RESEARCH



Impact of liquidity on capital structure and financial performance of non-financial-listed companies in the vietnam stock market

Nguyen Hoang Phi Nam^{1*} and Tran Thi My Tuyen²

Abstract

The primary objective of this study is to conduct a comprehensive analysis of the relationships between liquidity (LIQ), capital structure (LEV), and financial performance (FIP). Additionally, we seek to investigate the indirect effect of liquidity (LIQ) on financial performance (FIP) by examining the intermediary role of the capital structure (LEV) of non-financial-listed companies in the Vietnamese stock market. This study utilizes PLS-SEM with a robust sample of 644 non-financial-listed companies in the Vietnamese stock market. The findings suggest that liquidity positively influences financial performance but negatively impacts capital structure. Conversely, capital structure negatively affects financial performance. Thus, liquidity indirectly enhances financial performance through capital structure mediation. This research result can provide suggestions for non-financial enterprises in making financial decisions to increase financial efficiency by increasing the holdings of highly liquid assets to prevent risks and take advantage of new investment opportunities in the future. In addition, increasing the holding of highly liquid assets also reduces debt pressure and reduces interest costs, thereby increasing financial efficiency. Our research shows that the relationship between economic factors is extremely complex; specifically, our research shows the true nature of the positive impact of liquidity on financial performance, including direct positive effects and indirect positive effects through capital structure. In addition, our research results also show that non-financial enterprises that want to increase financial efficiency need to pay attention to revenue growth, and non-financial companies with larger total assets (size) will have more advantages in increasing financial performance.

Keywords Liquidity, Financial performance, Capital structure, PLS-SEM, Indirect effect

Introduction

Liquidity is pivotal in ensuring a company's ability to meet short-term liabilities and maintain uninterrupted cash flow by facilitating the swift and efficient conversion

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financing, accounts receivable, short-term advances, and inventory into cash. Assets are deemed liquid and of high quality when they can be readily and directly transformed into cash with minimal or no value depreciation. A thorough comprehension of the cash conversion cycle (CCC) is essential for executives to manage resources judiciously, thereby augmenting the firm's financial performance [71]. Effective liquidity management necessitates a strategic balance between maintaining sufficient liquidity to ensure solvency and capitalizing on investment opportunities to avoid excessive cash holdings or

of assets such as financial investments, short-term



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underutilization of valuable assets. Inefficient utilization of high liquidity can detract from a firm's profitability by missing out on potential investment opportunities and business development activities.

Previous studies focusing on the impact of liquidity on capital structure and financial performance have yielded mixed results. Kong et al. [38], Yameen et al. [83], Samo and Murad [63], Vuković et al. [79], Mugambi et al. [51], and Sogomi et al. [71] argue that liquidity has a positive impact on financial performance. In contrast, studies by Bolek and Wili'nski (2011), Eljelly [24], Schulz [66], and Li et al. [46] indicate a negative impact. In addition, research by Dadepo và Afolabi (2020), Nworie and Ofoje [56] and Aprilia and Oktaviannur [4] shows that liquidity based on different short-term assets will have different impacts on financial performance.

Sumani and Roziq [75] found a significant negative impact of capital structure (the debt-to-asset ratio and debt-to-equity ratio) on firm performance, while liquidity policy (cash ratio, cash holdings, current assets) has no significant impact on performance when performance is determined by ROA, ROE, and Tobin's Q.

Additionally, research conducted by Faulkender and Wang [26] and Anh, V. T. T., and Hung, P. T. M. (2019) examined the relationship between liquidity and capital structure based on data from many countries and regions in different industries. These findings indicate that more liquid firms tend to have lower debt-to-total asset ratios and vice versa.

In general, previous studies focused only on the direct relationship between liquidity, capital structure, and financial performance. In addition, the observed variables used to measure the concepts of liquidity and financial performance are not yet comprehensive and consistent.

Vietnam is recognized as an emerging financial market. The recent COVID-19 pandemic has significantly impacted businesses, particularly those with low liquidity and high debt. According to the Business Administration Department's report for the first quarter of 2021, 5,203 businesses have dissolved, marking a 26.4% increase compared to the same period in 2020. Additionally, the number of businesses temporarily suspending operations rose to 23,837, representing a 28.2% increase from the previous year. In this context, liquidity and capital structure are deemed critical factors and priority considerations for businesses, which may influence financial performance. Therefore, we intend to conduct a study to comprehensively assess the impact (including both direct and indirect effects) of liquidity on the financial performance of non-financial companies listed on the Vietnamese stock market. This research will provide a thorough perspective on the impact of liquidity on financial performance, which in turn can help managers and investors analyze and evaluate financial performance through the liquidity of the company, enabling them to make appropriate decisions in the context of global volatility and an emerging market like Vietnam. This study raises four research questions as follows:

- How does liquidity (LIQ) directly impact the capital structure (LEV) of non-financial companies listed on the Vietnam stock market?
- How does liquidity (LIQ) directly impact the financial performance (FIP) of non-financial companies listed on the Vietnam stock market?
- How does the capital structure (LEV) directly impact the financial performance (FIP) of non-financial companies listed on the Vietnam stock market?
- Does liquidity (LIQ) have an indirect impact on financial performance (FIP) through the intermediate variable capital structure (LEV) of non-financial companies listed on the Vietnam stock market?

To answer the above research questions, we conducted a review of theories and previous studies to construct a measurement model and a structural model. We collected secondary data from non-financial companies and used SmartPLS 4 software to analyze and estimate the model. The objective of this study is to analyze the comprehensive impact of liquidity (measured in a more general and comprehensive way) on the capital structure and financial performance of non-financial companies listed on Vietnamese market stocks, including direct and indirect impacts. The distinctive aspect of our research lies in uncovering the complex impact of liquidity on financial performance, including both direct and indirect effects through the capital structure of firms.

Literature review

Definition and measurement

A company's liquidity is defined as its ability to convert short-term assets into cash in an adequate and timely manner. Short-term assets include short-term financial investments, short-term receivables, short-term advances, and inventory. Liquidity shows a company's ability to meet its short-term debt obligations, and it is one of the factors that influences financial performance. Liquidity ratios are closely related to financial performance because they reflect the level of capital available for a company to operate. To maintain liquidity, a company's current assets must exceed its current liabilities; if not, then the company is not in good financial shape. Liquidity plays an important role in ensuring payments and taking advantage of investment opportunities. However, businesses should avoid storing too much cash or highly liquid assets that are not being used effectively to avoid reducing business profits [1, 2, 8, 57].

Liquidity is measured using the traditional ratio-based method and the cash flow-based method. The traditional method uses liquidity indicators such as the current ratio (CR) [9, 16, 21, 25, 38], quick ratio (QR) [16, 25, 83], instant ratio (capital adequacy ratio – CAR) [38] and cash conversion cycle (CCC) [9, 16, 71] to evaluate the impact of liquidity on financial performance based on balance sheets and income statements. The cash flowbased method uses liquidity indicators such as the debt repayment ratio from net operating cash flow (Cash flow ratio - CFR) [16, 38] and the demand guarantee ratio critical needs cash coverage (CNCC) from the cash flow statement to analyze the impact of financial activities on a business's cash flow, as in Abdul Rahman et al. (2020). This approach helps managers and investors better understand liquidity status and make smart financial decisions to optimize financial performance.

