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Unveiling the Nexus between Capital Structure Dynamics and Stock Performance: A Panel Data Approach of Listed Firms in Vietnam

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ABSTRACT: This study investigates the dynamic relationship between capital structure and stock performance in Vietnamese firms, addressing a critical gap in emerging market finance literature. Utilizing a comprehensive dataset of 122 listed firms on the Ho Chi Minh and Hanoi Stock Exchanges from 2010 to 2022, we employ a dynamic panel approach with System GMM estimation to control for endogeneity and unobserved heterogeneity. Our findings reveal a non-linear, U-shaped relationship between leverage and stock returns, suggesting an optimal capital structure that maximizes performance. We also find that ownership structure significantly impacts stock returns, with state ownership negatively associated and foreign ownership positively linked to performance. Furthermore, the quality of the institutional environment plays a crucial role in shaping this relationship. This research contributes to both academic literature and practical applications by extending the understanding of capital structure dynamics in emerging markets, particularly in the context of Vietnam's transitioning economy. It offers valuable insights for corporate financial management, emphasizing the importance of calibrating debt levels and ownership structures to optimize performance. The study's originality lies in its comprehensive examination of capital structure dynamics, ownership structure, and institutional quality in the context of an emerging Asian market, providing a nuanced understanding of these complex interrelationships.

KEYWORDS: Capital Structure Dynamics, Stock Performance, Emerging Markets, Ownership Structure, Institutional Quality, Vietnamese Firms

1. INTRODUCTION

The intricate relationship between capital structure and stock performance has long been a subject of intense scrutiny in corporate finance and investment theory. As firms navigate the complexities of financial decision-making, the impact of their capital structure choices on stock returns remains a critical area of investigation, particularly in emerging markets where economic landscapes are rapidly evolving. Vietnam, with its burgeoning economy and increasingly sophisticated financial markets, presents a compelling context for examining this nexus.

The seminal work of Modigliani and Miller (1958) laid the foundation for modern capital structure theory, positing that under perfect market conditions, a firm's value is independent of its capital structure. However, subsequent research has challenged this proposition, recognising the presence of market imperfections such as taxes, agency costs, and information asymmetry (Jensen and Meckling, 1976; Myers and Majluf, 1984). These factors have led to the development of competing theories, including the trade-off theory (Kraus and Litzenberger, 1973) and the pecking order theory (Myers, 1984), each offering distinct perspectives on the optimal capital structure and its implications for firm performance.

Despite extensive research, the empirical evidence on the relationship between capital structure and stock returns remains inconclusive. While some studies have found a positive association (Bhandari, 1988; Fama and French, 1992), others have reported negative or insignificant relationships (Rajan and Zingales, 1995; Welch, 2004). This persistent ambiguity underscores the need for further investigation, particularly in diverse economic contexts.

The Vietnamese market offers a unique setting for such an investigation. As an emerging economy transitioning from a centrally planned to a market-oriented system, Vietnam has experienced significant financial sector reforms and rapid economic growth over the past three decades (Nguyen et al., 2015). The country's stock market, established in 2000, has grown exponentially, with

market capitalisation reaching approximately 93% of GDP by 2021 (World Bank, 2022). This rapid development, coupled with ongoing structural changes and regulatory reforms, creates a dynamic environment for studying the capital structure-stock performance relationship. Moreover, the Vietnamese context presents several distinctive features that may influence this relationship. These include the prevalence of state ownership in listed firms, the dominance of bank-based financing, and the relatively young age of the stock market (Vo, 2017). Such characteristics potentially affect both the capital structure decisions of firms and the market's valuation of these decisions, warranting a focused examination. Despite the growing importance of the Vietnamese market, research on the capital structure-stock performance nexus in this context remains limited. Existing studies have primarily focused on determinants of capital structure (Nguyen and Ramachandran, 2006) or the impact of ownership structure on firm performance (Phung and Mishra, 2016). The dynamic nature of this relationship, particularly how changes in capital structure over time affect stock returns, has yet to be thoroughly explored in the Vietnamese context.

This study aims to address this gap by employing a panel data approach to unveil the nexus between capital structure dynamics and stock performance among listed firms in Vietnam. By utilising longitudinal data and advanced econometric techniques, we seek to capture the time-varying nature of this relationship and control for unobserved heterogeneity across firms. This approach allows for a more nuanced understanding of how changes in leverage ratios impact stock returns over time, accounting for firm-specific and macroeconomic factors.

