thesis will propose the hypothesis for the "distance" variable as follows:

H_1: 'Distance' has positive relationship with adjustment speed towards target capital structure

With regards to firm size, the authors argued that large companies tend to be more diversified with less volatile profitability and thus, have lower default risk accordingly (Banerjee *et al.*, 2004; Loof, 2004; Drobetz and Wanzenried, 2006). From this point, the authors examined the correlation between firm size (measure by logarithm of total assets) and speed of adjustment towards target leverage and concluded a positive relationship between them. Therefore, based on the literature, it is hypothesised that firm size will have positive correlation with adjustment speed.

H_2: Firm size has positive relationship with adjustment speed towards target capital structure

In terms of growth opportunities as determinant of adjustment speed, Drobetz and Wanzenried (2006) also indicated a positive impact result. The author argued that firms that have high possibility to grow in the future tend to have multiple sources of finance and find it easier to adjust towards target level. Banerjee *et al.* (2004) also obtained a similar empirical result of a positive impact of growth opportunities on adjustment speed of capital structure and argued that fast growing firms will have better chance and more flexible options to alter their debt structure than the less or no-growth firms. Based on these empirical findings, the hypothesis for the effect of growth opportunities on adjustment speed will be developed as follows:

H_3: Growth opportunities have positive relationship with adjustment speed towards target capital structure

Hypotheses H_1, H_2, and H_3 will be empirically tested, and the results will be discussed in Chapter 5.

3.3.3. Empirical studies on determinants of capital structure

Since capital plays a crucial role in the success of business as discussed in sub-section 3.1 of chapter 3, the determinants of capital structure have been widely discussed by scholars (Titman and Wessels, 1988; Drobetz and Fix, 2005; Homaifar *et al.,* 1994; Wald, 1999; de Jong *et al*., 2007). The fundamentals of the capital structure determinants research were grounded on the traditional theories mentioned in the sub-section 3.3.1 such as capital structure irrelevant theories proposed by Modigliani and Miller (1958), the trade-off theory mentioned by Miller (1977) and Kraus and Litzenberger (1973), and pecking order theory developed by Myers (1984) and Myers and Majluf (1984). These theories are regarded as the basis for later researchers to better identify different related factors that determine firms' actual capital structure decision.

Different approaches to empirically evaluate the impact of various factors on capital structure choice of firms have been mentioned in the literature. On the one hand, Homaifar *et al.* (1994) examined the choice of financial leverage in the country-specific perspective with macroeconomic exploratory variables such as inflation, unemployment rate, or capital market conditions. On the other hand, Titman and Wessels (1988) and Drobetz and Fix (2005) approached the same research topic with firm-specific variables with accounting data such as profitability, growth opportunities, industry uniqueness, or non-debt tax shield. Meanwhile, Wald (1999) compared the differences between countries to figure out the country-specific characteristics of the sample.

In terms of country's specific approach, it drawed the attention of scholars in the last decade since there have been an increasingly number of studies conducted to compare the differences between countries (Acedo-Ramirez and Ruiz-Cabestre, 2014). The basic assumption for this approach is that the firm-specific effects of each indicator on companies' financial leverage are similar for each country (Booth *et al.*, 2001; Giannetti, 2003; Song, 2004). A number of researchers attempted to follow this approach with the case study of the US and European listed firms (Bancel and Mittoo, 2004; Brounen *et al.*, 2006) and argued that the macro-economic factors such as national institutions, inflation rate, or international operations can significantly influence the financing behaviours of business managers as well as their financing policies. However, De Jong *et al.* (2007), in a comprehensive study of 42 countries, found that some indicators are not equally measured across countries which made it difficult to conduct a proper comparative study between countries and deliver appropriate sense of empirical implication. Hair *et al.* (2017) and Matthews (2017) also confirmed that there are mathematical problems if the attributes in capital structure are calculated with the same method across countries, of which political institution is considered as the most difficult one. As such, Ramli *et al.* (2019) said that the majority of literature focused on per country analysis and compared between countries based on individual study for each nation.

Although the topic has drawn attention of scholars with different research approaches, the majority of the literature focused on the firm-specific elements. Some of the most seminal papers in this field of research are Titman and Wessels (1988), Rajan and Zingales (1995), Graham (1996), Marsh (1982), Jalilvand and Harris (1984), Bayless and Chaplinsky (1990), MacKie-Mason (1990), Jung *et al.* (1996). In specific, Frank and Goyal (2009) conducted a comprehensive study of capital structure choice for the US markets with the data from 1950 to 2003. The authors took into consideration 25 predictions of financial leverage ratio being categorised into 11 groups: Profitability, Firm size, Growth opportunities, Industry specific factors, Nature of assets, Taxes, Risk, Supply-side factors, Stock market conditions, Debt market conditions, and Macroeconomic conditions. Taking into account both firm-specific factors and country-specific factors, the results of Frank and Goyal (2009) reported that economic inflation is the only country-specific element that positively affects that choice of using debt in capital structure. Besides, multiple firm-specific factors are proven to significantly impact the capital structure decision such as growth opportunities (negative effect), tangibility (positive effect), profitability (negative effect), firm size (positive effect). Another typical paper conducted by Titman and Wessels (1988) about capital structure choice of the US firms used the same set of exploratory variables. This study employed the data of 469 US publicly traded firms collected from the Annual Compustat Industrial Files during the period from 1974 to 1982. Short-term debt was included in Titman and Wessels (1988) study as a dependent variable measuring the capital structure of business along with long-term debt. The results of this paper suggest that short-term debt tend to be used by small sized firm; additionally, transaction cost (as part of profitability) is the nature of such correlation.The authors argued that high transaction cost will halt small business from issuing long-term sources of finance such as long-term debt or equity. Thus, short-term financing is more likely to be used by small firms. However, Titman and Wessels (1988) are unable to conclude any relationship between non-debt tax shield, volatility, tangible assets, or future growth.

Since this thesis focuses on the context of Vietnam, which is a young and developing market in the South East Asia region, the determinants of capital structure will be developed based on the particular characteristics of the market in this literature review part. The first important indicator is firm size. This indicator is measured by the logarithm of total asset value of business. Firm size is widely used by scholars as one of the most crucial factors affecting capital structure choice regardless research contexts and conditions (Ferri and Jones, 1979; Titman and Wessels, 1988; Ozkan, 2001; Rajagopal, 2010; Kim and Sorensen, 1986; Chung, 1993; Homaifar *et al.*, 1994; Warner, 1977; Ang *et al.*, 1982; Whited, 1992; Rajan and Zingales, 1995; Fischer *et al.*, 1989; Chang and Rhee, 1990; Chen *et al.*, 1998; Bevan and Danbolt, 2001; Fattouh *et al.*, 2002; Padron *et al.*, 2005; Gaud *et al.*, 2005; Tomak, 2013, for instance). The obvious impact of firm size on capital structure decision of business managers is argued by scholars, based on the theories of capital structure, to be that large firms tend to have higher reputation as well as higher capacity for collateral to take large and long-term debt for financing purposes (Titman and Wessels, 1988). By doing so, businesses can minimise the cost of capital since it is cheaper to raise funds via debt issuance than equity. This argument not only follows the trade-off theory due to tax reduction benefit from debt financing but is also supported by agency cost theory since it reduces the conflicts between shareholders and board of management by avoiding extra involvement of new shareholders as well as pressure for current shareholders to invest more. From these points of view, most of the papers hypothesised and successfully proved that the relationship between firm size – measured by logarithm of total assets – and financial leverage is positive (Fischer *et al.,* 1989; Chang and Rhee, 1990; Chen *et al.,* 1998; Banerjee *et al.,* 2004; Bevan and Danbolt, 2001; Fattouh *et al.,* 2002; Padron *et al.,* 2005; Gaud *et al.,* 2005; Tomak, 2013). However, there were several papers which reported a negative correlation such as Ooi (1999), Yolanda and Soekarno (2012) and Wahab and Ramli (2014) in which the authors supported the idea of pecking order theory that large firms should take advantage from internal finance first before considering debt issuance. Yet such papers are not considerable, for instance Yolanda and Soekarno (2012) conducted their research within the context of Indonesian market but employed only 5 firms for cross-sectional observations. The studies of Wahab and Ramli (2014) also includes only 13 listed government companies in the sample size. Thus, although the estimations of Yolanda and Soekarno (2012) and Wahab and Ramli (2014) were conducted acceptably, the sample of too few observations made it unable to reach a reliable and generalizable result. Therefore, this thesis will develop hypotheses for the impact of firm size on financial leverage as follows:

H_4: Firm size has positive relationship with financial leverage

Liquidity is also regarded as a determinant of capital structure since it has been taken into consideration in previous research (Prowse, 1990; Wiwattanakantang, 1999; Ozkan, 2001; Frank and Goyal, 2009; Welch, 2011; Ramli *et al.,* 2019). Unlike tangibility, firm size, and profitability, liquidity is not a strong predictor for capital structure determinants since it was not employed in all related studies in the past. However, in several papers of Vietnamese context, liquidity plays a significant role in capital structure choice of local managers (Nguyen and Ramachandran, 2006; Biger *et al.,* 2008; Nguyen *et al.,* 2014).

Especially, Nguyen *et al.* (2014) argued that in the context of Vietnam, liquidity is even more important since it represents the ability of companies to attract short-term debt which is the main financing options of SMEs. Therefore, it is strongly recommended to include liquidity in this thesis. Based on the current literature, Biger *et al.* (2008) concluded a positive correlation between short-term debt and liquidity of Vietnamese firms. However, in another study, Ozkan (2001) with the sample of 390 firms operating in the UK during the period from 1984 to 1996 found a negative impact of liquidity ratio on financial leverage. Thus, the empirical effect of liquidity as determinant of capital structure remains debatable with different case studies. The results of Nguyen and Ramachandran (2006), Biger *et al.* (2008), Nguyen *et al.* (2014), Biger *et al.* (2008) will be inherited for hypotheses development.

H_5: Liquidity has a positive relationship with financial leverage

The next predictor of capital structure is profitability. Unlike tangibility and firm size, profitability is believed to have negative impact on financial leverage (Bauer, 2004; Myers and Majluf, 1984; Titman and Wessels, 1988; Jensen *et al.*, 1992; Bathala *et al.*, 1994; Rajan and Zingales, 1995; Demirgüç-Kunt and Maksimovic 1996; De Miguel and Pindado, 2001; Schargrodsky, 2002; Huang and Song, 2005; Wahab *et al.*, 2012; Yolanda and Soekarno, 2012, Tomak, 2013; Wahab and Ramli, 2014; Frank & Goyal, 2009; Booth *et al.*, 2001). The authors confirmed the consistency of their research and pecking order theory that profitable firms will have more retained earnings to use first before considering other external methods. In details, Pandey (2001) conducted a study on the factors determining capital structure of Malaysian firms during the period from 1984 to 1999 with a sample of 106 cross-sectional observations. This paper found that profitability is significantly and negatively correlated to long-term debt. In another paper, Antoniou *et al.* (2005) conducted a comprehensive research on determinants of capital structure within the context of 3 European countries: UK, France, and Germany during different period from 1969 to 2000, 1983 to 2000 and 1987 to 2000, respectively. The authors concluded that there is a strong and negative relationship of profitability on external debts for the case of UK and French companies, while there is no evidence for any correlation for the German firms. This result is also consistent with the paper of Huang and Song (2005) with the sample of 1000 Chinese firms during 7 years from 1994 to 2000. A later study of Deesomsak *et al.* (2004) also confirmed the negative effect of profitability on financial leverage through a research with the context of four different Asian Pacific countries: Thailand, Malaysia, Singapore, and Australia. These papers have similar context as the current thesis, which means that their hypothesis should be used. Nevertheless, there are also several studies that shows contradictory result such as Taub (1975), Fattouh *et al.,* (2002), and Wiwattanakantang (1999) as the authors argued that more profitable firms will have higher accessibility to external loans through a good operating background. This conclusion is also consistent with the trade-off theory of capital structure since profitable firms will have more income to take advantage from tax shield of debts. It can be seen that there is a mixed result in terms of the impact of profitability on capital structure. However, this thesis will develop negative correlation hypotheses for the indicator of profitability on the basis of the study of Huang and Song (2005) and Deesomsak *et al.* (2004) as follows:

H_6: Profitability has negative relationship with financial leverage

Another important predictor of capital structure choice is asset structure which is measured by the collateral value or tangibility of companies. The former measurement, which is calculated as the ratio of inventory plus gross plant and equipment to total assets (Berger *et al.,* 1997 and Chang *et al*., 2009), is strongly supported by Scott (1972) who argues that debt issuance should be secured and, thereby, can increase firm's equity value since it expropriates wealth from the existing unsecured creditors. This is also consistent with Myers and Majluf (1984) that high collateral value can help firms to secured long-term debt and reduce business risk. Besides, Titman and Wessels (1988) argued that in terms of issuing debenture, there will be related costs associated with that in which firm's managers will have better information than outside shareholders. Thus, selling debt secured by property with known values can efficiently avoid such costs. This is also consistent with the study of Berger *et* al. (1997); Chang *et al.*, (2009); and Rajan and Zingales, (1995) which suggest that the high value of collateral assets can help to reduce agency cost and therefore, generate more productivity of firms. In general, the trade-off theory of capital structure suggested a positive correlation between tangibility and financial leverage since tangibility presents a high capacity for debt collateral and it only experiences small loss in value in case that firms go into distress. Stohs and Mauer (1996) in a study with sample of firms that have asset maturity structure also used tangibility as predictor and found out a positive relationship between this variable and long-term debt. Huang and Song (2005) studied the capital structure choice of 1000 Chinese firms during the period from 1994 to 2000 and reached the conclusion of a positive correlation between tangibility and long-term financial leverage. However, in another study conducted by Antoniou *et al.* (2002) with European firms from Germany, France and United Kingdom, the authors suggested a different impact of tangibility on long-term debt since German firms deliver consistent results of positive correlation for tangibility, meanwhile the data of French companies presents insignificant coefficient, and it is negative effected by tangibility for the case of UK firms. Therefore, it can be concluded that the majority of current studies confirm that the impact of tangibility on capital structure follows the trade-off theory. It is argued that firms with high value of tangible assets will have higher collateral value to secure long-term debt. This idea is confirmed by international studies such as Frank and Goyal (2009), Fauzi *et al*. (2013), Jensen and Meckling (1976), Jensen *et al.* (1992), Rajan and Zingales (1995), Bevan and Danbolt (2001), Wahab *et al.* (2012), Wahab and Ramli (2014), Wiwattanakantang (1999), and Booth *et al.* (2001) as well as

Vietnamese domestic researches such as Okuda and Lai (2012), Nguyen *et al*. (2014). Although several empirical studies still reported contradictory findings such as Antoniou *et al.* (2002), Cornelli *et al.* (1998), Hussain and Nivorozhkin (1997), Weill (2004); especially Nguyen and Ramachandran (2006) also pointed out that in Vietnam, it is logic to find a negative correlation between financial leverage and tangibility since short-term debt significantly dominates the debt structure and short-term debt issuance does not require collateral. In this case, liquidity is, instead, the considerable indicator. Yet the results of Nguyen and Ramachandran (2006) studies might be obsolete since it was conducted long time ago when Vietnamese capital market has just started growing. Therefore, the dominance of short-term debt no longer exists at the moment. Hence, in this thesis, the indication of Nguyen and Ramachandran (2006) will be used to hypothesise for short-term debt indicator only.

H_7: Tangibility has positive relationship with financial leverage

Growth opportunities are also regarded as an important determinant of capital structure (Myers, 1977; Myers, 1984; Williamson, 1988; Harris and Raviv, 1991; and Titman and Wessels, 1988). This predictor was mentioned in multiple theories of capital structure such as trade-off theory, agency cost theory (Acaravci, 2015). In specific, the trade-off theory indicated that firms that have higher investment opportunities will avoid using debt financing as they have stronger motivation to give up underinvestment (Myers, 2003). Additionally, it stated by and Huang and Song (2005) that although growth opportunities can be seen as an added value for firms in the consideration of investors, they cannot be employed as collateral to secure debt financing. Therefore, it is unlikely that firms can take advantage from high growth opportunities to attract long-term financial leverage. Besides, the negative impact is also supported by the argument that firms tend to avoid equity issuance if market-to-book ratio (measurement of growth opportunities) is low since they expected that their stocks are undervalued. However, the pecking order theory proposed by Myers (1984) suggested that high profitable firms will have higher investment opportunities, which implies a positive correlation between financial leverage and growth opportunities. Only when the investment cost is higher than retained earnings, companies will start to use debt financing. Regarding the empirical evidence, a large number of studies confirmed the consistency with trade-off theory and concluded that there is a negative correlation between financial leverage and growth opportunities such as Rajan and Zingales (1995), De Miguel and Pindado (2001), Chen and Jiang (2001), Bevan and Danbolt (2001), Drobetz and Fix (2005), Nguyen and Neelakantan (2006), Kim and Sorensen (1986). Especially the papers of Chen and Jiang (2001) and Nguyen and Neelakantan (2006) were conducted for the Chinese and Vietnamese economies and uphold the expectation of the current thesis. However, some authors such as Long and Malitz (1985); Rajagopal (2010) and Yang *et al.* (2010) find both signs positive and negative for the coefficients of growth opportunities based on the proxies used in their studies. Hence, this research will use the results of Chen and Jiang (2001) and Nguyen and Neelakantan (2006) to develop the following hypothesis:

H_8: Growth opportunities have negative relationship with financial leverage

The final variable that can have impact on financial leverage is non-debt tax shield. Theoretically, according to the trade-off theory of capital structure, the primary incentive for firms to use debt financing is to take advantage of income tax deductible from interest paid. Yet it was argued by DeAngelo and Masulis (1980) that some elements such as depreciation, amortisation and investment tax credits (considered as non-debt tax shield elements) can substitute the tax benefit gained from debt financing. In this regard, Titman and Wessels (1988) concluded that higher level of non-debt tax shield will lead to less debt in capital structure. Pecking order theory also suggested a negative correlation between financial leverage and non-debt tax shield (Acaravci, 2015). From the empirical perspective, the alternative choice of non-debt tax shield can help the companies to avoid using debt financing since the benefits of tax deduction can offset each other, which means that the correlation between non-debt tax shield and financial leverage is negative. Most empirical papers support this relationship such as Kim and Sorensen (1986) in an empirical test about the impact of agency costs of debt on corporate debt policy. The authors indicated that higher level of depreciation and amortisation value will lead to less debt in capital structure. Additionally, De Miguel and Pindado (2001) analysed the determinants of capital structure with the case study of Spanish firms in comparison with US firms and concluded that non-debt tax shield (measured by depreciation to total assets) is negatively correlated with financial leverage (measured by market debt ratio). The same results were reported by Mackie-Mason (1990), Demirguc-Kunt and Maksimovic (1996), Schargrodsky (2002), Akhtar and Oliver (2009) and Zabri (2012). The scholars stressed that if companies have high value of non-debt benefit elements such as depreciation expenses, investment tax credits and net operating loss carry-forward will have less incentive to take advantage from debt tax shield since its benefit is considerably equivalent or less valuable than non-debt tax benefit. Thus, based on these points, this thesis will develop the hypotheses for the last exploratory variable as follows:

H_9: Non-debt tax shield has negative relationship with financial leverage

3.3.4. Empirical studies on the interrelationship of growth, performance, and capital structure

3.3.4.1. Capital structure and profitability

Over the last decade the impact of capital structure choice on firm growth does not seem to have attract interest. Instead, firm performance and profitability appear to have been the subject of more investigations (Berger and Patti, 2006; Margaritis and Psillaki, 2007, 2010).

In a recent study, Coad *et al.* (2016) analysed the relationship between innovation and firm growth and considered whether firm age plays a role in this relationship. This research examined a large number of Spanish firms between 2004 and 2012 and considered business growth in terms of sales, productivity, and number of employees. Hernandez and Nieto (2016) also used sales as the dependent variables to define business growth. Carrizosa (2007), Ardishvili (1998), and Delmar (1997) also attempted to define firm growth based on various variables such as stock price value, number of employees, sales, productivity, or added value of production. Another study, by Kajanathan and Nimalthasan (2013) was conducted to assess the impacts of financial leverage on firm performance and growth and showed a positive correlation. However, the authors added recommendations that future research should consider detailed distinctions of the enterprises such as role of founders/managers, industry, market interests, or country's economy to estimate the correlation.

As mentioned in the previous part of the literature, one of the pioneering papers, Modigliani and Miller (1958), which proposed the capital-structure theory based on a number of strong assumptions, has been criticised by later scholars for not reflecting reality (Ahmad *et al.*, 2012). For instance, Gonenc (2003) investigated the capital structure decisions of Turkish companies within the context of micro institutional settings. The author found that the method of financing of Turkish companies significantly affected their profitability. However, whether an optimal level of capital structure exists continues to be debated among scholars. Based on the indication of Kajanathan and Nimalthasan (2013), it largely depends on the context and development orientation of each business.

For example, in a study by Ghosh (2008), the author remarked that there are two notable research streams to conclude the correlation between the level of debt financing in the business capital structure and business performance. The first one was created by Jensen

(1986), who found that companies that had a higher level of profitability tended to have greater levels of debt in their capital structure. The author also added further explanation that less profitable firms use less debt in order to address the agency problem associated with free cash flow. Indeed, with greater debt in capital structure, besides the obvious conflicts between debt-holders and shareholders, the company will have to use free cash flows to pay for extra debt service requirements, which means that less is left for the firms' shareholders. Meanwhile, Myers and Majluf (1984) proposed that due to information asymmetry in the market, external financing methods, including debt and equity issuance, tend to be undervalued by investors. For this reason, internal funds are prioritised in the financing hierarchy, and only if the retained earnings are insufficient for the company to take further investment opportunities are external options such as debt and equity suggested to raise further capital. This is also known as the pecking-order theory of capital structure. Therefore, Myers and Majluf (1984) concluded that if a company wants to maximise its profit, the level of debt use should be less in business capital structure. Ghosh (2008) attempted to determine which of the two theories correctly describe the relationship between the amount of debt in capital structure and the profitability of the firms listed on the NYSE and NASDAQ. Using the data obtained from COMPUSTAT for the period 1985–2003, Ghosh (2008) concluded that companies listed on the NYSE tend to have higher debt ratios than firms listed on the NASDAQ market. Yet, the financial leverage of the NASDAQ firms decreased significantly, while the firms listed on the NYSE remained relatively steady for the period 1985-2003. Additionally, while the correlation between firm performance and financial leverage in the capital structure of firms listed on the NYSE was strongly evident, such a relationship was not proven in the NASDAQ market. This thus provides convincing evidence for the theory of Myers and Majluf (1984).

Regarding the agency cost issue which refers to the management conflicts of benefits between various stakeholders of business such as debtholders, shareholders, and managers, Myers (1977) and Berger and Patti (2006) have contributed significantly to the debate in the literature. Indeed, this issue can be primarily mitigated by changing the financing method for capital structure. Myers (1977) said that the conflicts resulting from agency cost can significantly affect the profitability of the business. This is also regarded as a considerable problem that can influence business performance. In fact, Myers (1977) found that a higher level of financial leverage in the financial structure of a business will lead to a reduction in conflicts between shareholders and managers regarding the investment decision process. A high-geared firm, meanwhile, will also tend to decrease the agency costs due to the threats of a higher level of bankruptcy costs (Grossman and Hart, 1982) and a higher level of interest expenses (Jensen, 1986). Considering the funds raised for a new investment project, as indicated by Myers (1984), companies should prioritise considering debt financing first, especially low-risk debt, rather than equity due to the existence of information asymmetry. Indeed, outside investors tend to be less able to access business information than the internal board of management regarding the value of and capacity of fixed assets, which might lower their confidence regarding the financial performance of the proposals, which means that share price can be undervalued compared to its real value. Berger and Patti (2006) have successfully concretised the agency-cost issue raised between shareholders and managers by conducting an empirical study on capital structure and financial efficiency with a focus on the sample of 695 commercial banks in the US during the period from 1990 to 1995 with research methods adopted by the verification of the agency-cost theory. The financial theory advocated that the financing method plays a crucial role in "mitigating the agency costs of outside equity and increases firm value by constraining or encouraging managers to act more in the interests of shareholders" (Pratomo and Ismail, 2006). The conclusion of Berger and Patti

(2006) was strongly consistent with that of Myers (1977, 1984) and also supported the agency-cost theory, which implied that a higher rate of gearing in capital structure decreases the agency costs of equity and improves the financial performance of banks accordingly.

On the other hand, Agnihotri (2014) proposed another view on the matter which significantly considered the business strategy, meaning that capital structure choice should be considered based on the specific development strategy of the management board. The author also pointed out that the influences of leverage on firm performance can also be affected by the growth of the industry. Certain business strategies such as low-cost or unrelated diversification were supposed to be funded by debt financing which can help reduce the overall cost of capital. In addition, strategies that have higher risks such as market penetration, product differentiation, or innovation can be funded by premium share issuance to maintain the costs of capital at a low level. In particular, when the market undergoes an uncertainty process, these kinds of strategy should be funded by equity issuance. By contrast, when the market is stable and fully mature, debt financing is considered to be the reasonable option for hybrid and related diversification strategies to minimise the overall cost of capital.

3.3.4.2. Firm growth and profitability

In the literature, firm growth studies have mostly concentrated on empirical data investigation based on the framework of Gibrat’s Law (Gibrat, 1931). Accordingly, the firm growth model follows a random walk. As such, the studies conducted by Giotopoulos and Fotopoulos (2010) and Coad *et al.* (2018) firmly concluded a positive relationship between firm age and business growth for young firms only. Old firms follow the growth path of a random-walk stochastic process and ensuring continued growth in the following financial years is difficult. Considering firm size as a variable, Canarella and Miller

(2018) indicated a non-linear and concave-in-size correlation between firm growth and size. Most of the research in terms of business growth has concluded that persistence in profit strongly confirmed that business profitability will converge at a specific level for all companies within the data collected in their research sample and that no enterprise can remain profitable above the average rate in the long-term. Nevertheless, a number of studies have found profit persistence with regards to different industries and timescales and have derived a conclusion which contradicts that of the neoclassical economic model of perfect market competition (Mueller, 1990; Cable and Mueller, 2008; Goddard *et al.*, 2013; Pattitoni *et al.*, 2014; Tsoulfidis *et al.*, 2015). Recent studies by Amidu and Harvey (2016) and Gugler and Peev (2018) concluded that the 2008 global economic crisis significantly reduced the level and speed of profit persistence. The correlation between firm growth and profit drew the attention of key financial scholars worldwide and has implications for the theory of economic development (Schumpeter, 1934), the theory of entrepreneurship (Kirzner, 1979), or the theory of firm growth (Penrose, 1959). As a result, the majority of economists and researchers have admitted that profitability maximisation and firm growth are the most critical combined objective of any firm (Jang and Park, 2011).

3.3.4.3. Firm growth and capital structure

Regarding the literature on firm growth and financial leverage and other related factors, especially in the context of emerging markets, after the pioneering paper by Modigliani and Miller (1958), there has been a general consensus in research and discussion on the topic that financial leverage/capital structure is considered as one of the biggest influencing elements in terms of firm growth (Bei and Wijewardana, 2012). This includes studies such as Gupta (1968), Jensen and Meckling (1976), Ross (1977), Scott (1977), Bowman (1979), Senbent and Traggart (1984), Myers and Majluf (1984), Titman and Wessels (1988), Titman (1984), and Rajan and Zingales (1995).

As mentioned in the previous part of the literature review, one of the most typical definition streams for firm growth is about the growth rate of business sales/revenue. As such, Myers (1977, 1984), with the pecking-order theory of capital structure, can be recognised as one of the first scholars to discuss the relationship between capital structure and firm growth – measured by sales – and to indicate the benefit of financial leverage on the growth potential of firms. This view is supported by a later study, a comprehensive review conducted by Harris and Raviv (1991) which showed that the financial leverage ratio tends to increase along with a higher level of firm growth opportunities. In another paper, Opler and Titman (1994) indicated that sales growth has a negative relationship with financial leverage in smaller firms, especially firms operating in distressed industries. However, when the authors extended the sample and split them into groups based on firm size, they found a contradictory conclusion, that for large firms the impact of leverage is positive, especially for firms that are not in distressed industries. Sharpe (1994) also found evidence that sales growth has a significant impact on employment depending on financial leverage. In particular, employment of high-gearing firms has limited influence on sales growth during a period of economic recession. This means that there is an interrelationship between sales growth, employment growth/reduction, and capital structure.

While the majority of papers in the field of capital structure study have investigated the relationship between financial leverage and firm value or profitability, the matter of firm growth has received very little consideration from scholars. One of the most typical papers regarding the capital structure and firm growth was the study conducted by Bei and Wijewardana (2012), which was based on the data set of 30% of 13 sectors in the Sri Lanka market which had been collected from the published annual reports of companies during the decade from 2000 to 2009. The authors concluded that a positive impact of financial leverage on firm growth – with sales revenue as proxy for growth – is evident, although the authors still pointed out several negative signals for the future growth of companies in the sample, which would require another overall study with a larger sample size and various measures of growth.

As mentioned in the previous part of the literature review, a range of determinants affecting financial leverage have been discussed in detailed. Among them, growth is regarded as the most controversial factor (Titman, 1984). According to Hampton (1993), firm growth is defined as the changes in the percentage of several measures, such as total assets, sales revenue, and operating profits. Another paper, by Huynh and Petrunia (2010), concerning the matter of age effects, financial leverage, and firm growth has indicated that there is a positive correlation between firm growth and financial leverage, with growth measured by growth of sales with respect to four age groups. The study was conducted with a unique administrative dataset of companies in Canadian manufacturing industry, with a special focus on new firms which had been in operation in the market for less than 10 years. Based on their data and analysis, firms w had been operating for less than four years witnessed a strong correlation between sales growth and financial leverage, while the correlations in other groups were lower.

In fact, with the changes in sales revenue being employed as a measure of firm growth, the literature shows significant evidence for a positive correlation between sales growth and financial leverage, especially when it comes to emerging markets. Therefore, the first hypothesis of this study is as follows:

H_{10}: There is a positive relationship between financial leverage and sales growth.

In another perspective of firm growth, the paper by Liow (2010) attempted to examine the key financial aspects of successful listed companies in a global integration process collected from 24 emerging markets during the period 2000–2006 with a focus on the real estate industry. The main objective of the study was to assess the inter-relation among growth, profitability, and financial leverage as the three features to determine firm value. Although Liow (2010) focused only on the real estate market, which might diminish the generalisability of the research outcome, the focus on emerging markets is sufficiently useful to be reviewed in this study. Liow (2010) concluded a huge reliance of listed companies on financial leverage to sustain a high level of business-growth rate – which is measured by the changes in total assets. This was listed by the author as the actual growth rate of the company to distinguish it from the sustainable growth rate, which is calculated by multiplying the ROE and the earnings-retention ratio. In contrast to this view, Chung (1993) analysed the correlation between firms' asset characteristics, measured by total assets and the fixed-asset ratio, and financial leverage. The study found that firms that have more growth opportunities will witness a tendency to use less of both short-term and long-term debt in the capital structure. However, within the context of an emerging market, Liow (2010) delivers a more similar background of empirical results to Chung (1993). Thus, the second hypothesis of this study is proposed as follows:

H_{11}: There is a positive relationship between financial leverage and total asset growth

Regarding the literature on operating profit as a proxy for firm growth, Bei and Wijewardana (2012) conducted a study on the inter-relation of financial leverage, firm growth, and financial strength. The paper was conducted in the context of Sri Lanka as a typical emerging market with similar features to Vietnam during the period 2000 to 2009. In this study, financial leverage was measured by the total-debt ratio and the long-term debt ratio, and firm growth was proxied by the changes in percentage of operating profit and sales revenue. The results strongly indicated a positive correlation between operating profit growth and total debt ratio at a significance level of 5%, while there is no evidence of correlation for long-term debt. Additionally, operating profit growth was employed by Arasteh *et al.* (2013) in a study of Iranian listed firms using a panel-data analysis approach during the period 2007–2011. However, the authors provided contradictory findings to those of Bei and Wijewardana (2012), finding a negative relationship between the total-debt ratio and operating-profit growth. Nevertheless, this research project will develop the third hypothesis based on the study of Bei and Wijewardana (2012) due to the similarity in dataset and the context of an emerging market economy. The hypothesis, therefore, is as follows:

H_{12}: There is a positive relationship between financial leverage and operating profit growth

Studies of Titman (1984) and Jensen and Meckling (1976) also revealed that opportunities for business growth are a significant indication of the issue of the agency problem when issuing debt. The authors stated that firm growth is the proxy of available internal funds and clearly explained that if the firms operate well and make profit, it should have enough funds available internally for the next operation period. Further discussion of Jensen and Meckling (1976) and Myers (1977) about financial leverage and firm growth opportunities focus on the fact that when businesses have a high level of risky debt outstanding and when board of management prefers to maximise the equity value rather than firm value, the business will have a higher motivation to under- or overinvest in business future growth opportunities. In a paper by Billett *et al.* (2007), the authors discussed the growth opportunities regarding the firm’s investment opportunity with respect to their choice of financial leverage, debt maturity, and covenants. Based on a dataset including the debt covenant information, the authors firmly concluded that there is a negative correlation between financial leverage and firm growth opportunities within the covenant protection information. According to this approach, including the covenant information in the research model plays a crucial role in mitigating the agency problem that arises through debt financing for high growth firms. Indeed, Billett *et al.* (2007) clearly explained that due to the loss of firm value (thanks to the interest of the board of management), which contributed to the suboptimal investment decision, the problem of agency cost would increase remarkably. The increase in agency cost is also the result of a covenant mechanism used to mitigate the conflict between internal and external stakeholders of the business. These two elements constituting the rise of agency costs are known as short-term-debt and restrictive-debt covenants. Without the existence of such covenants, debt issuers would expect certain conflicts and thus require higher costs for debt lending. In this case, as stated by Billett *et al.* (2007) the recommendation is to use less debt financing in firms' capital structure, which means the authors expected that companies with a higher growth rate and future opportunities will have a tendency to use less financial leverage to finance their projects.

According to Billett *et al.* (2007), although the topic of capital structure has been widely discussed in the finance literature, the relation between firm growth and financial leverage still lacks the attention of scholars. However, it can be clearly seen that there are two research streams in the literature, namely, the relationship between growth opportunities and leverage and the relationship between growth opportunities and debt maturity. The results are also debatable. For instance, Rajan and Zingales (1995) found evidence for negative correlation between financial leverage and growth opportunities. In addition, Barclay and Smith (1995) pointed out that debt maturity is negatively correlated with growth opportunities. Yet the later studies, such as those of Barclay *et al.* (2003) and Johnson (2003), have changed their variable measure approach, employing financial leverage and debt maturity as endogenous variables and using a panel dataset with a system of simultaneous equations. Nevertheless, the outcome remained unchanged as the research model continued to present a negative relationship between those financial policy variables and growth opportunities (Barclay *et al.*, 2003).

3.3.5. Empirical studies on the determinants of firm growth

Some of the most crucial determinants of firm growth that have been mentioned in the literature include research and development (R&D), firm size, and liquidity.

Determining and predicting firm growth has drawn the attention of scholars in the finance literature (Zhang, 2018), and most studies in this field have indicated that firm growth variables seem to be heterogenous across firms. This has made it difficult to predict future growth opportunities (Geroski, 2005). In addition, McKelvie and Wiklund (2010) indicated that the range of firm growth determinants researched in the literature is limited. As mentioned by several researchers, the original study about firm growth should be referred back to Gibrat's law of proportionate effect, which proposed that business growth is independent of firm size. Some empirical studies have been conducted to test the idea of Gibrat's law on firm growth. However, the authors found mixed results in different contexts (Sutton, 1997). Innovation has been also noted as a typical determinant of firm growth across industries (Cohen, 2010), yet the empirical papers also presented different findings regarding the impacts of innovation, rendering the area debatable as well.