The COVID-19 pandemic economy has had a strong impact on businesses, especially those in Vietnam. In addition to the negative impacts, there are still positive impacts because they create a more competitive business environment. This competition requires companies to make efforts to improve their financial performance to maintain their business operations. Companies need to have financial statements that are evidenced by good financial performance, and their financial statements must comply with regulations governing financial reporting [55].

Financial performance is the ability of a business or organization to use its financial resources effectively to achieve business goals and optimize profits. This can include growing revenue, enhancing profitability, managing financial risk, and optimizing capital structure. Santos and Brito [64] noted that developing accurate financial performance measures is highly important for ensuring the quality of quantitative research results. If these measures are not properly defined or applied, they can lead to misleading results and compromise the reliability and validity of the study, as well as mask true relationships.

Based on a synthesis of previous studies, we classify and divide metrics measuring a company's financial performance into two main categories: book value ratio and market value ratio. There are four book value ratios commonly used to evaluate a company's financial performance: return on assets (ROA) [21, 25, 38, 52, 60, 71, 75], return on equity (ROE) [38, 46, 52, 60, 71, 75], return on net sales (ROS (Le Thi Kim, N. et al, 2021,[52], and return on capital employed (ROCE) [23, 38, 71]. The market value ratio, Tobin's Q [25, 75], is a tool used to evaluate the performance of a company's business operations and financial management.

Capital structure is the relationship between debt and equity in a business's capital resources. Capital structure or financial leverage decisions need to be considered with regard to how the combination of debt and equity in a company's capital structure affects its market value [84].

The capital structure of Vietnamese companies is characterized by a high debt ratio, primarily due to the relative ease of obtaining bank loans compared to issuing stocks or bonds in the stock market. This dependence on debt financing exposes businesses to significant financial risks, particularly amid fluctuating interest rates. Additionally, the prevalent use of short-term capital for long-term investments creates pressure to repay shortterm debt, further heightening financial risk. The insufficiency of sustainable long-term capital sources adversely impacts the ability of businesses to invest and expand their operations.

Despite the noteworthy progress of Vietnam's stock market, numerous enterprises encounter formidable challenges in issuing stocks or bonds. Contributing factors include inadequate transparency in financial reporting and corporate governance, coupled with limited investor confidence. Consequently, the dependency on banks and traditional financial institutions remains disproportionately high. Amidst fluctuating domestic and global economic conditions, it has become increasingly evident to many businesses that there is a critical need to develop more sustainable liquidity ratios and robust capital structures.

Literature review and hypotheses development Liquidity and financial performance

Various theories about liquidity management attempt to explain how companies determine the optimal level of liquidity that can enhance their profitability. Some of these include the liquidity-and-profitability trade-off theory and the liquidity preference theory. The liquidity and profitability trade-off theory, adopted from [39] capital structure trade-off theory, simply states that there is an inverse relationship between liquidity and profitability. This means that if businesses want to achieve high profits, they must operate with low liquidity, and vice versa. The essence of trade-off theory is the suggestion that firms determine the optimal level of cash by determining the importance of the ultimate costs and ultimate profits from holding cash (Yusuf et al., 2019). This theory accurately describes the relationship between both financial objectives and shows the dilemmas that companies face in achieving the optimal level of liquidity and how it can affect their financial performance.

Studies supporting the trade-off theory, such as that of Schulz [66], conducted a panel study on 3,363 unlisted Dutch SMEs during the period 2008–2015. The results of the study indicate that liquidity is a significant adverse predictor of a company's return on capital employed (ROCE) but a negligible negative predictor. of the company's ROA. Li et al. [46] studied the relationship between liquidity and the performance of non-financial companies in Ghana. The study uses the generalized least squares regression method to analyze data extracted from 15 companies during the period 2008–2017. Control variables such as size, efficiency, growth, and tangibility were used. The results show that liquidity, measured by the current ratio and cash ratio, has a significant negative impact on the return on equity.

However, the concept of liquidity preference theory mentioned by John Maynard Keynes in "The General Theory of Employment, Interest, and Money" (1964) is contrary to the above view. Cash is generally accepted as the most liquid asset. Keynes believed that liquid investments would be easily converted into cash at full value. Keynes describes the theory in terms of three motives to determine the need for liquidity, namely, transactional, precautionary, and motive. The transaction motive is about holding cash to meet the need to pay short-term liabilities that arise in the daily operations of the business. The precautionary motive is because businesses will not know what will happen in the future, so it is necessary to retain some cash. A business with highly fluctuating cash flows always wants higher liquidity to face risks. The speculative motive is to hold cash to wait for interest rates to increase, using it for investment opportunities such as purchasing goods with payment discounts or reduced sales prices, or exchange rate differences when holding foreign currency, or in buying and selling import and export goods. When a business satisfies the above three motives due to good liquidity, its profits increase (Njoroge, 2015). A business with good liquidity will have more investment opportunities, greater profitability, and increased credibility with customers, investors, lending banks, etc., at the same time. Good prevention of possible risks. Therefore, the efficiency of businesses will increase.

The liquidity of a company increases when it is able to finance its debts through increased reserve measures to meet the required satisfaction of the company. Therefore, the well-managed working capital of a company can enhance its financial performance, profitability, and liquidity [33],thus, a positive relationship between working capital (average collection period, average payment period, and cash conversion cycle) and a company's net profit can be established.

Some studies support this view, such as Yameen et al. [83], who used financial data extracted from the ProwessQ1 database from 2008 to 2017 in India. This study shows that the current ratio and the quick ratio have a positive and significant impact on the profitability of the pharmaceutical industry, as measured by return on assets. Kong et al. [38] studied a total of fifteen (15) non-financial companies, representing 53.57% of the original target sample of 28 companies and 36.59% of the total number of companies listed on the Stock Exchange Ghana (GSE) from 2008 to 2017. The results of the study show that liquidity has a significant relationship with the financial performance of companies measured by ROA (return on assets), but the relationship is insignificant with financial performance measured by ROE (return on equity) and ROCE (return on invested capital). Samo and Murad [63] used a sample of 40 selected publicly listed companies in the textile sector of the Pakistani economy. The results show that there is a positive relationship between liquidity and profitability and a negative relationship between financial leverage and profitability. The study by Vuković et al. [79] analyzes the main factors that impact a company's financial performance over a 7-year period (2013–2019). The sample includes 460 large and very large European agricultural companies involved in crop production. The presented results indicate that six variables (firm size, asset tangibility, current liquidity, short-term financing, long-term financing, and debt to assets) have a statistically significant impact on financial performance. The study by Mugambi et al. [51] aimed to observe the impact of capital structure determinants in the hotel industry and how this may affect their financial performance. With data covering companies in the 40-star hotel industry in Kenya, the results show that liquidity has a positive and significant impact on financial performance. Similarly, Sogomi et al. [71] studied small and medium-sized companies in Kenya. Research results also show that liquidity positively impacts financial performance.