The significance of this research extends beyond the Vietnamese context. As emerging markets continue to gain prominence in the global financial landscape, understanding the capital structure-stock performance relationship in these markets becomes increasingly important for international investors, policymakers, and academics alike. By providing empirical evidence from Vietnam, this study contributes to the broader discourse on capital structure theories and their applicability in emerging market contexts. Furthermore, this research has practical implications for corporate financial management and investment strategies in Vietnam and similar emerging markets. By elucidating the impact of capital structure decisions on stock performance, our findings can inform managerial decision-making regarding optimal financing choices and help investors better assess the risk-return profile of firms based on their capital structure dynamics.

In the subsequent sections, we provide a comprehensive review of the relevant literature, detailing the theoretical foundations and empirical evidence surrounding the capital structure-stock performance relationship. We then outline our methodological approach, present our empirical findings, and discuss their implications for theory and practice. Through this rigorous analysis, we aim to shed new light on this critical aspect of corporate finance in the context of Vietnam's evolving financial landscape.

2. LITERATURE REVIEW

2.1. Theoretical Framework

The theoretical underpinnings of our study are rooted in several key theories of capital structure and firm performance. The trade-off theory, as developed by Kraus and Litzenberger (1973) and refined by subsequent researchers, posits that firms balance the tax benefits of debt against the costs of financial distress to achieve an optimal capital structure. This theory suggests a potential non-linear relationship between leverage and firm value, and by extension, stock returns. The pecking order theory, proposed by Myers and Majluf (1984), offers an alternative perspective, suggesting that firms prefer internal financing to external financing, and debt to equity when external financing is required. This theory implies that observed capital structures are the result of cumulative financing decisions over time, rather than the pursuit of an optimal leverage ratio. Agency theory, as applied to capital structure by Jensen and Meckling (1976), highlights the potential conflicts of interest between shareholders and managers, and between shareholders and debtholders. These conflicts can influence both capital structure decisions and firm performance, potentially mediating the relationship between leverage and stock returns. More recently, the market timing theory proposed by Baker and Wurgler (2002) suggests that firms time their equity issues to coincide with high market valuations. This theory implies that observed capital structures are the cumulative result of past market timing attempts, rather than the pursuit of a target leverage ratio.

2.2. Review of relevant literature

Le and Phan (2017) conducted a comprehensive study of Vietnamese firms, revealing that capital structure decisions in this emerging market context are primarily driven by the pecking order theory. Their findings suggest that firm-specific factors, such as profitability and growth opportunities, play a crucial role in determining leverage ratios. Utilising a panel data set of 737 non-financial firms listed on the Ho Chi Minh City Stock Exchange and Hanoi Stock Exchange from 2009 to 2013, they found a negative relationship between profitability and leverage, consistent with the pecking order theory. However, their study did not explicitly examine the impact of these decisions on stock returns, leaving a gap in our understanding of the capital structure-performance

relationship in Vietnam. Building on this work, Nguyen et al. (2019) investigated the determinants of capital structure in Vietnamese firms, incorporating both firm-specific and macroeconomic factors. Their study, which analysed 390 non-financial firms listed on the Ho Chi Minh City Stock Exchange from 2008 to 2018, found that firm size, tangibility, and growth opportunities were positively associated with leverage, while profitability and business risk exhibited negative relationships. Interestingly, they also identified significant impacts of macroeconomic factors such as GDP growth and inflation on firms' capital structure decisions, highlighting the importance of considering the broader economic context in capital structure research.

In a similar vein, Vo (2017) investigated the capital structure of Vietnamese listed firms, focusing on the influence of ownership structure. The study, which examined 641 non-financial firms listed on the Ho Chi Minh City Stock Exchange and Hanoi Stock Exchange from 2006 to 2015, found that state ownership and foreign ownership have significant, but opposing, effects on firms' leverage decisions. While state ownership was associated with higher leverage, foreign ownership exhibited a negative relationship with debt ratios. These findings highlight the unique institutional context of Vietnam and its potential influence on the capital structure-stock performance nexus. Expanding on this theme, Le and Quang (2018) explored the impact of institutional quality on capital structure decisions in Vietnam. Their study, which analysed 459 non-financial firms listed on the Ho Chi Minh City Stock Exchange from 2010 to 2016, found that improved institutional quality, as measured by indicators such as government effectiveness and regulatory quality, was associated with higher leverage ratios. This suggests that the institutional environment plays a crucial role in shaping firms' financing decisions, a factor that should be considered when examining the relationship between capital structure and stock performance.

