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DETERMINANTS OF FINANCIAL PERFORMANCE IN THE VIETNAMESE SECURITIES INDUSTRY USING PANEL DATA EVIDENCE FROM 80 FIRMS ACROSS MARKET TIERS

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SUMMARY

The fast-paced development of the securities industry of Vietnam led to higher competition among enterprises and the necessity to discover the factors that determine the financial performance of various market segments. There is scarce literature concerning the financial performance of small, unlisted and UpCom securities firms, as previous studies concentrated mainly on listed firms, especially those located on HOSE. The aim of this study is to fill the gap by conducting an empirical study of the determinants of financial performance of Vietnamese securities firms at all market levels. Originality of this study consists of creating an extensive panel dataset of 80 securities firms and 238 observations for 2022-2024 with the inclusion of corporate governance, financial features of the company and macroeconomic factors. Quantitative panel longitudinal research design was utilized, and estimation approaches were performed sequentially, namely Pooled Ordinary Least Squares (OLS), Fixed Effects Model (FEM), Random Effects Model (REM) and Feasible Generalized Least Squares (FGLS). The financial performance of the sample firms was gauged using the following variables: Return on Assets (ROA), Return on Equity (ROE) and Return on Sales (ROS). From the results using FGLS method, it can be noted that firm size has been found to be the single most significant positive determinant of performance (ROA: $\beta=0.0099$; ROE: $\beta=0.0140$; ROS: $\beta=0.0747$, $p<0.001$), indicating the significance of economies of scale in the securities industry. Board gender positively impacts ROA and ROE, while CEO duality negatively impacts ROS. On the other hand, there is a negative impact of the fixed assets ratio and GDP growth on the financial performance of the firms, while inflation positively impacts ROE and ROS. It can be concluded that

organizational size, diversity in governance and resource management have been established as key determinants of securities firm performance.

Key words: *financial performance, securities companies, panel data; firm size, corporate governance, Vietnam, FGLS, emerging capital market, all market tiers.*

INTRODUCTION

There have been many changes taking place in the securities industry in Vietnam owing to expansion of the market, technological development, growing participation of investors, and regulation. Such changes have resulted in stiff competition among the securities companies, which has made it necessary for studying the factors which are important in influencing the financial performance. It is important to study these factors due to the reason that financial performance is a result of a combination of the capabilities of an organization, its financial management, structure of governance, and the market environment. There has been much research on Vietnamese listed firms which suggests that the financial performance of firms depends on many factors [1].

Foreign investments have also been found to play a vital role in determining firm performance in the case of emerging security markets. Research conducted in the case of Vietnam shows that foreign involvement can help in improving the availability of resources, management skills, and competitive advantages for firms. This further helps in improving competitive performance outcomes [2]. Besides, liquidity management is another very crucial factor that influences performance outcomes through financial flexibility, capital structure choices, and profitability [3].

Relationships between firm characteristics and performance might be different depending on levels of performance. Evidence from previous studies using more sophisticated techniques of analysis shows that variables affecting profitability differ across firms. The existence of firm heterogeneity is thus important in empirical studies [4]. Studies on Vietnamese transitional economy show that firm capabilities, innovation environment, and internal resources have an important role in determining long-term performance of firms [5].

While prior literature is quite informative, the securities industry appears to be one of the most poorly researched industries in Vietnam compared to other industries. Securities firms face particular operating environment factors, such as high sensitivity to the market changes, regulations, technological competition, and differences between listed and non-listed companies. Recent findings concerning Vietnamese securities firms reveal that years of operations have an effect on firm performance, indicating the need for specific research in this industry [6]. Also, financial structure is one more crucial factor that impacts performance of firms. The debt structure of the firm has been shown to have an effect on firm performance via its impact on financial risks and efficient resource utilization [7]. Capital structure decisions also have a significant effect on firm value for Vietnamese listed firms [8].

In addition to financial and managerial issues, organizational resources and governance systems have also proven to influence firm performance. The effectiveness of human resources has been highlighted as an important area through which competitive advantage can be gained, increasing efficiency and performance of firms in emerging markets [9]. The structure of ownership has also influenced decision-making, governance effectiveness, and financial results, especially in firms working in developing capital markets [10].

Even though the above factors have been considered individually and the existing literature is mostly related to the firms that are traded on the stock market, there is still a need to investigate the combined impact of these factors on financial performance in Vietnam. Hence, the research question for this paper can be stated as the following: What are the key factors that determine the financial performance of 80 Vietnamese securities companies operating in different markets from 2022 to 2024? The model developed in this paper takes into account the governance mechanisms, financial characteristics, reporting quality, and macroeconomic factors that influence financial performance in terms of ROA, ROE, and ROS.

Key Contributions:

- Panel analysis of performance within the financial sector covering the entire range of Vietnamese securities companies in all levels of markets.
- New findings that firm size, women on boards, and CEO duality are the strongest performance determinants as the sample diversity is greatly enhanced;
- Replication and expansion of existing results regarding the GDP-performance disconnect in the case of Vietnam in 2022.

Research Objective

- To investigate the effect of corporate governance variables on the financial performance of Vietnamese securities companies by investigating the impact of corporate governance features, CEO duality, and quality of financial reporting on ROA, ROE, and ROS.
- To evaluate the effects of firm-specific financial characteristics and macroeconomic variables on the financial performance of securities companies in various market tiers in Vietnam.
- To construct an empirical model based on the panel data to determine the critical factors that affect the financial performance of Vietnamese securities companies.

Research Questions

- RQ1: What is the effect of corporate governance variables, such as board of directors' composition, CEO duality, and financial reporting quality on the financial performance of securities companies in Vietnam?
- RQ2: How much do financial factors and macroeconomics affect the financial performance of securities companies operating at different levels of the market in Vietnam?
- RQ3: What are the important determinants that account for differences in financial performance between securities companies in Vietnam, and what managerial and policy implications follow from this study?