One of the reasons that scholars have provided for mixed results on the determinants of firm growth is that the dependent variable (firm growth) in the research model is too broad, which, first, can be measured under many different aspects and, second, can be affected by many different factors. For example, the growth of firms can be estimated by sales, employment, total assets, operating profit, or productivity. The independent determinants can vary to include innovation, business cycle, advertising expense, or financial leverage (Martin *et al.*, 2018; Audretsch *et al.*, 2014). Among them, research and development expenses (R&D) are always regarded as the proxy to precisely describe the innovation activities and investment. Nevertheless, Mazzucato and Parris (2015) noted that different types of firm will lead to different conclusions. According to Coad and Rao (2009), Delmar *et al.* (2003), and Hölzl (2009), the attention of scholars tends to focus on high-growth firms, which are mainly SMEs that are believed to be the driving force of a country's economic growth.

The theory of Gibrat's law regression model on firm growth has been expanded to include additional determinants of growth to make the model better fit the specific contexts of the research requirements (Mazzucato and Parris, 2015). Indeed, the correlation between R&D, business innovation, and firm growth has been regarded as one of the most crucial point, helping justify the interrelation of corporate R&D investment and national R&D policy. Various studies have been conducted, yet the results are mixed. For instance, the studies conducted by Capasso *et al.* (2015), Coad and Rao (2009), Del Monte and Papagni (2003), and Nunes *et al.* (2012) concentrating on the amount of R&D investment and its impact on firm growth rate all confirmed that the correlation exists, but that the trend of effect is debatable as to whether it has a positive or negative relationship. When it comes to the bridging approach of assessing the effects of R&D spending on firm profitability, which can be linked to firm growth, the results show significant heterogeneity, with various sample types of business and different characteristics including R&D intensity, innovation persistence, and so on (Falk, 2012; Capasso *et al.*, 2015; Demirel and Mazzucato, 2012; Deschryvere, 2014; Mason and Brown, 2013; Stam and Wennberg, 2009). Therefore, R&D effects on growth should be taken into consideration along with other enterprise factors. For instance, Demirel and Mazzucato (2012) conducted a study of the impact of R&D on firm growth within the context of pharmaceutical industry, in which the barriers to entry are high and R&D activities are significantly dependent on firm size and other elements, such as patent consistency. Falk (2012) indicated that R&D intensity has a strongly positive impact on firm performance in the context of Austrian companies with the least absolute deviation estimator. Deschryvere (2014) considered the issue of innovation persistence to analyse the relationship between R&D investment and business growth, with a strong focus on Finnish SMEs using a vector auto-regression (VAR) model approach. More recent papers have recommended that the research stream focus on fast-growing firms, whether they are large or small business, which will help make full use of the variable measurement to enhance the understanding of relevant growth process; although several challenges might arise, such as difficulty in prediction, lack of persistence, and complicated correlation with other related factors (Almus, 2002; Capasso *et al.*, 2014; Coad *et al.,* 2016; Goedhuys and Sleuwaegen, 2016; Coad *et al.,* 2014; Teruel and De Wit, 2017; Demir *et al.*, 2017; Stam, 2010). Coad *et al.* (2016) found that new and young firms show remarkable positive impacts of R&D on firm performance regarding the upper growth quantile and a negative impact of R&D on firm performance at the lower growth quantile. The paper was conducted based on quantile regression analysis using the data sample of Spanish firms (Coad *et al.*, 2016). In another study of Goedhuys and Sleuwaegen (2016), both high-growth and strongly declining firm groups were taken into consideration, and the authors concluded that there are positive effects on high-quantile companies, while the low-quantile firms show negative effects (Goedhuys and Sleuwaegen, 2016).

Regarding further details of innovation as the independent determinant of firm growth, Chung *et al.* (2019) attempted to determine the impacts of R&D on business growth with sales growth as the dependent variable. The study was conducted with the firm-specific approach of a Korean pharmaceutical industry using the company's data during the 12-year period 2007–2018 and adopting a quantile regression technique. Age, size of firm, and patent persistence were applied as explanatory variables. The authors found that R&D intensity saw significant positive impacts on the sales growth of companies, which represented firm growth as a whole, while R&D showed negative impacts on firm growth at the upper quantile, and the lower quantile showed opposite indication. Firm size, by contrast, demonstrated mixed results, with firm growth at the upper quantile, which means that Gibrat's law theory testing is rejected with respect to the Korean pharmaceutical industry. Meanwhile, firm age has a negative correlation with firm growth regarding the upper quantile, which is significantly coherent with literature showing that young firms grow faster. Finally, patent persistence produced the opposite result, with a negative correlation with firm growth at the upper quantile and positive correlation at the lower one. From this, the study of Chung *et al*. (2019) indicated that new and young firms or firms with high level of R&D intensity displayed a high level of growth rate, while the correlation of the model was not clear at the lower quantile.

In terms of measuring firm growth, a variety of indicators have been mentioned in the literature. For instance, sales revenue has been used in numerous papers, such as Del Monte and Papagni (2003); Billett *et al.* (2007); Bottazzi *et al.* (2009); Coad and Rao (2009); Mudambi and Swift (2011); Demirel and Mazzucato (2012); García-Manjón and Romero-Merino (2012); Nunes *et al.* (2012); Wu and Yeung (2012); Delmar *et al.* (2013); and Lee, (2014). Operating income has also been employed to measure firm growth in multiple studies, including Del Monte and Papagni (2003) and Coad and Rao (2009). In addition, R&D expenses can be also used to estimate the growth rate of a business (Billett *et al.*, 2007; Coad and Rao, 2009). Finally, the number of employees was also adopted as a firm-growth estimator in several papers, such as Del Monte and Papagni (2003); Yang and Huang (2005); Stam and Wennberg (2009); Coad and Rao (2009); Lee (2014); and Cintio *et al.* (2017).

Additionally, R&D itself has been examined as a determinant of various dimensions of firm growth, and the relationship was proved to be positive in most cases (Del Monte and Papagni, 2003; Yang and Huang, 2005; Stam and Wennberg, 2009; García-Manjón and Romero-Merino, 2012; Nunes *et al.*, 2012; Cintio *et al*., 2017). In particular, the papers by Del Monte and Papagni (2003) and García-Manjón and Romero-Merino (2012) have pointed out that the higher the R&D spending, the higher rate of sales growth, as a representative measure of firm growth. Yang and Huang (2005) found that the number of employees also was positively affected by the R&D expenditures of companies. Meanwhile, Coad and Rao (2009) conducted a more comprehensive study and found that both sales and employment rate increased according to the higher R&D spending, although business income was not affected. These variables were also adopted by Stam and Wennberg (2009) with the special sample focusing on the technology perspective, and the observationsbeen divided into high-tech and low-tech companies. The authors also found a positive impact of firm growth with respect to high-tech businesses, while the correlation was proved to be negative for low-tech ones. Similar findings were reported by Nunes *et al.* (2012), who found that high investment in R&D resulted in higher growth for high-tech firms and that this was less likely for lower-tech firms and SMEs. The pharmaceutical industry was considered by Demirel and Mazzucato (2012), who divided their sample into small firms and large firms (firm size was estimated by total assets) and revealed that R&D spending had a positive relationship for the category of small firms, while the result is negative for larger firms. In some cases, firm growth is also used as an independent variable, which is believed to positively influence profitability (Delmar *et al.*, 2013; Lee, 2014).

In a recent study, Spescha (2019) examined the efficiency of R&D expenditure to be used by Swiss firms using panel data for the period 1995–2012. The paper attempted to assess the empirical correlation between firms' R&D spending and their growth rate of sales revenue. Given their large sample size and richness of financial information of the data, the authors divided the data into various groups based on firm size, firm age, and quantity of firms in each industry to derive a broader conclusion for a specific group of companies. As such, the result showed that firm size made the difference, as smaller firms had a more positive correlation between R&D and firm growth, rather than large-firm group or firm age. The authors argued that smaller firms tend to make full use of R&D activities due to their greater growing space. The study also determined that the industry which contains a greater quantity of small firms will show a better positive correlation between R&D expenditures and firm growth. The conclusion regarding the growth rate of small firms and its correlation with R&D can be understandable in that large firms with modern technology and a market understanding tend to more closely approach their limits and must spend enormous sums on R&D in order to find out a breakthrough, which is not the case for small firms, which require much less R&D spending to learn and to adapt their technology and market understanding.

Employing firm productivity as a measurement of growth, Crépon *et al.* (1998) proposed a two-step model in which the authors explained that R&D spending first results in innovation output such as patents, and only then boosts productivity directly, as measured by added value over number of employees. In fact, Crépon *et al.* (1998) found a significant correlation between R&D expenditures and the number of registered patents, which is mostly one to one. Yet the actual values created by patents are highly right-skewed (Egger *et al.*, 2016). Egger *et al.* (2016) also pointed out that most patents contributed little profitability impact and only a small number of patents can have a large impact on profitability. The issue is explained by Egger *et al.* (2016) who emphasize that extra R&D expenditure can only lead to increase of patents with minor value only. This explanation implies that the model conclusion of Crépon *et al.* (1998) has been overestimated by assuming that a higher number of registered patents is directly linked to greater productivity. Thus, it is recommended that the raw numbers of granted patents be understood to not directly generate profits for firms. Only the commercialisation of the resulting innovations in the form of sales growth does.

3.4. Chapter summary

This chapter has introduced a broad theoretical framework on capital structure, starting with its origins in Modigliani and Miller’s (1958) theory. Modigliani and Miller (1963) then relaxed some assumptions by including the taxation factor in their model. Later, Miller (1977) proposed a trade-off theory on capital structure, stating that companies trade off the positive and negative impact of debt financing to raise capital. Besides, Myers and

Majluf (1984) developed the pecking-order theory based on the asymmetry of information among internal stakeholders (owners and managers) and external providers of the firm. Finally, Jensen and Meckling (1976), Jensen (1986), and Hart and Moore (1994) proposed agency theory of capital structure which took into account the business conflict between the management, stockholders and bond holders.

Additionally, a survey of existing empirical studies about testing capital structure theories and the impact of capital structure on firm growth was also conducted. In specific, Briozzo *et al.,* (2016) and Martinez *et al.,* (2017) found evidence to support the pecking-order theory of capital structure and recommended that internal funds should be prioritised to be used first and pay off debt as soon as possible. On the one hand, many scholars relaxed the theoretical framework of capital structure by concluding a situational financing decision in which the firm should pay attention to the changes of the economy as well as investment opportunities to decide the appropriate structure (López-Gracia and Sogorb-Mira, 2008; Degryse et al., 2012; Aybar-Arias et al., 2012; Serrasqueiro and Maças Nunes, 2012). On the other hand, the literature proposed another tendency of capital structure consideration which can combine both pecking-order and trade-off theory (Gaud *et al.,* 2007; Hovakimian and Li, 2011; Titman and Tsyplakov, 2007). It can be said that there is mixed evidence for the application of capital structure theories in practice.

Based on the literature review, this thesis will conduct 3 different studies to fully assess all the related aspects of capital structure. The first study of empirical part will be presented in chapter 5, which focuses on target capital structure. Indeed, the foundation of dynamic capital structure will be firstly developed in this chapter as the premise for further empirical part. The second empirical study in chapter 6 analysed the determinants of capital structure of listed Vietnamese firms by using the dynamic capital structure model used in chapter 5. The final empirical study will be presented in chapter 7, which evaluate the impact of capital structure on business growth.

In order to ensure that the research findings are consistent with the literature, twelve hypotheses were proposed based on the empirical review of literature as well as capital structure theories discussion. These will be tested in three different capital structure studies including target capital strucgure, determinants of capital structure, and impacts of capital structure on growth. As the results, rather than directly testing the capital structure theories as mentioned and reviewed in Section 3.2, the models' estimations findings will be indirectly related to the existing capital structure theories. The summary of hypotheses that will be tested in the empirical studies of this thesis is presented as follows.

Overall, the review of the literature on the empirical studies testing the various theories, as well as the empirical results of these studies will serve as the basis for the research methods and models proposed in the next chapter.

Table 3.1: Summary of hypotheses

Target capital structure	
H_1: 'Distance' has positive relationship with adjustment speed towards target capital structure	Banerjee *et al.* (2004), Loof (2004), Yeh (2011), Drobetz and Wanzenried (2006), and Qian *et al.* (2007) Haas and Peeters (2006)
H_2: Firm size has positive relationship with adjustment speed towards target capital structure	Banerjee *et al.* (2004), Loof (2004), Drobetz and Wanzenried (2006)
H_3: Growth opportunities has positive relationship with adjustment speed towards target	Drobetz and Wanzenried (2006), Banerjee *et al.* (2004)
Determinants of capital structure	
H_4: Firm size has positive relationship with financial leverage	Fischer *et al.* (1989), Chang and Rhee (1990), Chen *et al.* (1998), Banerjee *et al.* (2004), Bevan and Danbolt (2001), Fattouh *et al.* (2002), Padron *et al.* (2005), Gaud *et al.* (2005), Tomak (2013)
H_5: Liquidity has positive relationship with financial leverage	Frank and Goyal (2009), Welch (2011), Ramli *et al.* (2019), Nguyen and Ramachandran (2006), Biger *et al.* (2008), Nguyen *et al.* (2014), Ozkan (2001)
H_6: Profitability has negative relationship with financial leverage	Pandey (2001), Antoniou *et al.* (2002), Huang and Song (2002), Deesomsak *et al.* (2004), Taub (1975), Fattouh *et al.*, (2002), and Wiwattanakantang (1999)
H_7: Tangibility has positive relationship with financial leverage	Frank and Goyal (2009), Fauzi *et al*. (2013), Jensen and Meckling (1976), Jensen *et al.* (1992), Rajan and Zingales (1995), Bevan and Danbolt (2001), Wahab *et al.* (2012), Wahab and Ramli (2014), Wiwattanakantang (1999), Booth *et al.* (2001), Okuda and Lai (2012), Nguyen *et al*. (2014)
H_8: Growth opportunities has negative relationship with financial leverage	Rajan and Zingales (1995), De Miguel and Pindado (2001), Chen and Jiang (2001), Bevan and Danbolt (2001), Drobetz and Fix (2005), Nguyen and Neelakantan (2006), Kim and Sorensen (1986), Long and Malitz (1985), Rajagopal (2010) and Yang *et al.* (2010)
H_9: Non-debt tax shield has negative relationship with financial leverage	De Miguel and Pindado (2001), Mackie-Mason (1990), Demirguc-Kunt and Maksimovic (1996), Schargrodsky (2002), Akhtar and Oliver (2009) and Zabri (2012)
Impact of capital structure on firm growth	
H_{10}: There is a positive relationship between financial leverage and sales growth.	Bei and Wijewardana (2012), Hampton (1993), Huynh and Petrunia (2010).
H_{11}: There is a positive relationship between financial leverage and total asset growth	Liow (2010) and Chung (1993)
H_{12}: There is a positive relationship between financial leverage and operating profit growth	Bei and Wijewardana (2012) and Arasteh *et al.* (2013)

CHAPTER 4

RESEARCH METHODOLOGY

4.0. Introduction

This chapter presents the main methodological concepts used in this research, including the research paradigm, the quantitative variables, the empirical research model, and the model analysis approach. The chapter is divided into three main sections. Section 4.1 briefly outlines the existing research paradigms, providing a brief look at ontology and epistemology. The application of the research paradigm to this thesis is also specified clearly at the end of the section. Section 4.2 discusses the variables adopted by this thesis with a detailed justification of the author's choice. The range of variables include dependent variables, explanatory variables, and control variables. Section 4.3 clarifies the model analysis approach, mentioning the quantitative and qualitative approach and justifying how they are applied in this thesis.

4.1. Research paradigm

A research paradigm refers to a set of very general philosophical assumptions about the nature of the world (ontology) and how people can understand it (epistemology). These are assumptions that tend to be shared by researchers working in a specific field or tradition (Maxwell, 2005). Paradigms also typically include specific methodological strategies linked to these assumptions and identify particular studies that are seen as exemplifying these assumptions and methods (Maxwell, 2005).

4.1.1. Ontology

From the perspective of social-scientific research, an objective ontology assumes that reality exists independently of people's comprehension of it and that it is possible to establish and explain universal principles and facts through robust replicable methods. In contrast to an objective stance, a subjective ontology assumes that people's perceptions shape reality, a belief expressed in large sections of the social sciences (O'Gorman and MacIntosh, 2016). A subjective ontology sees facts as culturally and historically located and therefore subject to the variable behaviours, attitudes, experiences, and interpretations of both the observer and the observed.

On the basis of the theoretical research paradigm, the objective ontology is followed in this research for the following reasons. First, capital structure and business growth exist independently of people's comprehension of them. Second, although the object of study in this research is the gearing level and growth of businesses, which are not solid objects, they can all be measured and tested numerically in detail.

4.1.2. Epistemology

According to O'Gorman and MacIntosh (2016), epistemology concerns the way in which people obtain valid knowledge. These authors specified four epistemological positions, namely, positivist, critical realist, action research, and interpretivist. Collins (2010) and Saunders and Thornhill (2007) also listed four common research epistemological approaches: positivism, interpretivism, realism, and pragmatism. Although there are others, in recent studies, most researchers have focused more on positivism and interpretivism (ontological and epistemological perspectives), which increased the difficulty of identifying which is the most appropriate philosophy for their studies.

According to Fisher *et al.* (2004), positivism research philosophy indicates an approach to achieve true knowledge through scientific observation and analysis. In other words, this refers to the research approach that scientists tend to use their points of views to evaluate and solve the social problems with the help of objectivity (Cooper and Schindler, 2006).

According to Saunders *et al.* (2009), an interpretivist philosophy refers to "understanding the meanings and interpretations of 'social actors' and to understand their world from their point of view, is highly contextual and hence is not widely generalizable". In other words, Collins (2010) said that interpretivism does not emphasise reporting on a real objective, but instead focuses on justifying the world as it is experienced.

According to O'Gorman and MacIntosh (2016), the interpretivist paradigm considers the multiple realities which are inevitably revealed by the perspectives of different individuals, the contextual understanding and interpretation of the collected data, and the nature of the researcher's involvement. In other words, interpretivism emphasises on understanding what is occurring in a specific context rather than simply measuring it (Patton, 1990; Klein and Myers, 1999).

From the discussion above, a positivist paradigm is believed to be suitable in this research for the following reasons. First, this research will be conducted by testing systematic and statistical data, which is directly relevant to the positivist philosophy. Second, the author will attempt to reduce the financial phenomena of publicly listed firms to the simplest elements (business risks, profitability, growth, or productivity). Third, based on the literature review and the research rationale, hypotheses are formulated and tested. Finally, Fisher *et al.* (2004) described positivism as a philosophy which aims to approach true knowledge through observation and analyses via scientific method. Moreover, it is necessary to collect data about the stock market over a long period and to use statistical methods to analyse the data. Meanwhile, Alolo (2007) argued that a quantitative approach is a principle of a positivist perspective and is appropriate for cross-sectional research, which covers a representative sample and the collection of large amounts of data. Hence, positivism can be considered the main epistemological paradigm to be applied in this research.

4.2. Variable measurement

As mentioned at the end of Chapter 3, this thesis will conduct 3 different empirical studies in the field of capital structure. Therefore, this section provides thorough measurement approaches for all variables to be used in model estimation of Chapter 5, 6, and 7. It is notable that some variables will be used not only once but in different empirical chapters.

4.2.1. Target capital structure study

The dynamic capital structure model is firstly built in Chapter 6 of the thesis as the foundation of the empirical analysis. Thus, the research model of this study will comprise all the related capital structure determinants that were discussed in Chapter 3. It includes lagged leverage, firm size, liquidity, profitability, tangibility, growth opportunities, non-debt tax shield, and innovation. The dependent indicators measuring financial leverage in this study will be total market debt ratio and total book debt ratio. The use of these measurements was employed by Hovakimian et al. (2001), Antoniou et al. (2008), Byoun (2008), Huang and Ritter (2009), Fan et al. (2012) and Matemilola et al. (2018) in empirical studies of capital structure choice or determinants of capital structure. The equations are as follows.

$$Market\ debt\ ratio = \frac{Total\ liabilities}{Total\ liabilities + Market\ capitalisation}$$

$$Book\ debt\ ratio = \frac{Total\ liabilities}{Total\ liabilities + Equity}$$

Since the panel data of the thesis comprise 813 firms across 10 years of period, which is considered as a short-panel dataset, the analysis expects that the variation between cross-sectional observations will dominate the variation within individual cross-sections. Therefore, the lagged leverage ratio will be added as an independent variable to build the dynamic capital structure model. The other independent indicators of the model will be further discussed in the following section.

4.2.2. Determinants of capital structure study

A precise measure of financial leverage is the debt to total assets ratio, in which short-term and long-term debt should be employed separately since they reserve different business objectives. This measure, however, fails to incorporate the fact that some assets are offset by specific non-debt liabilities (Rajan and Zingales, 1995). For instance, financial leverage measured by this approach can be reduced if there is a rise in the gross amount of trade credit. Therefore, since the value of accounts payable and accounts receivable is significantly affected by industry characteristics, it is suggested by Rajan and Zingales (1995) to apply a measure of financial leverage that excludes the gross value of trade credit.

Additionally, financial leverage can also be measured by the total debt to net assets ratio, where net assets are defined as total assets minus total liabilities. Although this measure is not influenced by trade credit, it is affected by several financial elements that may not be related to financing process. For instance, assets held against pension liabilities can decrease this measure of leverage. Thus, the effects of financing decisions are probably best illustrated by the ratio of total debt to capital, where capital is defined as total liabilities plus equity.

In other words, this paper uses as the independent variables the debts measured by the book value of liabilities, with short-term and long-term market debt used to better characterise the role of each type of debt. The debt variables are derived based on the ideas of Flannery and Rangan (2006) to consider the capital capacity of the firm and are illustrated in the equation as follows:

$$STD = \frac{Short - term\ debt}{Total\ liabilities + Equity}$$

$$LTD = \frac{Long - term\ debt}{Total\ liabilities + Equity}$$

$$TD = \frac{Total\ liabilities}{Total\ liabilities + Equity}$$

Based on the literature review in Chapter 3, the list of determinants of capital structure should include firm size, liquidity, profitability, tangibility, growth opportunities, and non-debt tax shield. (Jensen, 1986; Titman and Wessels, 1988; Stulz, 1990; Rajan and Zingales, 1995; Ozkan, 2001; Myers, 2003; Esperança *et al.*, 2003; Vieira and Novo, 2010; Cabaço, 2010). Specifically, firm size was widely discussed by scholars as a crucial factor affecting capital structure choice of business (Titman and Wessels, 1988). Most of studies confirms a positive relationship between size of firms and long-term debt and negative sign in case of short-term debt (Michaelas *et al.*, 1999; Hall *et al.*, 2000; Esperança *et al.*, 2003; Vieira and Novo, 2010). The authors indicated that large firms tend to have lower transaction cost of financing and be more diversified which made it easier for them to get access to cheap loans from debt issuers than smaller firms. Therefore, based on the study of Titman and Wessels (1998) and Hall *et al.* (2000), firm size of Vietnamese listed companies will be measured by taking logarithm of firm's total asset. The calculating function is as follows.

$$Size = ln\ (Total\ Assets)$$

In the literature, the relationship between liquidity and firm performance has been widely discussed, and a positive correlation is indicated. For instance, Cho (1998) concluded that liquidity is regarded as one of the typical signals of firm profitability and performance, as firms that have a high liquidity ratio tend to have more cash for new projects and investments, or to mitigate issues of financial distress. Therefore, this study includes liquidity (LQ), measured in terms of current assets ratio, as another control variable, since it helps control for industry-related, firm-specific, and business-cycle factors. The ratio is calculated as current assets over current liabilities:

$$Liquidity = \frac{Current\ assets}{Current\ liabilities}$$

In terms of profitability, it was mentioned by pecking order theory of capital structure (Myers, 1984) that more profitable firms have tendency to prioritise using retained earnings as the main source of finance before considering external sources. Therefore, a negative correlation between profitability and financial leverage is expected (Michaelas *et al.*,1999; Hall *et al.,* 2000; Esperança *et al.,* 2003; Mira and Garcia, 2003; Cabaço, 2010; Vieira and Novo, 2010). Based on these past studies, profitability can be measured in several ways such as by Returns on equity (ROE), Returns on Assets (ROA), or Tobin's q (Myers, 1984; Michaelas *et al.*,1999; Hall *et al.*, 2000; Esperança *et al.,* 2003; Mira and Garcia, 2003; Cabaço, 2010; Vieira and Novo, 2010). However, the most popular method is ROE; especially for the case of capital structure research since it reflects the ability of a company to take advantage from equity (as a part of capital structure) to generate profit. Therefore, ROE will be employed in this study to measure profitability of Vietnamese listed firms. The formula is as follows:

$$Profitability = \frac{Net\ profit}{Ordinary\ stock}$$

Regarding the asset structure, Ramaswamy (2001), Frank and Goyal (2003), Jermias (2008), and Ebaid (2009) suggested that firm size may influence its performance: larger firms may have more capacity and capabilities. Therefore, tangibility (TAN; asset structure) will also be introduced as a control variable, calculated as a ratio of net fixed assets to total assets. This study uses the logarithm of the tangibility ratio as one of the major variables for the determinants of capital structure study. The formula is as follows:

$$Tangilibity = \frac{Fixed\ assets}{Total\ assets}$$

Regarding growth opportunities as determinants of capital structure, a negative correlation between this regressor and financial leverage is expected since they simply measure the possibilities of firms to grow in the future and cannot be used as collateral for debt issuers (Hovakimian *et al.,* 2001; Raja and Zingales, 1995; Holmes and Kent, 1991). However, there are several studies confirming a positive sign of growth opportunities (Mira and Garcia, 2003; Cabaço, 2010; Michaelas *et al.*, 1999). Hence, the empirical effect of this variable remains debatable. Therefore, since it was widely used by scholars as a determinant of capital structure, this will be included in the model estimation of this study. The most common way to evaluate the growth opportunities is the market to book ratio (Hovakimian *et al.*, 2001; Raja and Zingales, 1995; Holmes and Kent, 1991). It was argued that the higher of market to book ratio, the larger opportunity for firm to grow. Danbolt *et al.* (2010) mentioned various form of market to book ratio as it can be equity market-to-book or total asset market-to-book. Since logarithm of Total asset was already employed as measurement for firm size, this study will consider equity market-to-book perspective, which is also known as price to book ratio. The formula is as follows:

$$Growth\ opportunities = \frac{Market\ capitalisation}{Book\ value\ of\ equity}$$

Finally, non-debt tax shield elements such as depreciation, business provision, or allowances for doubtful accounts will also be employed as determinant of capital structure choice. This factor is expected to have negative effect on the use of financial leverage suggested by DeAngelo and Masulis (1980), Michaelas *et al.* (1999), and Mira and Garcia (2003). Based on these past studies, the non-debt tax shield of Vietnamese listed firms will be calculated as follows:

$$Non - debt\ tax\ shield = \frac{Depreciation\ expense}{Total\ assets}$$

4.2.3. Capital structure and firm growth study

Growth literature shows that there are many theories on firm growth. However, there is no convergence or cohesion among these theories. This might be due to the fact that the definition of a firm is different in each of these theories, based on different views (classic economics theories, behavioural theories, dynamic growth, and organisational learning models). In the literature, most business growth studies have been based on the work of Penrose (1959), who suggested that enterprises are a bundle of internal and external resources which help achieve competitive advantage.

In terms of measuring firm growth, there are many approaches on how to identify the main determinants underlying the firm growth. One aspect of theories addressing the effect of firm size and firm age on business growth was proposed by Evans (1987), Heshmati (2001), and Morone and Testa (2008), and a second aspect deals with the effect of internal business variables such as strategy, organisation, and the characteristics of the enterprise’s owners on firm growth (Fazzari *et al.*, 1988; Lumpkin and Dess, 1996; Freel and Robson, 2004).

To broaden the first set of theories, Mateev and Anastasov (2010) found that an enterprise’s growth is related to size as well as to other specific characteristics such as financial structure and productivity. The authors further indicated total assets to have a direct impact on the growth of sales revenue, while the number of employees, investment in R&D, and other intangible assets do not have much influence on the enterprise's growth prospects. Consistent with this conclusion, in a study conducted by Soumadi and Hayajneh (2012) about the relationship between capital structure and firm performance, firm size was also mentioned as an important variable which can lead to the differences in the research model due to the differences in the characteristics of large and small firms.

According to Geroski (1995), by contrast, the best variable for measuring firm size is the number of employees. As Kimberley (1979) indicated, employment, measured by number of employees, is the one of the best indicators for firm size. The author argued that employment reflects the organisation of internal management to adapt to changes in activity. Additionally, this indicator is more suitable for internal studies using financial accounting data since employment is not sensitive to external macroeconomic factors such as inflation, interest rates, or currency exchange rates. Penrose (1959) also insisted that employment rate is an ideal indicator to represent organisational complexity and to analyse the implication of firm growth. The only problem involved with the use of employment rate as indicator to measure growth is that it cannot capture the changes in labour productivity. Ardishvili *et al.* (1998) and Delmar (1997) found some similar growth indicators used in the empirical literature, such as the stock market value, the number of employees, the sales revenue, the productive capacity, the value of production or the added value of production.

Hence, from the review above-mentioned, it can be confidently confirmed that the number of employees has been effectively used as proxy for firm growth. However, it has never been employed as a dependent variable to be affected by financial leverage, which means that it is unable to be part of a significant hypothesis regarding the relationship between employment growth and capital structure based on the review of finance literature. However, production function has always been adopted as the general basis for empirical economic growth modelling process. The production function is a function that indicates the dependence of the output on the inputs. In other words, in the production function, the dependent variable is the output, while the independent variable (or the explanatory variable) is the input. This relationship can be expressed as a general function as follows:

$$Y = F(X)$$

where Y is the output and X is the input factors of the economy or business, which might include capital (K), labour force (L), land and natural resources (N), and human capital (H). In classical macroeconomics, the Cobb–Douglass production function expresses the value of GDP depending on the number of employees and the amount of capital as follow:

$$Y = L^{\alpha} K^{\beta}$$

where α and β are the elasticity coefficient for labour force and capital inflow, respectively. Figure 4.1 presents the isoquant curve as an optimal scale increase, and Figure 4.2 shows the potential development of Y as α and β change.

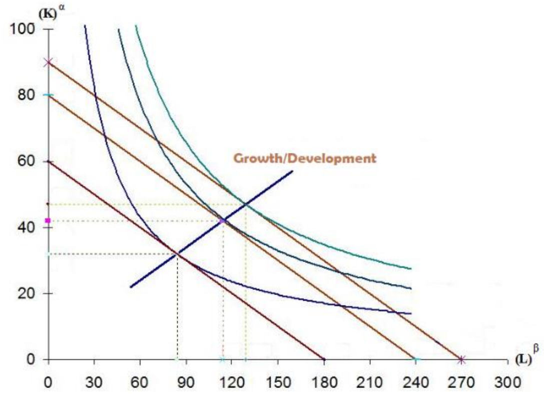


Figure 4.1: Cobb-Douglass production function

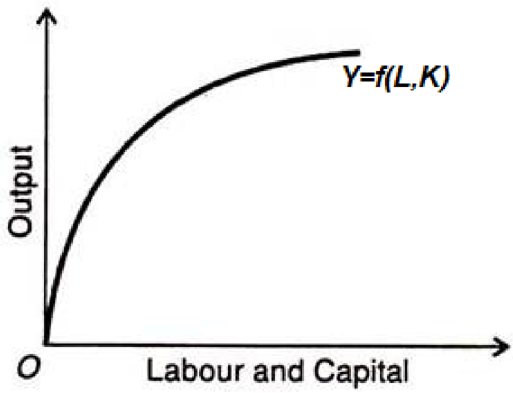


Figure 4.2: Cobb-Douglass production function isoquant curve

From these figures, following a microeconomic perspective, the production clearly indicates a non-linear relationship between the input of capital and labour force and the economic output where the more input, the higher the output. Therefore, the approach of measuring firm growth as the quantity of labour force or total assets of business presents a consistent idea with the classical Cobb–Douglass production function, in which they all represent the development of output production. As such, the growth of total assets and the growth of labour force can be technically proposed to be in the same direction.

However, there is no empirical evidence that there is any relationship between the changes in number of employees and capital structure. Hence, this measure will be dropped in this study.

The second approach of measuring firm growth was considered by Lorunka *et al.* (2011), who indicated that gender of the founder, amount of capital required at start-up phase of business, or development strategy of the company are important determinants in predicting firm growth. The authors further insisted that firm growth can also be predicted based on the commitment of the founders and their core managers. However, this approach is believed to be unable to be measured and quantified into an econometric quantitative model. Thus, most scholarly discussion regarding the measurement of firm growth follows the first set of theories.

Although all the parameters have been proven to be highly significant (Kirchhoff and Norton, 1992), not all react so quickly to external or internal changes of business. For instance, sales revenue is believed to be more volatile than firm value since firms can adjust sales more quickly than total asset value. Specifically, Kirchhoff and Norton (1992) employed three indicators for firm growth (employment, total assets, and sales revenue) and revealed that these measures can be used interchangeably since they indicate similar results in econometric estimations with a data of seven-year period. However, not all of them are considered to be suitable measurements of business growth. For example, although sales revenue is easy to record for research analysis and is relatively insensitive to capital intensity, it can be significantly influenced by the firm's arbitrary decisions, such as marketing strategies or financial decisions. Moreover, they can also be influenced by the decision to vertically integrate certain production processes and are sensitive to inflation and currency exchange rates (Delmar *et al.*, 2003).

In the last decade, the measurement of business growth has been discussed and adapted by researchers in various ways. Beck *et al.* (2005) used a unique firm-level survey database covering 54 countries to investigate the effect of financial, legal, and corruption problems on a firm's growth rate, measuring firm growth as the percentage change in firm sales over a period of time. This is consistent with the definition of Bei and Wijewardana (2012) and Huynh and Petrunia (2010), who indicated growth of business to be the expansion of total assets, sales, and operating profit. Based on the work of Gupta (1968) and Hampton (1993), two types of firm growth can be identified in the field of financial management, namely, internal growth and external growth. Both of these are believed to be directly influenced by the financial policies of the management.

Another paper of Ardishvili *et al.* (1998) also measured firm growth in different ways such as turnover/sales, employment, assets, market shares, and profits. Among these measures, sales and employment are in particular broadly used indicators of growth (Davidsson, 1991; Delmar, 1997; Weinzimmer *et al.*, 1998; Wiklund, 1998). This is because growth in sales and employment reflect both short-term and long-term changes in a firm and are easy to obtain. Furthermore, compared to other indicators such as market shares, sales and employment are more objective measures (Delmar, 1997).

To sum up, various measurements are used by scholars for firm growth. However, which the most suitable is remains debatable due to the diversification of research contexts and the main goal of the existing firms (Lumpkin and Dess, 1996; Velnampy & Nimalathasan, 2008; Zahra, 1991; Davidson & Wiklund, 2013).

A variety of indicators are applied in the literature to measure business growth, primarily growth in assets, sales, and employees. Although these indicators are often used as alternative proxies to measure business growth, each provides information on different growth aspects (Fuertes-Callén and Cuellar-Fernández, 2019), which means that these proxies are not interchangeable.

Therefore, in order to deliver a comprehensive analysis and recommendations for the Vietnamese listed firms as well as for policymakers in Vietnam, this thesis uses four proxies to describe firm growth.