In addition, some studies have shown different results with different measured variables. Dadepo and Afolabi [16] examined the impact of liquidity management on the financial performance of selected manufacturing companies in Nigeria. Descriptive, correlation, and multiple regression techniques were used to examine panel data obtained from the annual reports of 10 representative companies during the period 2012-2016. The findings show that liquidity management, proxied by the current ratio, cash ratio, and quick ratio, has a significant negative impact on financial performance, proxied by the return on assets, while the cash ratio and quick ratio have positive but insignificant effects. Nworie and Ofoje [56] studied the impact of liquidity on the financial performance of listed food and beverage companies in Nigeria. The research results showed that the product conversion time inventory has a significant negative impact on the return on assets of listed food and beverage companies in Nigeria, the current ratio does not have a significant positive impact on the return on assets of listed food and beverage companies in Nigeria; and the accounts receivable period does not have a significant positive impact on the return on assets of listed food and beverage companies in Nigeria. Research by Aprilia and Oktaviannur [4] evaluates the impact of the liquidity ratio on the financial performance of PT Garuda Indonesia Tbk. from 2020 to 2022. Multiple linear regression analyses were performed on the financial statement data to determine the relationships between the current ratio (CR), the quick ratio (QR), and the ratio of cash (Cash) and the return on assets (ROA). The findings show that CR and QR have a significant favorable impact on ROA; however, the cash ratio does not have a significant impact. Sumani and Roziq [75] find a significant negative impact of capital structure (the debt-to-assets ratio and debt-to-equity ratio) on firm performance, while liquidity policy (cash ratio, cash holdings, current assets) does not have a significant impact on financial performance as determined by ROA, ROE, or Tobin's Q.

After an overview of the theories and previous studies presented above, we realize that there is no absolute agreement between theories and previous studies on the impact of liquidity on the financial performance of companies and businesses in Vietnam. Due to the impact of the COVID-19 pandemic and the economic crisis, bank interest rates have increased, making it difficult for businesses to mobilize capital. Therefore, businesses tend to retain profits to serve as reserves, prevent risks, and wait for future investment opportunities. This is likely to result in improved financial performance. Therefore, we predict that the liquidity preference theory will perform better in this period, so liquidity will positively impact the financial performance of non-financial companies in Vietnam.

Hypothesis H1 Liquidity (LIQ) has a direct positive impact on the financial performance of non-financial companies listed on the Vietnamese stock market.

Liquidity and capital structure

According to the pecking order theory and liquidity preference theory, businesses with high liquidity tend to borrow less and achieve higher profits. Kumar et al. [41] analyzed the influence of liquidity on the decision to use the debt of businesses. Their research shows that firms in positive and highly liquid financial environments tend to use less debt, while firms in difficult and less liquid financial environments tend to increase the debt ratio to optimize capital use. Research by Lemmon and Zender [45] based on trade-off theory emphasizes the role of liquidity in the decision to use debt or equity. Businesses with low liquidity often incur increased costs when they need financing, so they tend to choose to use equity rather than debt.

The relationship between liquidity and the capital structure of businesses is an important topic in the field of corporate finance. Financial professionals often refer to the relationship between liquidity and capital structure as part of financial risk management and investment decisions. Faulkender and Wang [26] examined the relationship between liquidity and capital structure based on data from a variety of countries and industries. The results show that there is a notable relationship between these two factors. Businesses with high liquidity often have a lower debt-to-total asset ratio (LEV) and vice versa.

Research by Serghiescu and Văidean [67] evaluates the relative importance of five factors in the capital structure decisions of Romanian companies listed on the Bucharest Stock Exchange and operating in the sector build. The results of the study show that profitability and liquidity have a negative influence on the debt ratio of Romanian companies.

The study by Laili and Dalimunthe [42] examines the impact of liquidity on the capital structure of companies in the construction industry listed on the Indonesia Stock Exchange. The results indicate that liquidity does not have a significant impact on capital structure, as measured by the long-term debt-to-asset ratio. However, liquidity has a significant negative impact on capital structure, as measured by the debt-to-asset ratio, the debt-to-equity ratio, the short-term debt-to-asset ratio, the long-term debt-to-equity ratio, and the short-term debt-to-equity ratio. These results support the pecking order theory, which states that liquidity and capital structure have a negative relationship. Similarly, Suharna and Kurniasih [74] study Sri Kehati Indexed Companies in Indonesia, and the results also show that there is a negative impact of liquidity on capital structure. Suhardjo et al's [73] study examines the impact of profitability, liquidity, and company size on the capital structure of manufacturing companies listed on the Indonesia Stock Exchange in 2018–2020. The results also show that there is a negative impact of liquidity on capital structure.

Widjanarko's (2023) research searches for and analyzes the impact of business size, growth opportunities, and liquidity on capital structure. The sample of this study is 75 observational data points from food and beverage companies listed on the Indonesia Stock Exchange during the period 2013–2017. The results show that liquidity has a negative impact on capital structure.

However, some experimental studies have shown inconsistent results. The study by Ghasem and Ab Razak

(2016) investigated the impact of liquidity on the capital structure of 300 listed companies in the main market of Bursa Malaysia from the fiscal year 2005 to 2013. The results showed that the liquidity ratio Quick liquidity has a positive impact on leverage, although the current ratio is negatively related to leverage. Furthermore, shortterm debt is affected by liquidity more than is long-term debt. Daeli et al. [17] studied food and beverage companies listed on the Indonesia Stock Exchange from 2017 to 2019. The results showed a positive impact of liquidity on the capital structure. In addition, Taliding and Lenas [76] analyzed the profitability and liquidity of the capital structure of mining companies listed on the Indonesia Stock Exchange in 2018–2020. The results of this study show that liquidity measured by the current ratio (CR) and quick ratio (QR) does not affect capital structure. Similarly, research by Marlina and Dahlia [48] was conducted at manufacturing companies listed on the Indonesia Stock Exchange from 2016 to 2018. The results show that liquidity expressed by the current ratio does not have a significant influence on the capital structure.

Although the results are not similar, we still think that the pecking order theory and liquidity preference theory still have certain values because they explain well the inverse relationship between liquidity and structure capital structure in the context of Vietnam during and after COVID-19. Furthermore, studies showing opposite results have not been supported by any theory. Therefore, we propose the following research hypothesis:

Hypothesis H2 Liquidity (LIQ) has a direct, negative impact on the capital structure (LEV) of non-financial companies listed on the Vietnamese stock market.

Capital structure and financial performance

Modern financial theory began with the debate on the relationship between capital structure and firm value, initiated by Modigliani and Miller [50]. In a perfect market with no competition, Modigliani and Miller proposed that the value of a firm does not depend on its capital structure and that there is no optimal capital structure for each particular firm. However, these assumptions are not compatible with market realities, such as no transaction fees, no taxes, and equal information about interest rates and risks between debt and equity capital. By 1963, Miller and Modigliani had expanded their perspective by considering corporate tax benefits as a determinant of a company's capital structure. The important feature of taxation is the ability to deduct taxes from expenses, creating clear benefits from the use of debt. Taxable companies receive partial support through a reduction in liabilities and the benefit of paying interest on loans before tax deductions. Therefore, capital structure affects firm value. Miller and Modigliani [49] proposed that firms use debt financing to maximize their value. Since then, the issue of capital structure has deviated from the assumptions of perfect markets to imperfect markets, with the introduction of some market frictions on the cost side, such as asymmetric information, agency costs, and conflicts of interest. Trade-off theory advocates the use of debt to swap the cost of debt for tax benefits, and pecking order theory advocates the use of retained earnings followed by debt and equity to minimize information asymmetry.