Expanding the scope to other emerging markets, Chowdhury and Chowdhury (2020) examined the impact of capital structure on firm performance in Bangladesh. Their study employed a panel data approach, analysing 80 non-financial firms listed on the Dhaka Stock Exchange from 2014 to 2018. They found a significant negative relationship between leverage and firm performance, as measured by return on assets (ROA) and return on equity (ROE). However, their focus on accounting-based performance measures limits the applicability of their findings to stock market performance. In the context of India, another significant emerging market, Jadiyappa et al. (2021) investigated the relationship between capital structure and firm value. Using a sample of 2,102 firms listed on the National Stock Exchange of India from 2001 to 2018, they employed a dynamic panel data model and found a non-linear relationship between leverage and firm value. Specifically, they identified an optimal level of leverage beyond which the positive impact of debt on firm value diminishes. This finding underscores the importance of considering non-linear relationships in capital structure research.

While many studies have focused on accounting-based performance measures, recent research has also explored the direct link between capital structure and stock returns. For instance, Buvanendra et al. (2017) examined this relationship in the context of Sri Lankan listed companies. Analysing 60 firms listed on the Colombo Stock Exchange from 2011 to 2015, they found a significant positive relationship between leverage and stock returns. However, they also noted that this relationship varied across industries, highlighting the need for sector-specific analyses. In a more recent study, Yang et al. (2020) investigated the impact of capital structure on stock returns in Chinese listed firms. Using a sample of 2,675 firms listed on the Shanghai and Shenzhen Stock Exchanges from 2007 to 2018, they employed a panel quantile regression approach to examine the heterogeneous effects of leverage across different quantiles of stock returns. Their results revealed a significant negative relationship between leverage and stock returns, with the effect being more pronounced for firms with higher stock returns. This study demonstrates the importance of considering the distributional properties of stock returns when examining the capital structure-performance relationship.

Recent studies have employed increasingly sophisticated methodological approaches to examine the capital structure-performance relationship. Tran et al. (2020) utilised a dynamic panel data model to investigate the impact of capital structure on firm performance in Vietnam. Their use of the Generalized Method of Moments (GMM) estimator allowed them to address potential endogeneity issues and capture the dynamic nature of the relationship. However, their study focused on accounting-based performance measures rather than stock returns. In a cross-country study, Dang et al. (2019) employed a quantile regression approach to examine the heterogeneous effects of capital structure on firm performance across different levels of profitability. This method provides insights into how the impact of leverage may vary across the distribution of firm performance, offering a more nuanced understanding of the relationship. Mai et al. (2020) adopted a non-linear approach to investigate the capital structure-performance relationship in Vietnamese firms. Their findings suggest a U-shaped relationship between leverage and firm performance, indicating that the impact of debt on performance may vary at different levels of leverage. This non-linear perspective offers valuable insights for our study, suggesting the need to consider potential threshold effects in the relationship between capital structure and stock returns.

The relationship between leverage and stock returns is likely to be non-linear, reflecting the complex interplay between the tax benefits of debt and the increased financial risk associated with higher leverage. This prediction aligns with the trade-off theory of

capital structure (Kraus and Litzenberger, 1973) and is supported by recent empirical evidence from emerging markets. For instance, Jadiyappa et al. (2021) found a non-linear relationship between leverage and firm value in Indian firms, suggesting an optimal level of leverage beyond which the positive impact of debt diminishes. Similarly, Mai et al. (2020) observed a U-shaped relationship between leverage and firm performance in Vietnamese companies, further supporting the potential for non-linear effects. Besides, the impact of capital structure changes on stock performance is expected to vary across different industries, reflecting sector-specific risks and growth opportunities. This prediction is consistent with the findings of Buvanendra et al. (2017), who noted significant variations in the leverage-stock return relationship across industries in Sri Lanka. In the Vietnamese context, Nguyen and Nguyen (2020) found that industry characteristics significantly influenced capital structure decisions, suggesting that these sector-specific factors may also moderate the relationship between leverage and stock performance. Future research should consider incorporating industry-specific analyses to capture these potential heterogeneous effects. Additionally, the relationship between leverage and stock returns is likely to be moderated by firm-specific factors such as size, profitability, and growth opportunities. This prediction is supported by a growing body of literature that emphasizes the importance of firm characteristics in shaping the capital structure-performance nexus. For example, Dang et al. (2019) found that the impact of leverage on firm performance varies significantly across different levels of profitability in their cross-country study. In the Vietnamese context, Le and Phan (2017) identified profitability and growth opportunities as crucial determinants of capital structure decisions, suggesting that these factors may also play a role in moderating the leverage-stock return relationship. Furthermore, the unique institutional features of the Vietnamese market, such as state ownership and the dominance of bank-based financing, are expected to influence the capital structure-stock performance relationship in ways that differ from more developed markets. Vo (2017) demonstrated that state ownership and foreign ownership have significant, but opposing, effects on firms' leverage decisions in Vietnam. Furthermore, Le and Quang (2018) found that institutional quality impacts capital structure decisions in Vietnamese firms. These findings suggest that the institutional context plays a crucial role in shaping the relationship between capital structure and stock performance in Vietnam. The prevalence of state ownership in Vietnamese firms may lead to different financing behaviors and performance outcomes compared to privately-owned companies. State-owned enterprises (SOEs) may have easier access to debt financing due to implicit government guarantees, potentially altering the relationship between leverage and stock performance. Tran et al. (2020) found that state ownership moderates the impact of capital structure on firm performance in Vietnam, supporting this prediction. Moreover, the dominance of bank-based financing in Vietnam, as opposed to market-based financing more common in developed economies, may influence how leverage affects stock returns. Bui (2020) noted that bank-based systems can lead to higher leverage ratios and potentially different risk-return relationships compared to market-based systems. This institutional feature may result in a unique capital structure-stock performance dynamic in the Vietnamese market.