The rest of the paper is structured in the following way. Section 2 is devoted to the presentation of the literature review and the development of hypotheses, which will be based on the review of theories and prior empirical studies regarding corporate governance, firm-specific financial determinants, and macroeconomic factors affecting financial performance. Section 3 gives information about the conceptual framework and methodology used in the study, including the research design, sample selection process, variable definitions, mathematical model and its panel-data estimations. Section 4 provides detailed description of the data sources, sampling, research methods and econometric tools used in the study. Section 5 contains the empirical results and their discussion, including descriptive statistics, correlation analysis, model selection tests, estimation results using FGLS technique and testing of hypotheses. Section 6 includes discussion of results, their managerial implications, policy recommendations, limitations and future research. Finally, Section 7 concludes the study.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Theoretical Foundations

Four theories collectively provide the rationale for this research by providing explanations as to how governance structures, organizational resources, financing decisions, and environmental factors impact firm performance. The concept of Agency Theory is used as the starting point for analyzing governance structures such as board independence, gender diversity, CEO duality, and ownership because of the

emphasis on reducing agency costs and ensuring that managers' decisions are aligned with shareholders' goals. Ownership structures are linked to effective governance and control mechanisms as well as management incentives which affect firm performance outcomes in emerging economies [11]. Resource Dependence Theory is used to emphasize the strategic role of boards in facilitating access to strategic resources that include external expertise, relationships, legitimacy and financing options. In this theory, board diversity and external connectivity are viewed as means to help firms secure and use strategic resources while location can affect firm performance as well [12].

The theory of capital structure, which includes the propositions, trade-off theory, and pecking order theory, provides the link between the effect of financing decisions on profitability via the effects of those decisions on leverage, financial risk, and efficiency in resource allocation. The choice between financing via debt and equity influences the efficiency of capital structure and, thereby, business performance. The dynamic profit theory considers profitability as an evolving process that is the result of the interaction of firm capabilities, firm decisions, and external changes in the environment. In other words, the theory allows including such elements as firm characteristics and firm strategy, such as diversification, influencing business performance through resource allocation, risk, and competitive position in emerging economies [13].

Recent research has extended the current understanding of firm performance through emphasizing the impact of financial environment, digital transformation, sustainability, technological progress, and uncertainties in the market. The financial environment has an important role in the process of corporate decisions concerning the allocation of the resources towards growth and improvement [14]. As for emerging markets, the digitalization has become an increasingly important factor influencing the value, financial performance, and sustainable development of companies through increasing their efficiency, innovation potential, and competitiveness [15]. Corporate social responsibility has received increasing interest because of its impact on organizational behavior and cost management effectiveness, as well as the sustainability of the company in the long run [16]. The recent advances in the area of analysis and prediction tools have made it possible to change the approach to financial decisions, which is now based on the use of machine learning methods and optimization [17].

Likewise, explainable machine learning models have shown promise in enhancing financial distress predictions for corporations through transparent knowledge about financial risks and decision-making [18]. Besides the corporate attributes, external market environment plays a crucial role in determining the performance of corporations, especially in emerging markets, where the interdependencies among sectors and finance play a significant role in investment returns. The existence of extreme connectedness between oil markets and Vietnamese stock market sectors shows the necessity of considering the external economic environment in assessing financial performance and risk exposures [19]. Also, the global information uncertainty and behavioral factors in the market play roles in asset valuation and investments, which show the importance of incorporating market uncertainty into the financial performance evaluation framework [20]. All these studies imply that financial performance of the firms is a result of not only internal financial and governance attributes but also technology development, sustainability efforts, analysis abilities and external market environment.

Corporate Governance Variables

Effects of board size on firm performance have been identified in various settings. According to the Resource Dependence Theory, there would be a positive effect, since larger board sizes enable wider knowledge and external networking. Nonetheless, coordination cost theories and CEO dominance theories posit a negative effect of board size. In the Vietnamese securities industry, where the average board size (about 4.9 in sample) is still far below the statutory ceiling of 11, coordination cost issues may become secondary, but results in the literature have not been consistently positive (H1: positive relationship predicted, yet ambiguous). Board independence regulations were heightened worldwide due to the Sarbanes-Oxley Act (2002) reforms, based theoretically on the agency theory's monitoring focus. Nonetheless, empirical evidence is inconsistent in emerging markets, including some Vietnamese studies showing either null or negative effects (H2: positive relationship predicted).

The inclusion of women in corporate boards has been linked with better deliberation, risk management, and responsiveness to stakeholders. In the securities market where good risk assessment becomes especially important, the risk aversion tendency of women directors would add unique governance value (H3: positive). Board members from abroad will introduce best practices from other countries, create an international network of contacts, and make it easier to comply with international reporting standards, especially important for companies seeking foreign institutional investment (H4: positive). The coexistence of both roles of chairman of the board and CEO creates the concentration of power and decreases independence of the board from monitoring, leading to the known negative influence on performance (H5: negative). Financial reporting quality, as assessed by the residual model reflects the level of explanation of receivables by revenues growth. The high FRQ means low information asymmetry, lower cost of capital, and higher investor confidence—theory predicts that it should improve performance (H6: positive).

Firm-Specific Financial Variables

Older firms have enjoyed higher performance by virtue of reputational capital, institutional knowledge, and strong relationships with clients. Older securities firms have experienced numerous business cycles and have developed mechanisms to manage risks and client relationships that younger firms don't have (H7: positive). Effects of financial leverage are theoretically ambiguous, where tax shields and financial leverage amplify effects on the one hand, and costs of financial distress and forced deleveraging during market downturns suggest otherwise on the other hand (H8: +/-). Firm size is a measure of economies of scale in terms of compliance, technological infrastructure, and marketing in favor of larger securities firms. In the fragmented market of Vietnam securities industry, advantages of economies of scale through technological investment can be significant due to the high fixed costs of the trading systems infrastructure (H9: positive). Liquidity helps the uninterrupted margin lending operation and regulation compliance (H10: positive). Fixed asset ratio is a proxy for investment in technological infrastructure. While theoretically positive, the effects can be negative for smaller firms due to temporary reduction in profit before reaching the production scale (H11: positive, but ambiguous).

Macroeconomic Variables

GDP growth generally supports securities sector performance through higher trading volumes, stronger IPO markets, and improved investor sentiment (H12: positive). Inflation typically reduces real profitability through cost pressures, although the relationship may reverse within low-inflation regimes where inflation is correlated with economic activity (H13: negative).