The first is sales growth (SG), measured as the rate of change in sales between the observation year and the preceding years. This variable has been used to discuss the effect of capital structure on financial efficiency by Margaritis and Psillaki (2010) and Zeitun and Tian (2007) and was also suggested as a proxy for firm growth by Beck *et al.* (2005), Bei and Wijewardana (2012), Gupta (1968), and Hampton (1993):

$$SG_{i,t} = \frac{Sales_{i,t}}{Sales_{i,t-1}} - 1$$

The second proxy to measure firm growth is total assets (Hung *et al.*, 2019). This proxy generally adopts a logarithm of total assets value to measure firm size. The use of logarithm is reasonable to remove the problem of outlier of dataset. Additionally, total asset is employed rather than net asset because large firms with large liabilities in their financial structure may produce a negative net asset, thereby misrepresenting the firm's size. Earlier authors who used the same measure in similar studies include Adams *et al.* (2014), Andersson, *et al.* (2013), Choi (2010), Hardwick and Adams (2002), Olaosebikan (2013), and Yakob *et al.* (2014).

$$TAG_{i,t} = \frac{TA_{i,t}}{TA_{i,t-1}} - 1$$

Finally, as discussed in the previous chapter, profitability is also proposed for use as an alternative proxy for firm growth (Chung *et al.*, 2019; Del Monte and Papagni, 2003; Coad and Rao, 2009). Hence, the growth of operating profit is used in this study as a dependent variable representing firm growth:

$$OPG_{i,t} = \frac{OP_{i,t}}{OP_{i,t-1}} - 1$$

In this thesis, growth of sales revenue, total assets, and operating profit are all adopted as dependent variables measuring firm growth.

This thesis includes several control variables to account for firm-related or industry-related factors and to minimise specification bias in the model. Several determinants of capital structure model will be taken as control variables to explain more of the variance in growth indicators. These are asset structure, liquidity, advertising spending, and R&D spending.

The effect of liquidity on firm growth has been considered in a range of papers as a control and explanatory variable. Typically, as in a recent study of Fuertes-Callén and Cuellar-Fernández (2019), liquidity has been employed as a major control variable and has a negative and significant impact on firm growth, with sales and employment as proxies. Thus, in addition to be one of the determinants of capital structure as discussed above, it is evident from the literature that liquidity is an explanatory variable for firm growth study. Since the measure of firm growth is based on the changes in percentage of growth indicators (sales revenue, total assets, and operating profit), first difference of liquidity ratio will be employed in this study.

Regarding asset structure as control variable, prior research predicts that tangibility can have conflicting effects on growth. Given that tangible assets are easily monitored and provide good collateral, they tend to mitigate the agency conflicts mentioned in the literature review (Himmelberg *et al.*, 1999; Booth *et al*., 2001). Conversely, firms with high levels of intangible assets tend to have more investment opportunities in the long term and consequently a negative association between tangibility and firm growth (Rao *et al.*, 2007; Zeitun and Tian, 2007). Since it is evident that asset structure has certain impact on firm growth, it will be included in this study as a control variable. Hence, similar to liquidity and all the dependent variables, asset structure will be measured based on differences to ensure the validity of estimation.

Advertising and marketing spending (ADV) are also considered as another control variable for both industry-related and firm-specific perspectives. Indeed, advertising and marketing can be regarded as a useful approach to gain the market share and penetrate the new market, which is believed to have a positive impact on firm growth (Martin *et al.*, 2018). Hence, in this study, the differenced logarithm of advertising and marketing spending is employed as a control variable across the econometric estimations.

In addition, R&D, representing the innovation aspect of business, has been discussed in detail in Chapter 2 as one of the main independent variables that had been adopted by researchers while assessing the inter-relation between firm growth and capital structure (Audretsch *et al.*, 2014). Thus, in this paper, differenced R&D spending is also taken as another control and exploratory variable for the research models.

Since this study is specified to analyse the business growth model, in which the data is calculated by taking the changes in percentage of different growth indicators as dependent variables. Therefore, in order to ensure that the estimation is conducted properly and deliver consistent results, the explanatory variable will be also measured in differences.

4.2.4. Other variables

With regards to the first two studies of the thesis, which are about capital structure adjustment towards target financial leverage and determinants of capital structure, their empirical models will share the same set of variables which include firm size, liquidity, profitability, tangibility, growth opportunities, and non-debt tax shield as discussed above. In fact, there are several other variables that had been previously adopted into these models such as firm ownership, firm age, or regulatory framework (Diamond, 1991; Petersen and Rajan, 1994; Ezeoha, 2008; Hall *et al.*, 2004; and Gwatidzo *et al.*, 2016).

Regarding firm age, Gwatidzo *et al.* (2016) employed this variable as a determinant of capital structure that represents firm reputation. The authors hypothesized and argued that long-timed established firms are more likely to get access to financial leverage since they have adequate experience to survive various economic shocks in the course of their existence. This is also consistent with the ideas of Petersen and Rajan (1994), Ezeoha (2008) and Hall *et al.* (2004). However, this variable is not applicable in the case of Vietnamese listed firms. The first reason is that the dataset of the thesis is collected from stock exchange markets, hence the data on number of years that firms go listed is truly available, but the total age of firms (from the year that firms are founded) is not due to the lack of business information's transparency. Moreover, as discussed in Chapter 3, the financial information of Vietnamese firms that are not, or had not been, listed on stock exchange are not reliable due to low level of data transparency in Vietnam. Secondly, the Vietnamese stock exchange markets have just established since 2000 for HSX and 2005 for HNX; it clearly shows that the periods of time that firms being listed are not significantly distinguished. Based on these points, firm age will not be considered to be included into the research models of Chapter 5 and Chapter 6. In terms of capital structure and firm growth study in Chapter 7, there are rarely empirical papers conducted with regards to this approach. Therefore, the reasons to exclude firm age from the regression equation of firm growth study are not only due to the unavailability of data but also the lack of empirical evidence.

With regards to several other popular external variables such as ownership structure or regulatory framework. Ownership structure, for instance, was discussed and considered as an independent variable affecting capital structure choice of firms in many studies such as Arsov and Naumoski (2016), Chen *et al.* (2013), Nivorozhkin (2002), Al-Najjar and Taylor (2008), Friend and Lang (1988), and Gonenc (2003) and it is strongly proved to have significant influence on capital structure decision. However, in this thesis, either ownership structure or regulatory framework will not be adopted since the cross-sectional observations of the data are Vietnamese listed firms, which means that they are all private enterprise and have no difference in terms of ownership structure as well as national level regulatory framework.

4.2.5. Dummy variables

As the study is conducted on a panel dataset of Vietnamese listed companies, in order to control for both the cross-section and time-period aspect of the data, dummy variables are adopted. A basic problem in regression analysis is that the variables included in the model must be quantified by numbers. However, in reality, there are many economic variables related to many factors, including those that are not directly expressed by numbers. For example, the production and business efficiency of enterprises depends not only on the size of capital and the labour size in the enterprise, but also on the field of production and business. This raises the question of how to quantify the effect of characteristics that do not have numerical expression for the value of the dependent variable. In a regression analysis, the use of variables that represent such quality characteristics is called dummy variable. As such, dummy variables in a regression analysis represent quality variables not directly expressed by numbers. In this study, 813 listed companies are organised into ten specific industries: Basic materials, Consumer goods, Consumer services, Construction and real estate, Healthcare, Industrials, Oils and gas, Technology, Telecommunications, and Utilities. Hence, an industry dummy is also added to the research model, designated by numbers 1–10 respective to each industry. For the period 2008–2018, a time-series dummy variable is also adopted in this study.

4.3. Empirical research model and estimation approaches

4.3.1. Research model

As stated in the previous chapters, the literature review has provided and developed a range of approaches to assess the impacts of capital structure on companies listed on the Vietnamese stock market. The regression analysis focuses on the coefficient for short-term and long-term debt ratio (β_1 and β_2). The control variables for profitability are based on prior literature, including the advertisement spending, liquidity, and assets structure (e.g., Coad *et al.*, 2016; Frank and Goyal, 2003; Jermias, 2008; Ebaid, 2009). Therefore, based on the relevance and reliability of such theories and approaches, the empirical model for this research is developed and tested through a panel regression model, illustrated as follows:

$$Y_{it} = (\alpha_i + \gamma_t) + (\beta_0 + \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 TAN_{it} + \beta_4 LQ_{it} + \beta_5 ADV_{it}) + \varepsilon_{it}$$

where $Y_{it} = SG_{it}$, EG_{it}, TAG_{it}, and OPG_{it}, which are the respective proxies for business growth. ε_{it} is a random error terms; and α_i and γ_t represent the firm and period effect, respectively, and β_0 is the model intercept.

4.3.2. Estimation approach for the panel dataset

Panel data, also known as longitudinal dataset, is a special pool of data that combine both time-series and cross-section perspective of the economic data. Baltagi (2008) specified multiple advantages of panel data. First, since the panel data focus on cross-sections such as individuals, businesses, states, countries over time, there must be heterogeneity in these units. The panel data estimation technique can officially take account of that heterogeneity issue by considering the specific characteristics of each individual. Second, through the combination of time series and cross-sectional observations, panel data provide more information, less collinearity between variables, more degree of freedom which makes it more efficient. Third, thanks to the focus on repeated cross-sectional observations, the panel data is more suitable to study the dynamics of variables' changes. Finally, panel data can better detect and measure effects that cannot be observed in pure time series or pure cross-sectional data.

Consider an economic relationship, with the dependent variable Y_{it} for firm i in year t; a vector of k explanatory variables, which means X_{jit} with j ranges from 1 to k and one or more unobservable variables μ. The classical linear-regression model is as follows:

$$Y_{it} = \alpha + \sum_{j=1}^{k} \beta_j X_{jit} + \mu_{it} \tag{1}$$

The primary purpose of the empirical studies in this thesis is to make the best use of the panel dataset of 813 Vietnamese listed firms over 10 years period. Three different studies will be implemented to provide a comprehensive insight of capital structure situation of Vietnamese firms. Therefore, in order to ensure that the findings can best describe the insights, mitigating nonspherical errors such as heteroskedasticity, serial correlation, and cross-sectional dependence is one of the most important steps when it comes to panel data analysis. Hence, several econometric diagnostic tests will be performed to test the presence of such errors. Then, different estimation approaches should be applied in combination to ensure all the empirical results are compared. As discussed by Reed and Ye (2010), testing the existence of such nonspherical errors is only of limited value in terms of selecting the precise estimation technique. For instance, simple OLS regression (heteroskedasticity and cross-sectional dependence robust included) that ignores autocorrelation issue can be significantly more efficient in estimating confidence intervals compared to FGLS approach. Hence, this section will discuss the nature of several panel data estimators that will be used to estimate the equation (1) such as simple OLS, fixed- and random-effects, Fama-Macbeth approach, GMM approach, and panel corrected standard errors (PCSE).

4.3.2.1. Fixed-effects estimation

There are two estimation methods to estimate the fixed effects model parameters. The first one is the estimated regression of least square dummy variables (LSDV) with each dummy variable representing each observed object of the sample, and the second one is the fixed effect estimator. Assuming N represents the number of cross-sectional observations, T denotes the number of time series observation. When N is large, the use of LSDV estimation will be biased and not feasible (Baltagi, 2005) since this estimation approach will suffer from huge loss of degree of freedom. For example, suppose that there is a panel data with 1000 individuals of cross-section, to use LSDV estimation, it is required to create 1000 dummy variables and use OLS regression for more than 1000 variables. The principle of fixed effects estimation is understood as follows.

Suppose that the equation (1) is expanded with $k = 1$, which means that there are 1 independent variables X_1 as follow:

$$Y_{it} = \alpha_{it} + \beta_1 X_{1it} + \nu_i + \varepsilon_{it} \tag{2}$$

where $\mu_{it} = \nu_i + \varepsilon_{it}$. The error term of the classical linear regression model is divided into two components. ν_i represents unobserved factors that varies between cross-sectional observations but do not change over time. The component ε_{it} represents unobserved factors that varies between cross-sectional observations and over time.

To evaluate the effects of the independent variable X_1 on the dependent variable Y, the fixed effects estimator uses the changes in X_1 and Y over time. Suppose that Z_i is denoted as an unobserved variable that differs between cross-sections but does not change over time, which means that it includes the error term. Then the equation will be rewritten as follow.

$$Y_{it} = \alpha_{it} + \beta_1 X_{1it} + \beta_2 Z_i + \mu_{it} \tag{3}$$

Since Z_i does not change over time, it cannot explain any change in Y_{it}. Therefore, it is recommended to exclude the fixed effect of Z_i on Y_{it} by using the change in data of Y_{it} over time. Suppose that $\alpha_i = \beta_0 + \beta_2 Z_i$, equation (3) will be:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \mu_{it} \tag{4}$$

For each certain intercept, their values can be understood as the fixed effect of each observation i. Thus, this model is then called the fixed effects regression model. The variation of α_i comes from the variation of Z_i. The fixed-effect regression model can be rewritten with formulas containing n−1 dummy variables and constants:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \gamma_2 D2_i + \gamma_3 D3_i + .. + \gamma_n Dn_i + \mu_{it} \tag{5}$$

4.3.2.2. Random-effects estimation

Additionally, Baltagi (2008) also indicated that the LSDV and fixed-effect approach are unable to estimate the effect of time-invariant variable such as gender, education level or religion. In such cases, the random effect estimator would be more appropriate. Assuming the same panel dataset as for the fixed-effects model above with $N \times T$ observations and analysing the effects of X_1 and X_2 on dependent variable Y, the random effects model is written as follows:

$$Y_{it} = \beta_1 X_{it1} + \beta_2 X_{it2} + \nu_i + \varepsilon_{it}$$

With $i = 1,2, \ldots, N$ and $t = 1, 2, \ldots, T$. Suppose that ν_i is given as follows:

$$\nu_i = \alpha_0 + \omega_i$$

With ν_i is divided into two components: the uncertainty component α_0 denotes for the average intercept parameter, and the random component ω_i represents the standard deviation of the intercept parameter for observation i.

ω_i for each object is assumed to be derived from an independent probability distribution with a zero mean and homoscedasticity:

$$Cov(\omega_i, \omega_s) = 0$$

Thus, N random variable ω_i is called random effects. The random effects model can be rewritten as follows:

$$Y_{it} = \alpha_0 X_{it1} + \beta_2 X_{it2} + \varphi_{it}$$

where $\varphi_{it} = \omega_i + \varepsilon_{it}$.

An important assumption in the random effects model is that the error component φ_{it} does not correlate with any explanatory variables in the model.

An OLS estimation for the random effects model is believed to deliver unbiased results, but it is inefficient. Standard error estimation and t-statistics are no longer accurate because the OLS estimation ignores the autocorrelation in the φ_{it} error component (Baltagi, 2008). In order to ensure that the estimation results are not biased and effective, the feasible generalised least squared estimation (FGLS) is recommended to overcome the noise error autocorrelation phenomenon. In fact, the random effect estimator is a specific type of the generalised least square approach.

4.3.2.3. Consideration between fixed effects, random effects and pooled OLS

This section considers which model is the most appropriate: pooled OLS, fixed effects (FE), or random effects (RE). Indeed, the suitability of the FE and RE estimation can be verified based on a comparison with a classical pooled OLS estimation. Specifically, the FE estimator is verified by the F-test with the null hypothesis H_0, which assumes that all coefficients are zero (i.e., there is no difference between different objects or time periods). As such, rejecting the null hypothesis H_0 with a given significance level (e.g., a 5% significance level) will show that an FE estimator is appropriate. To estimate RE, the Lagrange multiplier (LM) method with a Breusch–Pagan test is suggested by Baltagi (2008) to verify the appropriateness of the estimation. Accordingly, the null hypothesis H_0 of Breusch–Pagan test states that the error of the OLS estimator does not include deviations between objects with var (ν_i) = 0 (i.e., when the variance between objects or time period is constant). Rejecting the H_0 hypothesis indicates that the error in the estimation includes deviations between groups and is in accordance with the RE estimator. Additionally, the Hausman test will be used to select the appropriate estimation method between FE and RE estimators (Baltagi, 2008; Gujarati, 2004). The H_0 hypothesis states that there is no correlation between the errors of different objects (ν_i) and the explanatory variables X_1 in the model. The RE estimate is accepted under the H_0 hypothesis but is not consistent with the alternative hypothesis. The FE estimate is accepted for both the H_0 hypothesis and the alternative hypothesis. However, if the null hypothesis H_0 is rejected, the FE estimate is more appropriate than the RE estimate. By contrast, if there is not enough evidence to reject H_0, meaning that there is no evidence for correlation between error terms and explanatory variables, the FE estimation is no longer appropriate and the RE will be prioritised for use in the panel data analysis.

Although Greene (2010) described three specific econometric models which have been widely used to deal with panel datasets, namely, pooled OLS, FE, and RE, according to Stimson (1985), Hicks (1994), and Beck and Katz (1995), the characteristics of pooled time-series cross-section analysis has been criticised recently in that its designs often violate the standard OLS assumptions about the error process. In fact, for the OLS to be optimal, it is necessary for all the errors to have the same variance (homoscedasticity) and for all the errors to be independent of each other. Thus, Hicks (1994) mentioned that errors tend to be not independent from one period to the next. In other words, they might be serially correlated, such that errors in firm *i* at time *t* are correlated with errors in firm *i* at time *t+1*. Second, the errors also tend to be correlated across sections. As Hicks (1994, 174) noted, they might be contemporaneously correlated, such that errors in firm *i* at time *t* are correlated with errors in firm *j* at time *t*. Third, errors tend to be heteroskedastic, meaning that they may have differing variances across ranges or subsets of sections (Beck and Katz, 1995). In addition, by grouping all observations regardless of the difference between firms and the change in company value, the model ignores the uniqueness and characteristics of the firms. If this problem is solved by including these individual characteristics in a random error, it leads to another dilemma: that the random error can be correlated to a certain degree with independent variables and thus violates the assumptions of linear-regression models. This can cause the estimates obtained to be biased and inconsistent. Furthermore, as mentioned by Wooldridge (2010), pooled OLS is believed to be applicable in empirical data research if the cross-sections samples are not the same for each time series period, which means that, if the panel dataset has too many missing values across panel, it might be considered insufficient observations to usefully apply the FE or RE estimator, thus meaning that a simple pooled OLS is preferred. Hence, pooled OLS, FE and RE estimators are all taken into consideration via several panel data tests to reveal the most appropriate approach for this study. The details of the tests are fully discussed in the next part of the chapter.

4.3.2.4. Fama–MacBeth approach

The analysis of panel or longitudinal data is the subject of one of the most active and innovative bodies of literature in econometrics (Hsiao, 2003; Dielman, 1989; Matyas and Sevestre, 1996; Raj and Baltagi, 1992; Arellano, 2003; and Baltagi, 2008), partly because panel data provides such a rich environment for the development of estimation techniques and theoretical results. The panel data is a combination of cross-section and time series. There are two major advantages of using panel data: i) panel data gives the estimated results of the parameters in the model more reliably, and ii) panel data allows the identification and measurement of the impact that cannot be identified and measured using cross-sectional or time-series data (Baltagi, 2008).

Fama and MacBeth (1973) proposed an original method of testing some asset pricing implications that arise from the assumption of normally distributed portfolio returns and risk-averse investors. This is also considered to be an alternative procedure for running cross-sectional regressions and for producing standard errors and test statistics. With panel data that has i cross-sectional observation and t periods, in terms of the Fama–MacBeth procedure, for each time period t, a cross-sectional regression is:

$$y_{i,t} = x_{i,t} \times b_t + \varepsilon_{i,t}$$

From this, a time-series of estimates $\hat{b}_t$ is obtained. Under the assumption that error terms are uncorrelated over time, we can then compute the overall estimate and standard errors using the most basic Stats 1 method. For any component of the vector b, one would compute the estimate and standard error as follows:

$$\hat{b} = \frac{1}{T}\sum_t b_t$$

$$SE = \sqrt{\frac{\frac{1}{T}\sum_t \left(b_t - \hat{b}\right)^2}{T}}$$

In a recent study by Petersen (2009) regarding the issues of estimating standard errors in finance panel data sets, the author indicated that the Fama–MacBeth standard errors are quite close to the standard errors generated by other methods. However, although Petersen (2009) strongly concluded that in the presence of a time effect (the residuals of a given year may be correlated across different firms), Fama–MacBeth produces unbiased standard errors and correctly sized confidence intervals, in the presence of a firm effect (the residuals of a given firm may be correlated across different years), standard errors are biased when estimated by Fama–MacBeth.

Although the Fama-Macbeth (1973) approach has certain pros and cons in terms of estimating panel dataset, based on the current literature review, this technique will be applied partially in the empirical analysis of this research along with other panel regression estimations.

4.3.2.5. Generalised Methods of Moments (GMM)

According to Baltagi (2005), in the study of panel data, fixed-effect and random-effect estimators are commonly employed to estimate the research model. Yet in the case of detecting phenomena that lead to inaccurate estimation, model's nonspherical errors can lead to various issues related to the residuals such as heteroskedasticity, serial correlation, cross-sectional dependence, lack of exogenous variables, or existence of endogenous variables. Hansen (1982) developed Generalised Methods of Moments (GMM), which is known as a generalised estimation technique for all common estimator such as OLS, Generalised Least Square (GLS), Fixed-effect, or Random-effect in panel data. Even under the existence of endogeneity, the GMM approach can give unbiased coefficients with a normal and efficient distribution.

According to Hansen (1982), the GMM method is commonly used in estimating linear dynamic panel data or in panel data which has heteroskedasticity, autocorrelation, and cross-sectional dependence issues. In this case, the linear estimations of panel data models such as fixed effects or random effects will no longer result in a reliable and efficient estimate. Therefore, the Generalised method of moments (GMM) approach will be the alternative option. However, according to Blundell and Bond (1998), the above estimates will have the problem of weak instrumental variables when the coefficients reach 1. In that case, the moment conditions are completely unrelated to the actual parameters, and the nature of estimation is dependent on time series element (T). When T is small, the estimate is random, but when T is large the GMM may be inconsistent, and the 2-stage least square estimation will no longer be correct. To solve this problem from the original GMM method, scholars have improved many versions of GMM that are more suitable for empirical studies. Most importantly, differencing GMM (D-GMM) method was developed by Arellano and Bond (1991) based on previous studies by Anderson and Hsiao (1982), Holtz-Eakin, Newey and Rosen (1988) and the System GMM (S-GMM) method by Blundell and Bond (1998) was proposed based on the idea of Arellano and Bover (1995) by adding some constraints to D-GMM.

4.3.2.6. Panel corrected standard errors

In empirical finance research field, time-series cross-sectional/longitudinal/panel data is commonly used to take advantage of both time-series observations and cross-sectional observations. Beck and Katz (1995) suggested panel corrected standard errors (PCSE) model as an alternative estimation approach over feasible generalised least square (FGLS), which had been produced by Parks (1967) to initially solve the combined issues of serial correlation and cross-sectional dependence of panel data. However, as concluded by Reed and Ye (2011) that FGLS is only the best feasible to implement in case of time periods T is higher than or equal the number of cross-sections (N). Therefore, Reed and Webb (2010) recommended that PCSE as a two-step modified version of simple ordinary least square that can better deal with panel data in many circumstances.

This is also indicated by Reed and Ye (2011) that panel corrected standard errors is considered as one of the most useful estimators that is recommended to be applied for time-series cross-sectional/panel data. Comparing with FGLS estimator, Beck and Katz (1995) published an extreme influential study and concluded that FGLS might produce significantly underestimated coefficient standard errors. Taking Monte Carlo experiments into account, Beck and Katz (1995) found that is possible to estimate precise standard error at no, or just little, less efficient than it does by FGLS estimator.

In an extended study carried out by Moundigbaye *et al.* (2018), the authors again indicated that PCSE is proved to be the best estimation method for panel data analysis in terms of testing hypotheses in all situations of their experiments. In specific, Moundigbaye *et al.* (2018) argued that the FGLS estimation technique is not appropriate with the dataset that has number of time periods T, less than number of cross-section N. Beck and Katz (1995) indicate the reason is that the associated error variance-covariance matrix (EVCM) cannot be inverted. Another reason is that in case of T ≥ N, there may be relatively few observations per EVCM parameter, causing the associated elements of the EVCM to be estimated with great imprecision. This could lead to serious underestimation of standard errors and cause the hypothesis testing to become meaningless. In order to address the problem of FGLS, Beck and Katz (1995) proposed a modified version of FGLS estimation method and called Panel Corrected Standard Errors (PCSE). PCSE preserves the (Prais-Winsten) weighting of observations for autocorrelation but uses a sandwich estimator to incorporate cross-sectional dependence when calculating standard errors. Therefore, it is no doubt that PCSE will be the main estimator to test hypotheses in this thesis.

4.3.2.7. The application of such estimators

In the most updated paper considering panel data's choices of estimator, Moundigbaye *et al.* (2018) indicated that PCSE is the most suitable and powerful estimation technique that can be used for panel dataset in terms of testing hypotheses. This is also confirmed by an earlier study of Reed and Ye (2011) when the authors used Monte Carlo experiments to explore the pros and cons of PCSE and FGLS and came up with a conclusion that PCSE is much more efficient with the dataset that have large N and small T. Hence, this thesis will apply PCSE strictly in Chapter 6 and 7 and its results will be used as the main implication for the research findings. The model in Chapter 5 about capital structure adjustment towards target level will be built as dynamic panel dataset with lagged financial leverage included as an independent variable. Therefore, as said by Moundigbaye *et al.* (2018), they had no evidence to conclude the efficiency of PCSE on dynamic panel data. Instead, as discussed in the sub-section 4.4.2.5, GMM estimator is much suitable and is specifically designed to deal with dynamic panel data. In this thesis, GMM estimation approach will be applied to estimate the dynamic panel data with the lag leverage as independent variables in Chapter 5 and Chapter 6. In specific, the Chapter 5 captured the issue of capital structure adjustment speed, in which the regression equation was built based on several past studies with $Leverage_{t-1}$ included into the model. Therefore, GMM technique will be the most important estimation to conclude the results of capital structure adjustment towards targeted level in Chapter 5. Additionally, Chapter 6, it was argued that lagged financial leverage can also affect the choice of capital structure in the current year, which makes it feasible to apply GMM estimator in this Chapter. Hence, in Chapter 6, the applicable findings will be based on both GMM and PCSE estimators.

4.4. Econometric testing and analysis

4.4.1. Unit-root test for stationary time-series data

Based on the research objective, the data of this study are collected from 813 companies listed on the HSX and HNX stock market from 2009 to 2018, which equals 8,943 observations. Thus, time-series data is also a part of the research raising the issue of stationary time-series data.

Stationarity of time-series data has been always a particularly important issue in time-series financial models and especially in panel-data research. According to Baltagi (2013), characteristics related to the normal distribution for non-stationary variables cannot be applied. For instance, the t-statistics and F-statistics obtained from the regression equation of these non-stationary variables will not have a normal distribution (Durlauf and Phillips, 1988). In addition, the failure to specify the stationarity of time-series variables will lead to spurious regression problems when variables are not cointegrated.

According to Baltagi (2008), a random series of Y_t is considered to be stationary if the mean and the variance of the series do not change over time and the value of the co-variance between the two periods depends only on the gap or time lag between the two periods, not on the actual time when the co-variance is calculated. The definition is consistent with a previous study of Gujarati (2004): A time series is stationary when the mean, variance, and covariance remain constant at any time within the period. A stationary time series tend to return to the mean values, and all the variation around the mean remains the same. In other words, a non-stationary time series has either a mean value or a variance value that changes over time. There are many methods for checking the stationarity of a time series, including Dickey–Fuller (DF), Phillips–Person (PP), and Extended Dickey and Fuller (ADF) testing, as well as self-correlation tests.

A unit-root test has been more widely used on panel data than on time-series data, because the former includes not only the dimension of the time effect but also the dimension of the cross-sectional effect of the object (Im, Pesaran and Shin, 1997; Maddala and Wu, 1999; Taylor and Sarno, 1998; Levin and Lin, 1992; Hadri, 2000; Choi, 2001; Levin, Lin and Chu, 2002; Breuer *et al.*, 2002; Carrion-i-Silvestre *et al.*, 2005; Pesaran, 2006; and Beyaert and Camacho, 2008). As indicated by Levin, Lin, and Chu (2002), according to Monte Carlo simulations, the asymptotic results provide a good approximation for the test statistics in panels of moderate size, and the power of the panel-based unit-root test is dramatically higher compared to performing a separate unit-root test for each individual time series. More recently, the most notable studies of Levin, Lin, and Chu (2002), Breitung (2000), Hadri (2000), and Im, Pesaran and Shin (2003) have developed unit-root tests for panel data. These panel unit-root tests are more effective than individual unit-root tests because the information in a time series is improved by adding cross-sectional elements (Baltagi, 2001).

Adding the spatial dimension into the analysis of a given moment in time can significantly increase the variability in the data. The first issue in panel unit-root testing is whether the objects are independent. There are two main branches of verification in panel data unit-root testing based on the dependability of cross-sectional element: (i) cross-sectional independence and (ii) cross-sectional dependence. The unit-root tests for panel data are summarised in Figure 4.3.

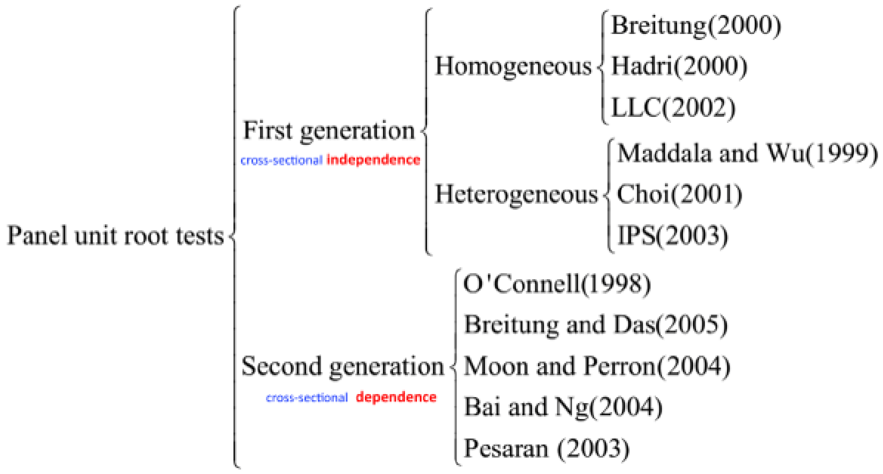


Figure 4.3: Panel unit-root tests approaches

As can be seen from the figure 4.3, there are a variety of econometric tests for the stationarity of panel data, including some with the assumption of cross-sectional independence, such as Levin, Lin, and Chu (2002), Harris and Tzavalis (1999), Breitung (2000), Fisher-type (Choi, 2001), and Hadri (2000) LM tests. Apart from the dependability of the cross-sectional element assumption, the assorted tests above-mentioned contain various asymptotic assumptions regarding the number of panels in the dataset and the number of time periods in each panel. While the Levin–Lin–Chu (LLC) test requires the ratio of the number of panels to time periods to tend to zero asymptotically, it does not apply well to datasets with a large number of panels and relatively few time periods. Besides, the Im–Pesaran–Shin (IPS) and Fisher-type tests allow for unbalanced panels and are thus suitable for use in this project, which has unbalanced data of 813 firms during the period from 2009 to 2018. A detailed discussion of these unit-root testing approaches is given below.

Dickey and Fuller (1981) introduced DF tests and augmented DF (ADF) tests; the unit-root test model of the latter has the form shown below:

$$\Delta y_{it} = \rho_i y_{i,t-1} + \sum_{l=1}^{p_i} \phi_{i,l} \Delta y_{t-l} + \alpha_i d_{it} + \varepsilon_{it} \quad (6)$$

$$\Delta y_{it} = \delta_t + \rho_i y_{i,t-1} + \sum_{l=1}^{p_i} \phi_{i,l} \Delta y_{t-l} + \alpha_i d_{it} + \varepsilon_{it} \quad (7)$$

where $\Delta y_t = y_t - y_{t-1}$; y_t represents the considered time-series data, d_{it} is the deterministic components, p_i is the length of the lag time, $\rho_i = 0$ means that the equation has unit root for individual i, if $\rho_i < 0$ then the equation is evident to be stationary around the deterministic part, and ε_t is the error term. Equation (7) is different from equation (6), in which there is an additional time trend effect parameter. The trend variable has a value from 1 to n, where 1 represents the first observation in the data series and n represents the last observation in the data series. The error term is the term for random errors; as derived from the classical assumption that it has an average of zero, the variance is constant and not autocorrelated. The results of the ADF test are often very sensitive to the choice of the length of the lag p_i; thus, Akaike's Information Criterion (AIC; Akaike, 1973) is used to select the optimal p_i for the ADF model. Specifically, the value of p_i is chosen so that the AIC can be at a minimum. The testing hypothesis of the model should be as below:

H_0: $\rho_i = 0$ (Y_t is non-stationary)

H_1: $\rho_i < 0$ (Y_t is the stationary)

In the ADF test, the ADF value does not follow a normal distribution. According to Dickey and Fuller (1981), the estimated t value of the coefficients in the models is based on the probability distribution τ (tau statistic, τ = estimated value of coefficient over error of estimated coefficient). A practical problem with this test is the choice of lags p_i. The next steps are the same as in the case of DF test. Schwert (1989) suggests choosing this maximum lag:

$$p_{max} = \left[12\left(\frac{T}{100}\right)^{\frac{1}{4}}\right]$$

because if p is too low, the test is affected by autocorrelation, and if p is too large, the power of the test is lower. The critical value τ is determined based on the Mackinnon (1996) table of available values. To test hypothesis H_0, it is suggested to compare the value τ with the critical value in Mackinnon (1996) and draw a conclusion about the stationarity of the observed series. Specifically, if the absolute value of the calculated value is greater than the absolute value of the critical value, then the null hypothesis H_0 will be rejected; that is, the time-series data is stationary, and vice versa, accepting the hypothesis H_0, the data is not stationary.

The LLC approach, first introduced in the paper by Levin and Lin (1992) and specified in Levin, Lin, and Chu (2002), is specified below:

$$\Delta y_{it} = \rho y_{i,t-1} + \alpha_0 + \delta_t + \alpha_i + \theta_t + \varepsilon_{it}$$

As can be seen from the equation, the model developed by Levin and Lin (1992) has taken into consideration all time trends θ_t, individual-specific effects α_i, and time-specific effects δ_t. Moreover, the later study of Levin and Lin (1993) further improved the model, which can be better applied to a panel dataset unit-root test, which had been proposed to address the problem of heteroskedasticity and autocorrelation using two major steps: (i) take the cross-section average of the panel dataset to eliminate the aggregate effects, (ii) apply the ADF test for each time series, and (iii) normalise the disturbance. However, the principal limitation of the LLC test was observed by Maddala and Wu (1999) to be that ρ would be the same across all observations. This means that, from the equation (1) above, the null hypothesis and alternative hypothesis of Levin and Lin (1993) can be specified as follows:

$$H_0: \rho_1 = \rho_2 = \cdots = \rho_N = \rho = 0$$
$$H_1: \rho_1 = \rho_2 = \cdots = \rho_N = \rho < 0$$

The null hypothesis is reasonable in several cases, yet the alternative one is considered very strong in general empirical finance research papers. For instance, in terms of examining the convergence hypothesis of the economic growth model, the null hypothesis can be established with the implication that none of the countries converge, which means that $\rho = 0$ across all economies. Yet, the alternative hypothesis cannot be considered reasonable assuming that all the economies can converge at the same rate if they do converge (Maddala and Wu, 1999). Thus, another panel unit-root test approach is discussed below.

The IPS approach proposed by Im, Pesaran, and Shin (1997) is an alternative method for conducting the unit-root test, with a focus on using standardised t-bar test statistics on the basis of a classical DF test averaged throughout the panel dataset. The most crucial highlight of the IPS approach is that it allows ρ_i to change and fluctuate throughout groups. In comparison with the LLC test, although both of them share the similar null hypothesis that all variables contain unit root across the panel, the LLC test gives a homogenous alternative that all series are stationary, while the IPS assumes ρ_i to be different across groups in the panel, which means the alternative one is that at least one series is stationary. From this point, the IPS approach is particularly appropriate for the dataset that has a medium quantity of cross-sectional elements along with a relatively long period of time. Furthermore, the IPS test also proposes allowance for the existence of heterogeneity to appear across the panel such as the individual firm-specific effects or the special patterns of residual serial correlations.