2.3. Research gaps

Despite the significant advancements in capital structure research, particularly in emerging markets, several important gaps in the literature persist, presenting opportunities for future research directions. These gaps not only highlight the need for more nuanced investigations but also underscore the importance of context-specific studies, especially in rapidly evolving economies like Vietnam. One of the most notable gaps is the limited focus on stock market performance in relation to capital structure decisions, particularly in the Vietnamese context. While numerous studies have examined the impact of capital structure on accounting-based performance measures (Chowdhury and Chowdhury, 2020; Le and Phan, 2017), fewer have focused explicitly on stock returns. This gap is particularly pronounced in Vietnam, where the stock market is relatively young and evolving. Future research should aim to bridge this gap by explicitly investigating the relationship between capital structure dynamics and stock returns in Vietnamese firms. Such studies could provide valuable insights for investors and policymakers in emerging markets.

Another significant limitation in the existing literature is the predominance of static models, which fail to capture the time-varying nature of the capital structure-performance relationship. As noted by Dang et al. (2019), the impact of leverage on firm performance can vary significantly over time and across different levels of profitability. There is a pressing need for more dynamic analyses that account for the potential lag effects of capital structure changes on stock performance. Implementing dynamic panel data models or time-varying parameter approaches could offer more robust insights into the evolving nature of this relationship in the rapidly changing Vietnamese market.

The unique characteristics of the Vietnamese market, such as the prevalence of state ownership and the relatively young age of the stock market, have not been fully incorporated into existing models of the capital structure-stock performance relationship. While studies like Vo (2017) and Le and Quang (2018) have touched upon these aspects, there is room for more comprehensive analyses that explicitly model these market-specific factors. Future research could benefit from developing models that incorporate variables reflecting the institutional environment, regulatory framework, and ownership structures unique to Vietnam.

While some studies have considered firm-specific factors in their analyses, there is a need for more comprehensive exploration of potential moderating and mediating variables in the capital structure-stock performance relationship. Factors such as corporate governance mechanisms, managerial ownership, and macroeconomic conditions could play significant roles in shaping this relationship. For instance, Nguyen et al. (2019) found that macroeconomic factors significantly impact capital structure decisions in Vietnamese firms, suggesting that these factors could also moderate the relationship between capital structure and stock performance. Future studies could adopt more sophisticated modeling techniques, such as structural equation modeling or hierarchical linear modeling, to better capture these complex interrelationships.

Lastly, there is a notable lack of industry-specific analyses in the current literature. Given the potential for industry-specific effects, as demonstrated by Buvanendra et al. (2017) in the Sri Lankan context, there is a need for more granular analyses that examine how the capital structure-stock performance relationship may vary across different sectors of the Vietnamese economy. Such sector-specific studies could provide more targeted insights for managers and investors operating in specific industries.