Research Gap

Though many studies have been done in relation to the performance of firms in emerging markets, there are still significant gaps in the study on factors influencing the performance of firms in the Vietnamese securities sector. Most studies conducted before have mainly covered listed firms or particular sectors, which give little information about the securities firms operating in a special environment like that of market volatility, regulations, technological competition, and different types of ownership. Prior studies have mainly looked at individual factors like financial state, capital structure, liquidity, ownership, digitization, and sustainability without considering a holistic approach. Additionally, little has been done regarding companies operating in various levels of markets, hence lack of knowledge concerning the performance disparities of the large listed securities companies vis-à-vis the small unlisted companies. It is, therefore, necessary for thorough research to be conducted, taking into consideration various aspects of performance determinants so as to get more insight regarding the determinants of performance in the securities market of Vietnam. This research fills this gap by formulating a unified panel data analysis which looks at the combined impact of various performance determinants.

Hypothesis Development

Hypotheses based on Agency Theory, Resource Dependency Theory, Capital Structure Theory, and Dynamic Profit Theory regarding the impact of corporate governance, financial features of the firms,

and macroeconomic factors on the financial performance of Vietnamese securities firms are developed in this paper. The financial performance of firms is measured based on return on assets (ROA), return on equity (ROE), and return on sales (ROS). Therefore, the following hypotheses are presented,

H1: Board size is positively associated with the financial performance of securities companies in Vietnam.

H2: Board independence is positively associated with the financial performance of securities companies in Vietnam.

H3: Female board presence is positively associated with the financial performance of securities companies in Vietnam.

H4: Foreign board presence is positively associated with the financial performance of securities companies in Vietnam.

H5: CEO duality is negatively associated with the financial performance of securities companies in Vietnam.

H6: Financial reporting quality is positively associated with the financial performance of securities companies in Vietnam.

H7: Firm age is positively associated with the financial performance of securities companies in Vietnam.

H8: Leverage is significantly associated with the financial performance of securities companies in Vietnam; however, the association can be either positive or negative.

H9: Firm size is positively associated with the financial performance of securities companies in Vietnam.

H10: Liquidity is positively associated with the financial performance of securities companies in Vietnam.

H11: Fixed asset ratio is positively associated with the financial performance of securities companies in Vietnam.

H12: There is a positive relationship between GDP growth and the financial performance of Vietnamese securities companies.

H13: There is a negative relationship between inflation and the financial performance of Vietnamese securities companies.

These instructions are in line with the hypotheses and predicted signs that have been mentioned in the paper before; some of the variables include: BOARD1 (+), BOARD2 (+/-), BOARD3 (+), BOARD4 (+), BOARD5 (-), leverage (+/-), SIZE (+), GDP (+), and inflation (-).

CONCEPTUAL FRAMEWORK FOR RESEARCH METHODOLOGY

As illustrated in figure 1, the following conceptual and analytical framework depicts the methodological approach followed by researchers to analyze the determinants of the financial performance of Vietnamese securities firms. The research starts with the extraction of credible secondary information from the audited financial statements and the macroeconomic data available for the period of 2022-2024. The sample size of the securities firms is initially reduced after undergoing the criteria for the screening of securities firms to achieve the final sample size of 80 firms that give rise to 238 firm-years. The three major dimensions of explanatory variables include corporate governance variables, financial variables, and macroeconomic variables measured against three different indicators of financial performance, namely ROA, ROE, and ROS.

The analytical procedure follows the preliminary statistical examinations, such as descriptive statistics, Pearson correlation, and VIF analysis, which allow confirming the reliability of the used data and the lack of multicollinearity problems. After that, the estimation of the panel data is carried out using (OLS), (FEM), and (REM). The mathematical model describes the interdependence between the financial performance and 13 explanatory variables through the generalized panel regression model, where the performance factors depend on the governance, financial, and macroeconomic determinants. At last, the obtained coefficients are analyzed using hypothesis testing (H1-H13).

The conceptual and analytical framework highlights the entire methodology used in analyzing the factors affecting financial performance within Vietnamese securities firms. In the process, data will be collected in the form of secondary data from audited financial statements, corporate governance statements, and macroeconomic variables in the period 2022–2024. Based on the selected criteria, out of the 82 securities firms that are available, only 80 firms and 238 firm years will remain in the sample after screening the data. Variables created will be classified under the category of corporate governance variables, firm-specific financial variables, and macroeconomic variables to explain ROA, ROE, and ROS.