The unit-root test proposed by Harris and Tzavalis (HT) (Harris and Tzavalis, 1999), meanwhile, stems from the work of Levin and Lin (1993) and develops the HT unit-root test which allows fixed time T and only cross-sectional element N is asymptotic. The testing equation of HT test is as follow.

$$y_{it} = \rho y_{i,t-1} + \alpha_0 + \delta_t + \alpha_i + \varepsilon_{it} \tag{8}$$

With α_i controls the individual specific effect and δ_t controls the time specific effect. The HT unit root test hypotheses are presented as follow.

H_0: $\rho_i = 1$ (Y_t is non-stationary)

H_1: $\rho_i < 1$ (Y_t is the stationary)

This test strongly fits the dataset of this research with 813 listed firms across the period of 10 years. For a fixed T, the authors also derived asymptotic normality (for $N \rightarrow$ infinity) of the appropriately normalised and centred coefficients. They also assumed a homogeneous variance, which the LLC test does not. The test, as implemented, uses y_{it} rather than Δy_{it} as the dependent variable, which means that the test is for $\rho = 1$ rather than $\rho = 0$. According to Hlouskova and Wagner (2005), the most practical implication of this approach is to obtain an improved method for panel data unit-root tests which is most suitable for small T and large N dataset. According to Hall and Mairesse (2002), based on testing equation (8), the least squares dummy variable estimator has a limiting normal distribution of the following form:

$$\sqrt{N}(\rho - 1 - B_2) \rightarrow N(0, C_2)$$

With $B_2 = \frac{-3}{T+1}$ and $C_2 = \frac{3(17T^2-20T+17)}{[5(T-1)(T+1)^3]}$. Therefore, it is straightforward to base a t-test on the estimated ρ, standardized by its mean and variance. Furthermore, HT test requires homoskedasticity and no autocorrelation in the error terms, because although it is based on a least square estimator, it does not require normality.

The Harris–Tzavalis approach closely fits with this study, showing certain improvements compared to the LLC, and it is specially designed to solve the panel dataset with large *N* and small *T*, yet one of its important assumptions is a balanced panel. Because the data is collected from the entire population of 813 listed firms in the Vietnamese stock exchange market from the starting point of the local stock market in 2008 up to 2018 (the HNX market being launched since 2005), the issue of companies being listed and delisted occurred relatively often. Hence, the summary of various tests is combined to show a comprehensive outlook of the stationarity of the data.

4.4.2. The Breusch and Pagan Lagrange multiplier test for the random effects model

To perform hypothetical tests in the random-effects model, small sample tests such as a t-test or F-test are not recommended for efficient use. Instead, using large-sample tests such as an asymptotic t-test, a likelihood ratio test, a Wald test, or an LM test is more appropriate.

Suppose the general equation of panel data regression model as follows:

$$y_{it} = \alpha + \beta X_{it} + u_{it} \tag{9}$$

with $i = 1 \dots \mathrm{N}$, $t = 1 \dots \mathrm{T}$, and $u_{it} = \mu_i + \lambda_t + v_{it}$, μ_i represents the individual effect of the panel, λ_t controls the time effect, and v_{it} is the error terms. According to Baltagi (2008), LM tests will be performed to check whether the time effects (λ_t) or individual effects (μ_i) are random or fixed effect.

The LM test includes 2 components LM1 and LM2, which means LM = $LM_1 + LM_2$. In which, LM_1 checks the randomness of the individual effects μ_i with the null hypothesis that variance (σ^2) of μ_i is equal to 0.

H_0: $\sigma_{\mu}^{2} = 0$

and LM_2 checks the randomness of the time effect λ_t with the null hypothesis that variance (σ^2) of λ_t is equal to 0.

H_0: $\sigma_{\lambda}^{2} = 0$

The LM_1 is calculated based on the equation as follow.

$$LM_1 = \frac{N.T}{2(T-1)}\left[\frac{\sum_{i=1}^{N}(\sum_{t=1}^{T}\hat{u}_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{u}_{it}^2} - 1\right]^2$$

with $\hat{u}_{it}$ is the observable estimate of the model error term. In case of rejecting the null hypothesis H_0, it is suggested to confirm the randomness of the individual effects.

The LM_2 is calculated based on the equation as follows.

$$LM_2 = \frac{N.T}{2(T-1)}\left[\frac{\sum_{t=1}^{T}(\sum_{i=1}^{T\times N}\hat{u}_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{u}_{it}^2} - 1\right]^2$$

Similar to the LM_1, rejecting the null hypothesis H_0, it is suggested to confirm the randomness of the time effects.

The LM test will be calculated based on LM = LM_1 + LM_2 with the null hypothesis that all the variance of unobserved individual and time effects is equal to zero, H_0: $\sigma_{\mu}^{2} = \sigma_{\lambda}^{2} = 0$. While the alternative hypothesis H_a states that at least one of the variances is different from 0.

The null hypothesis in the LM test is that variances across entities and time are zero; that is, there is no significant difference across individuals and time series (i.e., no panel effect). If the null is rejected, the random-effects model is believed to be appropriate. The LM test helps decide between a RE regression and a simple OLS regression. Rejecting the hypothesis means that the pooled OLS might not be the appropriate model. Although the pooled OLS has been criticised, as discussed above, the LM is still applied in this paper to test whether either the pooled OLS or the RE model is appropriate in this research.

4.4.3. The Hausman test for random effects and fixed-effects models

The Hausman test is used to select the appropriate estimation method between fixed and random effects (Baltagi, 2008; Gujarati, 2004). This is a statistical hypothesis test in econometrics named after James Durbin, De-Min Wu, and Jerry A. Hausman.

The general form of the Hausman test statistic is as follows:

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})'[Var(\hat{\beta}_{RE}) - Var(\hat{\beta}_{FE})]^{-1}(\hat{\beta}_{RE} - \hat{\beta}_{FE})$$

With the $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are the estimated variables coefficients of all exploratory variables resulted from the random effect and fixed effect panel regressions, respectively. Under the null hypothesis, it is $\chi2$ (k) distributed, where k is the number of parameters. H_0 holds that there is no correlation between the error term and the explanatory variables in the model. The estimation of random effects is reasonable under H_0 but not in the alternative hypothesis. The fixed effects estimation is reasonable for both H_0 and the alternative hypothesis. However, if the null hypothesis is rejected, the fixed-effects estimation is more appropriate than the random-effects estimation. By contrast, if there is insufficient evidence to reject H_0, the correlation between the error and the explanatory variables can be ruled out. The fixed-effects estimation is no longer consistent, and a random-effects estimation is used. If the individual effects do not change over time and correlate with the explanatory variables, it is suggested to use fixed-effects estimation methods to control and minimise the bias due to the correlation between these fixed effects and the explanatory variables. However, if the individual effects do not correlate with the explanatory variables, the FE estimation method would not be effective; thus, alternative RE estimation should be considered. The choice between the FE estimate with RE is based on the hypothesis of the correlation between the explanatory variables and the unobserved individual effects that do not change over time.

However, the Hausman test still has certain considerable issues. If the results of the FE and RE estimates are relatively similar, this gives a positive signal. Nevertheless, in reality this does not always occur. According to Wooldridge (2009), the following problems are related to the Hausman test. First, if the FE estimate is significantly inaccurate, the major difference from the RE is not significant. This occurs due to incorrect data collection. Second, when the sample size is very large, the Hausman test will be wrong, although the RE estimation result is similar to the FE estimation. Finally, if the difference between the RE and FE estimations is small, it is recommended to temporarily accept that the RE model is suitable.

4.4.4. Heteroskedasticity tests

An important assumption in the classical linear-regression model is that the noise factors (also known as error terms) appear in the overall regression function with constant variance (homoskedasticity), which means that they have the same variance. If this assumption is not satisfied, then model have the problem of heteroskedasticity.

Heteroskedasticity is a statistical situation in which there is a certain change in the residuals or errors after the regression equation is estimated from the sample observation. If the estimated regression coefficients are considered to be good, then the values of the residuals must follow a normal distribution and have constant variances. If they change, the estimated equations will be inaccurate or omit important independent variables affecting the dependent variable.

The presence of heteroskedasticity does not affect the unbiasedness and consistency of OLS estimation. However, it affects the efficiency of OLS estimates. This is to say, they are no longer the best unbiased linear estimate. With the existence of heteroskedasticity, the variances of OLS estimates are not calculated from conventional OLS formulas. Thus, if studies continue to use conventional OLS formulas, the t-test and F-test based on them can result in erroneous conclusions. Heteroskedasticity is a critical case of violating the assumptions of linear-regression models. Therefore, it may negatively affect the research outcomes when analysing econometrics or financial models such as CAPM.

There are two types of heteroskedasticity: unconditional and conditional. Unconditional heteroskedasticity occurs when heteroskedasticity does not correlate with the independent variables in regression. Although this violates one of the linear-regression model assumptions that the variance of the error term is the same for all observations, it does not establish a significant problem for statistical results. Conditional heteroskedasticity, by contrast, occurs when heteroskedasticity correlates with the independent variables in the regression. This type of problem is most likely to result in bad statistical interpretation.

As discussed, panel data is a combination of two dimensions: cross section and time period. In terms of dealing with panel dataset, regardless of applying fixed-effect model, random-effect model, or generalised method of moments (GMM), the basis of the regression method is still OLS, which means that testing the regression assumptions of the model is strongly encouraged.

In terms of dealing with the panel dataset, there are multiple econometric models, such as the pooled OLS model, fixed-effect model, and random-effect model, as discussed in section 4.5. Thus, for each estimation method, econometricians have developed different tests for heteroskedasticity. The Breusch–Pagan/Cook–Weisberg test, developed by Breusch and Pagan (1980) and usefully extended by Cook and Weisberg (1983), is applied to the pooled OLS model to test for heteroskedasticity. An FE estimation method is tested using the modified Wald test, and the Breusch–Pagan LM test can be used for the RE estimator. Especially, Lyon and Tsai (1996) indicated Likelihood ratio (LR) test as a useful approach for heteroskedasticity. The authors compared different types of LR test and concluded that this can be used interchangeably with modified Wald test for FE estimator.

Considering the equation (8) for panel data, an important assumption that the error term u_{it} is independent with the heteroskedastic σ_i^2. The average error term variance is calculated as follows.

$$\sigma^2 = \sum_{i=1}^{N} \frac{T_i \sigma_i^2}{n}$$

with $n = \sum_{i=1}^{N} T_i$. The LR is defined as follows with g different variances of error terms and normality assumption.

$$lnL = -\frac{T}{2} ln2\pi - \sum_{i=1}^{g} \frac{T_i}{2} ln\sigma_i^2 - \frac{1}{2} \sum_{i=1}^{g} \frac{1}{\sigma_i^2} (y_i - X_i\beta)'(y_i - X_i\beta)$$

The restricted model has the null hypothesis that H_0: $\sigma_i^2 = \sigma^2$ for all i. The log likelihood ratio is calculated as follows.

$$lnL_R = -\frac{T}{2}[ln(2\pi) + 1] - \frac{T}{2} ln\,(\hat{\sigma}^2)$$

In case of rejecting the null with significant p-value of the test statistic, it is evident that the panel data has heteroskedasticity issue, otherwise, accepting the null hypothesis, the panel data is homoskedastic.

4.4.5. Cross-sectional dependence test

A common assumption in panel-data models is that the noise errors in the model are mutually independent among panel objects, especially when the cross-sectional dimension N is large. However, in empirical studies, there is evidence that the errors between panel observations are interdependent (cross dependence). Ignoring the dependency between these errors can thus lead to problems, such as reducing the effectiveness of the estimation, as well as making the relevant statistical tests unsuitable.

Many tests can check for the cross-sectional dependence of residuals in panel data, such as Breusch–Pagan (1980) LM; Pesaran (2004) scaled LM; Baltagi, Feng, and Kao (2012) bias-corrected scaled LM; and Pesaran (2004) CD tests. Because the panel data in the study has a greater number of cross-sectional observations than the number of observations on time (N = 813 and T = 10), the LM statistics factor, calculated by Pesaran (2004), Friedman (1937), and Frees (1995), are suitable for use because of their suitability to the T < N context (Hoyos and Sarafidis, 2006; Blackburne and Frank, 2007).

Pesaran (2004) and Pesaran (2015) developed a specific cross-sectional dependence test (CD-test) for a list of variables with any length. The CD-test can be explained as the examination of the correlation of the mean across panel units. The major insight provided by the Pesaran (2004) approach is that the sum of pairwise correlations between different panels follows a normal standard distribution. As such, the null hypothesis is either strict cross-sectional independence (Pesaran, 2004) or weak cross-sectional dependence (Pesaran, 2015).

4.4.6. Autocorrelation test

The issue of autocorrelation can be defined as a correlation between observations within the time series (as in time-series data) or cross sections (as in cross-section data). In the context of regression, considering the general equation (8), the classical linear-regression model assumes that such autocorrelation does not exist in the noise error u_{it}.

$$Cov(u_i, u_j) = 0 \ (i \neq j)$$

In other words, the classical model assumes that the noise error component associated with one observation is not affected by the noise error component associated with another observation.

However, in practice it is possible for the noise-error component of the observations to be interdependent, as illustrated below:

$$Cov(u_i, u_j) \neq 0 \ (i \neq j)$$

The consequences of autocorrelation have been widely discussed in the literature. First, OLS estimates are no longer BLUE (best linear unbiassed estimator) in the case of existence of autocorrelation. Second, the estimated variance of OLS estimates is skewed. Third, the t-test and F-test are no longer reliable, because the usual formula for calculating the variance of errors is an estimate of the skewness σ^2, and in some cases, it seems to be a low estimate. Fourth, the result of R^2 may be unreliable measurements for real R^2. Finally, the standard variance and standard error of a calculated estimate may also be ineffective.

4.5. Summary of the key descriptive statistics

4.5.1. Description of the dataset

This project tried to ensure that the database used in the study is sufficient in terms of time period and number of observations. Hence, the author considered all the listed firms in the HSX and HNX stock markets whose data could be accessed for a period of 10 years. Consequently, the data in this research are collected from 813 listed companies (in the non-financial sector) from 2009 to 2018. In addition, to guarantee that the database is consistent in terms of the demand side only, the author excluded all the financial companies and banks listed in the stock exchange, because they are normally considered to be debt suppliers.

The two markets in Vietnam are relatively young. The Ho Chi Minh Stock exchange (HOSE or HSX) has been operating since 2000, but the Hanoi Stock Exchange market (HNX) only started in 2005. As such, the Vietnamese stock market can be considered young in comparison to other countries in the region (the Bangkok Stock Exchange was established in 1975; the Shanghai Stock Exchange was first established in 1904 and relaunched after the communist revolution in 1990; the Stock Exchange of Singapore was formed in 1973; the Manila Stock Exchange was established in 1927 and then merged with Philippine Stock Exchange in 1992; etc.). Hence, regarding the cross-sectional observation of the dataset, the whole population of the market at the end of 2018 is employed, excluding the financial sector, the result amounts to 813 firms.

On the other hand, in terms of time-series observations, the research data will be collected from 2009 onwards. The main reason for this decision relates to the establishment of, and adjustment to, local accounting standards. During the period 2000–2005, the Ministry of Finance issued 26 Vietnamese Accounting Standards (VAS) and guiding circulars. In particular, four accounting standards were related to fixed assets (Standard Asset No. 03 – tangible fixed assets [VAS 03], Standard No. 04 – intangible fixed assets [VAS 04], Standard No. 05 – investment properties [VAS 05], and Standard No. 06 – leasing assets [VAS 06]). These four standards are based on four International Accounting Standards (IAS): respectively, IAS 16, 38, 40 and 17. The current VAS are being developed on the basis of the IAS to facilitate the process of international economic integration of Vietnam. However, due to Vietnam's unique socio-economic conditions, the application of all IAS to business practice is not feasible (Trang and Tan, 2020). In the last 10 years, the application of International Financial Reporting Standards (IFRS) has developed rapidly and is widely applied around the world. In Vietnam today, most of the financial statements of enterprises have been produced under VAS issued by the Ministry of Finance in five phases from 2001 to 2005 with 26 standards. Only a few of which, who are foreign-invested enterprises or listed on the international market, prepare a financial statement according to IFRS (Tan and Trang, 2019). Although the standards have been completed and have taken full effect since 2005, until 2008, the Ministry of Finance officially published the handbook detailing the content and application approach of the VAS, which listed firms can follow and use to prepare their annual financial statement in the most accurate and transparent manner possible. Therefore, this research will be conducted using the financial and governance information of listed businesses in the period from 2009 to 2018. In order to produce the most precise findings and the most suitable recommendations, the research examines the entire population of 813 publicly listed firms in Vietnam.

During the data processing step, survivorship bias and winsorization have been taken into consideration carefully. Regarding the issue of survivorship bias that mentioned Brown *et al.* (1992), this research is believed not to encounter this problem. This issue refers to the cross-sectional observations by the way that business failure is ignored and only surviving enterprises are considered. Hence, since this thesis includes the whole 813 public listed firms in the stock exchange markets of Vietnam during the 10-year period, it means that all the possible observations have been included into the dataset no matter firms being newly listed or delisted. Therefore, it is strongly convinced that survivorship bias is not an issue with this dataset. With regards to winsorization problem, all the outliers that arose from calculation of firm growth were dropped to ensure the dataset can be used efficiently in estimation. Thus, the total number of cross-sectional observations is only 6580 out of 8130. This also made the dataset becomes an unbalanced panel. In order to ensure that the research findings are precisely reflect the nature of the data, multiple estimation techniques will be combined to enhance the robustness of the results.

All the financial data of the 813 listed firms are collected from the annual statements of each company and from the main website of the HSX and HNX markets. In addition, raw data is primarily processed using Microsoft Excel before being imported into additional statistical software for deep and detailed analysis. Stata and Eviews are used for further data analysis. To deal with the panel dataset, a fixed-effect model, a random-effect model, and pooled ordinary least square OLS, and several special estimation methods are all taken into consideration.

4.5.2. Descriptive statistics of firm growth and capital structure parameters

In this section, the two main important groups of variable measuring firm growth and capital structure of the cross-sectional observations will be briefly descriptively analysed.

The table 4.1 show the summary of descriptive statistics of the first group of variables measuring firm growth. As can be seen from the table, all the growth parameters have the values ranged from the min level of approximately -100% to around 100% growth in Sales, 231% growth in Assets, and 145% growth in Operating profit. The average growth rates of these parameters are 13%, 17%, and 11% respectively. Since the AssetsGrowth variable has max value of 2.31, it makes the standard deviation value also high as well which is 0.337 average variation around the mean level of 0.17. In the case of SalesGrowth and OPGrowth, the standard deviation is 0.298 and 0.314 respectively.

Table 4.1: Descriptive statistics for growth parameters

Variable	N	Mean	Sta. dev.	Min	Max	p25	p50	p75
SalesGrowth	6580	0.1321	0.298	-1.031	0.999	-.0785876	.0895111	.2390901
AssetsGrowth	6580	0.1700	0.337	-0.962	2.311	-.0367979	.0802178	.2619105
OPGrowth	6580	0.116	0.314	-1.051	1.455	-.0739861	.094943	.286096

Table 4.2 presents the data description of financial leverage variables including short-term debt, long-term debt, total debt, and market debt ratio. In this group of variables, apart from short-term debt, all the others have standard deviations higher than their mean values. It means that there is high variation between the data values. As can be seen from the table, 50% of the observations are ranged from p25 value to p75 value. In case of short-term debt variable, a half of the 6580 observations have the values from 0.15 to 0.25 meanwhile the min value is far away from the range above. It means that the data structure of short-term debt has the tendency to be right skewed. Long-term debt and market debt ratio show opposite results since the median value is 0.049 and 0.27 respectively which are much closer to the min value. Meanwhile, the total debt variable has the median value

of 0.51, which is approximately equal to the mean value. It means that the distribution of this variable's data is well followed the bell shape.

The statistics of total debt (51.78%) in table 4.2 shows that Vietnamese firms are overleveraged in comparison with those in most of other countries. In specific, it is higher than firms in developed countries such as French companies during the period 1998-2009 with the average of 22% reported by De La Bruslerie and Latrous (2012), Western European and East Asian companies during the period 1996-2008 with the average of 33.4% reported by Lin *et al.* (2011), and Chinese companies with around 47% as indicated by Zou and Xiao (2006). This is possibly due to, as mentioned in the context analysis, the domination of the banking sector and the early stage of development of the country's stock market and financial market with the credit capitalisation of 131% of GDP in 2019 as mentioned in Chapter 2. In other words, banking credit is still the main source of finance rather than stock market or other sources.

Additionally, the average short-term debt ratio is 20.1% which is significantly higher than the long-term one (13.3%). This indicates that Vietnamese listed firms are heavily dependent on short-term debt rather than long-term one, which could lead to a substantial effect on firm's performance as short-term debt drives firms to the risks of refinancing and liquidity.

Table 4.2: Descriptive statistics for financial leverage parameters

Variable	**N**	**Mean**	**Sta. dev.**	**Min**	**Max**	**p25**	**p50**	**p75**
SD	6580	.2014731	.0789225	.0003056	.3801269	.1502081	.195544	.2502048
LD	6580	.1329885	.09021014	.0001001	.9903212	.00876	.0490333	.1664174
TD	6580	.5178716	.19154051	.0010765	.9906408	.3192961	.5154287	.67546
MDR	6580	.284111	.06019457	.0013228	.980939	.1995904	.2707256	.3423696

4.6. Conclusion

This chapter has discussed the approaches taken to analyse the data, along with relevant econometric tests to ensure that the most precise results will be delivered. First, due to the late establishment and adjustment of the local accounting standard, the time-series aspect of the dataset will be collected from 2008 to 2018 with the whole population for a cross-sectional focus. This includes 813 firms as of 2018, excluding financial firms.

Second, with the aim of examining the impact of financial leverage on firm growth, the short-term and long-term debt are employed as proxies for capital structure. Firm growth is represented by the changes in sales revenue, total assets, and operating profit. In addition, as discussed in the sub-section 4.4, liquidity, tangible assets, advertising expense, and innovation are strongly believed to have a significant effect on business growth, measured by various proxies, which are thus added to the research model as control variables.

Third, based on the nature of the panel dataset, the fixed-effect and random-effect estimators are considered for use in this study. Additionally, to ensure that the results given by such estimators have no bias and are not inaccurate, heteroskedasticity, autocorrelation, and cross-sectional dependence issues are taken into account by means of several econometric tests.

To conclude, this chapter provided a wide range of discussion on the steps to conduct further empirical analyses throughout this research. In the next parts, chapter 5 will consider the capital structure determinants models to be tested and estimated appropriately to find out the choice of financial leverage of Vietnamese listed firms. Chapter 6 will analyse the target capital structure to figure out the speed of adjustment as well as factors affecting it. Chapter 7 will be the main empirical part to analyse the impact of capital structure on firm growth of Vietnamese listed companies.

CHAPTER 5

DYNAMIC CAPITAL ADJUSTMENT SPEED MODEL

AND TARGET CAPITAL STRUCTURE

5.0. Introduction

In this first empirical chapter, we develop the foundation for the research on capital structure and its related factors. This chapter provides empirical findings regarding the target capital structure of Vietnamese listed firms and the adjustment speed towards their targets. Specifically, the dynamic capital structure model is developed based on the determinants reviewed in Chapter 3. To ensure that the empirical results deliver the most precise and consistent implications for the context of Vietnam, several diagnostic tests are performed for heteroskedasticity, serial autocorrelation, and cross-sectional dependence. In addition, this chapter conducts unit root tests for all the related dependent and independent variables used across the empirical sections of this thesis. For the specific case of this chapter's study, three estimation techniques are employed to analyse the business convergence towards target capital structure, including fixed-effect estimator, Fama-Macbeth estimator (Fama and Macbeth, 1973; Fama and French, 2002; Flannery and Rangan, 2006), and 2-step system GMM.

5.1. Unit root test for time series observation

As discussed in Chapter 4, data stationarity is especially important for panel data models, since the time series dimension is included as a part of the econometric model. A stationary panel is said to have a mean, variance, and autocorrelation structure that do not change over time. In addition, the failure to specify the stationarity of time-series variables leads to spurious regression problems when variables have no cointegration. Thus, several unit root tests have been developed by scholars to examine the stationarity of the panel data, in which the variable is stationary if it does not contain a unit root. As such, the summary of LLC, IPS, ADF, and PP tests are presented below with the following hypothesis.

H_0: The panel contains a unit root

H_a: The panels are stationary

In this study, the Im-Pesaran-Shin (IPS), Levin-Lin-Chu (LLC), Augmented-Dickey-Fuller (ADF), and Phillips-Perron (PP) test approaches have been selected for use in the unit root test for the unbalanced panel data set, which contains a large *N*, with 813 firms, and small a *T*, of 10 years. In particular, the IPS approach is considered to be the most significant and reliable method for this research's panel data set, as most of the other tests were developed with the required assumption of a balanced panel (Im, Pesaran and Shin, 2003; Baltagi, 2005; Levin, Lin, and Chu, 2002; Harris and Tzavalis, 1999). Furthermore, although the IPS method has been mentioned as being limited by requiring all the time series in the panel data set to be cross-sectional independently distributed, in this study, with cross-sections of 813 different firms which have been operating in the same market and are considerably affected by the same economic shocks of the market, this thesis applies several unit root tests at the same time to mitigate the limitation of the IPS test assumption. Table 5.1 presents the results of the unit root tests for all variables used throughout the empirical parts of this thesis (Chapters 5, 6, and 7).

Table 5.1: Unit root test

Summary of Unit root test for dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG), Total debt (TD), Market debt ratio (MDR), independent variables: short-term debt to value of total assets (STD), long-term debt to value of total assets (LTD), Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), logarithm Research and Development investment (Ln_RD), logarithm of Total assets, Growth opportunities (GO), Depreciation (Depre), Non-debt tax shield (NDTS), Returns on Equity (ROE), and Earnings before interest and tax (EBIT). Panel unit root test summary includes Levin-Lin-Chu (LLC), Im-Pesaran and Shin W-stat (IPS), Augmented-Dickey-Fuller Fisher (ADF-Fisher), and Phillips-Perron Fisher (PP-Fisher) during the period from 2009 to 2018 with 0 lag and Newey-West automatic bandwidth selection and Bartlett kernel.

	LLC	**IPS**	**ADF-fisher**	**PP-fisher**
Sales Growth (SG)	-323.01	-64.36	3515.68	4241.80
Total Asset Growth (TAG)	-180.28	-60.38	3835.49	5041.03
Operating Profit Growth (OPG)	-446.64	-63.35	3715.58	4653.08
Short-term debt (STD)	-190.82	-36.95	2416.47	2886.78
Long-term debt (LTD)	-701.38	-98.26	2750.74	3325.39
Total debt (TD)	-178.01	-24.18	2216.96	2668.90
Market debt ratio (MDR)	-154.22	-29.36	2466.65	2952.33
Total Asset (Ln_TA)	-93.14	-35.70	2153.09	2645.90
Tangibility (Ln_TAN)	129.21	-9.65	2020.59	2430.81
Advertising (Ln_ADV)	-195.48	-138.70	2530.77	3416.08
Innovation (Ln_RD)	-166.57	-44.15	3241.35	3862.15
Liquidity (LQ)	-743.04	-61.10	2577.93	2971.97
EBIT	-123.81	-22.94	2281.83	2825.81
Growth Opportunities (GO)	-137.10	-39.44	2299.96	2710.58
Non-debt tax shield (NDTS)	-195.48	-138.71	2530.77	3416.08
Profitability (ROE)	-16.09	-18.42	2686.89	3279.64

All the p-value of the variables are reported at 0.000

Thus, as can be seen in Table 5.1 with the results of multiple unit root tests, the p-value of all variables is significant at the 1% level (p-value < 0.01), indicating that the null hypotheses of a panel containing a unit root are rejected; rather, the alternative hypotheses are accepted. This is to say, all the variables used in the research model do not contain unit roots—in other words, they are stationary. Based on the results of the unit root test, all the variables in this research fulfil the requirement of being stationary to avoid the possible spurious regression and be appropriate for the further tests and analysis.

5.2. Dynamic capital structure and speed of adjustment models

According to the study of Heshmati (2001), Miguel and Pindado (2001), and Hovakimian *et al.* (2001) concerning the dynamic capital structure model, the optimal level of financial leverage of firm i at time t is denoted as LV_{it}^{*}, which is affected by a list of L determinant variables; X will be denoted as the exploratory determinants, so X_{jit} is with j from 1 to L. From this point, the function of the optimal capital structure is as follows:

$$LV_{it}^{*} = \sum_{j=1}^{L} \beta_j X_{jit} \quad (1)$$

In addition to the optimal and targeted capital structure model, the current observed financial leverage of firm i at time t is denoted as LV_{it}. Since the existence of capital structure adjustment towards target level's phenomenon is confirmed by scholars as discussed in Chapter 3, this thesis made an assumption that the capital structure of Vietnamese listed firms will also have the same tendency. Hence, at the point that the adjustment process is completed, the observed financial leverage LV_{it} should therefore be equal to LV_{it}^{*}, which means $LV_{it}^{*} = LV_{it}$. This will occur in the event that there is no existence of information asymmetries and transaction costs (Miguel and Pindado, 2001; Hovakimian *et al.*, 2001). Thus, according to Flannery and Rangan (2006), the partial adjustment model is illustrated as follows:

$$(LV_{it} - LV_{it-1}) = \lambda_{it}(LV_{it}^{*} - LV_{it-1}) + \varepsilon_{it} \quad (2)$$

where λ_{it} represents the speed of adjustment from the previous year's observed capital structure of LV_{it-1}. Here, $|\lambda_{it}| < 1$ (Flannery and Rangan, 2006) implies that with t going to infinity, LV_{it} adjusts towards LV_{it}^{*}. If $\lambda_{it} = 1$, the current level of financial leverage has already reached the target. Meanwhile, if $\lambda_{it} > 1$, firm i adjusts more than what is required.

By substituting Equation (1) into (2), the estimated model for capital structure adjustment is as follows:

$$LV_{it} = \lambda_{it} \sum_{j=1}^{L} \beta_j X_{jit} + (1 - \lambda_{it}) LV_{it-1} + \varepsilon_{it} \tag{3}$$

where ε_{it} represents the error term. Furthermore, in considering the speed of adjustment λ_{it}, Drobetz and Wanzenried (2006) suggest that λ_{it} varies over time and can itself be a linear function of a constant term and some other determining factors. The list of K determinants on the capital structure adjustment speed is denoted as Z_{nit} with n from 1 to K. The function for the speed of adjustment is presented as follows:

$$\lambda_{it} = \alpha_0 + \sum_{n=1}^{K} \alpha_n Z_{nit} \tag{4}$$

However, according to Drobetz and Wanzenried (2006) and Flannery and Rangan (2006), it is possible to progress the analysis of capital structure adjustment speed with separate determinants at a time to keep the estimation problem tractable. Hence, $\sum_{n=1}^{K} Z_{nit}$ can be changed from a vector to a scalar. Therefore, Equation (4) is adjusted as follows:

$$\lambda_{it} = \alpha_0 + \alpha_1 Z_{it} \tag{5}$$

By substituting Equation (5) into (3), the final estimated model for the dynamic target capital structure model is as follows:

$$LV_{it} = (1 - \alpha_0) LV_{it-1} - \alpha_1 Z_{it} LV_{it-1} + \alpha_0 \sum_{j=1}^{L} \beta_j X_{jit} + \alpha_1 \sum_{j=1}^{L} \beta_j Z_{it} X_{jit} + \varepsilon_{it} \tag{6}$$

This chapter attempts to consider two empirical analyses. First, Equation (3) is used to estimate the coefficient $(1-\lambda_{it})$ to determine the adjustment speed to the target capital structure of Vietnamese listed firms. Second, Equation (6) is used to estimate the coefficient α_1 to find the determinants that affect the adjustment speed of Vietnamese listed firms. To ensure the study can deliver the best results based on the collected panel data, several econometric diagnostic tests are performed. Based on the tests' results, the most appropriate estimation techniques are discussed and applied in the following section.

5.3. Econometric diagnostic tests

5.3.1. Breusch and Pagan Lagrange multiplier test

The null hypothesis H_0 of the LM test states that the variance between observations is constant. Thus, rejecting the null hypothesis indicates that the errors in the estimation include deviations between observation, which supports the use of RE estimation. Based on the results presented in Table 5.2, the empirical model shows a significance level at 1%, indicating that the null hypothesis for OLS residuals that do not contain individual specific error components is rejected. In other words, pooled OLS is considered inappropriate, as it ignores the difference between units and the time effect; therefore, there is strong evidence of the panel effect across the panel data set. As a result, using a simple OLS method can lead to bias in the estimation of model results and is not considered in this study; rather, RE estimation is preferable.

Table 5.2: Breusch and Pagan Lagrange multiplier test

	Market debt
	$MDR_{i,t} = Xb + u_i + e_{i,t}$
chibar2(01)	423.98
Prob > chibar2	0.0000

5.3.2. Hausman test

Since the simple pooled OLS estimation was rejected by the LM test, the subsequent step of data analysis is to determine the suitability of FE and RE estimation using the Hausman test. Hausman's null hypothesis states that there is no correlation between the error term and explanatory variables (i.e. the result fails to reject H_0), so random effects estimation is more appropriate than fixed effects. In contrast, by rejecting H_0, the assumption of random effects is violated, and estimation only of fixed effects is appropriate.

Table 5.3: Hausman test

FE = consistent under Ho and Ha

RE = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

	Fixed Effects	**Random Effects**	**Difference**	**Hausman statistic**	**p-value**
Lagged Market debt	0.181	0.182	-0.001		
Firm size	0.040	0.037	0.002		
Liquidity	-0.007	-0.007	0.00002		
Profitability	0.027	0.025	0.002		
Tangibility	0.008	0.008	-0.000004	8.26	(0.0000)
Growth opportunities	-0.001	-0.001	0.00004		
EBIT	-0.320	-0.308	-0.010		
Depreciation	-0.014	-0.012	-0.002		
Innovation	-0.004	-0.003	-0.0004		

As presented in Table 5.3, the p-value of the Hausman statistic of the dynamic econometric model is significant at the 1% level. This reveals strong evidence of rejecting the null hypothesis, with no correlation between error term ε_i and the explanatory variables. In other words, random effect estimation might yield biased and inconsistent estimators. Meanwhile, the FE estimation approach is proved under the Hausman test to deliver unbiased and consistent results. Thus, in this thesis, the FE estimation is better than pooled OLS and RE. Thus, the FE estimation will be tested with further diagnostic econometric tests for heteroskedasticity issues, autocorrelation issues, and cross-sectional dependence issues.

5.3.3. Heteroskedasticity test

As discussed in Chapter 4, heteroskedasticity is considered to be one of the most crucial issues in panel data econometric estimation. In the absence of this issue, a simple estimation technique, such as random-effect or fixed-effect, is sufficient for delivering the appropriate results. In this empirical study, the modified Wald test is considered to diagnose the heteroskedasticity of the data. The results are illustrated in Table 5.4.

Table 5.4: Likelihood ratio test for heteroskedasticity

Summary of heteroskedasticity test for the model with Market debt ratio as dependent variable. Testing hypothesis:
H_0: The panel has homoskedasticity
H_a: The panel has heteroskedasticity

	Market debt
LR chi^2	24075.96
p-value	0.0000

As observable in Table 5.4, the p-value reveals a significance level at 1%. Therefore, the panel data used to estimate Equation (3) contains heteroskedasticity issues, which violates the assumption of homoskedasticity for the general least square estimation. Thus, it requires the application of certain estimation techniques to overcome this problem. Other diagnostic tests are further conducted, and appropriate estimation is discussed accordingly.