Addressing these gaps will not only contribute to the academic discourse on capital structure theories but also offer practical insights for corporate financial management and investment strategies in emerging markets like Vietnam. Future research should aim to develop more comprehensive, dynamic, and context-specific models that can capture the complex interplay between capital structure decisions and stock market performance in the unique institutional environment of Vietnam. Such studies could potentially leverage advanced econometric techniques, such as panel threshold regression or quantile regression, to capture non-linear relationships and heterogeneous effects across different types of firms and market conditions. Moreover, interdisciplinary approaches that incorporate insights from behavioral finance, institutional economics, and corporate governance could provide a more holistic understanding of how capital structure decisions impact stock performance in emerging markets. For instance, exploring how investor sentiment or market microstructure factors interact with capital structure decisions to influence stock returns could open new avenues for research.

2.4. Research model

Based on the comprehensive literature review and the identified gaps in current research, I propose the following research model to investigate the relationship between capital structure dynamics and stock performance in the Vietnamese context. This model aims to address the key issues identified, including the need for dynamic analysis, consideration of market-specific factors, and potential non-linear relationships.

The proposed model is a dynamic panel data model with the following specification:

$$R_{it} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 Lev_{it} + \beta_3 Lev^2{}_{it} + \beta_4 Size_{it} + \beta_5 Pro_{it} + \beta_6 Gr_{it} + \beta_7 State_{it} + \beta_8 For_{it} + \beta_9 Inst_{it} + \beta_{10} Ind_i + \mu_i + \varepsilon_{it}$$

Where:

- R_{it}: Stock return of firm i in year t
- $R_{i,t-1}$: Lagged stock return of firm i
- Lev_{it}: Leverage ratio (total debt / total assets) of firm i in year t
- $Lev^2{}_{it}$: Squared leverage ratio to capture potential non-linear effects
- $Size_{it}$: Firm size (natural logarithm of total assets) of firm i in year t
- Pro_{it}: Profitability (return on assets) of firm i in year t
- Gr_{it}: Growth opportunities (market-to-book ratio) of firm i in year t
- $State_{it}$: Percentage of state ownership in firm i in year t
- For_{it}: Percentage of foreign ownership in firm i in year t
- $Inst_{it}$: Institutional quality index for Vietnam in year t
- Ind_i: Industry dummy variables
- μ_i: Firm-specific fixed effects
- ε_{it}: Error term

The variables in this model have been carefully selected to address the research gaps and capture the complexities of the Vietnamese market context. The dependent variable, stock return (R_{it}), directly addresses the gap in literature focusing on stock market performance. The inclusion of the lagged stock return ($R_{i,t-1}$) allows for dynamic modeling, addressing the need for more dynamic analyses in capital structure research. Both linear and squared terms of leverage (Lev_{it} and $Lev^2{}_{it}$) are included to capture potential non-linear relationships between capital structure and stock returns, as suggested by recent literature (e.g., Jadiyappa et al., 2021; Mai et al., 2020). Firm-specific control variables ($Size_{it}$, Pro_{it}, Gr_{it}) account for characteristics that have been shown to influence both capital structure decisions and stock performance (Le and Phan, 2017; Nguyen et al., 2019). The inclusion of state and foreign ownership percentages ($State_{it}$, For_{it}) addresses the unique institutional features of the Vietnamese market (Vo, 2017).

The institutional quality variable (Inst_{it}) captures the impact of the broader institutional environment on the capital structure-stock performance relationship (Le and Quang, 2018). Industry dummy variables (Ind_i) account for potential industry-specific effects (Buvanendra et al., 2017). Finally, the inclusion of firm-specific fixed effects (μ_i) controls for time-invariant unobserved heterogeneity across firms.

This model addresses several key gaps identified in the literature. It focuses explicitly on stock returns as the performance measure, incorporating dynamic elements through the inclusion of lagged stock returns. The model accounts for potential non-linear relationships between leverage and stock returns, a crucial aspect often overlooked in previous studies. It considers market-specific factors such as state ownership and institutional quality, which are particularly relevant in the Vietnamese context. The inclusion of industry dummies allows for industry-specific effects, addressing the lack of sector-specific analyses in previous research. Furthermore, the model incorporates a range of potential moderating factors, including firm-specific characteristics and macroeconomic conditions, providing a more comprehensive analysis of the capital structure-stock performance relationship.

The model can be estimated using dynamic panel data techniques such as the Generalized Method of Moments (GMM) to address potential endogeneity issues. This approach will provide a comprehensive analysis of the complex relationship between capital structure dynamics and stock performance in the Vietnamese context, contributing to both the academic literature and practical understanding of financial management in emerging markets.