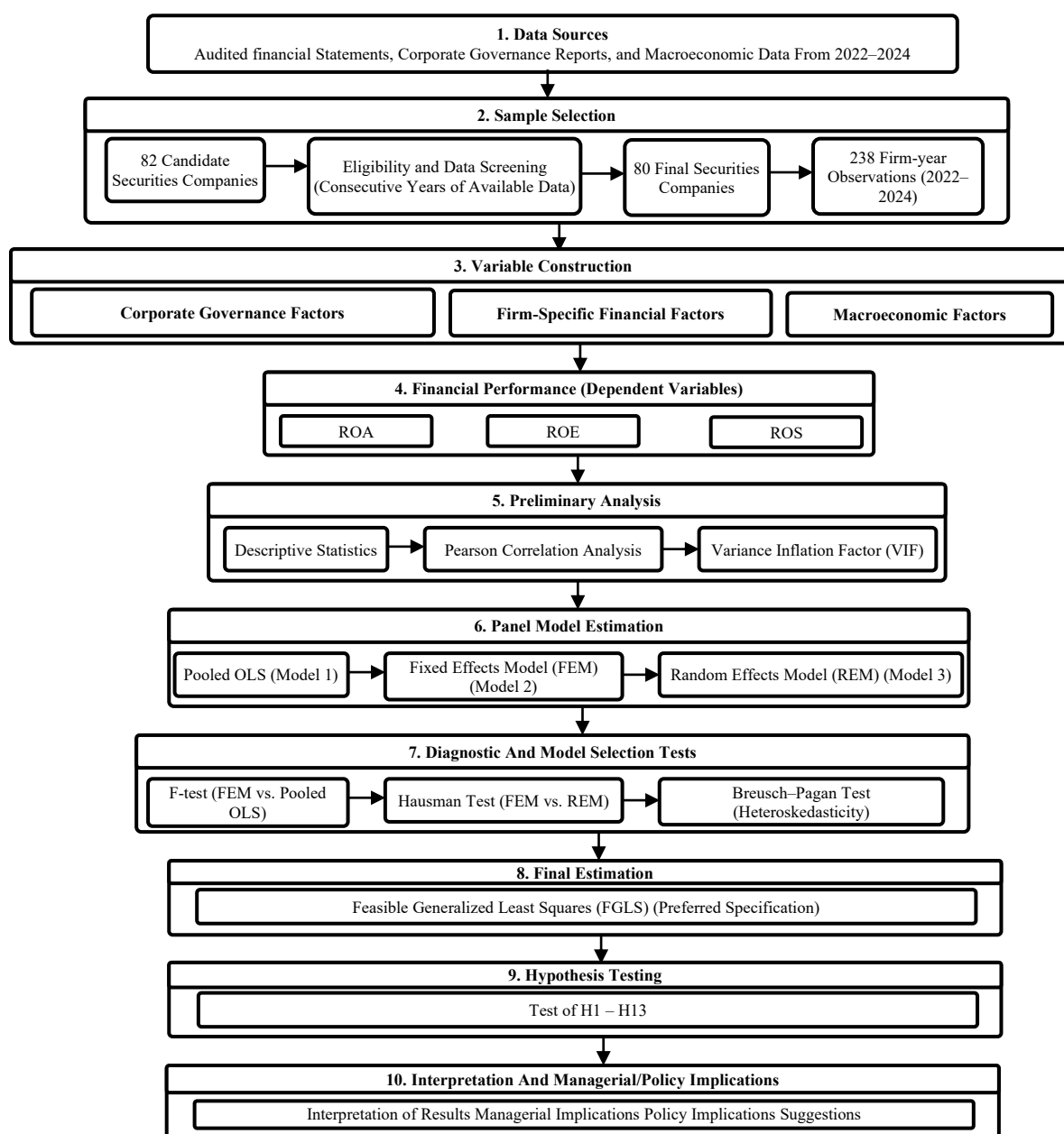


Figure 1: Conceptual framework for research methodology

Mathematically, the relationship between financial performance and explanatory variables can be illustrated using the general panel regression model:

$$PERF_{it} = \beta_0 + \sum_{k=1}^K \beta_k X_{kit} + \varepsilon_{it} \quad (1)$$

From the Above Equation (1) describes the where represents the financial performance indicator (*ROA, ROE, or ROS*) of firm in year, represents the explanatory variable, is the intercept term, represents the estimated coefficients, and denotes the error component. In this study, represents the combined influence of governance, firm-level, and macroeconomic determinants.

DATA AND METHODOLOGY

Research Design

The research design that would be employed in this study is the quantitative longitudinal panel research design since it will focus on finding out the factors that influence the financial performance of the Vietnamese securities companies. Quantitative research design is the most appropriate design in this case since it entails the evaluation of the statistical relationships between corporate governance, financial characteristics of the firm, macroeconomic factors, and three quantitative financial performance measures including (ROA), (ROE) and (ROS). It entails longitudinal and panel observation whereby there are cross sectional observations in relation to the securities firms and at the same time yearly observation from 2022 to 2024. It is very useful for testing of hypothesis and estimation of the strength of the proposed relationships. It conforms to the existing study which uses 80 firms and 238 firm year observations.

Sample Construction and Data Sources

The research design utilizes a non-randomized census-based purposive sample approach to select data for analysis, rather than random sampling, since the aim is to generate the most comprehensive dataset of the Vietnamese securities sector as far as the availability of data permits. The criteria of inclusion included the following: (i) that the company was operating as a Vietnamese securities company for the 2022-2024 study period, (ii) the availability of audited financial reports over at least two consecutive years and (iii) enough information about the firms' finances and corporate governance to construct the variables needed for the regression analysis. Any firm-years with missing critical data were excluded. Four firm-years with zero net revenue were also excluded from regression analysis since the calculation of the ROA ratio would not make sense for these firms.

All Vietnamese securities firms that have their complete audited financial statements for a minimum of two continuous years in the period from 2022 to 2024 are included in this research. At first, there are 82 firms representing five market types, including 17 firms listed on HOSE, 11 firms on HNX, 9 firms registered in UpCoM, 10 firms publicly registered but not on any exchange ("Khác"), and 33 firms that are privately registered and licensed by the SSC. Excluding 1 firm-year because of data problems and two company-years because of lack of important variables, there will be 80 firms and 238 firm-year observations for the period of 2022 to 2024 (78 firms having three years' panels, and 2 firms having two years' panels).

Data on financial statements have been obtained from the audited annual financial statements of companies reported to the SSC and available through the disclosure platforms of HOSE and HNX, supplemented by website data and the FiinTrade institutional database. Data on corporate governance have been gathered from annual and corporate governance reports. Data on macroeconomic variables (real GDP growth rate, inflation rate) have been collected from the General Statistics Office of Vietnam. Time period of 2022-2024 has been chosen because it includes three consecutive years with different market dynamics: one year with a serious correction (2022: VN-Index -32.8%, GDP +8.02%), one year with recovery (2023: VN-Index +12.2%, +5.05%) and one year with positive dynamics (2024:

VN-Index +12.1%, GDP +7.09%). This diversity of market conditions along with high heterogeneity of an 80-company sample has strong statistical identification power.

Implicit analysis of the effects of market-tier can also be done through the sampling structure in this case: The largest, most liquid, and most institutionalized market tier is represented by HOSE-listed firms (17); the second market tier is represented by HNX-listed firms (11); an intermediate market tier is represented by UpCom-registered firms (9); while all the other market tiers are covered by the non-listed firms (43). The inclusion of firms from all the market tiers in the sample as opposed to limiting it to the listed firms is to prevent the inherent biases in the HOSE-only samples.