5.3.4. Autocorrelation test

Apart from heteroskedasticity, autocorrelation (also known as serial correlation) is another important assumption for the panel data estimation process, in which the requirement for the estimation is that the data contains no autocorrelation. The Wooldridge approach assists in determining the result of the autocorrelation issue.

As can be seen in Table 5.5, the p-value of statistics is significant at the 1% level. It is evident that the null hypothesis should be rejected; rather, the alternative hypothesis being accepted. Therefore, the data contains autocorrelation issues, which could lead to biased estimated variance and unreliable coefficients in the estimation results. A further test concerns the cross-sectional dependence issue.

Table 5.5: Wooldridge test for autocorrelation

Summary of autocorrelation for the model with Market debt ratio as dependent variable. Testing hypothesis: H_0: no first-order autocorrelation

	Short-term debt
F (1, 781)	494.529
Prob > F	0.0000

5.3.5. Cross-sectional dependence test

Since the serial correlation issue is critical for time-series observation, cross-sectional dependence is an econometric problem relative to cross-sectional observation, which refers to the interdependence between 813 firms. Although in reality, firms tend to react the same to an economic shock because they are operating in the same market, especially in the real estate or technology industry, it is an important assumption for the data estimation that they should be independent of one another. The Pesaran approach for cross-sectional dependence testing is presented in Table 5.6.

As a result, the cross-sectional dependence issue occurs in many variables. Specifically, the market debt ratio, lagged market debt ratio, liquidity, tangibility, growth opportunities, and innovation have significant p-value at different levels (1%, 5%, and 10%). Therefore, in terms of testing cross-sectional dependence for these variables, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating cross-sectional dependence issues. Meanwhile, the firm size, profitability, EBIT, and depreciation reveal insignificant p-values, meaning they have no cross-sectional dependence issues.

Table 5.6: Pesaran test for cross-sectional dependence

Summary of cross-sectional dependence test for the dependent variable: Market debt ratio (MDR), and 9 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS). Under the null hypothesis of cross-section independence, CD ~ N (0,1), p-values close to zero indicate data are correlated across panel groups

	CD-test	**p-value**
Market debt ratio	6.779	0.00
Lagged Market debt ratio	5.789	0.00
Firm size	404.529	0.25
Liquidity	82.306	0.05
Profitability	166.971	0.11
Tangibility	44.127	0.03
Growth opportunities	127.674	0.07
EBIT	251.897	0.16
Non-debt tax shield	314.957	0.20
Innovation	25.975	0.02

It can be concluded based on multiple econometric tests in Section 5.3 that the panel data contains many econometric problems in terms of heteroskedasticity, serial correlation, and cross-sectional dependence. Therefore, further discussion on appropriate estimation techniques is performed in the empirical findings part of this thesis to determine the most suitable approach for this study.

5.4. Empirical findings

5.4.1. Appropriate estimation approach

Target capital structure has drawn the attention of corporate finance scholars with various ideas for an estimation method. For instance, Loof (2003) attempted to use a non-linear least squares approach to estimate the target capital structure adjustment. However, Drobetz and Wanzenried (2006) argue that this estimation method led to serious bias and inconsistent results due to the correlation between the error term and lag leverage, LV_{it-1}. Therefore, the non-linear least squares technique is not recommended for this research. Instead, the dynamic econometric model is suggested to be estimated by a difference-generalised method of moments (D-GMM) (Arellano and Bond, 1991), which is typically to be used to handle several econometric problems, such as fixed effects, time-invariant effects, and the endogeneity of regressors and dynamic panel bias (Daher *et al.*, 2015). However, Aderajew *et al.* (2019) claims that the D-GMM approach has certain limitations such that the lagged levels might weakly correlate with the first differences. Additionally, Roodman (2015) indicated that this problem might be more serious in the case that the instrumental lagged levels are highly persistent. Thus, Arellano and Bover (1995) addressed such limitations of the D-GMM technique to develop a level GMM method that performs the regression in levels. Yet, the final efficient technique was proposed by Blundell and Bond (1998) and is known as system GMM, which can combine both advantages of moment conditions and a level equation.

Several reasons explain why the system GMM estimator is particularly suitable for this research. First, the system GMM technique has better asymptotic and finite sample properties than the D-GMM approach. Second, instrument-endogenous variables are treated under difference equations, making it better for handling time-invariant firm-specific attributes. Third, system GMM is suitable for the panel data set, which has a large number of cross-sections and small number of time-series period.

Another estimator was developed by Fama and Macbeth (1973) (FM) and was recommended by Fama and French (2002) and Flannery and Rangan (2006) to efficiently avoid understating coefficient standard errors. The FM estimator has been applied in a similar study by Flannery and Rangan (2006) regarding partial adjustment towards the target capital structure of all firms in Compustat Industrial Annual tapes between the years 1965 and 2001, excluding the financial sector. Thus, this approach is used in this research to estimate Equations (3) and (5) in conjunction with system GMM to enhance the robustness of the findings.

5.4.2. Empirical estimations of capital structure adjustment speed

Table 5.7 presents the estimated result of the dynamic capital structure adjustment model based on Equation (3), discussed in Section 5.2. This equation is estimated using three methods: Model 1 is fixed-effect estimation, model 2 applies Fama Macbeth estimation, and model 3 is estimated by the system GMM approach. The focus of the estimations is to determine the coefficient of the lagged leverage variable, which represents the speed of the capital structure adjustment towards the target.

As can be seen in Table 5.7, the Fama Macbeth and system GMM estimators possess a similar and 1% significant coefficient of $Leverage_{t-1}$, with 0.705 and 0.713, respectively. The fixed effect with robust standard error reports a coefficient of 0.0117 with a significance level of 1%. Since the coefficient specified in the econometric model is $1 - \lambda_{it}$, the rough speed of adjustment towards the target capital structure is 29.5% and 28.7% per year, as reported by Fama Macbeth and system GMM, respectively. Meanwhile, as indicated by the robust fixed-effect estimator, the target capital structure adjustment speed is calculated to be 98.83% within the current year, which means that in one year, Vietnamese listed firms can adjust their capital structure to the targeted level. This is believed to be impossible and too large compared with the empirical findings of the literature; for instance, Aderajew *et al.* (2019) found the adjustment speed to target capital structure of 1,500 Dutch farm businesses to range from 13.12% to 64.05% depending on the type of the farm. Meanwhile, Flannery and Rangan (2006) found an approximate of 37% per year adjustment speed of all firms in Compustat Industrial Annual tapes between 1965 and 2001. Therefore, the result of 98.83% is not considered to be feasible empirical findings of this research; rather, the coefficients reported by Fama Macbeth and system GMM estimations are more consistent.

Table 5.7: Capital structure adjustment estimations

Dynamic panel-data estimation

	Model 1 Fixed effect	**Model 2 Fama Macbeth**	**Model 3 System GMM**
Leverage$_{t-1}$	0.0117***	0.705***	0.713***
	(0.003)	(0.136)	(0.123)
Size	0.008*	0.027*	-0.071*
	(0.034)	(0.018)	(0.042)
Liquidity	-0.004**	0.014	0.011*
	(0.002)	(0.021)	(0.006)
Profitability	0.033**	0.212*	0.293
	(0.022)	(0.142)	(0.245)
Tangibility	0.037*	-0.001	0.153***
	(0.024)	(0.005)	(0.037)
Growth opportunities	-0.014***	0.004	-0.057***
	(0.001)	(0.005)	(0.010)
EBIT	-0.27**	-0.424**	-2.219***
	(0.136)	(0.196)	(0.439)
Non-debt tax shield	-0.007	-0.004	-0.123***
	(0.018)	(0.003)	(0.038)
R&D	0.002	-0.004*	0.038***
	(0.0003)	(0.002)	(0.010)
Constant	-0.35	-0.411	0.79**
	(0.343)	(0.411)	(0.345)
Observations	6295	6295	6295
F statistic	15.75	752.05	
P-value	0.000	0.000	
R-square	0.2927	0.6834	
Wald statistic			977.608
P-value			0.000
AR(2)			0.320
Sargan test			1.000
Hansen test			0.699

5.4.3. Empirical estimations of determinants of capital structure adjustment speed

Equation (6) is estimated in this section using the system GMM estimator suggested by Drobetz and Wanzenried (2006), Flannery and Rangan (2006), and Aderajew *et al.* (2019). System GMM can estimate all the α and β parameters of Equation (6) together. Specifically, α_1 is the primary focus of the estimator, which is the coefficients on the interaction term between the lagged leverage of the capital structure (LV_{it-1}) and a determinant of the capital structure adjustment speed (Z_{it}). As recommended by Drobetz and Wanzenried (2006), the estimation process is separated for each determinant to avoid multicollinearity and keep the model problem tractable. Table 5.8 reports the estimated coefficients of the mentioned interaction terms and the lagged debt ratio.

Table 5.8: Determinants of capital structure adjustment speed

		Market debt ratio	**Book debt ratio**
Model 1: Distance to target	Lagged debt ratio (LV_{it-1})	-0.027***	0.301*
		(0.009)	(0.189)
	Distance × Lagged MDR: $-(Dist \times LV_{it-1})$	-0.071*	-0.046**
		(0.038)	(0.530)
	Wald test	0.000	0.000
	AR(2)	0.210	0.115
	Sargan test	0.161	0.610
	Hansen test	0.201	0.619
Model 2: Firm Size	Lagged debt ratio (LV_{it-1})	7.549*	4.075*
		(4.17)	(2.960)
	Size × Lagged MDR: $-(Size \times LV_{it-1})$	-0.281*	-0.117**
		(0.151)	(0.108)
	Wald test	0.000	0.000
	AR(2)	0.450	0.051
	Sargan test	0.984	0.465
	Hansen test	0.261	0.636
Model 3: Growth opportunities	Lagged debt ratio (LV_{it-1})	0.742***	0.752***
		(0.176)	(0.117)
	Growth × Lagged MDR: $-(GO \times LV_{it-1})$	-0.11***	-0.048***
		(0.019)	(0.013)
	Wald test	0.000	0.000
	AR(2)	0.333	0.205
	Sargan test	1.000	0.838
	Hansen test	0.677	0.705

It is noted that in Equation (6), the sign of α_1 is specified as negative; thus, the interpretation for the sign of the estimated coefficient is performed accordingly. First, a weak positive relationship between the distance from the target capital structure and the speed of adjustment is reported, with a 10% significance level for the market debt option and a 5% significance level for the book debt option. This result contradicts the findings of Loof (2004) and Banerjee et al. (2004) but is consistent with Drobetz and Wanzenried (2006). The positive correlation between distance to target debt level and speed of adjustment is consistent with the first hypothesis H1 and also consistent with the literature of Qian et al. (2007) and Haas and Peeters (2006), however, the impact level is relatively minor. It implies that in Vietnam, the fixed cost of adjusting the capital structure is significant and considerable, and the further the distance from their target level, the higher the speed that Vietnamese firms will adjust towards their targets, and vice versa. Second, model 2 reports a strong positive coefficient for the interaction term between the lagged leverage variable and the firm size, which also significantly supports the second hypothesis of the thesis H_2. The estimation is significant at 10% and 5% for the market debt ratio and book debt ratio models, respectively. This result is confirmed by Banerjee *et al.* (2004) and Loof (2004), who state that larger companies are more likely to pay attention to capital structure decisions than smaller ones. Finally, growth opportunities also witness a positive correlation with the speed of adjustment at a 1% significance level. The coefficient has a medium sign with 0.11 in the market debt option and 0.048 in the book debt option. This supports the hypothesis that firms with higher growth opportunities should find it easier to adjust the capital structure towards their target level, which is consistent with the findings of Drobetz and Wanzenried (2006) and Uysal (2011).

5.5. Chapter conclusion and hypotheses testing results

Table 5.9 presents the hypothesis testing results of the study in Chapter 6, in which the distance to the target leverage level, firm size, and growth opportunities are tested determinants. The estimation results revealed that all the determinants positively and significantly influence the speed of adjustment towards firms' target capital structure. The empirical results of this study strongly support the hypotheses developed in Chapter 3 for positive correlation between proposed factors and adjustment speed towards target debt. This is consistent with and strongly supported by the current literature of Banerjee *et al.* (2004) and Drobetz and Wanzenried (2006).

Table 5.9: Hypothesis testing result

Hypothesis	Empirical results
H_1: 'Distance' has positive relationship with adjustment speed towards target capital structure	Strong support
H_2: Firm size has positive relationship with adjustment speed towards target capital structure	Strong support
H_3: Growth opportunities has positive relationship with adjustment speed towards target capital structure	Strong support

Based on the empirical findings of this chapter, it is concluded that the approximate speed of deviation towards the target capital structure is 29% per year, which is roughly consistent with the average speed of the empirical studies (Aderajew *et al.*, 2019; Flannery and Rangan, 2006). However, regarding other papers, in terms of the emerging and developing markets (South East Asian or South African countries), conducted by Haron (2015), Tzang *et al.* (2013), and Ameer (2010), this empirical speed of Vietnam is only half of their adjustment findings. This result indicates that it would require more than three years on average for Vietnamese firms to achieve their target level of leverage. In practice, Vietnam is an emerging and rapidly growing market, with a most recent growth rate of 3% per year in terms of the number of listed firms and growing at 10% per year in terms of market capitalisation. Therefore, if it takes three years for businesses to have their capital structure convergence to the target level, this is a considerably low speed, since they tend to complete their long-term projects before the target structure is reached (Nguyen *et al.*, 2014; Nguyen, 2015). Although it is not hypothesised in the literature review about the speed of adjustment towards target capital structure, it was expected that the approximate speed should be 60%. Moreover, Loof (2004) and Drobetz and Wanzenried (2006) argue that firms a small distance from the target level are not likely to attempt to adjust towards the target level, since it is not relatively necessary, and the cost of adjustment can outweigh the benefits of reaching the target structure. Hence, the empirical results of this study again strongly support the existence of the target debt level in the capital structure, and listed firms will tend to adjust their capital structure towards the specific desired level. Although the speed is relatively slow compared with the practical needs for long-term projects, the target structure should be reviewed annually, since it is significantly affected by the number of firm-specific factors, as analysed in Chapter 5.

In addition, distance to the target level, firm size, and growth opportunities positively affect the adjustment speed of listed firms, with firm size being the most important factor, having a high coefficient of 0.281, followed by growth opportunities with 0.11. The empirical results reveal that larger firms have more advantages for capital structure adjustment, as they are more diversified and have a higher reputation to access multiple sources of finance. In the case of Vietnam, this is proved to be the most significant determinant for debt structure convergence. The next significant factor is growth opportunities, with a positive coefficient of 0.11. This indicates that firms with a greater possibility to grow will adjust more quickly to reach the debt structure, which serves as the basis for them to achieve further growth. The final factor is the distance to the target debt structure, which has a relatively small coefficient of 0.071, thereby implying that a larger distance towards the target level tends to boost the adjustment speed. However, the low impact level indicates that if the debt ratio is very far from the target rate, companies will quickly react to change the financial policy for the purpose of adjustment. Yet, when companies nearly reach the desired ratio, they tend to slow down significantly and might even halt the convergence process, since the adjustment cost may outweigh the benefit of reaching the target structure.

In the list in the literature review, although there were several studies conducted to investigate this topic in the past, none was conducted for Vietnam, especially on a large and comprehensive scale of the entire listed firm population. Therefore, this thesis is considered to be a remarkable contribution to the empirical field of target debt structure convergence and adjustment speed. Furthermore, the method of model development and the estimation approaches are grounded on the literature and consistent with other studies (Im *et al.*, 2020; Touil and Mamoghli, 2020; Flannery and Rangan, 2006; Haas and Peeters, 2006; Drobetz and Wanzenried, 2006, Uysal, 2011; Haron, 2015; Tzang *et al.,* 2013; Ameer, 2010; and Qian *et al.,* 2007). Hence, the empirical results in this study can serve as the foundation for the Vietnamese knowledge in the field of target capital structure and as the basis for further research literature.

CHAPTER 6

DETERMINANTS OF CAPITAL STRUCTURE

6.0. Introduction

This chapter aims to present the empirical results of the analysis of determinants on the capital structure of Vietnamese listed firms, excluding financial sectors. To ensure the precision of research outcomes and minimise the violation of model assumptions, several econometric tests are conducted. This could be considered the basis for an appropriate recommendation for business managers in terms of capital structure choice. In addition, this will contribute to the current empirical literature of capital structure determinants for the Vietnam market. In general, this chapter attempts to fully utilise the econometric techniques to precisely demonstrate the relationship between financial leverage (proxied by short-term debt, long-term debt, and total debt) and its determinants. To achieve this goal, OLS, RE, FE, and system GMM are considered through a variety of model diagnostic tests. The most suitable approach among pooled OLS, RE, and FE is employed as the estimation method for the chapter in conjunction with system GMM to enhance the robustness of the findings.

Based on the capital structure model specified in Chapter 5, this study includes six independent variables in the model to analyse the determinants of capital structure for the case of Vietnamese listed firms. As the primary approach followed before estimating the coefficients of variables, several diagnostic tests are conducted to ensure the most appropriate estimation techniques. First, the Lagrange multiplier test is conducted to determine whether the simple OLS estimation method is suitable for this research. Second, in the event that the classical OLS estimator is rejected by the Lagrange multiplier, the Hausman test will be performed to consider the suitability between the FE and RE estimation approaches. From this selection, preliminary regression is performed, along with several model diagnostic tests for heteroskedasticity, autocorrelation, and cross-sectional dependence. Based on the results of these tests, the problems of current econometric model estimation can be determined, and mitigating options will be considered to ensure the empirical findings are free of spuriousness.

6.1. Diagnostic tests for panel data

6.1.1. Breusch and Pagan Lagrange multiplier test

In terms of dealing with panel data, selecting between the OLS, FE, or RE estimation methods is the first important step to ensure the regression delivers the most precise results. The purpose of this step is to select the most appropriate model specification by which the estimation method can be properly used to generate the results. Among the common tests for likelihood-based inference (Lagrange multiplier, likelihood ratio, and Wald), the LM test stands out, as it has the advantage of statistic computation, which uses only the results of the null hypothesis and restricted model. This is believed to be simpler than the other tests that use the alternative hypothesis and an unrestricted model (Greene, 2012; Greene and McKenzie, 2012). Additionally, with the advantage of using the null hypothesis as mentioned above, in the case that the parameter lies on the boundary of the parameter space, the LM test will still follow a standard distribution. Therefore, especially in the case of testing for random effects in a linear model, the Breusch and Pagan Lagrange multiplier test is useful for determining the suitability of OLS estimation based on the residuals of pooled OLS (Baltagi, 2008; Greene, 2012). Accordingly, the hypothesis H_0 states that the variance between observations is constant. Thus, rejecting the null hypothesis indicates that the errors in the estimation include deviations between observations, which supports the use of RE estimation.

Table 6.1: Breusch and Pagan Lagrange multiplier test

Breusch and Pagan Lagrange multiplier tests to examine the panel effect of the dataset for 4 different models with 3 dependent variables: SD - Short-term debt, LD - long-term debt, and TD - Total debt

	Short-term debt	**Long-term debt**	**Total debt**
	$SD_{i,t} = Xb + u_i + e_{i,t}$	$LD_{i,t} = Xb + u_i + e_{i,t}$	$TD_{i,t} = Xb + u_i + e_{i,t}$
chibar2(01)	1307.21	315.88	430.02
Prob > chibar2	0.0000	0.0000	0.0000

As discussed in the introduction section of this chapter, the first econometric test is performed to determine whether the simple OLS estimation is sufficient for presenting the precise correlation between the explanatory variables and dependent variables. Based on the results presented in Table 6.1, all the empirical models witness a significance level at 1%, indicating that the null hypothesis for OLS residuals that do not contain individual specific error components is rejected. In other words, pooled OLS is inappropriate, as it ignores the difference between units and the time effect. Therefore, there is strong evidence of the panel effect across the panel data set. Thus, the simple OLS method can lead to bias in the estimation of model results and is not considered in this study; rather, RE estimation is preferable.

6.1.2. Hausman test

Since the simple pooled OLS estimation was rejected by the LM test, the subsequent step of data analysis is to determine the suitability of FE and RE estimation using the Hausman test. Hausman's null hypothesis is that there is no correlation between the error term and explanatory variables (i.e. the result fails in rejecting H_0), so random effects estimation is more appropriate than fixed effects. In contrast, by rejecting H_0, the assumption of random effects is violated, and estimation of only fixed effects is appropriate.

H_0: No correlation between error term εi and exploratory variables

H_1: Correlation between error term εi and exploratory variables

The results of Hausman statistic and p-value are presented in Table 6.2.

Table 6.2: Hausman test

Summary of Hausman test for 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD), 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS).

FE = consistent under Ho and Ha

RE = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

		Fixed Effects	**Random Effects**	**Difference**	**Hausman statistic (p-value)**
Short-term debt model	Firm size (Ln_TA)	0.006	0.002	0.004	141.64 (0.0000)
	Liquidity (LQ)	-0.003	-0.003	0.0005	
	Profitability (ROE)	0.008	0.008	-0.0007	
	Tangibility (Ln_TAN)	0.0006	-0.002	0.002	
	Growth opportunities (GO)	0.0004	-0.00005	0.0004	
	Non-debt tax shield (NDTS)	-0.0009	0.002	-0.003	
Long-term debt model	Firm size (Ln_TA)	-0.017	0.0003	-0.017	58.41 (0.0000)
	Liquidity (LQ)	0.002	0.002	-0.0009	
	Profitability (ROE)	-0.009	-0.010	0.001	
	Tangibility (Ln_TAN)	0.031	0.033	-0.002	
	Growth opportunities (GO)	-0.011	-0.007	-0.004	
	Non-debt tax shield (NDTS)	-0.002	-0.012	0.010	
Total debt model	Firm size (Ln_TA)	-0.0004	0.013	-0.014	37.29 (0.0000)
	Liquidity (LQ)	-0.004	-0.005	0.001	
	Profitability (ROE)	-0.009	-0.017	0.008	
	Tangibility (Ln_TAN)	0.030	0.023	0.004	
	Growth opportunities (GO)	-0.010	-0.008	-0.003	
	Non-debt tax shield (NDTS)	0.00009	0.00002	0.00008	

As presented in Table 6.2, the p-value of the Hausman statistic of all three econometric models is significant at the 1% level. This reveals strong evidence for rejecting the null hypothesis of there being no correlation between error termε_i and the explanatory variables. In other words, random effect estimation may yield biased and inconsistent coefficients of regressors; meanwhile, the FE estimation approach is proved under the Hausman test to deliver unbiased and consistent results. Thus, in this thesis, FE estimation is better than pooled OLS and RE estimation for indicating the effect of the independent determinants: firm value, liquidity, profitability, tangibility, growth opportunities, and non-debt tax shield on financial leverage. Based on this result, the FE model is examined through further diagnostic tests for heteroskedasticity issues, autocorrelation issues, and cross-sectional dependence issues.

6.1.3. Heteroskedasticity test (Modified Wald test approach)

Heteroskedasticity is considered to be one of the most crucial problems in regression estimation, since it can lead to a variety of consequences, such as the estimated standard error being incorrect even though the regression estimator is unbiased, or the confidence interval and hypothesis test being no longer reliable, since the estimation coefficient is not the least variance. Thus, in terms of testing for FE estimation, the modified Wald test is strongly recommended by Lyon and Tsai (1996) and Greene (2000) for examining the heteroskedasticity issue.

The results specified in Table 6.3 provide strong evidence that all three models contain heteroskedasticity issues. Specifically, the results of the modified Wald test for heteroskedasticity have a significant p-value at 1% in all models, so the null hypothesis can be rejected; rather, the alternative hypothesis is accepted, as the panel data contains heteroskedasticity. This is a serious problem in panel data analysis, since it can lead to the incorrect estimation of error terms and unreliable coefficients. Additional tests for autocorrelation and cross-sectional dependence are performed. Afterwards, the necessary mitigating estimation option is discussed and conducted.

Table 6.3: Likelihood ratio test for heteroskedasticity

Summary of heteroskedasticity test for 3 specific models with 3 dependent variables as proxies for capital structure: Short-term debt, Long-term debt, and Total debt. Testing hypothesis:
H_0: The panel has homoskedasticity
Ha: The panel has heteroskedasticity

	Short-term debt	**Long-term debt**	**Total debt**
LR chi^2	2745.20	33274.24	23125.68
Prob>chi2	0.0000	0.0000	0.0000

6.1.4. Autocorrelation test (Wooldridge approach)

Autocorrelation occurs when the errors are correlated with one another. In this case, the noise errors of various observations are computed from different distributions, which is not the distribution of explanatory variables. Some of the problems caused by the autocorrelation issue are that the estimated variance of the regression is biased, and therefore, the results of the F-test are no longer reliable. Table 6.4 presents the results of the autocorrelation test based on the Wooldridge approach

Table 6.4: Wooldridge test for autocorrelation

Summary of autocorrelation for 3 specific models with 3 dependent variables as proxies for capital structure: Short-term debt, Long-term debt, and Total debt. Testing hypothesis:
H_0: no first-order autocorrelation

	Short-term debt	**Long-term debt**	**Total debt**
F (1, 801)	76.221	8.070	8.403
Prob > F	0.0000	0.0046	0.0038

As presented in Table 6.4, the p-value of all models is significant at the 1% level. Therefore, the null hypothesis is rejected; rather, the alternative hypothesis can be accepted in this test. As such, the panel data has an autocorrelation issue.

6.1.5. Cross-sectional dependence test (Pesaran approach)

Similar to the unit root test, which is dedicated to examining the time-series observations of panel data, the Pesaran approach for cross-sectional dependence is specified to test whether the cross-sectional observations of the panel data are correlated with one another. Indeed, one of the most crucial assumptions for panel data estimation is that all the cross-sections are independent. The null hypothesis of the Pesaran approach is that the variables have no cross-sectional dependence issues. The test is performed and presented in Table 6.5.

Based on Table 6.5, only the p-value of short-term debt is insignificant at 0.707, indicating that no cross-sectional dependence occurs for this variable. Meanwhile, all other variables in the model witness a significant p-value at a 1% level. Thus, the cross-sectional dependence issue occurs in most parts of the panel data set, except for the short-term debt.

To summarise, the panel data used in this research is proven to contain multiple issues regarding heteroskedasticity, autocorrelation, and cross-sectional dependence. Therefore, in addition to the data findings produced by the fixed-effect regression approach, the robust standard error with an industry-fixed dummy variable, time-year dummy variable, panel-corrected standard errors model, and system GMM estimation are considered as additional methods for mitigating such issues and delivering the most appropriate results.

Table 6.5: Pesaran test for cross-sectional dependence

Summary of cross-sectional dependence test for 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD), 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS).Under the null hypothesis of cross-section independence, CD ~ N (0,1), p-values close to zero indicate data are correlated across panel groups

	CD-test	**p-value**
Short-term debt	-0.376	0.707
Long-term debt	33.149	0.000
Total Debt	6.779	0.000
Firm size	404.529	0.000
Liquidity	82.306	0.000
Profitability	166.971	0.000
Tangibility	44.127	0.000
Growth opportunities	127.674	0.000
Non-debt tax shield	314.957	0.000

6.2. Fixed effects estimation

Table 6.6 presents the fixed-effects estimator results for three regression models with dependent variables, including short-term debt, long-term debt, and total debt, respectively. The table summarises the estimated coefficients and their p-values accordingly for each exploratory variable. These are regarded as the preliminary findings for indicating the factors that determine the capital structure of Vietnamese listed firms.

In terms of the first model, with short-term debt as dependent variables, tangibility and non-debt tax shield are the only variables that report insignificant results, with p-values much higher than the acceptable level of 10% (0.608 and 0.498, respectively). Therefore, no evidence exists for the effect of tangibility and non-debt tax shield on short-term financial leverage. Meanwhile, the other explanatory variables reveal significant effects on the choice of short-term debt in Vietnamese listed firms. In detail, firm size, liquidity, and growth opportunities have a strong relationship at a 1% significance level, and profitability at a 10% level. Moreover, with positive estimated coefficients of correlation for firm size, profitability, and growth opportunities, this implies that larger firms (higher value of total assets) with more profitability ratios and a high level of opportunities for growth (market value is rising) tend to utilise short-term leverage for business operation. In addition, liquidity presents a contradictory signal, that companies with low ability to transform current assets into cash to sort out all the current liabilities tend to use more short-run debt in the capital structure.

Regarding the second and the third model, with long-term debt and total debt as the dependent variables, the results reveal insignificant coefficients for most explanatory variables (firm size, liquidity, profitability, and non-debt tax shield). Tangibility and growth opportunities are the only two independent variables that show significant results, in which tangibility is significant at 5% for the model of long-term debt (p-value of 0.032) and 10% for the model of total debt (p-value of 0.053), while growth opportunities are significant at 1% for both models. The results of these two models suggest that the value of tangible assets normally leads to a high level of collateral value relative to intangible assets, indicating that listed firms can more easily gain access to financial leverage. Regarding growth opportunities, it can be considered a type of asset that brings added value to the firms but without collateralisation or considering taxable income (Acaravci, 2015). Thus, firms with good opportunities for future growth tend to avoid using debt as their primary financing method; rather, equity is more likely to be used first. These results significantly support the hypotheses H_7 and H_8 as indicated in Chapter 3. However, this simple FE estimation has no evidence to support the other hypotheses of the study H_4, H_5, H_6, H_9 due to the existence of several econometric nonspherical errors, which requires further estimation methods to be used.

The results of negative correlation between growth opportunities and long-term debt and total debt are strongly consistent with many empirical studies (Myers, 1977; Rajan and Zingales, 1995; Miguel and Pindado, 2001; Chen and Jiang, 2001; Bevan and Danbolt, 2001; Drobetz and Fix, 2005; Nguyen and Neelakantan, 2006). Particularly regarding the capital structure theories discussed in Chapter 3, the trade-off theory predicts a negative relationship between leverage and investment opportunities. Additionally, the pecking order theory suggests that a firm's growth is negatively related to its capital structure. Growth opportunities may be considered assets that add value to a firm but cannot be collateralized and are not subject to taxable income. The agency problem suggests a negative relationship between capital structure and a firm's growth. As a result, firms with high growth opportunities might not issue debt in the first place, and leverage is expected to be negatively related to growth opportunities (Jensen and Meckling, 1976; Myers and Majluf, 1984; and Fama and French, 2000).

Titman and Wessels (1988) indicated that the assets include the ratio of intangible assets to total assets and the ratio of inventory plus gross plant and equipment to total assets. A positive relationship exists between tangibility and leverage, and a negative relationship exists between intangibility and leverage. The trade-off theory predicts a positive relationship between leverage and tangible assets. Tangible assets typically provide a high collateral value relative to intangible assets, which implies that these assets can support greater debt. Tangible assets reduce the cost of financial distress. Most empirical studies observe a positive relationship between leverage and tangibility (e.g. Jensen and Meckling, 1976; Titman and Wessels, 1988; Jensen *et al.,* 1992; Rajan and Zingales, 1995; Demirgüç-Kunt and Maksimovic, 1996; Chen *et al.,* 1998; Banerjee *et al.,* 2004; Chen and Jiang, 2001; Bevan and Danbolt, 2001; Zabri, 2012; Wahab *et al.,* 2012; Wahab and Ramli, 2014). On the other hand, agency theory predicts a negative relationship between the tangibility of assets and leverage.

Table 6.6: Fixed effect estimation

The fixed effect regression models are reported in the table to examine the determinants of capital structure proxied by 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD). The list of determinants includes 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS). Numbers in brackets are standard errors of the regressors.

	Model 1 **Short-term debt**	**Model 2** **Long-term debt**	**Model 3** **Total debt**
Firm size	0.006***	-0.0171	-0.0004
	(0.002)	(0.023)	(0.023)
Liquidity	-0.003***	0.0016	-0.004*
	(0.0002)	(0.002)	(0.002)
Profitability	0.008*	-0.009	-0.009
	(0.004)	(0.055)	(0.055)
Tangibility	0.0006	0.0306**	0.0278*
	(0.001)	(0.014)	(0.014)
Growth opportunities	0.0004***	-0.011***	-.0103***
	(0.0001)	(0.002)	(0.001)
Non-debt tax shield	-0.0009	-0.002	0.00009
	(0.001)	(0.017)	(0.017)
Constant	0.0531	-0.061	-0.099
	(0.047)	(0.587)	(0.590)
Observations	6580	6580	6580
R-squared	0.2638	0.4369	0.3485
F statistic	63.47	9.84	9.98
P-value	0.0000	0.0000	0.0000

In the case of the short-term debt model, the result is not consistent with the current literature, especially in terms of tangibility. Specifically, many scholars found a certain impact of tangible assets to be the determinant for capital structure (Myers and Majluf, 1984; Titman and Wessels, 1988; Arsov and Naumoski, 2016). This should be the result of serious problems identified in the diagnostic tests. Therefore, to enhance the robustness of the empirical findings and discussion, further estimation approaches are considered in the following section.

6.3. Robust standard error with industry-fixed dummy variable

Due to the existence of serious econometric problems revealed through the diagnostic tests, one solution for overcoming the presence of the heteroskedasticity issue was proposed by White (1980) and is known as the robust variance estimator. The approach is dedicated to providing consistent standard errors for estimated regression coefficients with the existence of heteroskedasticity. Additionally, Newey-West (1987) extended the idea of White (1980) to produce an estimator that can address both autocorrelation and heteroskedasticity problems. Furthermore, the industry dummy variable was added to the econometric models to increase the validity of the empirical findings. Regarding model 1 with short-term debt as the dependent variable, firm size is the only proxy that has an insignificant result. Otherwise, liquidity is strongly significant at the 1% level; profitability, tangibility, and growth opportunities are at the 10% level; and non-debt tax shield is at the 5% level. In model 2, liquidity is the only insignificant factor, and in model 3, only tangibility is insignificant.

In terms of firm size as a factor that affects the capital structure choice of Vietnamese listed firms, no evidence exists regarding the effect of size in the short-term debt model. However, in models 2 and 3, strong evidence exists for positive correlation. This empirical result is significantly consistent with the hypothesis H_4 proposed in the literature review. Additionally, it is also supported by the trade-off theory of capital structure, which indicates that large firms tend to follow diversified sources of finance to reduce the risk, since they have no serious pressures about rapidly growing. This view is consistent with the empirical findings of Fischer *et al.* (1989), Chang and Rhee (1990), Chen *et al.* (1998), Banerjee *et al.* (2004), Bevan and Danbolt (2001), Fattouh *et al.* (2002), Padron *et al.* (2005), Gaud *et al.* (2005), and Tomak (2013).

In addition, liquidity has a negative correlation with short-term debt and total debt at strong significance levels. This is consistent with the current empirical literature of Deesomsak *et al.* (2004) and De Jong *et al.* (2007). Indeed, the liquidity ratio is considered to be an efficient measure used by creditors to determine a company's ability to fulfil its short-term debt obligation; therefore, a higher level of liquidity should result in better accessibility to leverage. Thus, the empirical result of this estimation is contradictory with the proposed hypothesis in Chapter 3. However, the result of this model is supported by the pecking order theory of capital structure, which states that firms with accumulated cash and liquid assets will prefer to use internal sources of finance first before considering external funds. In this case, it can be seen that Vietnamese listed firms follow the structure of the pecking order theory. Regarding model 2, although the relationship between liquidity and long-term debt is positive and thus inconsistent with the literature, the p-value is insignificant, with 0.204.

Table 6.7: Robust standard errors estimation with industry-fixed dummy variable

The fixed effect regression models are reported in the table to examine the determinants of capital structure proxied by 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD). The list of determinants includes 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS).