Kraus and Litzenberger [39] present a trade-off theory, which assumes that managers choose debt to a certain extent to balance the tax advantages and bankruptcy costs associated with debt. The agency theory of Jensen and Meckling (1976) emphasizes different agency costs arising from conflicts of interest between the principal and the agent, i.e., the capital provider as the principal (shareholders and creditors) and the manager as representative. It argues that different agency costs arise due to the choice of different sources of financing, which may be influenced by the interests of managers rather than owners. To minimize information asymmetry, Myers and Majluf [54] proposed an order that prioritizes the use of internally available capital, with debt and equity last. Another aspect of capital structure that has been emphasized by Baker and Wurgler [6] is market timing theory. In market timing theory, they state that companies time stock issuances in such a way that they issue new shares when stock prices are overvalued and buy back shares when they are undervalued. As a result, changes in stock prices affect a company's capital structure. Companies typically do not care whether they finance with debt or equity, they simply chose the type of financing that, at the time, seemed to be more highly valued by the financial markets.

In general, the theories on how capital structure affects a company's financial performance are contradictory. Trade-off theory and agency theory advocate the use of debt to achieve tax benefits and additional monitoring by creditors to minimize conflicts. On the other hand, the pecking order suggests that the use of internal capital, i.e., retained earnings for profitable companies, can enhance the value of the company more than debt. Finally, market timing theory suggests that debt and equity can contribute value, depending on market conditions. This inconsistency is also shown through an overview of previous studies. Studies such as Myers [53], Berger and Di Patti [7], Margaritis and Psillaki [47], Singh & Bagga [70], Khan et al. [35], and Khan et al. [36] argue that a high debt ratio in a firm's finances contributes to firm performance, but Qureshi [59], Sumani and Roziq [75], and Alhassan and

Islam (2021) report that low debt, in the long run, contributes to company performance.

In addition, some studies have shown inconsistent results. Zeitun and Tian [85] conducted research on the data of 167 companies listed on the Amman Stock Exchange in Jordan from 1989 to 2003. The research results showed that capital structure has a strong relationship with the financial performance of companies. Specifically, capital structure has a negative relationship with return on assets (ROA). In addition, the research results also show that the ratio of short-term debt has a positive impact on Tobin's Q index, while the ratio of total debt-to-total assets has a negative impact on Tobin's Q. However, the long-term debt ratio was not a statistically significant factor for Tobin's Q in their study. Shubita and Alsawalhah [69] investigated the impact of capital structure on the profits of 39 manufacturing companies listed on the Amman stock exchange from 2004 to 2009. The research results show that there is a relationship. There is a negative relationship between the ratio of short-term debt-to-total assets and ROE (return on equity), but there is a positive relationship between the scale and the business growth rate of the project. Research also shows that ROE has a negative relationship with the ratio of longterm debt-to-total assets and the ratio of total debt-tototal assets.

Capital structure characteristics of Vietnamese companies with high debt ratios. This can be explained by the fact that accessing bank loans is easier than issuing stocks or bonds on the stock market. Dependence on debt also causes businesses to face high financial risks and high borrowing costs, especially in the context of fluctuating interest rates, leading to reduced financial efficiency. Therefore, we predict that the pecking order theory will work better in the Vietnamese context during the research period and propose the following research hypothesis:

Hypothesis H3 The capital structure (LEV) has a direct, negative impact on the financial performance (FIP) of non-financial companies listed on the Vietnamese stock market.

From the above hypotheses, we predict that capital structure will play a mediating role in transmitting the impact of liquidity on financial performance.

Hypothesis H4 Liquidity (LIQ) has a positive indirect impact on financial performance through the intermediate variable capital structure (LEV) of non-financial companies listed on the Vietnamese stock market.

Control variables

To control for different firm characteristics, a set of control variables is included in the analysis. Each control variable reflects a specific aspect of the business's operations. According to Thi Kim, N. et al. (2021), firm size (SIZE) can affect financial performance in many ways. A larger company can have more influence over current and potential investors, creditors, stakeholders, and even consumers. Therefore, many researchers consider firm size to be a determinant of financial performance. However, there are mixed results on the impact of firm size on financial performance. Stierwald [72], Vijayakumar [78], Kipesha [37], and Dahiyat et al. [18] found a positive influence between firm size and financial performance. Dhawan [22], Ramasamy (2005), and Salman and Yazdanfar [62] found that firm size has a negative impact on financial performance.

According to Deitiana [20], high revenue growth is one of the signs that a business has been successful in the past and can be used as a tool to predict future growth. This partly shows the company's ability to expand its market share or launch new products. In addition, good revenue growth helps the company attract more investors. Therefore, there have been many studies on the impact of revenue growth on the financial performance of businesses, such as those by Krishnan and Moyer [40], Zeitun and Tian [85], and Yazdanfar (2013), who found a positive and significant relationship between growth and firm performance. According to Demirgüneş, K. (2016), revenue growth (GROW) is an important indicator that reflects short-term and long-term changes in the sales capacity of companies, and this variable is included in many research models. These studies include those of Weinzimmer et al. [81], Coad (2007), Short et al. [68], and Bottazzi et al. [11].

In addition, according to Pervan et al. [58], among various company-specific factors affecting profitability, firm age (AGE) is confirmed to be an important factor. However, most of the empirical studies in this area have been conducted in developed countries, while the influence of firm age on firm performance in developing countries has been examined at a much lower level. Therefore, to contribute to this topic and enrich the understanding of firm performance as a whole, Pervan et al. [58] analyze a sample of 956 active firms in the food industry in Croatia in the period 2005–2014. The results show that age negatively affects company performance. As a firm ages, the benefits of its accumulated knowledge in all important aspects of the business (technology, supply channels, customer relationships, human capital, and financial costs) will be diminished by the inertia, inflexibility, and rigidity of accumulated rules, routines, and organizational structures. In addition to firm age, other company-specific factors that influence the profitability of companies operating in the food industry in Croatia include size, liquidity, and solvency. Yameen et al. [83] argue that the size and age of the business have a negative impact on the financial performance of companies.

Based on the above arguments, we use the model to study the following control variables: firm size (SIZE), revenue growth (GROW) and firm age (AGE).

Methods

Research data

The research data are panel data collected from the financial statements of non-financial companies listed on the Ho Chi Minh City Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) from 2018 to 2022, with a total of 670 companies. However, we excluded some companies with inconsistent or missing data and companies with outliers, resulting in a remaining sample of 644 companies. We exclusively selected non-financial companies due to their similar characteristics in terms of liquidity and capital structure. In contrast, financial companies possess their own industry-specific attributes regarding these aspects. Therefore, including financial companies in the research data may distort the estimation results.