Table 1: Distribution of sampled firms vietnamese securities companies by market tier

Market tier/category	Initial companies
HOSE-listed securities companies	17
HNX-listed securities companies	11
UpCoM-registered securities companies	9
Non-exchange-listed publicly registered (“Khác”)	10
Unlisted private SSC-licensed securities companies	33
Initial sample	80

The distribution of the sample of Vietnamese securities companies based on different market tiers is illustrated in table 1. In total, the sample contains 80 firms: 17 HOSE-listed firms, 11 HNX-listed firms, 9 UpCoM-registered firms, 10 firms listed neither on any exchange but publicly registered, and 33 privately unlisted firms holding SSC license. The majority of the sample are privately unlisted firms holding SSC license, which means the sample is not confined to only the listed firms on conventional exchanges. It will facilitate a more comprehensive analysis of the financial performance drivers of the Vietnamese securities firms.

Variable Measurement

Table 2 presents variable definitions and expected signs.

Table 2. Variable definitions, measurement, and expected signs

Variable	Abbrev.	Measurement	Exp. Sign
Return on Assets	ROA	Net profit after tax / Average total assets	
Return on Equity	ROE	Net profit after tax / Average equity	
Return on Sales	ROS	Net profit after tax / Net revenue	
Board size	BOARD1	Total number of BOD members	+
Board independence ratio	BOARD2	Independent members / Total BOD members	+/-
Female board ratio	BOARD3	Female members / Total BOD members	+
Foreign board ratio	BOARD4	Foreign members / Total BOD members	+
CEO duality	BOARD5	Dummy: 1 if Chair = CEO; 0 otherwise	-
Financial reporting quality	FRQ	Neg. abs. residual from McNichols–Stubben (2008); higher = better	+
Firm age	AGE	Current year – Year of establishment (years)	+
Capital structure (leverage)	LEVERAGE	Total liabilities / Total assets	+/-
Firm size	SIZE	Ln (Total assets) at year-end	+
Liquidity	LIQUIDITY	Current assets / Current liabilities	+
Fixed asset ratio	FIXED	Net fixed assets / Total assets	+
GDP growth rate	GDP	Annual real GDP growth rate, Vietnam (%)	+
Inflation rate	INFLATION	Annual CPI growth rate, Vietnam (%)	-

Table 2 describes the Variable measurement framework which has been used in identifying the dependent and independent variables for examining the financial performance of Vietnamese securities firms. Financial performance variables include ROA, ROE, and ROS while the determinants are captured by corporate governance variables, financial characteristics of the firm, and macroeconomic variables. The choice of the variables and their signs is made from a theoretical basis.

Financial Reporting Quality (FRQ)

FRQ is measured as the negative absolute value of the residual from the following model: $\Delta AR_{it} = \beta_0 + \beta_1 \Delta Sales_{it} + \varepsilon_{it}$. Higher (i.e., less negative) FRQ values reflect greater financial reporting quality, as changes in accounts receivable are better explained by legitimate revenue growth. This measure is computed for each firm-year using cross-sectional variation within each year.

Estimation Strategy

The regression equation is estimated for each of the three performance measures using 13 explanatory variables as follows: $PERF_{it} = \beta_0 + \sum \beta_k X_{kit} + \varepsilon_{it}$, where $PERF = \{ROA, ROE, ROS\}$. The F-statistic decides whether FEM is more suitable than Pooled OLS, whereas the choice is made between FEM and REM using the aforementioned test. As heteroskedasticity is confirmed at a level of significance lower than 0.001 in all three cases using the Breusch-Pagan tests ($p < 0.001$, $p < 0.001$, $p = 0.006$), (FGLS) will be the preferred estimator.

One crucial difference in methodological terms when compared to previous HOSE only research papers is the inclusion of significant levels of cross-sectional heterogeneity in terms of firm size (assets from about VND 10 billion to over VND 92 trillion), ownership and regulation. Such heterogeneity increases the validity of identifying the impact of firm size and governance while simultaneously raising concerns related to the necessity of handling outliers. Therefore, ROA and ROE are winsorized at the 1st and 99th percentiles; ROS, which is substantially more sensitive to firms with near-zero net revenue, is winsorized at the 2.5th and 97.5th percentiles; and liquidity is winsorized at the 99th percentile to deal with the highly right-skewed distribution caused by small firms with insignificant short-term liabilities. Four firm-year data points with zero net revenue (essentially dormant companies) are discarded from further analysis.

The baseline empirical model is specified as:

$$PERF_{it} = \beta_0 + \beta_1 BOARD1_{it} + \beta_2 BOARD2_{it} + \beta_3 BOARD3_{it} + \beta_4 BOARD4_{it} + \beta_5 BOARD5_{it} + \varepsilon_{it} \quad (2)$$

From the above Equation (2) describes the $PERF_{it}$: Performance metric for entity i at time t , β_0 : Intercept term, $\beta_1 \dots \beta_5$: Regression coefficients for each board characteristic/variable, $BOARDk_{it}$: k -th board characteristic for entity i at time t . ε_{it} : Error term

Three distinct models are estimated with ROA, ROE, and ROS as the dependent variable. Pooled OLS is first estimated as the benchmark model, and then FEM and REM models are estimated. The F-test is used to assess the appropriateness of FEM vis-a-vis the pooled OLS, whereas the Hausman test compares FEM and REM models. Since heteroskedasticity is detected from the Breusch-Pagan test, FGLS is used as the final estimator where alternative is ROA, ROE, and ROS of firm i in year t . is the intercept, to are the coefficients of the independent variables, and is the disturbance term.

Statistical Software and Analytical Procedure

Data analysis was done through the utilization of SPSS software. Data screening, descriptive statistics, Pearson correlation, Variance Inflation Factor (VIF), panel regression, and diagnostics were all done using SPSS software. Estimations of pooled OLS, fixed effects model (FEM) and random effects model (REM) were done in this sequence. The F-test and Hausman tests were employed in model selection while Breusch-Pagan test was used for heteroskedasticity testing. Following the detection of heteroskedasticity, estimation of Feasible Generalized Least Squares (FGLS) was the final stage.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 3 presents descriptive statistics for all variables.