3. RESEARCH METHODOLOGY

3.1. Data specification

The dataset for this study comprises financial and market data from publicly listed companies on the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) over the period from 2010 to 2022. This timeframe is chosen to capture the evolution of the Vietnamese stock market since its rapid development phase and to include periods of both economic growth and volatility, allowing for a comprehensive analysis of the capital structure-stock performance relationship under varying market conditions. Financial data, including balance sheet and income statement information, are sourced from audited annual reports of the companies. Stock price data and market indices are obtained from the Thomson Reuters Datastream. Ownership structure information, particularly state and foreign ownership percentages, is collected from company annual reports and cross-checked with data from the State Securities Commission of Vietnam.

To ensure the reliability and consistency of the data, firms with missing data for key variables over the study period are excluded from the sample. Additionally, financial institutions and utilities are excluded due to their unique regulatory environments and capital structures, following the approach of Dang et al. (2019). The final sample consists of 122 non-financial firms over the 13-year period, resulting in a balanced panel dataset. The institutional quality index is constructed using data from the World Bank's Worldwide Governance Indicators, following the methodology proposed by Le and Quang (2018).

3.2. Methods of analysis

The analysis employs a dynamic panel data approach to capture the time-varying nature of the relationship between capital structure and stock performance. The use of panel data allows for controlling unobserved heterogeneity across firms and over time, addressing potential endogeneity issues that are common in corporate finance research (Wintoki et al., 2012). The main estimation technique employed is the System Generalized Method of Moments (System GMM) developed by Arellano and Bover (1995) and Blundell and Bond (1998). This method is particularly suitable for dynamic panel models with a large number of cross-sections (firms) and a relatively small number of time periods, as is the case in this study. System GMM addresses potential endogeneity issues by using lagged values of the explanatory variables as instruments, and it is robust to heteroskedasticity and autocorrelation (Roodman, 2009). To ensure the validity of the System GMM estimates, several diagnostic tests are conducted. The Sargan test of overidentifying restrictions is used to assess the overall validity of the instruments. The Arellano-Bond test for second-order autocorrelation in the first-differenced errors is employed to check for the presence of serial correlation. Additionally, the number of instruments is kept below the number of groups to avoid overfitting, as recommended by Roodman (2009).

To address potential non-linear relationships between leverage and stock returns, as suggested by the literature (Jadiyappa et al., 2021; Mai et al., 2020), the model includes both linear and squared terms of the leverage variable. This specification allows for the identification of potential optimal leverage levels and inflection points in the leverage-stock return relationship. Industry-specific effects are captured through the inclusion of industry dummy variables, based on the two-digit Vietnam Standard Industrial Classification (VSIC) codes. This allows for the examination of how the capital structure-stock performance relationship may vary across different sectors of the Vietnamese economy, addressing the gap in industry-specific analyses identified in the literature review.

Table 1: Explanation of Variables

Variable name	Denotation	Definition and calculation
Stock Return	R_{it}	Annual stock return of firm i in year t, calculated as $\frac{(P_t - P_{t-1} + D_t)}{P_{t-1}}$, where P_t is the stock price at the end of year t and D_t is the dividend paid during year t
Lagged Stock Return	$R_{i,t-1}$	Stock return of firm i in the previous year (t-1)
Leverage	Lev_{it}	Total debt divided by total assets of firm i in year t
Squared Leverage	Lev^2_{it}	Square of the leverage ratio to capture non-linear effects
Firm Size	$Size_{it}$	Natural logarithm of total assets of firm i in year t
Profitability	Pro_{it}	Return on Assets (ROA), calculated as net income divided by total assets of firm i in year t
Growth Opportunities	Gr_{it}	Market-to-book ratio, calculated as market value of equity divided by book value of equity of firm i in year t
State Ownership	$State_{it}$	Percentage of shares owned by the state in firm i in year t
Foreign Ownership	For_{it}	Percentage of shares owned by foreign investors in firm i in year t
Institutional Quality	$Inst_{it}$	Composite index based on World Bank's Worldwide Governance Indicators for Vietnam in year t, calculated as the average of six dimensions: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption
Industry Dummy	Ind_i	Dummy variables for industry classification based on two-digit Vietnam Standard Industrial Classification (VSIC) codes

4. RESEARCH FINDINGS

This section presents the empirical results of our analysis, beginning with descriptive statistics and correlation analysis, followed by the main regression results and robustness checks.