Research models and methods

On the basis of the results of previous studies we have surveyed, we present a research model with specific variables and measurements to examine the impact of liquidity on the capital structure and financial performance of businesses' careers as follows:

$$LEV_{it} = \alpha_0 + \alpha_1 LIQ_{it} + \pounds$$
 (1)

$$FIP_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 LEV_{it} + \beta_3 COV_{it} + \varepsilon$$
(2)

In there:

- $-\alpha_0, \beta_0$: constant (intercept)
- $-\alpha_1, \beta_2, \beta_2, \beta_3$: regression coefficients
- $-\varepsilon$, *£*: random error
- LEV: Capital structure = Total liabilities/total assets
- – LIQ: Liquidity, measured by:
- QR—quick ratio=(Current Assets—Inventory)/Current Liabilities
- CR—Current ratio = current assets/current liabilities
- CAR—Capital adequacy ratio = (cash equivalents + marketable securities)/current liabilities
- CCC—Cash conversion cycle=ICP+RCP PDP (ICP=Inventory/(Costs of Goods Sold/365); RCP=Accounts Receivables/(Sales/365); PDP=Accounts Payables/(Costs of Goods Sold/365)

- – FIP: Financial performance, measured by:
- ROA—Return on assets=Net income/Everage total assets
- ROE—Return on equity=Net Income/Everage Shareholders' Equity
- ROS—Return on net sales=operating profit/net sales
- ROCE—Return on capital employed=Net income/ capital employed
- TOBIN'Q—Market value ratio=total market value of firm/total asset value of firm
- – COV: Control variable, measured by:
- GROWN—Revenue growth=(Net Revenue this year—Net Revenue last year)/(Net Revenue last year) *100%
- SIZE—Firm size = Log of Total Assets
- AGE—Firm age=Number of years listed on the stock market of the enterprise (Table 1)

Panel data regression techniques like OLS (ordinary least squares), FEM (fixed effects model), REM (random effects model), and GMM (generalized method of moments) have limitations: they assume a simple model structure, observable variables, and error-free measurements [27]. To overcome these, researchers use structural equation modeling (SEM), which allows modeling complex variable relationships and accounts for measurement errors, leading to more accurate theoretical constructs [15]. PLS-SEM (partial least squares structural equation modeling), a "causal prediction" approach, focuses on explaining variance in dependent variables [12].

In this study, we use the PLS-SEM path model to perform research model tests. According to Lee et al. [44], structural equation modeling (SEM) with the partial least squares (PLS) approach is widely used to analyze quantitative data in research in the field of social science. Structural equation modeling is a set of statistical techniques that allows simultaneous testing of a set of relationships established in the form of hypotheses between (i) one or more independent variables and (ii) one or more dependent variables. Using structural models helps researchers comprehensively test hypotheses related to the research model. Background theory related to the research model is further developed because the structural model is capable of testing all mediating and moderating relationships. In addition, the structural model with the partial least squares approach (PLS-SEM) allows simultaneous testing of both the structural model and the measurement model.

Table 1 Measurement of variables in the model

Latent variables	Measure (Observed variables)		Previous studies	Expected correlation with	
				LEV	FIP
FIP (financial performance)— Dependent variable	ROA	Net Income/Average Total Assets	Demirgüneş [21], Kong et al. [38], Farhan et al. [25], Sumani and Roziq [75], Rahman and Sharma, [60], Mwenda and Pastory [52, 71])	(-)	
Latent variables FIP (financial performance)— Dependent variable LIQ (Liquidity)—Independent variable LEV (capital structure) -Dependent variable in model (1), inde- pendent variable in model (2) COV (Control variable)	ROE	Net Income/Average Sharehold- ers'Equity	Kong et al. [38], Li et al. [46], Sumani and Roziq [75], Rahman and Sharma [60], Mwenda and Pastory [52], Sogomi et al. [71]		
	ROS	Operating Profit/Net Sales	Le Thi Kim, N. et al. (2021), Mwenda and Pastory [52]		
	ROCE	Net Income/Capital Employed	Kong et al. [38], Effiong and Ejabu [23], Sogomi et al. [71]		
	TOBIN'Q	Total Market Value of Firm/Total Asset Value of Firm	Farhan et al (2019,Sumani and Roziq [75]		
LIQ (Liquidity)—Independent variable	QR	(Current Assets—Inventory)/ Current Liabilities	Farhan et al. [25], Yameen et al. [83], Dadepo and Afolabi [16]	(-)	(+)
variable	CR	Current Assets/Current Liabilities	Demirgüneş [21] Bibi and Amjad [9], Kong et al. [38], Farhan et al. [25], Dadepo and Afolabi [16]		
	CAR	(Cash Equivalents + Marketable Securities)/Current Liabilities	Dadepo and Afolabi [16], Kong et al. [38]		
	ССС	CCC = ICP + RCP - PDP ICP = Inventory/(Costs of Goods Sold/365) RCP = Accounts Receivables/ (Sales/365)PDP = Accounts Paya- bles/(Costs of Goods Sold/365)	Bibi and Amjad [9], Dadepo and Afolabi [16], Sogomi et al. [71]		
	CFR	Net Operating Cash Flows/Total Current Liabilities	Kong et al. [38], Dadepo and Afolabi [16]		
	CNCC	(Net Operating Cash Flow + Interest paid)/(Total Cur- rent Liabilities + Interest)	Abdul Rahman et al. (2020)		
LEV (capital structure) -Depend- ent variable in model (1), inde- pendent variable in model (2)	LEV	Total Liabilities/Total Assets	Le Thi Kim, N. et al. (2021), Tesema [77]		(-)
COV (Control variable)	GROWN	(Net Revenue this year—Net Revenue last year)/(Net Revenue last year) *100%	Deitiana [20], Demirgüneş [21], Le Thi Kim, N. et al. (2021)		(+)
	SIZE	Log of Total Assets	Le Thi Kim, N. et al. (2021); Sogomi et al. [71]		(+)
	AGE	Number of years listed on the stock market of the enterprise	Pervan et al. [58]		(+)

Analyze the results

Measurement model testing

structural model (PLS-SEM) in SmartPLS 4 software, the results are shown in Figure 1 as follows:

Based on the definitions and measurements of latent variables, the author determines the measurement model of latent variables as a reflective measurement model. After the variables are entered into the

Descriptive statistics

Table 2 shows that the observed variables measuring the FIP are ROA, ROE, ROS, and ROCE, which have



Fig. 1 Expected research model. Source: Authors' construct

Table	2	Descriptive	statistics.	Source:	SmartP	LS 4
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Name	Mean	Observed min	Observed max	Standard deviation
ROA	0.057	-5.347	1.052	0.176
ROE	0.119	-5.636	3.378	0.27
ROS	0.077	-9.75	9.174	0.489
ROCE	0.06	-38.8	10.885	1.314
TOBINQ	2.904	-35.412	76.028	3.647
CR	2.525	0.005	44.427	3.505
QR	2.004	-0.081	42.527	3.224
CAR	0.435	0	11.149	0.866
CCC	464.233	0.477	55,643.638	2021.53
CFR	4.161	0.009	65.312	5.429
CNCC	4.2	0.012	65.376	5.423
LEV	0.588	0.001	79.28	2.104
GROWTH	0.14	-0.959	15.347	0.809
SIZE	27.1	21.879	33.99	1.663
AGE	6.856	0	22	4.515

average standard deviations; in contrast, the TOBINQ has quite a large standard deviation. This shows that companies in Vietnam have diverse Tobin's Q ratios, suggesting differences in their market valuations relative to their assets.