Table 3. Descriptive statistics for the final regression sample

Variable	N	Mean	Std. Dev.	Min	Max
ROA	238	0.0036	0.0921	-0.5112	0.1319
ROE	238	0.0211	0.1107	-0.5179	0.2206
ROS	238	0.0198	0.6005	-2.3046	0.6565
BOARD1	238	4.903	1.621	3	11
BOARD2	238	0.216	0.110	0.000	0.433
BOARD3	238	0.156	0.076	0.000	0.319
BOARD4	238	0.022	0.040	0.000	0.220
BOARD5	238	0.534	0.500	0	1
FRQ	238	-0.022	0.012	-0.059	-0.0003
AGE (years)	238	17.02	4.83	2	30
LEVERAGE	238	0.2867	0.2500	0.0022	0.8481
Ln (SIZE)	238	28.116	1.835	23.114	31.928
LIQUIDITY	238	35.868	74.847	1.275	439.419
FIXED	238	0.0162	0.0353	0.0000	0.3913
GDP (%)	238	6.709	1.243	5.05	8.02
INFLATION (%)	238	3.345	0.207	3.15	3.63

Source: Author's compilation from the software.

The results from table 3 present some noteworthy contrasts between the full-sample descriptive statistics and those provided for HOSE-only samples. ROA and ROE of the sample are much lower compared to that of HOSE-listed subsidiaries due to the inclusion of numerous smaller unlisted firms which are less profitable and more volatile in terms of earning. Winsorization of both the maximum and minimum ROA and ROE was done at the 1st/99th percentiles in order to reduce the effect of the few very small or newly established firms with nearly zero denominators. Minimum ROA and ROE turn out to be 51.12% and -51.79% respectively, reflecting huge losses at some firms due to 2022 market corrections due to pro-cyclical revenue structure of securities companies. Firm size, measured in terms of log (total assets) = 28.12 (approximately equal to VND 1.6 trillion), is 4.5 times smaller than in the case of HOSE-only samples, which indicates the predominant character of small and medium-sized firms in the industry. Leverage ratio of 28.7% is also lower in the case of non-listed firms, owing to the fact that have comparatively low dependence on debt financing for margin lending. Ratio of fixed assets amounts to 1.6% but has a long right tail (max. 39.1%) because of some firms which have made substantial investments in fixed assets. Liquidity ratio has an extremely right-skewed distribution (mean 35.9 and median 4.3).

Correlation and Multicollinearity

The highest pairwise correlation among the independent variables is 0.711 (between SIZE and LEVERAGE), which is expected given that larger firms use more debt to fund margin lending at scale. All other correlations remain below 0.65. The mean VIF of 1.92 (range: 1.11–3.71) confirms the absence of multicollinearity concerns. The relatively low correlations between governance variables (BOARD1–BOARD5, FRQ) and financial variables validate the multi-dimensional analytical framework.

Figure 2 presents the correlation matrix analysis that shows varying strength of relationships among the research variables, with no signs of extreme correlations between independent variables. The highest correlation is found between the SIZE and LEVERAGE variables, which equals 0.711, implying that large securities companies use high amounts of debt financing. All other relationships are mostly weak and moderate, staying under the commonly accepted multicollinearity level. The performance metrics

ROA, ROE, and ROS demonstrate moderately high positive correlations among each other because all reflect various sides of financial performance. CEO duality (BOARD5), fixed asset ratio (FIXED), and GDP demonstrate several negative correlations while governance and other firm characteristics have weak-to-moderate relationships. Thus, it can be stated that the explanatory variables reflect various aspects of firm characteristics and can be considered together in the following regression analysis.

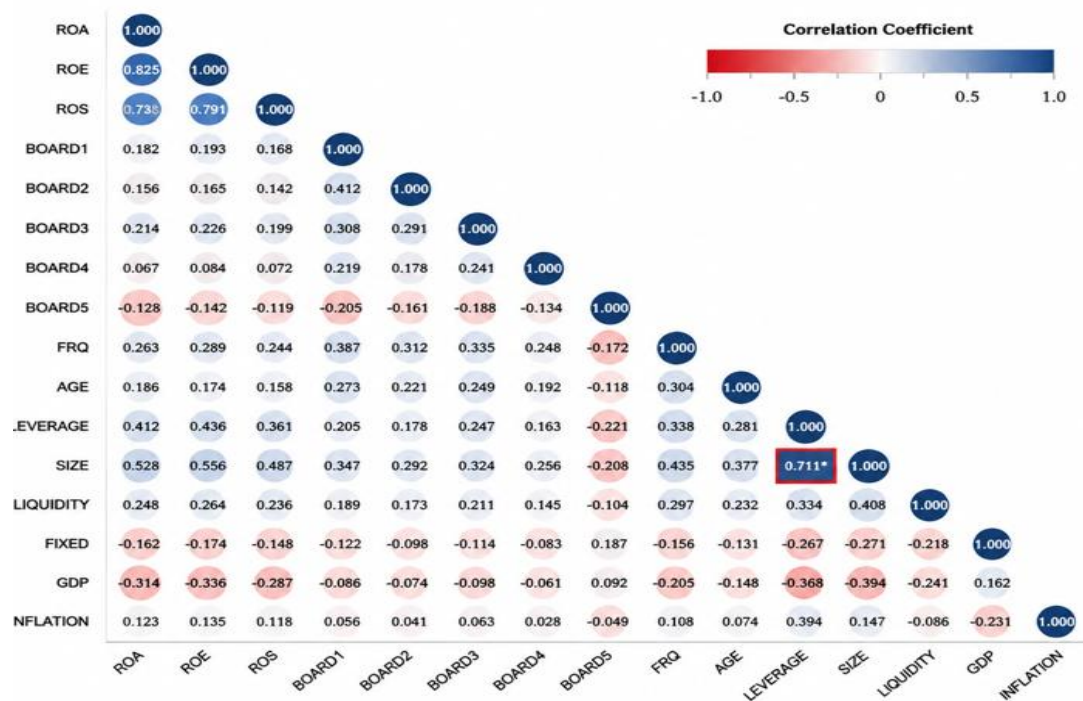


Figure 2: Pearson correlation matrix of the study variables

Model Selection Results

Table 4 presents the results of the diagnostic and model selection tests.