Std. Err. adjusted for 10 clusters in Industry

	Model 1 Short-term debt	**Model 2 Long-term debt**	**Model 3 Total debt**
Size	-0.001	0.032**	0.043***
	(0.003)	(0.012)	(0.012)
Liquidity	-0.004***	0.004	-0.008**
	(0.0005)	(0.003)	(0.003)
Profitability	0.007*	-0.0104*	-0.045**
	(0.004)	(0.022)	(0.017)
Tangibility	-0.003*	0.0202**	0.004
	(0.002)	(0.008)	(0.007)
Growth opportunities	-0.0005*	-0.0018*	-0.001**
	(0.0002)	(0.0009)	(0.0007)
Non-debt tax shield	0.006**	-0.029**	-0.009**
	(0.002)	(0.012)	(0.013)
Constant	0.182***	-0.569***	-0.512**
	(0.021)	(0.149)	(0.165)
Fixed Industry	Yes	Yes	Yes
Observations	6580	6580	6580
R-squared	0.1174	0.6290	0.4409
F statistic	17.10	44.91	24.22
P-value	0.0002	0.0000	0.0000

In the case of profitability as the determinant of financial leverage choice, models 2 and 3 present negative and significant correlation at 10% and 5%, respectively. This strongly supports the hypothesis H_6 about the negative correlation between profitability and financial leverage. According to the pecking order theory of capital structure, firms are advised to utilise internal sources of finance first before considering external funds; as a result, more profitable companies will have lower debts in capital structure. Thus, the model of long-term debt and total debt consistently follow the pecking order theory. Although this result contradicts the trade-off theory, in which highly profitable firms that have more tax reduction benefits are recommended to use more debt, it is still supported by numerical empirical papers (Myers and Majluf, 1984; Titman and Wessels, 1988; Jensen *et al.*, 1992; Bathala *et al.*, 1994; Rajan and Zingales, 1995; Demirgüç-Kunt and Maksimovic 1996; Miguel and Pindado, 2001; Schargrodsky, 2002; Huang and Song, 2005; Wahab *et al.*, 2012; Yolanda and Soekarno, 2012, Tomak, 2013; Wahap and Ramli 2014).

Furthermore, negative relationships occur with tangibility and growth opportunities, at 10% and 5% significance levels for model 1, which is consistent with the proposed hypothesis H_8 indicated in Chapter 3 for growth opportunities variable, yet it is still violates the hypothesis H_7 for tangibility indicator. The impact direction of tangibility is not supported by the recent empirical papers, such as those of Zabri, (2012), Wahab *et al.* (2012), and Wahab and Ramli (2014). Nevertheless, in terms of long-run financing, tangibility has a significant positive impact, indicating that the value of tangible fixed assets of Vietnamese listed companies still positively affects the choice of financial leverage; however, in model 3, this factor has an insignificant result. Meanwhile, the effect of growth opportunities is strongly supported by scholars (Myers, 1977; Rajan and Zingales, 1995; Miguel and Pindado, 2001; Chen and Jiang, 2001; Bevan and Danbolt, 2001; Drobetz and Fix, 2005; Nguyen and Neelakantan, 2006).

The final explanatory variable is the non-debt tax shield, which positively impacts model 1 (short-term debt) but negatively impacts models 2 and 3 (long-term debt and total debt, respectively). Thus, the model 1 of short-term debt does not support the hypothesis H_9, yet the models 2 and 3 are strongly consistent with the hypothesis H_9 to confirm a negative correlation between non-debt tax shield and financial leverage. In model 1, it can be argued that the value of a non-debt tax shield is attractive collateral, which might induce a company to take more debts; however, the negative correlation is strongly supported by the literature, such as Kim and Sorensen (1986), Titman and Wessels (1988), Mackie-Mason (1990), Demirguc-Kunt and Maksimovic (1996), Miguel and Pindado (2001), Schargrodsky (2002), and Zabri (2012).

6.4. Robust standard error with industry-fixed and time-year dummy variable

On June 26, 2015, the Vietnamese Government officially issued Decree 60/2015, which allows foreign investors to invest unlimitedly in public enterprises. In addition, it stipulates that foreign investors can invest unlimitedly in government bonds and corporate bonds, which is considered a breakthrough in attracting foreign capital flows into the Vietnam stock market. With this permission to increase foreign ownership in domestic enterprises, it is also a breakthrough in bringing Vietnam's stock market up a rank from the frontier market to the emerging market (Ministry of Finance, 2016). Furthermore, in the past 10 years, Vietnam has successfully completed many free trade agreements with other countries and territories in the world. For instance, the Vietnam-Japan Economic Partnership Agreement (VJEPA) has been in effect since 2009; the Vietnam-Chile Free Trade Agreement (VCFTA) has been in effect since 2014; the Vietnam-Korea Free Trade Agreement (VKFTA) has been in effect since 2015; and especially the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has been in effect since 2018 (WTO centre, 2020). Due to such changes in the macro economy through the time period of this study, the time-year effect is added to the robust standard error model with industry-fixed effects to strengthen the robustness of the findings.

Table 6.8 provides a similar result as that of the previous table, since firm size is the only variable that has an insignificant p-value for model 1; meanwhile, liquidity and profitability are insignificant for model 2, and the explanatory variables are all significant for model 3. The added year-fixed effect allows the econometric model to be more precise, since both cross-section and time-series elements of the panel data are controlled by the dummies. As observable in Table 5.9, the only difference from the estimation of industry-fixed control is the significance of the tangibility variable in model 3. This indicates that listed firms that have a high value of tangible fixed assets in their asset structure are more likely to take advantage of financial leverage due to the high possible collateral for debt. This empirical result is consistent with and supported by Zabri, (2012), Wahab *et al.* (2012), and Wahab and Ramli (2014).

Table 6.8: Robust standard errors regression with industry- and year- dummy

The fixed effect regression models are reported in the table to examine the determinants of capital structure proxied by 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD). The list of determinants includes 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS). Numbers in brackets are robust standard errors of the regressors.

	Model 1 **Short-term debt**		**Model 2** **Long-term debt**		**Model 3** **Total debt**	
Firm size	-0.001	(0.003)	0.033**	(0.014)	0.045**	(0.015)
Liquidity	-0.004***	(0.001)	0.004	(0.003)	-0.008**	(0.003)
Profitability	0.006**	(0.004)	-0.008	(0.028)	-0.047*	(0.023)
Tangibility	-0.003*	(0.001)	0.019**	(0.007)	0.0022*	(0.006)
Growth opportunities	-0.0004*	(0.0003)	-0.002**	(0.001)	-0.0008**	(0.001)
Non-debt tax shield	0.006***	(0.002)	-0.028**	(0.012)	-0.007*	(0.013)
2010	-0.005	(0.004)	0.001	(0.005)	-0.022	(0.008)
2011	-0.008	(0.003)	-0.007	(0.009)	-0.033	(0.01)
2012	-0.006	(0.003)	-0.0114	(0.009)	-0.027	(0.009)
2013	-0.001	(0.003)	0.098	(0.113)	0.0867	(0.115)
2014	-0.003	(0.004)	0.0164	(0.026)	-0.0122	(0.026)
2015	-0.003	(0.004)	0.009	(0.024)	-0.028	(0.024)
2016	-0.006	(0.003)	0.004	(0.018)	-0.0458	(0.019)
2017	-0.009	(0.003)	-0.007	(0.021)	-0.0427	(0.022)
2018	-0.006	(0.002)	-0.007	(0.029)	-0.0362	(0.029)
Constant	0.183	(0.018)	-0.583	(0.18)	-.0537	(0.19)
Fixed Industry	Yes		Yes		Yes	
Fixed Year	Yes		Yes		Yes	
Observations	6580		6580		6580	
R-squared	0.1186		0.4880		0.2000	
F-test	23.10		45.21		20.73	
Prob > F	0.0001		0.0000		0.0001	

6.5. Panel-corrected standard errors estimation

Although the robust standard errors with fixed dummy variables were employed to overcome certain issues of the panel data set in this research, due to the existence of multiple econometric problems (namely heteroskedasticity, autocorrelation, and cross-sectional dependence), an additional method of estimation is conducted to enhance the reliability of the empirical results. Beck and Katz (1995) recommend a sandwich-type estimation approach for the covariance matrix of the estimated parameters, which is known as the panel-corrected standard error estimation (PCSE). The PCSE is used to robust the possibility of non-spherical errors. In particular, this approach is strongly believed to solve the problem of heteroskedasticity (Huber, 1967; White, 1980; MacKinnon and White, 1985). Hence, this research applied the PCSE approach to overcome the issues found by the diagnostic tests presented above and proposed the result in Table 6.9.

The results of PCSE reveal that firm size is not considered to be a determinant for the choice of financial leverage regardless of the type of debt, with insignificant p-values across the three models. Therefore, the hypothesis H_4 is not supported by the empirical results of PCSE estimator. This created a remarkable difference with respect to the results of the robust standard error estimation. Additionally, in model 1, profitability is no longer a significant determinant, as the p-value is 0.121. Liquidity is reconfirmed to have a significant negative effect on the choice of Vietnamese listed firms in terms of short-term debt and total debt choices. It can be significantly concluded that the empirical result in this study does not support the hypothesis H_5 throughout various estimation so far. The PCSE estimator reports that profitability negatively impacts only the total debt, with a p-value of 0.065, which is consistent with the hypothesis H_6. The value of tangibility is strongly significant for having mixed effects on companies' choices for short-term debt and long-term debt; meanwhile, no evidence is presented for the total debt model. Both growth opportunities and non-debt tax shield mutually impact financial leverage throughout the three estimated models. Although the coefficients of these two variables is relatively low, it is still consistent with the hypotheses H_8 and H_9.

Table 6.9: Panel corrected standard errors

The fixed effect regression models are reported in the table to examine the determinants of capital structure proxied by 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD). The list of determinants includes 6 independent variables: Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS). Numbers in brackets are panel-corrected standard errors of the regressors.

	Model 1 Short-term debt	**Model 2 Long-term debt**	**Model 3 Total debt**
Firm size	-0.001	0.0294	0.0397
	(0.002)	(0.064)	(0.06)
Liquidity	-0.004***	0.0036	-0.008***
	(0.0004)	(0.003)	(0.003)
Profitability	0.007	-0.007	-0.0436*
	(0.005)	(0.023)	(0.025)
Tangibility	-0.003***	0.0204*	0.0047
	(0.001)	(0.044)	(0.042)
Growth opportunities	-0.0005*	-0.0017***	-0.001*
	(0.0002)	(0.021)	(0.018)
Non-debt tax shield	0.006**	-0.026***	-0.006*
	(0.002)	(0.018)	(0.010)
Constant	0.183***	-0.572**	-0.495*
	(0.042)	(0.517)	(0.665)
Observations	6580	6580	6580
R-squared	0.1578	0.3108	0.5710
Wald statistic	151.43	180.10	276.42
P-value	0.0000	0.0000	0.0000

6.6. System GMM estimation

According to Hansen (1982), the GMM method is commonly used to estimate linear dynamic panel data or panel data that has heteroskedasticity, autocorrelation, and cross-sectional dependence issues. In this case, the linear estimations of panel data models, such as fixed effects or random effects, will no longer result in a reliable and efficient estimate. Therefore, the generalised method of moments (GMM) approach is the alternative option. However, according to Blundell and Bond (1998), the above estimates have the problem of weak instrumental variables when the coefficients reach 1. In this case, the moment conditions are completely unrelated to the actual parameters, and the nature of the estimation depends on the time series element (T). When T is small, the estimate is random, but when T is large, the GMM might be inconsistent, and the 2-stage least squares estimation is longer be correct. To solve this problem using the original GMM method, scholars have introduced many improved versions of the GMM that are more suitable for empirical studies. Most crucial are the differencing GMM (D-GMM) method developed by Arellano and Bond (1991), based on previous studies by Anderson and Hsiao (1982), Holtz-Eakin, and Newey and Rosen (1988), and the system GMM (S-GMM) method by Blundell and Bond (1998), proposed based on the idea of Arellano and Bover (1995) by adding some constraints to D-GMM.

Due to difficulties in determining the variables that can be used as strong instruments for all determinants of capital structure to apply the GMM approach, the paper by Titman and Tsyplakov (2007) indicates a dynamic capital structure model in which the choice of capital structure and its determinants can be considered dynamic in nature. This is supported by the study of Nguyen *et al*. (2014) within the context of Vietnamese listed firms. Thus, the dynamic panel GMM estimation proposed by Arellano and Bond (1991) is applied to overcome the issues of heteroskedasticity, autocorrelation, and cross-sectional dependence along with endogenous problems to allow for a dynamic relationship between leverage and its determinants. The result is presented in Table 6.10.

The two-step system GMM delivers a mostly significant result in all models. The non-debt tax shield is the only insignificant variable in model 1, and profitability is the only insignificant variable in model 2. AR(2) tests for second-order autocorrelation of all models failed to reject the null hypothesis at 5% significance, indicating that there is no serial correlation issue in this estimation. Additionally, insignificant p-values of the Sargan and Hansen tests imply valid over-identifying restrictions for the three models examined in this research.

Regarding the lag leverage variable, it is proven by the system GMM that it significantly affects the choice of financial leverage in the current year. This positive impact implies that Vietnamese listed firms tend to increase their debt in the subsequent year. In addition, firm size reconfirmed the results of robust standard error estimation and panel-corrected standard error estimation in that it negatively correlates with short-term debt but positively affects the choice of the firms for long-term debt and total debt. It can then be interpreted that larger firms will choose debt as their long-term financing method for large and long-run projects. Meanwhile, short-term debt is the option for smaller firms that have less accessibility to a large amount of debt. The positive relationship in the long-term perspective is strongly supported by many scholars, such as Fischer *et al.* (1989), Chang and Rhee (1990), Chen *et al.* (1998), Banerjee *et al.* (2004), Bevan and Danbolt (2001), Fattouh *et al.* (2002), Padron *et al.* (2005), and Tomak (2013). Furthermore, the tangibility variable yields a similar result as firm size, with a significant and negative coefficient for the short-term debt model but positive correlation with dependent variables regarding long-term and total debt, as presented in Table 6.10. This remarkably confirms the behaviour of Vietnamese listed firms that large companies, which tend to have more tangible fixed assets, will have more collateral to access long-term debt (Banerjee *et al.*, 2004; Chen and Jiang, 2001; Bevan and Danbolt, 2001; Zabri, 2012; Wahab *et al.*, 2012; Wahab and Ramli, 2014). This empirical result strictly follows the trade-off theory of capital structure that firms are suggested to first take advantage of the tax benefits of debt financing before considering the equity issuance option.

The liquidity ratio in this case reveals a mixed result, with a negative correlation in model 1 (short-term debt model) but positive effects in models 2 and 3 (long-term debt and total debt models). This finding implies a consistent direction in Vietnamese listed firms from the long-term perspective, since both models 2 and 3 have positive estimated coefficients. In this case, Vietnamese firms that have higher liquidity ratios tend to follow the debt financing structure, since they have a better capacity to meet each short-term obligation when they fall due. On the other hand, firms with lower liquidity ratios will have a greater tendency to use their liquid assets to finance their investments, resulting in a negative correlation with short-term debt.

In terms of profitability, model 2 reveals an insignificant estimated result for positive correlation. However, mixed results are reported in models 1 and 3, with a negative relationship for the short-term debt model and a positive relationship for the total debt model. In fact, the negative correlation between firms' profitability and leverage has been more widely proven in the corporate finance literature, such as Myers and Majluf (1984), Titman and Wessels (1988), Jensen *et al.* (1992), Bathala *et al.* (1994), Rajan and Zingales (1995), Demirgüç-Kunt and Maksimovic (1996), Miguel and Pindado (2001), Schargrodsky (2002), Huang and Song (2005), Wahab *et al.* (2012), Yolanda and Soekarno (2012), Tomak (2013), and Wahap and Ramli (2014). This result strictly follows the pecking order theory of capital structure, since more profitable firms will prioritise the use of internal financing first before considering any other external sources.

Regarding the case of growth opportunities as determinants of financial leverage, models 2 and 3 reveal a negative correlation with long-term debt and total debt, which is strongly consistent with some of the scholars in the literature on corporate finance, such as Rajan and Zingales (1995), Miguel and Pindado (2001), Chen and Jiang (2001), Bevan and Danbolt (2001), Drobetz and Fix (2005), and Nguyen and Neelakantan (2006). This is supported by the pecking order theory of capital structure in that financial leverage is not recommended to be prioritised in the financing option. In fact, it is argued that although future growth opportunities of firms can be regarded as added value to companies, they cannot be treated as collateral and are not subject to income tax, meaning that it brings no accessibility to financial leverage. Therefore, firms with high opportunities to grow tend to use less debt in their capital structure.

The final variable to consider is the non-debt tax shield, which has a significant and negative effect on leverage choice for long-term and total debt; this finding is supported by a range of studies in the literature (Kim and Sorensen, 1986; Titman and Wessels, 1988; Mackie-Mason, 1990; Demirguc-Kunt and Maksimovic, 1996; Miguel and Pindado, 2001; Schargrodsky, 2002; Zabri 2012). It can be argued that depreciation expense and investment tax credit are subject to tax reduction, which could substitute the benefit from the tax shield of debt. Thus, this leads to lower debts in capital structure for firms that have high non-debt tax shields.

Table 6.10: System GMM estimation

Dynamic panel-data estimation, two-step system GMM is reported in the table to examine the determinants of capital structure proxied by 3 dependent variables: Short-term debt (STD), Long-term debt (LTD), Total debt (TD). The list of determinants includes 7 independent variables: Lagged financial leverage (Leverage$_{t-1}$), Firm size – Logarithm Total asset (Ln_TA), Liquidity (LQ), Profitability (ROE), Logarithm tangible assets (Ln_TAN), Growth opportunities (GO), and Non-debt tax shield (NDTS). Numbers in brackets are robust and panel-corrected standard errors of the regressors.

	Model 1 Short-term debt	**Model 2 Long-term debt**	**Model 3 Total debt**
Leverage$_{t-1}$	0.697***	1.27***	0.749***
	(0.248)	(0.090)	(0.071)
Firm size	-0.003*	0.102***	0.094***
	(0.002)	(0.028)	(0.029)
Liquidity	-0.002***	0.028***	0.021***
	(0.0007)	(0.004)	(0.005)
Profitability	0.069*	0.174	-0.495***
	(0.041)	(0.127)	(0.152)
Tangibility	-0.002*	0.058***	0.156***
	(0.001)	(0.022)	(0.026)
Growth opportunities	0.0006***	-0.015***	-0.045***
	(0.0002)	(0.006)	(0.008)
Non-debt tax shield	0.0006	-0.045***	-0.062**
	(0.002)	(0.013)	(0.029)
Constant	0.012	0.163	0.499**
	(0.050)	(0.243)	(0.234)
Observations	5767	5767	5767
Wald statistic	118.41	509.57	439.80
P-value	0.000	0.000	0.000
AR(2)	0.052	0.259	0.359
Sargan test	0.947	0.854	0.956
Hansen test	0.781	0.403	0.293

6.7. Conclusion and discussion on findings

This chapter focused on examining the capital structure choice of Vietnamese listed firms with a list of specified determinants including firm size, liquidity, profitability, tangibility, growth opportunities, non-debt tax shield. Since the panel data of the thesis was diagnosed under various tests for heteroskedasticity, serial correlation, and cross-sectional dependence issues and revealed that it contains serious econometric nonspherical errors. Therefore, corrected estimations were employed to enhance the robustness of the results and mitigate the residual problems. Hence, the use of dummy fixed effect with robust standard errors, panel correct standard errors, and 2-step system GMM were adopted in this empirical study.

One of the main aims of this chapter is to assess firm size as a determinant of capital structure. Although the panel-corrected standard error estimator is considered to be a strong estimator for mitigating econometric issues, this technique eliminates the possibility that size is the determinant of capital structure. Yet, the two-step system GMM reveals significant evidence for the correlation between firm size and capital structure regardless of measurements. Therefore, in this research, the empirical model yields mixed results regarding whether firm size impacts capital structure. However, apart from the PCSE estimator, the positive effect of firm size on long-term and total debt is confirmed by the robust standard error estimators. Thus, there is some support for the relationship between firm size and financial leverage. Indeed, the positive correlation of long-term debt and total debt is consistent with several key studies, such as Titman and Wessels (1988). It is argued that the larger size of a firm will associate with less risk, since large businesses are more diversified with stable cash flow. Therefore, such firms can easily gain access to cheap loans, especially for long-term projects. Additionally, this result is supported by a variety of studies, such as Panno (2003), Rajan and Zingales (1995), Wald (1999), Booth *et al.* (2001), and Wiwattanakantang (1999). The negative relationship between firm size and short-term debt reported by the system GMM estimator is not supported by other estimators. Moreover, the coefficient is relatively low at -0.003, which indicates that the impact level is considerably low and negligible, though it is coherent with Chen and Jiang (2001). This result is expected for the context of Vietnam, since the stock market is still young and borrowing is the most common external source of finance for listed businesses, especially in terms of large firms with good reputation and high levels of diversification.

Table 6.11: Summary of hypotheses testing

Variables	**Hypothesis**	**Empirical results**
Firm size	H_4: Firm size has positive relationship with financial leverage	Moderate support
Liquidity	H_5: Liquidity has positive relationship with financial leverage	Weak support
Profitability	H_6: Profitability has negative relationship with financial leverage	Moderate support
Tangibility	H_7: Tangibility has positive relationship with financial leverage	Strong support
Growth opportunities	H_8: Growth opportunities has negative relationship with financial leverage	Strong support
Non-debt tax shield	H_9: Non-debt tax shield has negative relationship with financial leverage	Moderate support

Regarding liquidity as the determinant of capital structure, the negative relationship between short-term debt and capital structure is confirmed through four estimation approaches. This is consistent with Ozkan (2001), since the firms that have a higher rate of liquidity tend to prioritise the use of such current assets for investment and serving working capital needs—following the pecking order theory of capital structure. Furthermore, Laureano *et al.* (2012) support this idea by arguing that SMEs tend to follow short-term debt issuance to maintain working capital, which is suitable for the case of the Vietnamese market. Yet, this negative correlation resulted from the empirical analysis is strongly contradictory to the hypothesis H_5 proposed in Chapter 3. However, model 3 presents mixed results, with a negative sign presented through three estimators that have robust and panel-corrected standard errors and a positive sign in system GMM estimation. However, 2-step system GMM is considered to be the most reliable estimator in this study since it is believed to be the best mitigating option to sort out panel data nonspherical errors. Therefore, the empirical findings in this study can conclude a relatively weak support for the hypothesis H_5. For the case of model 2, no evidence exists to conclude any relationship between liquidity rate and long-term debt.

With profitability measured by ROE as a determinant of capital structure, the summary table indicates a significant negative impact of profitability on total debt. Indeed, the hypothesis H_6 is just moderately supported by the empirical findings since the evidence for long-term debt model is relatively limited (only robust standard error estimator shows evidence) and short-term debt model shows positive correlation via GMM estimator. As such, the positive relationship in short-term debt model does not support the hypothesis H_6, however, the results of total debt model is strongly consistent with the proposed hypothesis. According to the pecking order theory of capital structure, more profitable firms prioritise the use of internal funds before considering external sources. Therefore, based on the pecking order theory proposed by Myers (1977, 1984), the profitability factor will have a negative correlation with capital structure. This finding is consistent also with the empirical literature of Bauer (2004), Avarmaa *et al.* (2011), and Kędzior (2012). Hence, this research suggests that Vietnamese listed firms tend to follow the pecking order theory to use retained earnings first to decrease the level of business risks. In terms of the short-term debt model, the robust standard errors and system GMM estimators indicate a significant positive effect of profitability on short-run debt issuance. Therefore, the short-term debt financing method is still preferable in profitable firms to serve the purpose of trade credit or working capital requirements. However, other scholars have argued that more profitable firms should have additional income to be shielded from tax reduction benefits, so they are encouraged to take advantage of debt financing (Bauer, 2004; Taub, 1975; Fattouh *et al.*, 2002). This could be more applicable for an emerging market such as Vietnam, in which most firms are considered to be SMEs and have great ambition for rapid growth. Accordingly, they tend to use financial leverage as much as possible to betterboost their development.

For the case of tangible assets, it can be seen from the empirical results in this study that models 1 and 2 are consistently significant throughout four estimators of this research. In detail, model 1 reveals that short-term debt is negatively affected by the tangibility of business, while long-term debt presents a contradictory sign. This can be explained in that firms with a high value of tangible fixed assets tend to have high collateral to attract long-term debt issuance offers. Therefore, they prefer to take advantage of this to raise their external debt funds for long-term business strategies rather than short-term financing purposes. Thus, it is evident from the empirical findings of this study that long-term debt and total debt strongly support the hypothesis H_7 as proposed in Chapter 3. This result is supported by a variety of empirical studies, such as Banerjee *et al.* (2004), Chen and Jiang (2001), Bevan and Danbolt (2001), Zabri (2012), Wahab *et al.* (2012), and Wahab and Ramli (2014). Model 3 has similar results as model 2; however, it is not proven to be significant under the industry-fixed robust standard error and PCSE estimators. Therefore, this thesis can conclude only medium support for the effect of tangibility on total debt.

Regarding growth opportunities and non-debt tax shield as determinants of capital structure, these two variables exhibit strong and consistent outcomes throughout four estimators of this research. Specifically, growth opportunities are significantly and negatively correlated with financial leverage, which is consistent with the hypothesis H_8 indicated in Chapter 3. This is strongly supported by numerous empirical studies in the past (Myers, 1977; Rajan and Zingales, 1995; Miguel and Pindado, 2001; Chen and Jiang, 2001; Bevan and Danbolt, 2001; Drobetz and Fix, 2005; Nguyen and Neelakantan, 2006). The result suggests that although growth opportunities represent the future added value of firms, it is not possible to use as physical collateral to attract external debts or experience tax benefits. Therefore, firms that have greater opportunities to grow tend to follow the pecking order theory to avoid using financial leverage. In terms of the final explanatory variable, all the estimators of this thesis confirm the negative relationship between non-debt tax shield and long-term and total debts. This finding is expected and consistent with the empirical literature (Kim and Sorensen, 1986; Titman and Wessels, 1988; Mackie-Mason, 1990; Demirguc-Kunt and Maksimovic, 1996; Miguel and Pindado, 2001; Schargrodsky, 2002; Zabri 2012). As such, Vietnamese listed firms with high levels of non-debt tax shields, such as depreciation, provision, or allowances, use a lower level of debt in capital structure, since the depreciation expenses can be substituted for the benefits of tax reduction from financial leverage. However, in the robust standard error estimations, the positive correlation between non-debt tax shield and short-term debt is still proven to be significant. Therefore, this empirical result only moderately supports the last hypothesis H_9 of the second study for a negative correlation between non-debt tax shield and financial leverage.

CHAPTER 7

CAPITAL STRUCTURE AND FIRM GROWTH

7.0. Introduction

This chapter presents the results and empirical findings regarding the impact of financial leverage on the business growth of Vietnamese listed firms. Several econometric tests are performed to ensure appropriate findings, free of spuriousness or violation of assumptions. More appropriate recommendations for policymakers can then be made. First, the Lagrange multiplier test is used to determine whether the classical pooled OLS model is suitable for this research. Second, in the event that pooled OLS is rejected, the Hausman test is applied to determine the appropriateness between the FE and RE estimation methods. After selecting a feasible model for the study, the heteroskedasticity, autocorrelation, and cross-sectional dependence issues are tested to determine whether there are any problems within the model so that certain mitigating options can be considered.

7.2. Diagnostic tests for panel data

7.2.1. Breusch and Pagan Lagrange multiplier test

Breusch and Pagan Lagrangian multiplier was proposed by Breusch and Pagan (1980) and is known as a typical test for deciding between the traditional pooled OLS and random-effect approach. This test examines whether individual and time-specific variance components are equal to 0; as mentioned in Chapter 4, H_0: $\sigma_u^2 = 0$ or $\sigma_\mu^2 = \sigma_\lambda^2 = 0$. The LM statistic follows the chi-squared distribution with one degree of freedom.

Table 7.1: Breusch and Pagan Lagrange multiplier test

Breusch and Pagan Lagrange multiplier tests to examine the panel effect of the dataset for 3 different models with 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG).

	Sales Growth	**Total Asset Growth**	**Operating profit Growth**
chibar2(01)	0.72	7.64	6.49
Prob > chibar2	0.0983	0.0029	0.0054

Since the result of Table 7.1 reveals a significance level lower than 10% for all models, it is suggested to reject the null that OLS residuals do not contain individual specific error components; in particular, the results are strongly supportive for the model with total assets growth, and operating profit growth as dependent variables. In other words, pooled OLS is indicated to be inappropriate, as it ignores the difference between units and the time effect, so strong evidence of the panel effect exists across the panel data set. Thus, using the simple OLS method can lead to bias in the estimation of model results and is therefore not considered in this study.

However, the Sales Growth model witnessed a borderline result with the p-value of 0.0983. Theoretically, this statistic is acceptable to reject the null hypothesis at 10% significance level. Yet it also leaves a signal that the rejection is not strongly significant. For instance, with the significance level of 5%, the Breusch and Pagan Lagrange multiplier test for Sales Growth model will have no evidence to reject the null, rather it recommends accepting the null hypothesis that OLS is more suitable to estimate the empirical model. Based on the literature review, it is rare that simple OLS are employed to estimate the panel data. Hence, at this stage, it is decided that the Breusch and Pagan Lagrange multiplier test will reject the null at 10% significance level.

7.2.2. Hausman test

The Hausman test is conducted in this study, given Hausman's H_0 hypothesis that there is no correlation between fixed effects and explanatory variables (i.e. the result fails in rejecting H_0), random-effects estimation is more appropriate than fixed effects. In contrast, by rejecting H_0, the assumption of random effects is violated, and only estimation of fixed effects is appropriate.

The results of the Hausman test, presented in Table 7.2, reveal a significance level of 0.0912 for the model with sales growth as the dependent variable, which is lower than the significance level of 10%. The other models (total assets growth, and operating profit growth) have strong support from the Hausman test for the fixed-effects model with a p-value of 0.000, indicating that the null hypothesis H_0 can be rejected. Therefore, the fixed-effects model is accepted for use in this paper.

However, the Sales Growth model once again witnessed a borderline p-value statistic with 0.0912. This means the test does not strongly reject the null hypothesis that supports random effect model. The statistic result might reduce the reliability of the test. However, this thesis decided to follow the 10% significance statistics to use fixed-effect method for model estimation. To ensure the estimation is appropriately selected, further tests and arguments will be carried out and multiple estimation techniques will be employed and enhance to robustness of the empirical results.

Although the preliminary tests above illustrate a significant signal for concluding certain impacts of financial leverage and related explanatory variables, further econometric tests must be performed to eliminate any related unnecessary problems during the financial modelling process. The tests include the heteroskedasticity test, autocorrelation test, and cross-sectional dependence test.

Table 7.2: Hausman test

Summary of Hausman test for 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG), 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD), and 4 control variables: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD).
FE = consistent under Ho and Ha
RE = inconsistent under Ha, efficient under Ho
Test: Ho: difference in coefficients not systematic

		Fixed Effects	**Random Effects**	**Difference**	**Hausmann Statistic (p-value)**
Sales Growth Model	Short-term debt (STD)	0.493	0.480	0.012	10.91 (0.0912)
	Long-term debt (LTD)	0.022	0.013	0.009	
	Liquidity (LQ)	0.0005	0.0006	0.00008	
	Tangibility (Ln_TAN)	0.227	0.127	0.100	
	Advertising (Ln_ADV)	0.077	0.057	0.020	
	Innovation (Ln_RD)	-0.034	-0.056	0.022	
Total Asset Growth Model	Short-term debt (STD)	0.208	0.112	0.096	158.27 (0.0000)
	Long-term debt (LTD)	0.047	0.035	0.012	
	Liquidity (LQ)	-0.0003	-0.0004	0.0001	
	Tangibility (Ln_TAN)	0.036	0.028	0.0076	
	Advertising (Ln_ADV)	-0.121	-0.048	-0.073	
	Innovation (Ln_RD)	-0.002	0.001	-0.003	
Operating profit Growth Model	Short-term debt (STD)	0.210	0.092	0.117	47.55 (0.0000)
	Long-term debt (LTD)	0.017	0.010	0.007	
	Liquidity (LQ)	0.0001	0.00007	0.00005	
	Tangibility (Ln_TAN)	0.028	0.019	0.009	
	Advertising (Ln_ADV)	-0.018	-0.0002	-0.017	
	Innovation (Ln_RD)	-0.004	-0.005	0.001	

7.2.3. Heteroskedasticity test (Likelihood ratio test approach)

As visible in Table 7.3, the p-value of the Wald test is strongly significant at a 1% level in all four models specified in this research, indicating that the null hypothesis can be rejected; therefore, we must accept the alternative hypothesis, that the panel data has a heteroskedasticity issue. This is a critical case of violating the assumptions of linear-regression models and can lead to biased empirical results. This can be seen as a problem that should be solved via other special econometric regression models.

Table 7.3: Likelihood ratio test for heteroskedasticity

Summary of heteroskedasticity test 3 specific models with 3 dependent variables as proxies for firm growth: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG).
H_0: The panel has homoskedasticity
H_a: The panel has heteroskedasticity

	Sales Growth	**Total Asset Growth**	**Operating profit Growth**
LR chi^2	30648.11	4888.20	3329.81
p-value	0.0000	0.0000	0.0000

7.2.4. Autocorrelation test (Wooldridge approach)

Table 7.4 reports the results of the Wooldridge test for autocorrelation. The test suggests that sales growth does not reveal significant first-order autocorrelation, with p-values of 0.7594. For the remaining two dependent variables, there is evidence for autocorrelation. The null hypothesis of the Wooldridge test is rejected at around the 1% level of significance for total asset growth model and 5% for operating profit growth model. Thus, for at least these two models, it is suggested to be aware of this autocorrelation issue.

Table 7.4: Wooldridge test for autocorrelation

Summary of autocorrelation test carried out for 3 specific models with 3 dependent variables as proxies for firm growth: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG).
H_0: no first-order autocorrelation

	Sales Growth	**Total Asset Growth**	**Operating profit Growth**
F (1, 801)	0.094	59.924	5.783
Prob > F	0.7594	0.0000	0.0164

7.2.5. Cross-sectional dependence test (Pesaran approach)

To ensure the empirical model is valid and reliable, cross-sectional dependence should be checked, as well. As we have 813 listed firms in the Vietnamese stock exchange market, we should assume the existence of common political and economic factors that could affect all stocks. Cross-sectional dependence is therefore tested as follows.

As can be seen in Table 7.5, all statistics are significant at the 1% level. Therefore, the null hypothesis is rejected for all variables; in other words, there is cross-sectional dependence across all variables of the data set.

Table 7.5: Pesaran test for cross-sectional dependence

Summary of cross-sectional dependence test carried out or 3 specific models with 3 dependent variables as proxies for firm growth: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG), 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD), and 4 control variables: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD). Under the null hypothesis of cross-section independence, CD ~ N (0,1), p-values close to zero indicate data are correlated across panel groups

	CD-test	**p-value**
Sales growth (SG)	90.487	0.000
Short-term debt (STD)	14.784	0.000
Long-term debt (LTD)	12.797	0.000
Liquidity (LQ)	125.224	0.000
Tangibility (Ln_TAN)	22.831	0.000
Advertising (Ln_ADV)	22.592	0.000
Innovation (Ln_RD)	20.577	0.000
Total Asset growth (TAG)	182.574	0.000
Operating profit growth (OPG)	86.483	0.000

Given the results of the Pesaran tests, it can be concluded that the model applied in this study encountered issues of cross-sectional dependence and heteroskedasticity. In this case, it could lead to a severely misleading conclusion on the model estimation. Therefore, along with the data findings resulting from the fixed-effects regression approach, a robust standard error with an industry-fixed dummy variable, time-year dummy variable, and panel-corrected standard error model are considered additional methods for mitigating such issues and delivering the most appropriate results.