The observed variables measuring the latent variable liquidity (LIQ) are CR, QR, CAR, CCC, CFR, and CNCC, which have quite high standard deviations, especially for the CCC, which has a standard deviation of 55643.638. The high standard deviation of liquidity measures for Vietnamese companies indicates significant variability or dispersion in the liquidity levels among these companies. This variability suggests that some companies may have very high liquidity, while others might have very low liquidity. This information is crucial for understanding the financial health and risk profile of these companies, as well as their ability to meet short-term financial obligations and capitalize on investment opportunities.

The capital structure variable (LEV) has a fairly high standard deviation. The high standard deviation of the variable measuring the debt-to-total assets ratio of Vietnamese companies indicates significant variability or dispersion in their leverage levels. This variability suggests that some companies use high levels of debt to finance their operations, while others maintain lower debt levels or even prefer equity financing. Understanding this dispersion is crucial for assessing the risk exposure and financial stability of companies in the Vietnamese market, including their ability to manage debt obligations and their potential impact on financial performance.

The variables growth and size have an average standard deviation. However, the age variable has a fairly high standard deviation. The high standard deviation of the variable measuring the number of years listed (AGE) for Vietnamese companies indicates significant variability or dispersion in the duration for which these companies have been listed. This variability suggests that some

Table 3 Outer Loadings – Matrix. Source: SmartPLS 4

	AGE	FIP	GROW	LEV	LIQ	SIZE
AGE	1					
CAR					0.686	
CCC					-0.291	
CFR					0.776	
CNCC					0.775	
CR					0.806	
GROW			1			
LEV				1		
QR					0.806	
ROA		0.955				
ROCE		0.051				
ROE		0.386				
ROS		0.69				
SIZE						1
TOBINQ		0.158				

companies have been listed for a relatively short period, while others have a much longer listing history. Understanding this dispersion is important for assessing the maturity, stability, and experience level of companies in the Vietnamese market, which can influence investor perceptions and decisions.

Assessment of indicator reliability

Reliability of individual indicators As a result of analyzing the estimated model on SmartPLS 4, we rely on the outer loading coefficient of the observed variables to evaluate the quality of the variable through the degree of association between the indicators and the parent latent variable:

Sarstedt et al. [65] said that the observed variable is quality when the external loading factor is \geq 0.708, meaning that the latent variable has explained 50% of the variation of the indicators (because in SMART-PLS, the external loading factor is $\sqrt[2]{R2}$ linear regression from the latent variable onto the indicators, so $(0.708)^2 = 0.5$. However, according to Hulland [31], in reality, analysts will often encounter the outer loading coefficient in a weak form (<0.7). At that time, the analyst needs to consider whether to retain or eliminate indicators with outer loading coefficients. Sarstedt et al.

Table 4Construct reliability and validity – Overview. Source:SmartPLS 4

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
FIP	0.474	1.076	0.594	0.313
LIQ	0.73	0.792	0.804	0.498

[65] recommended that indicators whose outer loading coefficients are between 0.4 and 0.7 should not be automatically eliminated. If removal does not affect content validity or increase aggregate reliability, the analyst should consider removing the indicator. For indicators with an outer loading coefficient less than 0.4, that indicator should be removed from the measurement model [5] if removing the indicator does not affect the level of measurement content accuracy.

Based on the results in Table 3, it is evident that the variables in liquidity (LIQ) have a CCC, and the variables ROCE, ROE, and TOBINQ in financial performance (FIP) have outer loading coefficients less than 0.4.

Reliability of the set of indicators Table 4 shows the Average Variance Extracted (AVE), which tests the model's convergence and dispersion. A good model needs an AVE coefficient \geq 0.5 (Hock & Ringle, 2006). Based on the results in Table 4, the AVE indices of both the FIP and LIQ variables are less than 0.5. Therefore, we remove the observed variables CCC, ROCE, ROE, and TOBINQ (with an outer loading coefficient less than 0.4) from the liquidity (LIQ) and financial performance (FIP) measurement models.

After removing the above variables, the reliability of the set of indicators in the measurement model is assessed through Figure 2 as follows:

Evaluation of convergent validity

The results in Table 5 show that the AVE values of both the FIP and LIQ variables are greater than 0.5.



Fig. 2 Research model. Source: Authors' construct

Table 5	Construct	eliability	and va	alidity –	Overview.	Source:
SmartPLS	54					

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
FIP	0.621	1.002	0.817	0.696
LIQ	0.836	0.838	0.884	0.605

Therefore, the measurement model achieves convergent validity.

Evaluation of discriminant validity

The average value of interconstruct correlations of indicators across structures (heterograft-heterethod correlations) – HTMT According to Henseler et al. [29], HTMT_{ij} \leq 0.85, the measurement model will achieve a "level of discrimination accuracy" between the pair of scales i and j. Based on the results in Table 6, the HTMT values for all pairs of constructs presented in the matrix table are less than 0.85. This indicates that the two sets of indicators measuring the two latent variables (LIQ and FIP) are discriminantly accurate and meet the conditions for performing bootstrap testing to determine the level of discriminant accuracy.

HTMT bootstrap test According to Henseler et al. [29], to evaluate the level of discriminant validity, it is necessary to test the statistical hypothesis of the HTMT index (H0: HTMTij \geq 1, H1: HTMTij <1) with a 95% bootstrap confidence interval. Table 7 presents four columns of results related to the HTMT. The first column shows the HTMT value in the original sample; the second column shows the

Table 6 Discriminant validity - HTMT - Matrix. Source: SmartPLS 4

	AGE	FIP	GROW	LEV	LIQ	SIZE
AGE						
FIP	0.016					
GROW	0.015	0.062				
LEV	0.014	0.848	0.003			
LIQ	0.025	0.195	0.042	0.122		
SIZE	0.123	0.18	0.02	0.063	0.281	

	Original sample (O)	Sample mean (M)	2.50%	97.50%
FIP <-> AGE	0.016	0.025	0.005	0.056
GROW <-> AGE	0.015	0.019	0.001	0.048
GROW <-> FIP	0.062	0.064	0.024	0.109
LEV <-> AGE	0.014	0.013	0.001	0.026
LEV <-> FIP	0.848	0.817	0.568	0.933
LEV <-> GROW	0.003	0.007	0	0.025
LIQ <-> AGE	0.025	0.031	0.012	0.061
LIQ <-> FIP	0.195	0.201	0.155	0.255
LIQ <-> GROW	0.042	0.045	0.025	0.07
LIQ <-> LEV	0.122	0.135	0.102	0.218
SIZE <-> AGE	0.123	0.122	0.088	0.156
SIZE <-> FIP	0.18	0.179	0.14	0.214
SIZE <-> GROW	0.02	0.026	0.001	0.066
SIZE <-> LEV	0.063	0.06	0.012	0.099
SIZE <-> LIQ	0.281	0.282	0.253	0.31

 Table 7
 Boostrapping – HTMT.
 Source: SmartPLS 4sss

average HTMT value calculated from 5,000 resampled samples; and the last two columns are the most important because they are used to conduct the test. Observing the values in the last two columns, we can see that the HTMT value in the original sample will fall within the 2.5% to 97.5% percentile range with a 95% probability. All HTMT values of the 5,000 bootstrap samples within the 95% range are less than 1. Therefore, the null hypothesis (H0) can be rejected with a 5% error probability. In other words, all HTMT values are less than 1, so it can be concluded that the measurement model achieves discriminant validity.