Table 4. Diagnostic and model selection tests

Test	ROA	ROE	ROS	Decision
F-test: FEM vs. Pooled OLS	F=1.018 ($p=0.456$)	F=1.109 ($p=0.293$)	F=1.503 ($p=0.017$)	FEM preferred for ROS; Pooled/REM for ROA & ROE
Hausman: FEM vs. REM	$\chi^2=10.885$ ($p=0.620$)	$\chi^2=9.547$ ($p=0.731$)	$\chi^2=12.171$ ($p=0.514$)	REM preferred for all three specifications
Breusch-Pagan (heteroscedasticity)	$p<0.001$	$p<0.001$	$p=0.006$	Heteroskedasticity confirmed; FGLS required
R ² (Pooled OLS / FEM)	0.234 / 0.167	0.337 / 0.171	0.246 / 0.149	
Mean VIF (range)	1.92 (1.11– 3.71)	1.92 (1.11– 3.71)	1.92 (1.11– 3.71)	No multicollinearity

In contrast to the HOSE-only results, the Hausman tests consistently favor REM over FEM across all three performance dimensions (all $p > 0.50$), suggesting that, after expanding the sample to include the full industry population, firm-specific unobserved effects are no longer systematically correlated with the regressors. This finding is theoretically coherent: in a heterogeneous 80-firm sample spanning all market tiers, the unobserved firm-specific effects (e.g., local market positioning, regulatory history) are more plausibly drawn from a random distribution rather than being systematically related to governance or financial characteristics. The F-test confirms that FEM is significantly preferred to Pooled OLS only for ROS ($F = 1.503$, $p = 0.017$), which is consistent with the Hausman finding. The Breusch-Pagan tests confirm heteroskedasticity across all models, necessitating the use of FGLS as the final estimator. A mean VIF of 1.92 confirms that multicollinearity is not a concern. N/A denotes not applicable. FEM =

Fixed Effects Model; REM = Random Effects Model; OLS = Ordinary Least Squares; VIF = Variance Inflation Factor

FGLS Estimation Results and Discussion

Table 5 presents FGLS results for all three performance dimensions.

Table 5. FGLS regression results (Preferred specification)

Variable	ROA Coef. (<i>p</i> -value)	ROE Coef. (<i>p</i> -value)	ROS Coef. (<i>p</i> -value)
BOARD1	−0.0010 (0.419)	−0.0012 (0.500)	−0.0114 (0.155)
BOARD2	−0.0092 (0.587)	0.0016 (0.947)	0.0737 (0.502)
BOARD3	0.0529** (0.012)	0.0655** (0.040)	0.0760 (0.515)
BOARD4	−0.0577* (0.060)	−0.0868* (0.058)	−0.0160 (0.932)
BOARD5	−0.0054* (0.083)	−0.0030 (0.518)	−0.0544*** (0.007)
FRQ	−0.3662*** (0.001)	−0.3875** (0.015)	0.0276 (0.968)
AGE	−0.0005 (0.149)	0.0001 (0.866)	−0.0048** (0.019)
LEVERAGE	−0.0142 (0.122)	0.0515*** (0.000)	−0.0553 (0.369)
SIZE	0.0099*** (0.000)	0.0140*** (0.000)	0.0747*** (0.000)
LIQUIDITY	0.0000 (0.390)	0.0001** (0.044)	0.0006*** (0.010)
FIXED	−0.5484*** (0.000)	−0.5307*** (0.000)	−4.888*** (0.000)
GDP	−0.0030*** (0.003)	−0.0063*** (0.000)	−0.0406*** (0.000)
INFLATION	0.0108* (0.071)	0.0245*** (0.005)	0.1622*** (0.000)
Constant	−0.2656*** (0.000)	−0.4228*** (0.000)	−2.067*** (0.000)
N / Firms	238 / 80	238 / 80	238 / 80

Note: *p*-values in parentheses. **p* < 0.10; ***p* < 0.05; ****p* < 0.01. All specifications estimated by FGLS with entity-level variance weighting to correct for heteroskedasticity. N = 238 firm-year observations from 80 companies across all market tiers, 2022–2024. GDP growth and inflation are year-level macroeconomic controls.

Firm Size (SIZE). The most striking finding from the expanded sample is the consistent, large, and highly significant positive effect of firm size across all three performance dimensions (ROA: $\beta = 0.0099$, $p < 0.001$; ROE: $\beta = 0.0140$, $p < 0.001$; ROS: $\beta = 0.0747$, $p < 0.001$). This result—the strongest and most robust finding in the study—reflects powerful scale economies in the Vietnamese securities industry. Big companies have the ability to spread their fixed costs in trading systems infrastructure, compliance staffs, and branch network over a greater sales base; attract better institutional clients who produce more revenue in fees on each client relationship; borrow in the debt market at cheaper prices for margin lending; and develop their branding and platform which attracts retail clients at smaller costs per unit. According to the coefficient on ROS, an increase in one standard deviation in the size of the firm (1.82 log points, equivalent to 5 times in total asset size) would lead to a 13.6 percentage point improvement in profit margins. The findings are consistent. The strong effect of size in sample versus the weak effect in the subsample of HOSE suggests that the scale economies are more pronounced when the whole range of Vietnamese securities firms is taken into consideration.

Female Board Ratio (BOARD3). The ratio of female board members exhibits a significantly positive relationship with ROA ($\beta = 0.0529$, $p < 0.05$) and ROE ($\beta = 0.0655$, $p < 0.05$). Thus, the hypothesis H3 is confirmed. From a theoretical perspective, such results coincide with the predictions of the agency theory about the greater effectiveness of gender-diverse boards as monitoring mechanisms and predictions of the resource dependence theory about the distinctive contribution of female directors into decision making. Given the importance of good risk management practices in the securities industry, gender-diverse boards' tendency to create a more careful risk management framework may lead directly to increased risk-adjusted performance. One standard deviation increase in the female board ratio (0.076) leads to an increase in ROA by 0.40% and ROE by 0.50%. Such an effect is rather significant, considering the means of 0.36% and 2.11% respectively. However, there is no significance for ROS. That is, the effect is stronger on the efficiency of asset usage and equity than on the efficiency of revenue to profit conversion.