7.3. Regression results

Since the data diagnostic tests in Section 7.2 present several econometric issues of heteroskedasticity, autocorrelation, and cross-sectional dependence that might lead to biased estimation results of the fixed-effects estimator, in this section, multiple estimation techniques are applied simultaneously for the panel data set of this thesis to enhance the robustness of the outcomes. Specifically, a fixed-effects estimator is conducted first as the primary approach for the findings based on the results of the Hausman test. Afterwards, other estimation techniques are performed, such as robust standard errors with fixed-industry dummy variables and time dummy variables in addition to a panel-corrected standard error estimator. The summary and comparison of the estimators' results and empirical implications of the regression outcome are presented at the end of the chapter.

7.3.1. Fixed effect regression estimation

As observable in table 7.6, the sales revenue growth model estimated by the FE approach is presented in the second column. Regarding the proxies for capital structure, only long-term leverage has a significant effect on sales growth at the 1% level, while short-term debt indicates an insignificant impact. Thus, it can be concluded from these results that there is no evidence of any impact of short-term debt on the growth of sales in Vietnamese listed firms. Based on this, it can be concluded that Vietnamese listed firms are more likely to take advantage of long-term leverage, such as bank borrowings, to maximise the growth of sales in the current year. Meanwhile, short-term leverage might take effect in the shorter term. Regarding other control variables, only innovation has high p-values, with 0.272; this indicates that it is not evident to conclude any impact of R&D on the sales growth of listed businesses. Meanwhile, the growth of liquidity, tangible assets, and advertising are proven to affect sales growth at a 1% significance (p-value < 0.01). Regarding the sign of such impact, long-term leverage, liquidity, tangible assets, and advertising have positive relationships with sales growth, indicating that to promote the rise of sales revenue, listed firms are suggested to fully utilise long-term debt, enhance level of liquidity, and increase investment in fixed assets and advertising.

The third column of Table 7.6 presents the coefficient summary for the total asset growth model. The results reveal again that only long-term proxy of capital structure significantly impact firm growth measured by total assets. This positive correlation reported in Table 7.6 imply that the greater use of long-term financial leverage in capital structure, the higher the growth rate of companies' total asset value. Meanwhile, short-term debt shows insignificant impact as estimated under FE approach. Along with these explanatory variables, two control variables (liquidity and tangibility) also significantly affect the growth of a business's total assets. The growth of both liquidity ratio and tangible assets leads to a higher growth rate of the total asset value.

The final column of Table 7.6 presents the regression results of the operating profit growth model. As can be seen from the coefficient summary, only long-term debt significantly impacts the growth of operating profit at the 5% significance level. Additionally, the correlation coefficient is positive, meaning that long-term financial leverage should be employed to enhance the growth rate of operating profit. Meanwhile, the short-term debt is again insignificant with high p-value and extremely small coefficient. Regarding the control variables, all of them show strongly significant impact on growth rate of sales revenue at 1% level.

Table 7.6: Fixed effect regression

The fixed effect regression models are reported in the table to examine the impact of capital structure (CS) proxied by 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD) on firm growth (FG) proxied by 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG). Control variables include in this research includes: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD)

	Sales Growth	**Total Asset Growth**	**Operating profit Growth**
Short-term debt (STD)	0.00003	0.00003	0.00003
	(0.0001)	(0.00002)	(0.00002)
Long-term debt (LTD)	0.055***	0.007***	0.002**
	(0.005)	(0.001)	(0.0009)
Liquidity (LQ)	0.558***	0.098***	0.041***
	(0.03)	(0.0065)	(0.0055)
Tangibility (Ln_TAN)	0.770***	0.400***	0.367***
	(0.227)	(0.05)	(0.042)
Advertising (Ln_ADV)	0.015***	-0.000005	0.0002***
	(0.0002)	(0.00003)	(0.00003)
Innovation (Ln_RD)	0.157	-0.033	0.068***
	(0.143)	(0.031)	(0.03)
Constant	-0.121***	0.162***	0.109***
	(0.024)	(0.005)	(0.004)
Observations	6580	6580	6580
R-squared	0.6496	0.2922	0.3724
F-test	1.12	1.12	0.98
Prob > F	0.0171	0.0157	0.0661

In is concluded based on FE estimation that short-term debt has no impact on firm growth regardless of measurement approaches. Meanwhile, long-term financial leverage is proven to significantly affect firm growth. However, to ensure the econometric model delivers the most appropriate and unbiased results, further estimation approaches are performed.

7.3.2. Robust standard errors with industry-fixed dummy variable

It is mentioned previously that the existence of an econometric model's nonspherical errors might cause misleading results. Indeed, the normal OLS estimation for model coefficients is still believed to be non-biased; however, the variance of the estimated coefficients and the covariance between the coefficients obtained from the OLS estimation method are proven to be biased. Since then, one solution has been proposed by White (1980), in which the author indicates the robust standard error method with the notion of using the estimation coefficients generated from the OLS method yet recalculating the variance of the estimated coefficients without the assumption of homoskedasticity. Thus, the robust standard errors estimation can be employed to mitigate the presence of heteroskedasticity. In addition, the various advantages of panel regression with robust standard errors should be mentioned. First, robust standard error regression is an alternative to the OLS regression when data contains distinct values or observed influences. Second, this estimation approach can be used to detect influential observations. Finally, it can be employed in any situation in which OLS regression is applicable to overcome the issue of data problems, such as outliers.

Table 7.7: Robust standard errors industry-fixed dummy

The fixed effect regression models are reported in the table to examine the impact of capital structure (CS) proxied by 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD) on firm growth (FG) proxied by 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG). Control variables include in this research includes: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD). Numbers in brackets are robust standard errors of the regressors.
Std. Err. adjusted for 10 clusters in Industry

	Sales Growth SG	**Total asset growth TAG**	**Operating profit growth OPG**
Short-term debt (STD)	0.00002*	0.00002	0.00002*
	(0.00001)	(0.00003)	(0.00001)
Long-term debt (LTD)	0.055*	0.006**	0.002*
	(0.04)	(0.002)	(0.0009)
Liquidity (LQ)	0.553	0.097**	0.041
	(0.779)	(0.037)	(0.03)
Tangibility (Ln_TAN)	0.765*	0.431***	0.388***
	(0.411)	(0.058)	(0.036)
Advertising (Ln_ADV)	0.015***	-0.00001	0.0001**
	(0.002)	(0.00002)	(0.00004)
Innovation (Ln_RD)	0.146	0.005	0.087***
	(0.281)	(0.037)	(0.024)
Constant	-0.121***	0.161***	0.108***
	(0.019)	(0.001)	(0.0009)
Fixed Industry	Yes	Yes	Yes
Observations	6580	6580	6580
R-squared	0.6496	0.4865	0.3927
F-test	43.17	38.54	278.40
Prob > F	0.000	0.000	0.000

As reported in Table 7.7 for the sales growth model, capital structure fully affects the dependent variable at a 10% significance level for both short-term and long-term debt. The positive coefficients of these proxies indicate that utilising financial leverage will effectively lead to high growth rate for sales revenue. Regarding the control aspects of the model, only tangibility and advertising spending impact the sales growth, at a significance level of 10% and 1%, respectively. Additionally, these regressors affect the sales growth with positive directions and tangibility holds the biggest coefficient with 0.765, implying that fixed assets play the most important role in this model. While the others are strongly insignificant. This concludes that financial leverage should be used, fixed assets and advertisement should be utilised, as they all lead to the positive growth of the sales revenue.

In terms of the model with total assets as a proxy for firm growth, the correlation coefficient of short-term debt is insignificant with high p-value. Thus, long-term leverage is the only proxy of capital structure that affects the growth of total assets. However, the positive coefficient of long-term debt is relatively small, indicating a low effect accordingly. Liquidity and tangible assets also present positive relationship with growth rate of total assets value at 5% and 1% significance level, respectively. Meanwhile, advertising spending and innovation are proven to have insignificant impact under the robust estimation.

For the case of the last model, financial leverage is recommended to fully impact the profit growth at 10% significance for both short-term and long-term debt. However, similar to the sales growth model, the coefficient of short-term leverage is very small, which indicates that although the relationship with operating profit growth is significantly confirmed, the level of impact is expected to be relatively low. Additionally, liquidity is the only insignificant indicator in this firm growth model.

7.3.3. Robust standard errors with industry-fixed and year-fixed dummy variables

Based on the discussion in Section 7.4, several economic events occurred during the period of study, including national financial policies and the effects of multiple international free trade agreements. Thus, a year-fixed dummy variable is added to the estimation of Section 7.3.2 to enhance the robustness of the results. Table 7.8 reported the summary of coefficients resulting from the fixed-effect regression with robust standard errors and industry- and year-fixed dummy variables added to the models.

The first model, with sales growth as the dependent variable, reveals that capital structure fully influences the growth of sales with both short-term and long-term debt as the significant proxies. In detail, short-term leverage indicates a positive relationship with the dependent variable at 10% significance (p-value of 0.069). Meanwhile, long-term debt shows a similar significant p-value of 0.058, indicating that it is evident to conclude certain positive relationship between long-term leverage and sales growth. Regarding the control aspects of the model, tangible assets, and advertising spending are proven to positively affect the dependent variable at a significance level of 10% and 1%, respectively, while liquidity and innovation are strongly insignificant. The results in Table 7.8 indicate that financial leverage is recommended to be fully utilised for both short-term and long-term perspectives, as it tends to create a positive growth to sales revenue. In addition, it is suggested that having more investment in fixed assets can help to boost revenue growth. Furthermore, this model recommends additional spending on advertisements to enhance the sales growth.

Table 7.8: Robust standard errors with industry-fixed and year-fixed dummy

The fixed effect regression models are reported in the table to examine the impact of capital structure (CS) proxied by 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD) on firm growth (FG) proxied by 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG). Control variables include in this research includes: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD). Numbers in brackets are robust standard errors of the regressors.

	Sales Growth		**Total Asset Growth**		**Operating profit Growth**	
Short-term debt	0.00002*	(0.00001)	0.00001	(0.00002)	0.00002*	(0.00001)
Long-term debt	0.055*	(0.040)	0.005**	(0.002)	0.002*	(0.0008)
Liquidity	0.547	(0.782)	0.087**	(0.033)	0.036	(0.026)
Tangibility	0.714*	(0.401)	0.349***	(0.062)	0.351***	(0.034)
Advertising	0.015***	(0.002)	-0.00002	(0.00002)	0.0001**	(0.00003)
Innovation	0.129	(0.282)	0.028	(0.030)	0.091***	(0.023)
2010	0.005	(0.085)	-0.030	(0.020)	0.055	(0.026)
2011	-0.214	(0.119)	-0.414***	(0.032)	-0.155	(0.029)
2012	-0.232	(0.078)	-0.266***	(0.026)	-0.188	(0.024)
2013	-0.127	(0.096)	0.126***	(0.037)	-0.006	(0.032)
2014	-0.018	(0.058)	-0.180***	(0.025)	-0.070	(0.018)
2015	-0.140	(0.082)	-0.154***	(0.026)	-0.0543	(0.017)
2016	-0.108	(0.054)	-0.165***	(0.024)	-0.095	(0.018)
2017	-0.227	(0.124)	-0.179***	(0.029)	-0.088	(0.021)
2018	-0.285	(0.117)	-0.22***	(0.031)	-0.127	(0.026)
Constant	0.017	(0.058)	0.316***	(0.022)	0.183	(0.018)
Fixed Year	Yes		Yes		Yes	
Observations	6580		6580		6580	
R-squared	0.6505		0.4776		0.3630	
F-test	26.60		1033.76		111.42	
Prob > F	0.000		0.000		0.000	

In terms of the model with total assets as a proxy for firm growth, capital structure has a partially positive impact on the growth of the total asset value, as only long-term financial leverage variable is strongly significant at 5%. Yet, short-term debt indicates an insignificant effect with a high p-value of 0.564. Regarding control aspects of this model, liquidity and tangible assets are significantly impact the growth of total assets, at a 5% and 1% significance level, respectively. Additionally, all of them show positive relationship, which implies that the more use of long-term debt and investment in fixed asset would lead to higher growth rate of a firm's total assets value. Besides, the liquidity situation of businesses is also suggested to be enhanced to promote total asset growth.

For the last model, the summary of coefficients presents nearly the same results as the first model (sales growth model), as the financial leverage fully impacts the profit growth at a 10% significance level for both short-term debt and long-term debt. Again, tangible assets and advertising spending both strongly and significantly influence the growth of operating profit, at 1% and 5% significance levels, respectively. In this model, their effects are both positive, which implies that higher value of fixed assets and advertisement expense can improve growth rate of operating profit. However, the coefficient of advertising spending is relatively low, only 0.0001, which means that although the relationship between advertising expense and profit growth is confirmed by the estimation, the impact level is expected to be very low. Instead of liquidity, the operating profit growth model exhibits a significantly positive impact of innovation at 1% significance level.

As seen in Tables 7.6, 7.7, and 7.8, the regression outcomes of different estimation techniques provide slightly different descriptive results. Therefore, econometric issues of heteroskedasticity, autocorrelation, and cross-sectional dependence play significant roles in affecting the regression process. Thus, the panel-corrected standard error estimator is employed as another technique to mitigate the econometric issues described above.

7.3.4. Panel corrected standard errors (PCSE) model

The fixed-effects model is diagnosed via several econometric tests for heteroskedasticity, autocorrelation, and cross-sectional dependence issues, and the results reveal that this model cannot be effectively used to indicate the most appropriate results of the panel data set. One of the first attempts to consider the heteroskedasticity, temporal, and spatial cross-sectional dependence of the error term in the panel data set was proposed by Parks (1967) and is known as the feasible generalised least squares (FGLS) based algorithm. However, this approach is criticised as being inappropriate for the case of panel data sets with medium- and large-scale panels due to two specific reasons. First, the FGLS model is no longer feasible if the panel contains a small time period dimension *T* and large cross-section dimension. Second, Beck and Katz (1995) indicated that the approach of the FGLS method tends to generate an unacceptably small standard errors estimation. As such, to serve the purpose of correcting the issues of heteroskedasticity, autocorrelation, and cross-sectional dependence and mitigate the problems of FGLS mentioned above, Beck and Katz (1995) recommended a sandwich-type estimation approach for the covariance matrix of the estimated parameters that is well known as panel-corrected standard errors estimation (PCSE). This method is used to robustify the possibility of non-spherical errors. In particular, this approach is strongly believed to solve the problem of heteroskedasticity (Huber 1967; White 1980; MacKinnon and White 1985). Hence, this research applies the PCSE approach to overcome the issues found by the diagnostic tests above and proposes the following descriptive results.

In Table 7.9, regarding the first model, the Prais-Winsten approach for correlated panels corrected standard error regression reveals that at the significance levels of 10% and 1%, the growth of both short-term debt and long-term debt, are proven to impact the sales growth with the same direction, in which they all positively affect the growth of sales revenue. However, the coefficient of short-term debt is still relatively small, indicating a low impact level on the dependent variable. Regarding the control indicators, innovation still reveals an insignificant impact with a p-value of 0.256, while all other variables significantly impact sales growth with positive directions. Among them, liquidity and tangibility show very strong impacts on growth rate of sales revenue with high coefficients of 0.546 and 0.705, respectively.

Regarding the model with total asset growth as the dependent variable, both proxies of capital structure have a significant positive impact on the firm growth. In terms of control variables, only advertising expense indicates a high p-value of 0.392, which is considered to be an insignificant regressor. All other variables are significantly correlated with the dependent variables, though in different directions. Specifically, liquidity and tangibility present a positive relationship, so the shorter the time for current assets to be liquidated to cover the short-term debt and the higher tangibility in asset structure, the higher the value of assets growth rate.

Finally, as presented in Table 7.9, the growth of operating profit is proven to be impacted by both proxies of capital structure, namely short-term and long-term financial leverage, with a significance level of 5% for both of them. Additionally, in this model, the panel corrected standard errors estimation shows that all the control variables significantly and positively impact the firm growth proxy. Yet the correlation coefficient of advertising expense is remarkably smaller than other variables', which indicates that enhancing liquidity ratio or investment in fixed assets and R&D will be more efficient to boost the growth rate of operating profit.

Table 7.9: Panel corrected standard errors

The fixed effect regression models are reported in the table to examine the impact of capital structure (CS) proxied by 2 independent variables: short-term debt to market value of total assets (STD), long-term debt to market value of total assets (LTD) on firm growth (FG) proxied by 3 dependent variables: Sales growth (SG), Total assets growth (TAG), Operating profit growth (OPG). Control variables include in this research includes: Liquidity (LQ), logarithm Tangible assets (Ln_TAN), logarithm Advertising expense (Ln_ADV), and logarithm Research and Development investment (Ln_RD). Numbers in brackets are robust standard errors of the regressors.

	Sales Growth SG	**Total asset growth TAG**	**Operating profit growth OPG**
Short-term debt (STD)	0.00006*	0.00002*	0.00004**
	(0.00003)	(0.00002)	(0.00002)
Long-term debt (LTD)	0.050***	0.006***	0.002**
	(0.016)	(0.0014)	(0.001)
Liquidity (LQ)	0.546**	0.095***	0.038***
	(0.235)	(0.012)	(0.009)
Tangibility (Ln_TAN)	0.705**	0.396***	0.388***
	(0.327)	(0.093)	(0.056)
Advertising (Ln_ADV)	0.015***	-0.00002	0.0001**
	(0.0007)	(0.00003)	(0.00005)
Innovation (Ln_RD)	0.128	-0.003	0.066***
	(0.113)	(0.041)	(0.022)
Constant	-0.218***	0.179***	0.105***
	(0.047)	(0.049)	(0.021)
Observations	6580	6580	6580
R-squared	0.6630	0.3937	0.3594

7.4. Discussion on research findings

The empirical results of this chapter illustrate the impact of capital structure, measured by short-term and long-term financial leverage, on firm growth, measured by the growth rate of sales, total assets, and operating profit. The model developed in Chapter 3 based on the literature review was estimated using fixed-effect estimator. Model's nonspherical errors such as heteroskedasticity, autocorrelation, and cross-sectional dependence were particularly mitigated by robust standard errors and panel corrected standard errors estimators. This section summarises the regression results and the comparison with the current literature to assess the consistency of the findings.

To sum up, under the three estimators that applied correction for standard errors, short-term leverage is confirmed to have positive impact on growth rate of sales revenue and operating profit. Meanwhile, regarding the total asset growth model, short-term debt only indicates significant effect under the PCSE approach. Yet, this result is sufficient to conclude a strong support to the hypothesis H_{10} and H_{12} with regards to short-term component of financial leverage. Meanwhile, hypothesis H_{11} is only supported by PCSE technique which indicates an overall weak support for short-term debt component. Furthermore, it is notable that although the empirical findings in this chapter presents certain support for short-term component of hypotheses H_{10}, H_{11} and H_{12}, the impact level of short-term debt on firm growth as a whole is considered to be extremely limited since the coefficients in all cases are relatively small. For example, with the sales growth model estimated under PCSE approach, the coefficient of 0.00006 implies that with 1% increase in short-term debt in the next year, it leads to only 0.00006% increase in growth of sales compared to previous year. This is considered as an inefficient and negligible impact. In terms of long-term leverage, this proxy of capital structure is proven to positively and significantly impact firm growth in all four estimation methods regardless of measurements. Based on this, the study strongly confirms the positive effect of non-current liabilities on sales growth, total asset growth and operating profit growth, with the coefficients of 0.05, 0.006 and 0.002, respectively, as presented in the PCSE estimator. Therefore, a 1% rise in non-current liabilities would contribute to an increase of 0.05% for sales growth rate, 0.006% for total assets growth and 0.002% for operating profit growth. These empirical findings strongly support the long-term debt component of hypotheses H_{10}, H_{11} and H_{12}.

Regarding the consistency of this study's outcome with the current empirical literature, financial leverage, which is represented by short-term debt and long-term debt, exhibits moderate consistency with the literature, as indicated by Myers (1977, 1984) based on his pecking-order theory of capital structure and the empirical results of Harris and Raviv (1990), Opler and Titman (1994), and Hampton (1993). Indeed, the long-term perspective of leverage in this model is strongly supported by the empirical results, as all the standard errors corrected estimators yielded a significant and positive correlation. Regarding the hypothesis with total assets growth as a proxy for firm growth, the results are consistent with the literature (Liow, 2010; Chung, 1993), as it is supported for the positive relationship in the empirical results table for both short-term and long-term debt. In the case of the operating profit growth model, both short-term debt and long-term debt are strongly supported by the current literature of Bei and Wijewardana (2012) and Arasteh *et al.* (2013), with a significant positive relationship between the two parameters.

Moreover, in this study, the use of short-term debt as an additional aspect of financial leverage, which has not been used by the above-mentioned scholars, could be considered an additional contribution to the research. In fact, as most of the papers examined the impact of capital structure on several dependent variables, such as firm growth, firm performance, or firm value, the proxy for financial leverage is primarily the long-term debt or total debt ratio rather than the short-term debt ratio. This approach of measuring financial leverage was applied to adapt the context more closely to a young stock market, in which most of the listed firms are considered to be medium enterprises only, and short-term financing is extremely important especially for maintaining a stable working capital (Nguyen, 2015) and taking full advantage of short-run trade credit to enhance sales (Tran and Dinh, 2015). More importantly, the empirical results of this research significantly identified that the hypothesis for short-term debt is evidently supported across all the models in this study. Thus, short-term leverage is theoretically recommended by this research to be feasibly used as a proxy for capital structure, especially in the case of an emerging economy with a very young stock exchange market. The limited impact presented throughout estimation approaches in this study indicates that short-term leverage does not directly influence the rise of firm growth indicators, but it is important for listed SMEs to maintain a stable operating process. On the other hand, in practice, these results further suggest that short-term debt requires more attention from both firms' managers and economic policymakers such that it can certainly help to improve the growth of the firm from various perspectives, including sales, total assets, and operating profit.

From the empirical results presented in Table 7.10, it can generally be concluded that the research outcomes are consistent with the current literature on the relationship between financial leverage and firm growth, measured by percentage changes of sales revenue, total assets, and operating profit.

Table 7.10: Empirical hypothesis results

Hypothesis	Components	Empirical results
H_{10}: There is a positive relationship between financial leverage and sales growth	Short-term leverage	Moderate support
	Long-term leverage	Strong support
H_{11}: There is a positive relationship between financial leverage and total assets growth	Short-term leverage	Weak support
	Long-term leverage	Strong support
H_{12}: there is a positive relationship between financial leverage and operating profit growth	Short-term leverage	Moderate support
	Long-term leverage	Strong support

Regarding the control regressors of this study, liquidity reveals a significant relationship with the total asset growth throughout all the estimators. Meanwhile, the sales growth and operating profit growth models exhibit significant impact of liquidity only under the PCSE estimator, yet this is believed to be most reliable estimation technique in this study. With regards to total asset growth model, the coefficient is reported at a consistent rate throughout the estimators (0.095 approximately). Therefore, it is confirmed based on the empirical result of this thesis that liquidity ratio is positively related to firm growth measured by total asset. However, for the sales growth and operating profit growth models, the empirical findings of this thesis only weakly support the existence of a positive relationship between liquidity and firm growth proxies. Notably, the impact level of liquidity in sales growth model is significantly high under the PCSE estimator with coefficient of 0.546. This positive effect of liquidity is consistent with the results discussed in the international literature review (Cho, 1998; Fuertes-Callén and Cuellar-Fernández, 2019), which might indicate that the positive impact of liquidity on firm growth is considerable. However, this outcome contradicts a local study by Oanh (2017) in that liquidity's impact on firm growth is negative, although the level of effect is very minor with a coefficient of -0.0055. Indeed, the positive effect of liquidity on firm growth is believed to be more understandable since it was argued by Cho (1998), and Fuertes-Callén and Cuellar-Fernández (2019) that since liquidity ratio represents the firms' ability to secure short-term financial obligations, the rise of liquidity implies higher capacity to utilise short-term debt more efficiently and generate growth in all aspects. Thus, this thesis can firmly conclude a moderate impact of liquidity on Vietnamese listed firms' growth.

Similar to long-term financial leverage indicator, tangible asset indicates a strong positive impact on firm growth regardless of the estimation technique. In detail, for the PCSE estimator, the coefficients of asset structure are positive across all the tested cases, at a 5% significance level for sales growth model and 1% for the others. In the robust standard error approaches, tangibility reported a strong positive ccoefficient at 10% and 1% significance levels. Thus, it can be strongly confirmed that assets structure represented by tangible assets has a significant and positive impact on firm growth. In other words, the more investment for fixed assets, the better growth of the firm in terms of sales, total assets, and operating profit. This conclusion is consistent with the current literature on capital structure, such as Ramaswamy (2001), Frank and Goyal (2003), Jermias (2008), and Ebaid (2009). Since the high value of tangibility can significantly indicate a higher possibility of collateral for debt guarantee (Himmelberg *et al.*, 1999; Booth *et al.*, 2001), the more fixed assets owned by listed firms, the better the likelihood that they finance their capital with debts, especially for long-term projects. As such, this outcome is considerably consistent with the literature and is expected in this research.

In terms of advertising spending and innovation spending, they present only a partial impact on firm growth. In detail, advertisement exhibits a certain effect on firm growth in the robust standard error as well as PCSE estimators with significant and positive coefficients for sales growth and operating profit growth. Meanwhile, the total assets growth model shows insignificant results across all estimators. It is noteworthy that this result is consistent regardless of estimation approaches. Thus, advertisement exhibits a strong positive impact on sales and operating profit growth as proxies of firm growth with significant support from the econometric estimations, while there is no evidence for any impact of advertisement on total assets growth. This conclusion is consistent with the current firm growth literature, especially in the case that growth is measured by sales revenue. Martin *et al.* (2018) and Audretsch *et al.* (2014) indicate that the increase in advertising expenses will no doubt boost the revenue, which is normally used during market penetration projects. The same implication can be applied for the operating profit growth model, though the impact level is lower, since the coefficient of the regressor is only 0.0001, as presented in Table 7.9; therefore, with the same amount of investing in advertisement activities, the growth rate of sales revenue will be higher than operating profit. This is understandable because advertising spending is treated as part of the business expenses to be deducted from the sales revenue before determining the operating profit. However, the insignificant impact on the total asset growth model is relatively unexpected in this research since it is proven to positively affect the growth of operating profit already. Still, it can be argued that due to the small size of the market and since most Vietnamese listed firms are SMEs as discussed in Chapter 2, inventory can become a significant part of a business's current assets. Therefore, rapidly selling products can somewhat lead to a slight reduction in the total asset growth rate. From this point of view, advertisement should be considered a short-term project depending on the specific business strategy of Vietnamese firms. Additionally, due to a relatively slight boost to operating profit growth with coefficient of only 0.0001, the insignificant impact on total asset growth is understandable.

Regarding the R&D as a proxy for business innovation, the empirical results present extremely limited evidence for the significant relationship between this variable and firm growth. Specifically, the results for this variable are consistent throughout all the estimation approaches that innovation positively impact only operating profit growth, while the other two proxies of firm growth observed insignificant coefficients regardless of estimators used. For instance, regarding the PCSE estimator, the result reports a significant and positive effect of innovation on operating profit growth (1% significance) and the impact level is moderate with coefficient of 0.066. Thus, this thesis strongly concludes that there is a positive relationship between business innovation investment and the growth of operating profit. Yet the insignificant results in the other two models (sales growth and total assets growth) is not expected in this research. These findings can be interpreted that although innovation via investment in R&D was paid attention to by Vietnamese listed firms, the real effect of R&D activities on financial growth rate has not been actualised. In other words, the R&D process of Vietnamese listed firms is not efficient at the moment. In the current literature, the effect of innovation measured by R&D spending on firm growth is mixed. For instance, the studies conducted by Capasso *et al.* (2015), Coad and Rao (2009), Del Monte and Papagni (2003), and Nunes *et al.* (2012) focussed on the innovation dimension of businesses to find the impact on firm growth. The authors confirmed that the relationship exists but that the tendency of the effect remains debatable. Most of the scholars suggested that R&D effects on growth should be considered alongside other enterprise factors. Coad *et al.* (2016) and Goedhuys and Sleuwaegen (2016) recommend that the orientation of the R&D effect would be straightforward if the data observations were divided into different growth quantiles. Indeed, Coad *et al.* (2016) and Goedhuys and Sleuwaegen (2016) conclude that the negative sign is confirmed for the sample of firms at a lower quantile growth rate. According to these findings, Vietnamese listed firms might be at a low growth rate, and the R&D process has not led to a certain breakthrough to boost the growth rate. However, Mazzucato and Parris (2015) and Coad and Rao (2009) recommend that for long-term and sustainable growth, innovation is the most crucial factor.

CHAPTER 8

RESEARCH DISCUSSION AND RECOMMENDATIONS

8.1. Discussion of the research findings

8.1.1. Summary of the main results and hypothesis testing

This thesis provides three empirical studies on capital structure within the context of Vietnamese listed firms. The first study, discussed in Chapter 5, concerns the foundation for a dynamic model of capital structure and the target level of financial leverage. This study focuses on analysing the adjustment process of capital structure towards the target level. The adjustment speed is measured via multiple estimation techniques, especially the Fama-Macbeth approach and system GMM. Fama-Macbeth and GMM estimators report an average speed of approximately 30%. Meanwhile, the adjustment speed the FE estimator reports is approximately 98%, which is considered infeasible in practice. Thus, this study strongly confirms that the average adjustment speed towards the target capital structure of Vietnamese listed firms is approximately 30% per year. This result is considered slower than the expected rate of 60% based on the related literature for other emerging economies, as Haron (2015), Tzang *et al.* (2013), and Ameer (2010) have proposed. This implies that, on average, Vietnamese listed firms take approximately three years to reach their desired level of capital structure. This is quite slow, since major business projects can be finished within one year. Due to this empirical result, further examination about the factors affecting the adjustment speed sheds light on the most significant determinant that contributes to the higher speed of adjustment. Three factors were considered in this study (distance to target, firm size, and growth opportunities), and the results reveal that all of them positively correlate with the adjustment speed with different impact levels. This empirical result strongly supports the first three hypotheses proposed in Chapter 3 on positive correlation with adjustment speed. In particular, firm size is the most significant factor, with a coefficient of 0.281 for the market debt model. This means that a 1% increase in firm size (measured by total asset value) can lead to a 0.281% higher speed of adjustment. This implies that larger firms can adjust faster, since they have better access to various sources of finance based on their high collateral value and business reputation for bank loans. The second-most significant factor that influences the speed of adjustment towards target capital structure is growth opportunities, followed by distance to target variable. The remarkable impact of firm size justifies the empirical result of a slow adjustment speed of 30% per year, which was reported in the earlier analysis, since most of the listed firms in Vietnam are medium-sized enterprises, which makes it difficult for them to quickly converge their financial leverage towards the desired level.

The second study in Chapter 6 concerns the determinants of capital structure. Specifically, six factors were specified in the capital structure model to evaluate their impact on financial leverage (measured by short-term debt, long-term debt, and total debt). Accordingly, six hypotheses were proposed based on the review of related literature in Table 3.1, which are tested via the empirical examination in Chapter 6. The results show that it is evident to conclude the relationships between firm size, liquidity, profitability, tangibility, growth opportunities, and non-debt tax shield on financial leverage. Of these, liquidity is the least significant variable, indicating only weak support for hypothesis H_5. The reason lies in the short-term debt model, which had a negative correlation across all the estimation approaches. However, short-term debt is only a minor part of the business capital structure. Therefore, the weak support Table 6.11 shows is based on the results reported in the two-step system GMM estimator for a positive relationship between liquidity and total debt ratio. Meanwhile, firm size, profitability, and a non-debt tax shield report moderate support for hypotheses H_4, H_6, and H_9, and strong support is concluded for tangibility and growth opportunities (H_7 and H_8). As a result, this thesis strongly argues that, in the Vietnamese context, firms that have a high value of tangible fixed assets can easily take advantage of those collaterals to have debt financing and quickly increase financial leverage. This is understandable because collateral is a common requirement from commercial banks before issuing loans. In addition, growth opportunities also proved to have a negative correlation with financial leverage based on the empirical results of this study. Although investors may consider growth opportunities to be added value for firms, they cannot be employed as collateral to secure debt financing. Therefore, it is unlikely that firms can take advantage of high-growth opportunities to attract long-term financial leverage. The negative impact is also supported by the argument that firms tend to avoid equity issuance if the market-to-book ratio (a measurement of growth opportunities) is low, as they expect their stocks to be undervalued. Additionally, this thesis also reports a positive effect of firm size on financial leverage. This implies that larger firms have better advantages in raising debt financing based on sufficient collateral value, high business reputation, and credit rating. Finally, there is moderate support for the negative relationship between profitability and non-debt tax shields with financial leverage. This argument is based on the pecking order theory that profitable firms have more retained earnings to use before considering other, external methods. Thus, the use of the retained earnings reduces the necessity of debt financing in capital structure. The same result is reported for non-debt tax shield; thus, some elements, such as depreciation, amortisation, and investment tax credits (considered to be non-debt tax shield elements), can substitute the tax benefit gained from debt financing.

The third study was conducted in Chapter 7. Its focus is the impact of capital structure on firm growth (measured by the growth rate of financial indicators: sales revenue, total assets, and operating profit). In this study, short-term debt and long-term debt were employed as proxies for capital structure. Accordingly, three hypotheses were developed in Chapter 3 based on the review of the literature as shown in Table 3.1. The hypothesis testing results in Chapter 7 reveal that long-term financial leverage strongly affects the growth of Vietnamese listed firms in all aspects of business. This result implies that long-term debt is the fundamental source of finance for Vietnamese listed firms to develop further business projects and help boost the growth of firms in all aspects, including sales, operating profit, and total assets. Meanwhile, the short-term debt model shows moderate support for the sales and operating profit model, and only weak support for the total assets growth model. As a result, it is concluded that short-term leverage is simply used to serve short-run activities, such as trade credit or working capital requirements, rather than long-run activities, which can help boost firms' growth rate. Therefore, the effect of short-term debt is only moderately or weakly concluded in this research.

8.1.2. Theoretical research contribution

Based on the summary of research findings, this thesis significantly contributes to the literature regarding the capital structure model and emerging economies. The first empirical contribution to the current literature of capital structure is the finding that the approximate speed of adjustment towards the target financial leverage in Vietnam is 30% per year. This is remarkably slow in comparison with other emerging markets (around 60% per year), as discussed in Chapter 3. However, this particular finding can be justified by the large impact of firm size on adjustment speed, which indicates that, in a developing market like Vietnam in which a majority of firms are considered SMEs, the target structure convergence speed is significantly slower. This is also the first in-depth analysis on the target debt level for the Vietnamese context. Hence, although inheriting the past papers of Fama and French (2002), Leary and Roberts (2005), Frank and Goyal (2003), Haron (2015), and Tzang *et al.* (2013) to build up the empirical regression equation to estimate the adjustment speed of capital structure, this is still the foundation for the

Vietnamese scholars to consider and apply for further target gearing study, especially for leading industries research.

Second, this thesis also provides contributions to the literature on capital structure determinants by building on the previous model and concluding that there is a positive correlation for firm size, liquidity, and tangibility, and a negative correlation for profitability, growth opportunities, and non-debt tax shield. However, although short-term debt was added into the model to adapt to the context of a developing economy, the empirical results do not strongly support the impact of such determinants on short-term financial leverage. However, the idea of including short-term financing method into the capital structure determinants model is no doubt a feasible approach with the context of emerging economies. A more industry-based research might show a better estimated result and more precise implication between long-term and short-term financing options.

The final literature contribution of the thesis is the analysis of capital structure's impact on firm growth. Since the empirical research on firm growth is limited compared with firm performance research, this is considered a typical, in-depth analysis to evaluate and measure the impact of capital structure on firm growth. The empirical findings indicate that short-term debt is not likely to impact firms' growth; rather, long-term debt is proven to positively affect the growth rate of sales revenue, operating profit, and total assets. Hence, this thesis can be regarded as one of the updated and leading research on analysing the quality of business development by examining the firm growth in multiple aspects.