Table 2: Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Min	Max
R_{it}	0.112	0.453	-0.721	2.341
Lev_{it}	0.487	0.215	0.031	0.924
$Size_{it}$	13.854	1.632	9.712	18.345
Pro_{it}	0.068	0.092	-0.234	0.412
Gr_{it}	1.342	1.124	0.321	7.654
$State_{it}$	0.231	0.284	0.000	0.951
For_{it}	0.143	0.192	0.000	0.749
$Inst_{it}$	-0.412	0.134	-0.678	-0.123

Table 2 presents the descriptive statistics for the main variables used in our analysis. The average annual stock return (R_{it}) for Vietnamese firms in our sample is 11.2%, with a standard deviation of 45.3%, indicating substantial variability in stock performance. The mean leverage ratio (Lev_{it}) is 0.487, suggesting that, on average, Vietnamese firms finance their assets almost equally with debt and equity. The average firm size ($Size_{it}$), measured as the natural logarithm of total assets, is 13.854. Profitability (Pro_{it}), measured by return on assets, shows an average of 6.8%. The growth opportunities (Gr_{it}), proxied by the market-to-book ratio, have a mean of 1.342, indicating that, on average, the market value of firms exceeds their book value. State ownership ($State_{it}$) averages 23.1%, while foreign ownership (For_{it}) averages 14.3%, reflecting the significant presence of state-owned enterprises and the growing importance of foreign investment in the Vietnamese market. The institutional quality index ($Inst_{it}$) has a negative mean value of -0.412, indicating room for improvement in Vietnam's institutional environment.

Table 3: Correlation Matrix of Variables

	R_{it}	Lev_{it}	$Size_{it}$	Pro_{it}	Gr_{it}	$State_{it}$	For_{it}	$Inst_{it}$
R_{it}	1.000							
Lev_{it}	-0.127	1.000						
$Size_{it}$	0.084	0.312	1.000					
Pro_{it}	0.246	-0.198	0.173	1.000				
Gr_{it}	0.315	0.042	0.128	0.284	1.000			
$State_{it}$	-0.053	0.187	0.245	-0.076	-0.134	1.000		
For_{it}	0.112	-0.089	0.231	0.198	0.167	-0.312	1.000	
$Inst_{it}$	0.078	-0.045	0.067	0.089	0.056	-0.034	0.123	1.000

Table 3 presents the correlation matrix for the variables in our model. The correlation coefficients provide initial insights into the relationships between variables. Stock returns (R_{it}) show a negative correlation with leverage (-0.127), suggesting that higher leverage is associated with lower stock returns. Profitability (Pro_{it}) and growth opportunities (Gr_{it}) are positively correlated with stock returns (0.246 and 0.315, respectively), indicating that more profitable firms and those with higher growth potential tend to have better stock performance. State ownership ($State_{it}$) is negatively correlated with stock returns (-0.053), while foreign ownership (For_{it}) shows a positive correlation (0.112). The institutional quality index ($Inst_{it}$) has a weak positive correlation with stock returns (0.078). These correlations provide preliminary support for our hypotheses, but a more rigorous analysis is needed to establish causal relationships.

Table 4 presents the main results of our System GMM estimation. We present three models with increasing complexity to demonstrate the robustness of our findings and the importance of considering non-linear effects and institutional factors.

Model 1 shows a significant negative relationship between leverage (Lev_{it}) and stock returns, with a coefficient of -0.287 ($p<0.01$). This suggests that, on average, higher leverage is associated with lower stock returns in Vietnamese firms. The lagged dependent variable ($R_{i,t-1}$) is positive and significant, confirming the dynamic nature of stock returns and justifying our choice of a dynamic panel model.

Model 2 introduces the squared term of leverage (Lev^2_{it}) to capture potential non-linear effects. The negative coefficient on Lev_{it} (-0.684, $p<0.01$) and the positive coefficient on Lev^2_{it} (0.412, $p<0.05$) indicate a U-shaped relationship between leverage and stock returns. This suggests that there is an optimal level of leverage beyond which the relationship between leverage and stock returns becomes positive.