Structural model validation

Assessment of multicollinearity

According to Hair et al. [28], if VIF \geq 5, multicollinearity is highly likely to appear in the model. $3 \leq \text{VIF} \leq 5$: multicollinearity may occur, VIF < 3: multicollinearity may not exist. In Table 8, the VIF coefficient results of the

	AGE	FIP	GROW	LEV	LIQ	SIZE
AGE		1.02				
FIP						
GROW		1.001				
LEV		1.023				
LIQ		1.095		1		
SIZE		1.102				

Table 8	Collinearity	Statistics	(VIFs)—Inner V	/IFs. Sc	ource: SmartPl	_S 4
	commeanity	5 10 115 11 05	(1113) 11111011		our cer orritar a	-0 .

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Tstatistics (O/STDEV)	P values
AGE—> FIP	0.013	0.013	0.01	1.231	0.218
GROW—>FIP	0.043	0.046	0.014	3.01	0.003
LEV—>FIP	-0.756	-0.723	0.1	7.593	0
LIQ—>FIP	0.093	0.097	0.02	4.716	0
LIQ>LEV	-0.111	-0.124	0.033	3.417	0.001
SIZE—> FIP	0.1	0.105	0.019	5.371	0

 Table 10
 Bootstrapping—Specific Indirect Effect. Source:

 SmartPLS 4
 SmartPLS 4

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/ STDEV)	P values
LIQ—>LEV—>FIP	0.084	0.086	0.007	11.263	0.000

independent variables are all less than 3, so multicollinearity may not occur in the model.

Evaluating the statistical significance and magnitude of the regression coefficients

Direct effect The bootstrap estimation results in Table 9 indicate the following:

Liquidity (LIQ) has a positive effect on financial performance (FIP), with a coefficient of Original sample (O) = 0.093 and a significance level of 1%. This means that companies with higher liquidity have better financial performance and vice versa.

Liquidity (LIQ) has a negative effect on capital structure (LEV), with a significance level of 1%. This implies that companies with higher liquidity use less debt financing.

The capital structure (LEV) has a negative effect on financial performance (FIP) at a significance level of 1%. This means that companies that use more financial leverage have lower financial performance.

In addition, the control variables have the following effects:

- GROW has a positive effect on financial performance (FIP) with a significance level of 1%. This finding implies that companies with greater revenue growth have better financial performance.
- SIZE has a positive effect on financial performance (FIP) with a significance level of 1%. This means that larger companies have better financial performance.
- The relationship between AGE and financial performance (FIP) is not statistically significant. Therefore,

Table 11 Bootstrapping—Total Effect. Source:	SmartPLS 4
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	R-square		R-square
Table 12	Bootstrapping – R Square.	Source: SmartPLS	4

	n square	adjusted
ΞIP	0.613	0.613
_EV	0.012	0.012

Table 13 Bootstrapping – f Square. Source: SmartPLS 4

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/ STDEV)	P values
AGE—>FIP	0	0.001	0.001	0.588	0.557
GROW—>FIP	0.005	0.005	0.003	1.711	0.087
LEV—>FIP	1.446	1.382	0.586	2.466	0.014
LIQ—>FIP	0.02	0.021	0.006	3.328	0.001
LIQ—>LEV	0.013	0.017	0.013	0.965	0.335
SIZE—>FIP	0.024	0.025	0.006	3.747	0

it can be concluded that the number of years listed has no impact on financial performance.

Indirect Effect Table 10 shows a P value of 0, which is statistically significant for the Original sample (O) = 0.084. This finding indicates that the capital structure (LEV) variable plays a mediating role in the effect of liquidity (LIQ) on financial performance (FIP).

Total Effect:

Table 11 shows that the total effect of liquidity (LIQ) on financial performance (FIP) is statistically significant, with a coefficient of Original sample (O)=0.177. This coefficient represents the total positive effect of liquidity (LIQ) on financial performance. It is the sum of the direct positive effect of liquidity (LIQ) on financial performance (FIP) [Original sample (O)=0.093] and the indirect positive effect of liquidity (LIQ) on financial performance (FIP) through the mediating variable of capital structure

.218
.003
1
J
.001
1

(LEV) [Original sample (O) = 0.084]. The results of this study are also consistent with hypothesis H4.

Evaluating the coefficient of determination (R.²)

The results in Table 12 indicate that the R-squared value for financial performance (FIP) is moderate (approximately 61%). However, the R-squared value for capital structure (LEV) is quite low, suggesting that there are many other factors influencing debt structure.

Evaluating the effect size (f2)

The results in Table 13 indicate that the AGE and GROW variables do not significantly explain the dependent variable, financial performance (FIP), as their P values are greater than 0.05. Additionally, the liquidity variable (LIQ) does not play a significant role in explaining the capital structure variable (LEV).

The capital structure variable (LEV) impacts the dependent variable, financial performance (FIP), with P values less than 0.05 and a Sample mean (M) value of 1.382. According to Cohen [14], if P values are less than 0.05 and the Sample mean (M) value is greater than 0.35, then the magnitude of the effect of the independent variable on the dependent variable is considered large. Therefore, the capital structure variable (LEV) plays a major role in explaining the dependent variable, financial performance (FIP).

The liquidity variable (LIQ) impacts the dependent variable, financial performance (FIP), with P values less than 0.05 and the Sample mean (M) value of 0.021. According to Cohen [14], if the P value is less than 0.05 and the Sample mean (M) value is greater than 0.02 and less than 0.15, then the magnitude of the effect of the independent variable on the dependent variable is considered small. Therefore, the liquidity variable (LIQ) plays a minor role in explaining the dependent variable, financial performance (FIP).

Discussion

Impact of liquidity (LIQ) on financial performance (FIP)

Liquidity has a positive impact on financial performance at the 1% significance level, in line with hypothesis H1. This implies that companies with higher liquidity generally have better financial performance and vice versa. However, the role of liquidity in explaining the variation in financial performance is not large. The research results contradict those of [39] capital structure trade-off theory and the studies of Schulz [66] and Li et al. [46]. However, our research results are consistent with the liquidity preference theory of John Maynard Keynes (1964) and the studies of Yameen et al. [83], Kong et al. [38], Samo and Murad [63], Issah Kulo [33], Vuković et al. [79], Mugambi et al. [51], and Sogomi et al. [71]. Our research results can be explained by the fact that during the research period, Vietnam was greatly affected by the COVID-19 pandemic and economic crisis, with high bank interest rates causing businesses to face difficulties in raising capital. Therefore, businesses tend to retain profits as reserves, prevent risks, and wait for future investment opportunities. This means that the liquidity preference theory works better in the Vietnamese context during the study period, so high liquidity can lead to improved financial performance.

The capital structure (LEV) plays a mediating role in the impact of liquidity on financial performance. The total impact coefficient of liquidity on financial performance is represented by the coefficient of the Original sample (O) = 0.177, which includes direct impact [Original sample (O) = 0.093] and indirect impact through capital structure [Original sample (O) = 0.084]. This is a new and interesting finding in our study.