Regarding the practical contributions of this research based on the empirical results of Chapters 5, 6, and 7, this thesis can effectively provide recommendations and implication for the two main stakeholders of the finance research field: policymakers and business managers. The details are provided in the sub-section 8.2.2.

8.2. Policy implications and recommendations

8.2.1. Advantages and disadvantages of capital structure planning

The capital structure of listed firms, also known as financial leverage, is the use of debt and equity at a certain proportion to finance production and business activities. A high-leverage ratio proves that enterprises use a high level of debt and vice versa. An optimal capital structure must ensure reasonability between debt and equity so that the cost of capital and the risk are maintained at an acceptable level that is consistent with the specific business conditions.

In addition, listed companies can change their capital structure or restructure their capital sources through various means, such as issuing additional securities, borrowing from financial institutions, or retaining profit from the previous fiscal year. Furthermore, businesses can restructure capital resources without changing their capital size, such as by borrowing more to buy back firm shares or issuing more shares to repay debt. The capital structure of a listed firm must be built based on the fundamental objective of maximising the wealth of shareholders and the value of the firm. Indeed, the value of the business is optimal when the average cost of capital is at its lowest. Therefore, the basic objective of a capital structure decision is to determine the method of financing that can provide the lowest cost of capital.

When adjusting the capital structure, listed companies should pay attention to the following questions. First, how does the capital structure adjustment of the enterprise affect the capital cost? Second, at what point does the capital structure minimise the cost of capital and maximise the firm value? Finally, how do the value of the business and the stock price fluctuate when the firm adjusts its capital structure to an optimal level?

8.2.1.1. Advantages

Currently, the country’s economic context and integration trends have created favourable conditions for listed businesses’ capital structure planning.

First, Vietnam's economy continues to have robust growth, at an average of about 6% per year over the past 30 years, and it is forecasted to maintain a high growth rate until the end of 2020, and in this period, the inflation and exchange rate indicators will tend to be stable. This is a favourable condition for listed companies to expand their production and business activities, thereby promoting growth in stock prices, which causes an increase in market capitalisation.

Second, in the coming years, the government will continue to forcefully promote the process of equitisation and divestment in state-owned enterprises associated with listing on the stock market. Between 2017 and 2020, there will have been more than 400 SOE divestments, thereby paving the way for the supply of goods on the stock market.

Third, the participation and implementation of new-generation free trade agreements (FTAs), such as the EU-Vietnam FTA and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), will help boost the production and export activities of listed companies. These commitments help remove tariff barriers on goods and increase opportunities for domestic goods to gain access to more international markets with more favourable conditions and aid businesses in expanding their markets via export promotion. Afterwards, stocks in these industries will be more attractive to investors, leading to positive growth and a rise in the stock market.

Fourth, commitment in the new-generation FTA forces listed companies to innovate, restructure, and apply international standards and practices on corporate governance, risk management, and information disclosure to operate more effectively and improve competitiveness. In addition, the process of the equitisation of SOEs, the demand for corporate valuation, the need to issue and find strategic partners, and the listed market (domestic and foreign) represent the factors that will increase the demand for security companies’ services.

Fifth, the newly signed FTA agreements will create opportunities for Vietnam to attract foreign investment, including direct investment and indirect investment, through the stock market. With extensive commitment requirements in many fields, the trade and investment relations between Vietnam and the CPTPP member countries or the EU member countries will develop strongly, thereby promoting capital flows investment into Vietnam. Additionally, new policies such as investment law, corporate law, and real estate business law, in addition to the upcoming securities law (amended), continue to create favourable conditions for the participation of foreign investors in the Vietnam stock market.

8.2.1.2. Disadvantages

In addition to the advantages mentioned above, many shortcomings create difficulties and obstacles for listed businesses in capital structure planning.

First, the State of Vietnam continues to play an important management role for listed firms. At present, approximately 42% of listed firms in the market have state ownership of more than 10%, and of these, 21% of SOEs hold dominant shares (more than 50%), 15% of SOEs are highly influential (20%–50%), and 6% of SOEs play important management roles (more than 10%). Many listed SOEs still operate based on the current given advantages of SOEs, which are prioritised for easier borrowing, so there is no motivation for efficient capital investment and cost savings. Many equitised enterprises still apply the same methods of organisation and governance for the management of new companies, which greatly influences financial policymaking in listed businesses.

Second, at present, state-owned commercial banks still account for more than 50% of the credit market share; as a result, the majority of credit amount flows into large enterprises, giving priority to businesses that have favourable relationships with banks, which means the credit products will not be diversified. While the financial market is still weak, Vietnam's economic development is primarily based on the banking system, whose unreasonable credit allocation significantly impacts the capital financing policy of listed businesses.

Third, the role of institutional investors in the stock market is very limited; it mainly involves individual investors. The presence of institutional investors with long-term investment strategy plays an important role in providing medium- and long-term capital. The strategy of financial liberalisation has been implemented via government policies to attract foreign investors' participation in the stock market; however, at present, the market still lacks important institutional investors, such as life insurance companies, pension funds, investment funds, and so on. Therefore, the allocation of capital in the economy focusses primarily on short-term capital, as raising long-term capital is a difficult problem in the current conditions.

Fourth, the legal background of Vietnam is incomplete, and many problems persist, creating difficulties and obstacles in capital-raising activities. A number of relevant provisions of the local enterprise law have not created favourable conditions for shareholders and company members to exercise the right to sue managers when necessary; there are no adequate, specific, and reasonable regulations on the private placement of shares for joint-stock companies, which creates difficulties and even hinders raising additional capital and, in many cases, prevents business expansion. Moreover, the current provisions on the share price of the securities law create make it difficult to issue the activities of listed companies with stock prices below par value.

Fifth, the lack of standardisation in financial management in listed businesses affects capital structure decisions. Financial management in businesses is often overlooked, and the capital needed to meet the needs of business activities is spontaneously selected rather than based on the basic principles of appropriate financial management strategy. The spread of inefficient investment activities in the wrong areas and business functions, such as securities and real estate, has become popular. In fact, inadequacies within the enterprise are the main causes of difficulties and challenges in capital structure planning.

8.2.2. Policy implications

Apart from the theoretical implication that discussed in the sub-section 8.1.2, the empirical findings of the thesis also significantly contribute to the practice for different stakeholders. Firstly, in terms of internal stakeholder (business managers), Vietnamese private firms in general and listed firms in particular can take a lesson from this thesis to have a better understanding on the current situation of capital structure of private firms in Vietnam. Specifically, the concept of capital structure adjustment towards a target gearing level is not new in the global research but it still captures less attention in the context of Vietnam by either business managers or policymakers. Hence, the current adjustment rate of 30% per year can bring several ideas such as the importance to enhance the speed of capital convergence based on the growth of firm size or increase market capitalisation to improve growth opportunities. The determinants of financial leverage can significantly help managers to raise certain ideas on the approaches to better adjust their firms' capital structure. Secondly, regarding the perspective of external stakeholder (policymakers or investors), the results of empirical studies can help to show them a clear picture of how financial leverage can affect the business growth and the way that capital structure decision was made. Based on these information, the national monetary policy can be adjusted to better support the private sectors, especially during the Covid-19 pandemic period. Besides, investors can also understand the nature of their portfolios' capital structure and better consider their decision.

8.2.2.1. Internal implication

First, listed businesses must proactively establish a division that specialises in capital management.

Capital management is an important activity for listed companies before and after the construction of the target capital structure. However, most listed companies have not yet established a specialised unit in this area; hence, the responsibility for planning the capital structure of an enterprise is often delegated to the board of management. After the capital structure decision is established, no department is responsible for monitoring and evaluating the decision to promptly make any necessary, appropriate changes. Therefore, to develop and manage an effective capital structure, listed businesses should create a specialised department for capital management. The capital management department must be in close contact with the direct production and other business units to perceive the characteristics of the current business situation as well as future development orientation. After obtaining a thorough understanding of the capital needs and considering the business's current situation, the capital management department can weigh the pros and cons of the sources of capital funding that the business can use in addition to the cost of raising capital from these sources. Furthermore, the capital management unit must be responsible for proposing changes to the operation plans if there is heterogeneity or conflict between the enterprise's ability to raise capital and the development plan to ensure the feasibility of the business strategy and financial capacity in the future. After the enterprise's capital structure has been approved, the capital management unit must regularly monitor its implementation and make timely adjustments to maintain its benefits in case there are any abnormal changes in macroeconomics and in the firm's production and business activities.

Second, diversify sources of capital financing.

Corporate bonds are an important source of capital financing that listed businesses should exploit. This is a popular form of borrowing, but the growth rate and the amount of money raised from the bonds of listed companies are almost negligible. Thus, in the near future, it is strongly recommended that listed businesses, especially large ones, consider raising capital by issuing bonds. Listed companies should issue bonds in a public manner that is not limited to several ordinary investors. Information concerning the types of bonds issued, such as face value, term, and related conditions, should be published in the media for all interested investors. In particular, listed companies should pay attention to introducing bonds to foreign investors. Many risk-tolerant foreign investors, especially large institutions, are fond of the corporate bonds of developing countries such as Vietnam, as the growth potential is still high, and the interest rates are more attractive than in developed countries.

Small-sized businesses, for whom it is difficult to issue bonds, may consider seeking investment funds or venture capital units, as these are financial intermediaries who are willing to accept risks in exchange for high returns for small businesses or start-ups if their projects are attractive. This helps businesses diversify their funding structure, reduce risks, and finance costs.

For the import-export sector, it is necessary to take advantage of the forms of international trade finance that many domestic banks apply, such as discounting commercial papers, pledging valuable papers, and all types of letters of credit or factoring. These are highly convenient and useful means for import-export businesses to limit risks in international transactions and payments and help businesses actively avoid temporary shortages of working capital while operating their business. Therefore, import-export enterprises in Vietnam should actively learn about these approaches to international trade finance and select the appropriate form for themselves. It is notable that, with the particular development scale of the import-export industry in Vietnam and the pace of globalisation in the field of import and export in general, the use of these sources of funding will inevitably become a trend. Therefore, businesses should proactively familiarise themselves with and use these sources to avoid becoming passive when participating in international trade activities in the future.

For businesses operating in the field of manufacturing, mining, and construction, which have great demand for investment in fixed assets, renting property is an appropriate choice. In reality, leasing assets is a form of credit, but one with assets rather than cash. The expertise of asset-leasing companies in the field of asset investment helps businesses save time and costs when seeking to borrow capital to increase their fixed assets. In addition to diversifying forms of capital financing, listed firms must build a solid credit relationship network. To do so, members of the board of management should be nominated to participate in mass organisations and business associations. Additionally, businesses should actively participate in related forums and social activities to enhance their opportunities for expanding business relations.

Third, perfecting the accounting work, preparing financial statements, and the information disclosure activities of listed firms.

To improve accessibility to external capital, listed firms should take further measures to improve their accounting system, the process of making financial statements, and the disclosure of financial statements, and to ensure that information reaches investors in a timely, reliable manner. Accordingly, listed firms must build an accounting system that is consistent with the management structure, apply information technology in management, and use accounting software to update data daily. In addition to the information on the financial statements in the form prescribed by the Ministry of Finance, listed businesses should publish more complete versions of a number of "sensitive" criteria in the notes to the financial statements, which is one of the four statements that a listed company must make public (along with statement of financial position, statement of profit and loss account, and statement of changes in equity). This is essentially an explanation of the business, including additional information for clarification and more detailed information and accounting data that have been omitted from the financial statements, such as the balance sheet and the statement of profit and loss account. Through additional information on notes to the financial statements, the listed company can more transparently present the information on the financial statements, providing investors useful knowledge to help make their decisions. In addition, listed companies must arrange specialised information disclosure officers to be responsible for checking and monitoring the information disclosure of enterprises to avoid having the information publisher concurrently hold other positions, such as chief accountant, financial director, or member of the management board.

Fourth, improve the quality of corporate governance.

Good governance contributes to sustainable development, improved operations, and improved accessibility to capital from outside listed firms. To improve the governance of listed companies, it is necessary to further raise awareness of the importance of good management practices by paying more attention to protecting the rights of shareholders and stakeholders, enhancing the transparency of information, and ensuring the responsibility of the board in terms of risk monitoring. In addition, a governance standard must be established in accordance with international standards and, if necessary, with the help of consulting companies and experts in the field.

On the other hand, strengthening the role of the supervisory board and the internal audit department is a tool to help identify and improve weaknesses in the enterprise's management system. Members of the internal control unit must be independent and have the appropriate qualifications. It is necessary to enhance the coordination between the board of directors, the internal control board, the chief financial officer (CFO), and the accounting department in making financial decisions in general and with respect to capital structure in particular. In terms of strengthening the role of the CFO in corporate governance, the CFO must make strategic recommendations to the board based on financial analyses and forecasts. To do so, the accounting department must provide an integrated information system to store, monitor, and report on the performance and financial situation, and the internal control system ensures effective implementation, compliant governance, and fraud prevention.

8.2.2.2. Policymaker implication

Since the research is carried out with the Vietnamese listed firms as the observation and used their 10-year financial data for empirical analysis, the main implication will be applied for private sector of emerging economies in general and Vietnam in particular as discussed so far. However, from the perspective of policymakers, there are still several implications that should be noted, especially for the context of Covid-19 pandemic. Based on the results of Chapter 7, the contribution of long-term financing methods, especially long-term financial leverage is extremely essential in enhancing the growth quality of listed firms. Since the data used in this thesis does not cover the Covid-19 period, the measures that Vietnamese government should take are recommended to be more drastic. This is not only to help local private sector to have easier access to mid- and long-term gearing capital to improve growth quality in size, profit, and sales, but also to prevent the mass bankruptcy as well as regional supply chain disruption caused by Covid-19 pandemic. From this point, the practical implication in this section will be predominantly applied to the State Bank of Vietnam and the commercial banks.

Firstly, based on the empirical result that long-term debt plays significant role in improving private firms' growth in all aspects, it is recommended that the SBV should provide certain supports to commercial banks that are working closely with local SMEs to enhance liquidity to help them overcome the difficulties of Covid-19 pandemic. In specific, the SBV can consider further lowering the interest rate from 0.1 - 0.2% until the end of 2021 (by that time, it is expected that Covid-19 vaccine will be worldwide available), or consider increasing credit growth target, but only apply to commercial banks that have close and actual supports for local businesses. It is advisable to continue implementing structural reforms towards a healthier monetary system in the future, not spreading out to all credit institutions. Interest rate "supports", if any, should only be limited to businesses that are directly affected by the epidemic in the direction of "reducing interest" or "sharing difficulties" from the banking industry, not easing monetary policy or credit expansion into the economy. SBV can allow credit institutions to reschedule the debt repayment due date but have to maintain the same amount of debt for good and potential businesses who are currently affected by Covid-19. This implication is strongly consistent with the empirical result in Chapter 7 since liquidity positively affects all firm growth parameters (Table 7.10). Additionally, based on current international experience, liquidity support for businesses is an opinion proposed by many famous economists such as Mankiw (2020), Baldwin and Weder di Mauro (2020), Saez and Zucman (2020). Many countries have implemented strong policies from this point of view: governments in France and UK provide direct cash support for small companies in the restaurant and tourism sectors which had to close due to Covid-19; government in Germany gives businesses unlimited loans; government in Spain stops collecting loans for real estate mortgages; government in Sweden pays most of the wages for local businesses' employees while they leave work due to Covid-19; government in Norway acts as a guarantee of bank loans for SMEs and buying bonds of large enterprises (Lan, 2020). Indeed, this implication is stemming from the urgent need of many Vietnamese enterprises, especially the industries that are negatively affected by Covid-19. These businesses are in need of liquidity support such as increasing money in (borrowing preferential interest rates), or reducing money out (extending or refunding taxes, fees, interest rates, insurance...). Liquidity/cash flow or "capital cushion" are the factors that help businesses overcome difficulties of the pandemic. It is observable that large enterprises go bankrupt in economic recessions in the past two decades is mainly due to poor financial governance (Nguyen Dung, 2020). This recommendation should be acted in combination with the first internal implication that discussed in the sub-section 8.2.2.1.

The second recommendation is to add the 6^{th} object to the list of beneficiaries of priority that can exercise ceiling interest rate in Article 13, Clause 2, Circular 39/2016/TT-NHHN about regulations on lending activities of credit institutions. The goal is to serve the economic areas that are significantly affected by pandemic or climate change. Based on international experience, pandemic and climate change became the most critical global issues; and especially Vietnam, an agriculturally based nation, is one of the countries that is severely affected by climate change. Additionally, the commercial openness of Vietnam also made the pandemic outbreak quickly and caused serious problems to the private businesses. In fact, the ceiling interest rate has short-term and certain direct effects in most of SMEs in Vietnam. This is one of the tools that directly impact the credit market, but also allows credit institutions to have some flexibility in applying this regulation. By this way, the macro economy will be maintained since the private area is focused and supported to reduce their financial burden. Although the role of short-term capital is not clearly proven based on the empirical result of this thesis, it is believed to be a crucial factor that can help private sector during this severe period of time. The growth quality might not be clearly enhanced, yet the bankruptcy and the risk of economy’s collapse is minimised.

8.3. Research limitations

Although this thesis delivered a broad, in-depth analysis of all aspects of capital structure within the context of Vietnam, certain limitations require further clarification for future studies.

First, this thesis only considers the financial data from the period between 2009 and 2018 due to the changes in Vietnam Accounting Standards, as discussed in Chapter 4, as well as the lack of transparency during the beginning phase of the Vietnamese stock market. Although the research considered the whole population of Vietnamese firms listed in the local stock market, the time-series observation of 10 years is limited. Thus, it is strongly recommended that future research extend the time period to produce a better panel dataset.

Second, this research focuses on examining only one country (Vietnam), which can weaken the generalisability of the findings. Although the motivation of this study is to emphasise emerging and transition economies, which Vietnam typifies, a comparative approach should give more persuasive results and enhance study's generalisability. Although focusing on only one country can result in an in-depth investigation that may not be possible with comparative research future research should nevertheless consider a comparative study with a larger dataset to deliver a more comprehensive outcome.

Third, due to the particularity of stock listings of equitised SOEs, this thesis measures only the indicators that reflect the capital structure of enterprises based on accounting values. In addition, due to the limited information and data, this thesis does not assess the impact of factors that reflect the specific characteristics of the industry level. Furthermore, the capital structure analysis model of listed enterprises considers internal variables but not variables of the enterprise's business environment. Thus, it is recommended that future research include macro-economic factors in the capital structure model as well as the firm growth model. These factors might include foreign direct investment inflows or the inflation rate. This suggestion becomes even more important during the Covid-19 pandemic, since an external and unexpected pandemic can significantly change business behaviours in all aspects, including capital-raising strategies. The final limitation that warrants mention concerns the capital structure and firm growth model development and appropriate estimation approaches. Although different estimation methods were applied in this thesis, such as FE, robust standard errors with dummy variables, panel-corrected standard errors, and system GMM, to capture the residual issues such as heteroskedasticity, serial correlation, or cross-sectional dependence, it is not certain that all the econometric issues were completely mitigated, especially the problem of endogeneity. Thus, in combination with the third limitation mentioned above, it is also suggested that future research consider more variables, including external and macro-economic factors, to minimise the issue of endogeneity.

8.4. Research conclusions

As an emerging economy in the process of international integration, the financial decisions of entities in Vietnam cannot be outside the common rule of the market economy. Awareness of the characteristics of enterprises' capital financing policies and the factors that affect the capital structure and growth of enterprises in the past would not only help guide businesses in terms of forming financial policies but also play a particularly important role in the process of economic ownership restructuring in Vietnam.

This study was conducted to examine the impact of capital structure on firm growth using different measurements for each variable. The approach of the analysis applied in this thesis is mainly quantitative techniques with various econometric model tests and a comparison of the results from multiple estimation methods. The data analysis findings reveal that long-term leverage indicates a strong and positive effect on the growth of firms with all representative proxies. Meanwhile, short-term debt shows only a moderate effect.

Specifically, the analysis results indicate that Vietnamese listed enterprises rely heavily on long-term debt to boost future business growth, while the impact of short-term liabilities on investment and business activities is relatively limited. In addition, the capital structure depends on several factors related to the management conditions of listed companies. Although the analytical results are somewhat consistent with existing studies, the ability of corporate finance theories to explain the capital structure policy of listed enterprises in Vietnam is still limited because of subjective aspects of the enterprises themselves and objective reasons related to the characteristics of the economic structure during the transformation period and the development level of Vietnam's financial market.

Based on the research results regarding the impact of financial leverage on the growth of listed companies, this thesis proposes solutions to improve the capital structure of listed enterprises and provides recommendations for government agencies to create a favourable environment for businesses to achieve their optimal capital structure. For SOEs, it is necessary to create a solid foundation of corporate financial management for the formulation of capital structure policies, with each enterprise based on its specific characteristics to build a suitable model of capital structure. Macroeconomic policies from the government and authorities should focus on (1) perfecting the legal environment related to the capital-raising activities of listed enterprises, (2) developing capital markets for more efficient medium- and long-term capital raising for businesses, and (3) enhancing information transparency to minimise the capital-raising costs for businesses.

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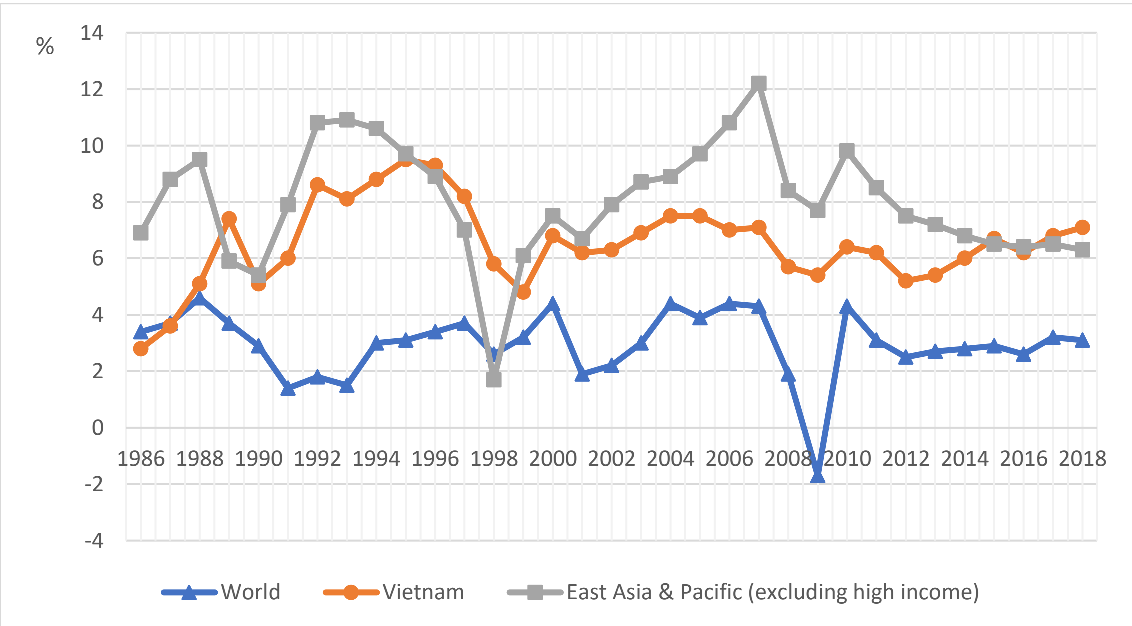
APPENDIX

The Vietnamese economy

In 1986, the Communist Party of Vietnam decided to sign the resolution to officially launch economic and political reform programmes. Since then, the Vietnamese economy has exhibited remarkable changes with impressive performance and achieved the objective of modernising its economy. After 20 years of development, Vietnam took another significant step in terms of economic opening and international commerce by becoming a member of the World Trade Organisation (WTO) in 2007. This step helped Vietnam become a more competitive economy in the region and encouraged export-driven industry to develop. Since then, Vietnam has been widely recognised as a developing country with a stable macroeconomy, excellent inflation control, and strong external accounts (World Bank, 2014).

Regarding the country's economic growth, the GDP growth rate has remained at a high level for 35 years since the economic reform. Figure 2.1 shows the GDP growth of Vietnam in the past 35 years.

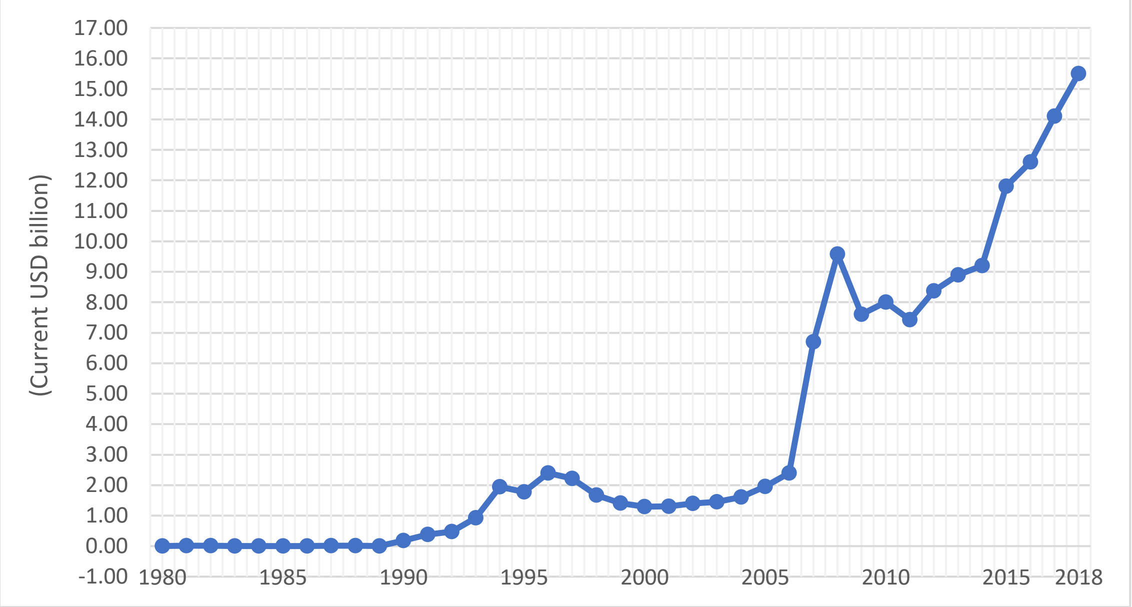


Source: World Bank Data (2019a)

Figure A1: GDP growth (%)

As can be seen from Figure 2.1, Vietnam's economy has maintained a high GDP growth rate since 1986, remaining above the average rate for the world and strictly following the average development trend of the region. However, since 2012, Vietnam has maintained a stable increase, while surrounding countries in the East Asia and Pacific region have begun to suffer from a reduction in GDP growth rate. According to the World Bank (2011), Vietnam is one of the fastest-developing economies in the world. In addition, the weighted contributions of domestic economic sectors have changed in the last 2 decades. Indeed, the agriculture sector's contribution to GDP has decreased, while the share of the services and industry sectors has increased remarkably, demonstrating that the economic restructuring strategy of the government is going in the right direction.

A crucial determinant that contributed to the high and sustainable growth of the country's GDP has been FDI, which has been regarded as an important factor that has drawn the attention of the government since the mid-1900s. Indeed, attracting FDI has been the key driver of Vietnam's macroeconomic strategy with the purpose of quickly expanding the local economy and absorbing new technology and business governance from international companies.



Source: World Bank Data (2019b)

Figure A2: Foreign Direct Investment into Vietnam (current USD billion)

Figure 2.2 shows the amount of inward FDI into Vietnam in the last four decades. This important capital flow began to increase significantly a few years after the country's economic reform in 1986. In 2008 and 2009, despite the extreme competition among the countries in the region such as China, Thailand, or Laos in attracting FDI, Vietnam remained one of the largest recipients of FDI in the world (9.579 billion USD in 2008 and 7.6 billion USD in 2009), allowing it to weather the global financial crisis. The majority of the capital inflow was to invest in the manufacturing industry, which then greatly contributed to the domestic employment rate as well as becoming a huge motivation for the local firms to engage in dynamic innovation for competition.

In Vietnam, there have been two legal ways for international capital inflow: direct investment and indirect investment. Based on the Investment Law approved by the Vietnamese National Assembly (VNA) on 26 November 2014 and issued to take effect on 1 Jul. 2015, FDI is defined as several kinds of investment including: (1) establishing a 100% foreign-owned company, (2) establishing a joint venture (between foreign companies and local companies under another company's name), and (3) joining in a local company's management by buying stock or signing in a construction contract or agreement in various forms, such as Build-Operate-Transfer, Build-Transfer, or Build-Transfer-Operate contracts. Meanwhile, the form of foreign indirect investment is also diversified to include the purchase of local companies' stocks, debenture bonds, and other relevant or similar types of papers and indirect investing via securities investment funds or via intermediary financial institutions. As recorded by the General Statistic Office, the majority of FDI flows into Vietnam in the form of 100% foreign-owned firms or joint ventures to engage in specific construction projects in Vietnam under the strict requirement of an investment certificate relevant to each type of investment. Although there is no specific requirement for capital structure, international investors are obligated to ensure that the fund invested into Vietnam must be sufficient to establish the business or complete the project assigned in the certificate. Notably, the international invested companies are not allowed to raise their debt higher than their registered loan capital. Additionally, FDI inflow to establish limited liability companies is required to invest their registered capital fully within three years of the date stated in the investment certificate. The investors are also strictly required to maintain their invested capital until their business has been operating for two years and to follow all the obligations under Vietnamese law (Mayer Brown, 2014).

Along with attracting and strengthening the role of FDI in the country's economic development, the export sector is another key development in Vietnam's macroeconomic strategy. Currently, China is no longer the best ideal destination for multinational manufacturing companies, as overall costs are rising significantly, and Vietnam is now regarded as a new competitive arsenal of the world with increasing international orders shifting from China to Vietnam. Recognising the advantages of low labour costs (which are now 50% of those in China, and roughly 40% of those in Thailand and the Philippines), a young population, and a high-skilled workforce, the Vietnamese government put much effort into encouraging multinational manufacturing firms to enter and establish business with supportive locations in specific industrial parks, a particular income-tax rate, and reduced administrative procedures. Additionally, in terms of macroeconomic administration, apart from joining the WTO in 2007, Vietnam recently joined several significant free-trade agreements, namely, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) ratification and the European–Vietnam Free Trade Agreement (EVFTA), which are considered to be remarkably advantageous for Vietnam due to the current trade war between the United States and China. Based on its strategic location, with 3,260 km of coastline, Vietnam is an ideal export hub to all the ASEAN economies. At the moment, a new agreement, the Regional Comprehensive Economic Partnership (RCEP), is under negotiation. This is expected to help Vietnam gain easy access to the majority of the world's largest markets without severe tariffs and restrictions. Table 2.1 summarises some typical recent financial indicators of Vietnam.

Vietnam's import volume has continued to grow significantly over the years due to the demand for domestic usage and manufacture. In the previous decade, import was always higher than export, which means that the country experienced international trade deficits during this period. However, based on significant support from the government in terms of exporting, these import values have played an important role in reducing trade deficits and achieving a surplus in the country's trade account since 2012.

Table A1: Main Vietnamese economic indicators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP (million USD)	66,371	77,414	99,130	106,014	115,931	135,539	155,820	171,392	186,205	193,241	205,276	223,780	245,214
GDP growth (annual %)	6.98	7.13	5.66	5.40	6.42	6.24	5.25	5.42	5.98	6.68	6.21	6.81	7.08
GDP per capita (current USD)	797	919	1,165	1,232	1,334	1,543	1,755	1,910	2,030	2,085	2,192	2,365	2,566
Inflation rate (annual %)	7.40	8.30	23.10	7.10	8.90	18.70	9.10	6.60	4.71	0.88	3.24	3.52	3.54
Exports (million USD)	44,945	54,591	69,725	66,375	83,474	107,606	124,701	143,186	160,890	173,490	192,188	227,346	259,514
Imports (million USD)	46,856	65,096	83,250	76,434	92,995	113,208	119,242	139,491	154,791	171,962	186,929	221,075	251,282
Trade balance	-1,911	-10,505	-13,525	-10,059	-9,521	-5,602	5,459	3,695	6,098	1,529	5,258	6,271	8,232
FDI (million USD)	12,004.5	21,348.8	71,726.8	23,107.5	19,886.8	15,598.1	16,348.0	22,352.2	21,921.7	24,115.0	26,890.5	37,100.6	36,368.6

Sources: Asian Development Bank data (n.d.), World Bank data (n.d.)

During the period 2006–2018, the Vietnamese inflation rate was also unstable and largely affected by global economic issues. It stood around 7–8% until the international financial crisis in 2008, which negatively affected Vietnam's economy and increased the inflation rate to 23.1%. However, based on previous experience controlling inflation, the government successfully reduced and maintained inflation at an acceptable rate, which has consistently been less than 7% in the past five years.

Overall, Vietnam has put much effort into industrialisation and modernisation during the early twenty-first century while successfully maintaining sustainable GDP growth, controlling the inflation rate, attracting huge amount of FDI inflows, and restructuring domestic economic sectors. All of these have helped the country make huge steps in global integration and economic opening. Currently, the orientation of Vietnamese economic development has been to increasingly take part in the global supply chain both widely and deeply, contributing a high manufacturing quality.

State-owned enterprise equitisation process

After the Communist Party of Vietnam won the Vietnam War and achieved independence in 1975, SOEs became the driving force of the country's economic rebuilding process. However, as mentioned, until 1986, Vietnam followed a subsidised centrally planned economic model, which seriously damaged the economy and increased the necessity of economic restructuring.

The equitisation of SOEs, that is, the transformation of an SOE into a joint-stock enterprise, became the Vietnamese government's key objective. This was an important part of the country economic renewal strategy. In Vietnam, an SOE was defined as a company in which 100% of stocks are owned by government. However, later, according to the Vietnamese National Assembly (1995), the Vietnamese General Statistic Office redefined the term as a company in which the government owns a majority interests (51%

or more). While the government prioritised the process of equitisation for the country’s economic development, the characteristics of the political regime prevented it from being done perfectly. Indeed, Decision No. 14, issued by the government in 2011 (Socialist Republic of Vietnam, 2011), stated that the equitisation process would only be done partially, with the state maintaining 100% stock ownership in several economic sectors, such as public utilities, power transmission, oil and gas, aviation, and railways and at least 50% in the energy, mining, telecommunications, infrastructure, cement and steel production, sanitation and water supply, and banking and insurance sectors.

As reported by the World Bank (2013), the equitisation of SOEs in Vietnam progressed more slowly than the government planned. This report is consistent with the consideration of the Vietnam Ministry of Foreign Affairs (2010), which reported that the equitisation in Vietnam was completed by 2010 but that the initial target was not achieved. However, the results achieved in this project have been remarkable thanks to various management methods such as divestment, M&A, and liquidation. According to Vietnam-Briefing (2014), in 2013, there were 3,135 SOEs left, a decrease from 5,800 in 2000. However, the speed of restructuring has decreased recently, with only 162 SOEs equitised since 2016 (Vietnam-Briefing, 2019). Currently, according to the macroeconomic development masterplan 2020, the Vietnamese government is aiming to privatise 406 SOEs by equitising and divesting capital by the end of 2020. Under Decision No. 26, issued by the prime minister in 2019, 93 companies were added to the list.

Overall, after 33 years of economic renewal, the private sector has increasingly grown, with the purpose of becoming the leading force for Vietnam’s economic development. In addition, the government has also committed to establishing the best level playing field for all enterprises in the market under free trade arrangements. Additionally, the CPTPP also requires the country to reduce its number of SOEs. The government has recognised the necessity of state divestment, with socialised capital being needed to finance the public infrastructure projects which are crucial for the country's economic growth. This is regarded as a significant step towards a market economy, achieved via the process of divesting state enterprises.