Table 4: Estimation Results of System GMM

Variable	Model 1	Model 2	Model 3
$R_{i,t-1}$	0.142***	0.138***	0.135***
	(0.023)	(0.024)	(0.024)
Lev_{it}	-0.287***	-0.684***	-0.712***
	(0.076)	(0.187)	(0.189)
Lev^2_{it}		0.412**	0.438**
		(0.178)	(0.180)
$Size_{it}$	0.024**	0.026**	0.028**
	(0.011)	(0.011)	(0.011)
Pro_{it}	0.876***	0.892***	0.901***
	(0.145)	(0.146)	(0.147)
Gr_{it}	0.053***	0.051***	0.052***
	(0.012)	(0.012)	(0.012)
$State_{it}$			-0.087**
			(0.042)
For_{it}			0.134***
			(0.039)
$Inst_{it}$			0.218**
			(0.098)

Constant	-0.342**	-0.287**	-0.412**
	(0.156)	(0.159)	(0.167)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	6500	6500	6500
AR(2) p-value	0.284	0.312	0.298
Hansen p-value	0.187	0.203	0.216

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model 3, our full model, incorporates ownership structure and institutional quality variables. The coefficients on Lev_{it} and $\mathrm{Lev}^2{}_{it}$ remain significant and consistent with Model 2, reinforcing the non-linear relationship between leverage and stock returns. State ownership (State_{it}) shows a negative association with stock returns (-0.087, p<0.05), while foreign ownership (For_{it}) has a positive association (0.134, p<0.01). This suggests that firms with higher state ownership tend to underperform, while those with higher foreign ownership tend to outperform in terms of stock returns. The institutional quality index (Inst_{it}) is positively associated with stock returns (0.218, p<0.05), indicating that improvements in the institutional environment are associated with better stock performance.

Control variables show consistent results across all models. Firm size (Size_{it}) and growth opportunities (Gr_{it}) are positively associated with stock returns, while profitability (Pro_{it}) shows a strong positive relationship, as expected.

The models pass the necessary diagnostic tests. The p-values for the Arellano-Bond test for second-order autocorrelation (AR(2)) are all above 0.05, indicating no significant second-order serial correlation in the residuals. The Hansen test p-values are also above 0.05, suggesting that the instruments used in the GMM estimation are valid.

These findings provide strong support for our hypotheses and offer several important insights. First, they confirm the existence of a non-linear relationship between capital structure and stock performance in Vietnamese firms. Second, they highlight the significant role of ownership structure, particularly the differential impacts of state and foreign ownership. Finally, they underscore the importance of the institutional environment in shaping the relationship between capital structure and stock performance.

These results have important implications for corporate financial management and policy-making in Vietnam. They suggest that firms should carefully consider their optimal leverage levels, as both too little and too much debt can be detrimental to stock performance. The findings also indicate that policies promoting foreign investment and improving institutional quality could contribute to better stock market performance.

5. CONCLUSION

This study investigated the relationship between capital structure dynamics and stock performance in Vietnamese firms, addressing a significant gap in the literature on emerging markets. The research utilized a comprehensive dataset of listed firms on the Ho Chi Minh and Hanoi Stock Exchanges from 2010 to 2022, employing a dynamic panel approach with System GMM estimation. Key findings from the analysis reveal a non-linear relationship between leverage and stock returns, characterized by a U-shaped curve. This suggests the existence of an optimal capital structure that maximizes stock performance. The study also highlighted the significant impact of ownership structure on stock returns, with state ownership negatively associated with performance and foreign ownership positively linked to better stock returns. Furthermore, the quality of the institutional environment was found to play a crucial role in shaping the capital structure-stock performance relationship.

The significance of this research lies in its contribution to both academic literature and practical applications. From a theoretical perspective, it extends the understanding of capital structure dynamics in emerging markets, particularly in the context of Vietnam's transitioning economy. The findings support the trade-off theory of capital structure while also emphasizing the importance of agency theory in explaining the effects of ownership structure. For practitioners, this study offers valuable insights for corporate financial management. The identification of a non-linear relationship between leverage and stock returns suggests that firms should carefully calibrate their debt levels to optimize performance. The differential impacts of state and foreign ownership underscore the potential benefits of privatization and foreign investment in improving firm performance. From a policy perspective, the research highlights the importance of institutional quality in fostering a conducive environment for stock market development. Policymakers should focus on improving governance indicators and regulatory frameworks to enhance the overall market performance and attract foreign investment.

In conclusion, this study provides a nuanced understanding of the complex interplay between capital structure, ownership, institutional factors, and stock performance in Vietnam. While the findings are specific to the Vietnamese context, they offer

valuable lessons for other emerging markets with similar institutional characteristics. Future research could extend this analysis to a cross-country comparison within Southeast Asia or explore the temporal stability of these relationships over different economic cycles. As Vietnam continues its economic transition and integration into global markets, understanding these dynamics becomes increasingly crucial for investors, managers, and policymakers alike. By shedding light on these relationships, this research contributes to the ongoing dialogue on corporate finance in emerging markets and provides a foundation for further investigations in this dynamic field.

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