The results of this study show that economic relationships not only include direct interactions between factors but also have indirect effects through intermediate factors and this interaction is operated by liquidity preference theory and pecking order theory. Specifically, the liquidity preference theory posits that during challenging economic periods such as the COVID-19 pandemic in Vietnam, businesses should prioritize liquidity to increase reserve resources for future investment opportunities, thereby enhancing financial performance. Additionally, the pecking order theory suggests that prioritizing retained earnings will help businesses increase liquidity, thereby reducing bank borrowing, lowering borrowing costs, and ultimately improving financial performance.

Impact of liquidity (LIQ) on capital structure (LEV)

Liquidity has a negative impact on capital structure at the 1% significance level, in line with hypothesis H2. This indicates that companies with higher liquidity generally use less debt financing.

Our research results are consistent with the pecking order theory and liquidity preference theory and are also consistent with the research of Kumar et al. [41], Lemmon and Zender [45], Faulkender and Wang [26], Serghiescu and Väidean [67], Laili and Dalimunthe [42], Suharna and Kurniasih [74], Suhardjo et al. [73], and Widjanarko (2023). However, our research results are not consistent with the research results of Ghasem and Ab Razak (2016), Marlina and Dahlia [48], Daeli et al. [17], and Taliding and Lenas [76].

Our research results are reasonable in the context that in Vietnam during the research period, businesses were strongly affected by the COVID-19 pandemic and the subsequent financial crisis, causing bank interest rates to increase. Therefore, businesses focus on retaining generated profits and limiting the use of liabilities. This research result once again proves that liquidity preference theory and pecking order theory work well in the context of Vietnam during the research period.

However, our research results also show that liquidity does not play an important role in explaining the variation in capital structure.

Impact of capital structure (LEV) on financial performance (FIP)

Capital structure has a negative impact on financial performance at the 1% significance level, in line with hypothesis H3. This indicates that the more financial leverage a company uses, the lower its financial performance.

Our research results contrast with those of the tradeoff theory, agency theory, and studies by Myers [53], Berger and Di Patti [7], Margaritis and Psillaki [47], Singh & Bagga [70], Khan et al. [35], and Khan et al. [36]. However, our research results are consistent with the pecking order theory and the studies of Qureshi [59], Sumani and Roziq [75], and Alhassan and Islam (2021).

Our research results are consistent with the context in Vietnam during the research period. As analyzed above, high bank interest rates led to increased borrowing costs and reduced financial efficiency. The results of this study show that in the context of Vietnam during the research period, the pecking order theory performs better than the trade-off theory and the agency theory.

Our research shows that capital structure also plays an important role in explaining variations in financial performance.

Impact of control variables on financial performance (FIP)

The GROW variable has a positive impact on financial performance at the 1% significance level but does not play an important role in explaining the variation in financial performance. This means that the greater the revenue growth of businesses is, the greater their financial performance. Our results from this study are consistent with those of Thi Kim, N. et al. (2021) but are not consistent with the results of Demirgüneş, K. (2016). Our research results can be explained by the fact that in Vietnam during the research period, businesses with high revenue growth are one of the signs that businesses have been successful in the past and can be used as a tool to predict future developments and help companies attract more investors, thereby increasing financial performance.

Similarly, the research results show that the SIZE variable has a positive impact on financial performance at the 1% significance level but does not play an important role in explaining fluctuations in financial performance. This means that the greater the scale of a business is, the Page 16 of 19

greater its financial performance. This research result is consistent with the research of Stierwald [72], Vijayakumar [78], Kipesha [37], and Dahiyat et al. [18] but is not consistent with the research results of Dhawan [22], Ramasamy (2005), and Salman and Yazdanfar [62]. Our research results can be explained by the fact that in Vietnam during the research period, larger-scale companies often had more advantages in accessing the market, mobilizing investment capital, and accessing large projects, thereby leading to greater financial efficiency.

Finally, the AGE variable does not have a significant impact on financial performance. The results of this study are not consistent with the results of Pervan et al. [58]. Our research results show that in Vietnam during the research period, both old and young businesses had the same advantage in the market.

Although this study has significantly contributed to the understanding of the correlation between capital structure and financial performance, there are still some points that need to be considered and improved upon in future research. Specifically, the R² of the capital structure variable (LEV) is quite small, and capital structure is measured only by the LEV variable, which may limit the ability to further analyze the impact of other factors, such as equity capital, capital structure, and external factors, on the financial performance of companies. Future research directions may revolve around expanding the scope and complexity of the research model. The research proposal suggests finding additional measurement variables to evaluate the capital structure more comprehensively. These variables may include the selffinancing ratio, debt-to-equity ratio, capital structure, cash flow management, and factors related to external financing, such as interest rates and loan terms and conditions. Adjusting and adding these measurement variables can help improve the accuracy and applicability of research to business practice.

Implications

Theoretical Contributions of the Study:

This research indicates that, within the Vietnamese context during the specified period, liquidity preference theory and pecking order theory demonstrate greater explanatory effectiveness than trade-off theory and agency theory. This can be attributed to the liquidity challenges faced by businesses in Vietnam during the Covid-19 period. High bank interest rates led to a reluctance to borrow, prompting companies to prioritize cash flow for maintaining liquidity.

Business and Management Practice Contributions of the Study:

This research can provide suggestions for non-financial companies in making financial decisions to increase financial efficiency by increasing the holdings of highly liquid assets to prevent risks and take advantage of new investment opportunities in the future. In addition, increasing the holding of highly liquid assets also reduces debt pressure and reduces interest costs, thereby increasing financial efficiency.

Contribution of the Study to readers

Although this study has certain contributions, the study still has some limitations, such as the fact that the fact that the R^2 of the latent capital structure variable is quite small and is only measured by the observed variable LEV. In addition, although this study studied the period before and after the CoVid-19 pandemic, it did not analyze the difference between these two periods.

The next research direction we propose is to continue the study with sample data including more years and analyze the difference between the two periods before and after the Covid-19 pandemic, and at the same time add other observed variables to measure the latent capital structure variable.

Conclusion

This study contributes to the field of corporate finance research by specifically analyzing the direct impact of liquidity on capital structure and financial performance and the indirect impact of capital structure on financial performance, thereby analyzing the indirect impact of liquidity on financial performance through the capital structure of 644 non-financial companies listed on the Vietnamese stock market. The findings suggest that liquidity positively influences financial performance but negatively impacts capital structure. Conversely, capital structure negatively affects financial performance. Thus, liquidity indirectly enhances financial performance through capital structure mediation.

Our research shows that the relationship between economic factors is extremely complex; specifically, our research shows the true nature of the positive impact of liquidity on financial performance, including direct positive effects and indirect positive effects through capital structure.

In addition, our research results also show that nonfinancial companies that want to increase financial efficiency need to pay attention to revenue growth, and non-financial companies with larger total assets (size) will have more advantages in increasing financial performance.

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Author contributions

Authors have equally contributed to the design and implementation of the research, the analysis of the results, and the writing of the manuscript.

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Data availability

Research data are provided.

Declarations

Competing interests

The authors declare that they have no competing interests.

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