Foreign Board Ratio (BOARD4). Despite predictions (H4), the inclusion of foreign directors appears to have a consistently negative and statistically significant relationship with ROA ($\beta = -0.0577$, $p < 0.10$) and ROE ($\beta = -0.0868$, $p < 0.10$). Although insignificant at standard levels of significance, the constant direction is noteworthy in the case of ROS. This observation could be related to a number of issues arising in Vietnam's securities market environment. For example, the inclusion of foreign directors in smaller, non-listed securities corporations could indicate the representation of an ownership position by foreign strategic shareholders, who are risk-averse and thus have a negative correlation with accounting measures of performance and return. The other reason could be the cost of incorporation of foreign directors (communication problems, cultural issues, lack of familiarity with the requirements of the local regulation) that outweighs the positive contribution from their resources.

CEO duality (BOARD5). There is found a highly significant negative relationship between CEO duality and ROS ($\beta = -0.0544$, $p < 0.01$) and a marginally negative relationship between CEO duality and ROA ($\beta = -0.0054$, $p < 0.10$), which confirms H5 for those dimensions. The high influence on ROS implies that the profit margin manipulation, which involves cost discipline, revenue discipline, and strategic vision, is negatively impacted especially much by the CEO duality due to excessive power concentration. In cases when the same person holds both the chair and CEO positions, there can be no strong monitoring function.

Financial Reporting Quality (FRQ). The relationship between FRQ and both ROA ($\beta = -0.366$, $p < 0.001$) and ROE ($\beta = -0.388$, $p < 0.05$), contrary to H6, is negatively significant. This is a puzzling finding, since the direction of the relationship is different from that found in the case of HOSE alone. Within the framework of the full sample, including numerous non-listed securities companies, a higher (less negative) FRQ, implying that there is less unexplained variation in accounts receivable, could be paradoxically linked with low profitability because of: (i) the fact that firms under financial stress might be more aggressive in recognizing revenues in order to report positive income and, hence, have greater receivable anomalies (and lower FRQs); or (ii) the fact that firms having high FRQs might be more conservative in terms of recognizing revenues, which could reduce their short-term income. Such an interpretation of the results is justified by the fact that FRQ-performance relationships can be performance measures-dependent. Alternatively, endogeneity could be possible.

Leverage (LEVERAGE). Leverage exerts a positive impact on ROE ($\beta = 0.0515$, $p < 0.001$), which is in line with the financial leverage amplification effect, while its impact on ROA and ROS is insignificant. This result is theoretically logical since leverage increases the return on equity only in situations where it does not decrease the asset return or margin of profit, that is, when the asset return is greater than the interest rate on debt. Thus, the positive association between ROE and leverage in sample means that, on average throughout the whole period of 2022-2024, Vietnamese securities companies with leverage maintained positive asset return exceeding their borrowing cost, especially during the recovery period from 2023 to 2024.

Ratio of Fixed Assets (FIXED). In contradiction to H11, the ratio of fixed assets is highly significant and negatively related to all three measures of company performance (ROA: $\beta = -0.5484$, $p < 0.001$; ROE: $\beta = -0.5307$, $p < 0.001$; ROS: $\beta = -4.888$, $p < 0.001$). This is the second-most economically significant result of the research. The negative impact can be explained by two aspects inherent in the Vietnam securities industry environment. Firstly, significant investments in fixed assets, including technology infrastructure in small companies, may refer to the investment stage where resources have been invested, but the profit has not been earned yet. Secondly, and possibly even more important, a relatively high ratio of fixed assets among the asset light firms is probably indicative of the higher fixed costs due to model decisions (renting or ownership of technology infrastructure).

Macroeconomic Variables. Negative correlations of the GDP growth rate with all three performance indicators have been found (ROA: $\beta = -0.003$, $p < 0.01$; ROE: $\beta = -0.006$, $p < 0.001$; ROS: $\beta = -0.041$, $p < 0.001$). This evidence, consistent for the HOSE only analysis and full sample analysis alike, proves the structural decoupling of macroeconomic growth from the profitability of the Vietnamese securities industry during 2022-2024 period. The reason behind such a situation is that the year of 2022, which has witnessed the highest GDP growth rate of the analyzed period (8.02%), has also seen the lowest

stock market performance (VN-Index: -32.8%). Such poor results were due to global monetary tightening measures and domestic regulations in the bond market. Thus, an endogeneity problem resulted in a negative GDP-Profitability correlation prevailing over the positive one. Inflation has been found to affect positively ROE ($\beta = 0.025$, $p < 0.01$) and ROS ($\beta = 0.162$, $p < 0.001$), and marginally positively ROA ($p = 0.071$). The evidence contradicts hypothesis H13. The mechanism at work here is that Vietnam, being an environment with a strictly controlled inflation (3.15% - 3.63% range throughout the sample, below government ceiling target), has seen higher inflation rates corresponding to more active markets.

In summary, the results reveal that financial performance in Vietnamese securities companies depends on the interaction among organizational size, corporate governance, financial decisions, and macroeconomic conditions. In particular, the consistent positive influence of organization size implies that there are many advantages arising from economies of scale due to technological efficiency, compliance efficiency, access to financing, and market coverage. The positive relationship between female director presence and ROA and ROE implies that board diversity will lead to more efficient monitoring and decision making, while the negative impact of CEO duality on ROS reflects the negative effects of managerial over-concentration in terms of organizational performance.

For the management of small firms, it is advised to pursue strategic alliances, technological partnerships, specialization, or consolidation to address the issue of lack of scale. Meanwhile, for any firm, the need to ensure board diversity and split the positions of chairman and CEO, when necessary, is paramount. The regulators should be able to assist in industry consolidation, diversity of governance, and technology infrastructure development for small securities firms. In addition, the surprising negative impact of GDP proves that profitability of securities industry can differ from economic growth in times of disruptions in the capital markets environment.

Summary of Hypothesis Testing

Table 6 summarizes the hypothesis testing outcomes across all three performance dimensions.

Table 6. Summary of hypothesis testing outcomes

H.	Variable	Exp.	ROA	ROE	ROS	Verdict
H1	BOARD1	+	n.s. (-)	n.s. (-)	n.s. (-)	Not supported
H2	BOARD2	+	n.s. (-)	n.s.	n.s.	Not supported
H3	BOARD3	+	*** (0.012)	*** (0.040)	n.s.	Partially supported
H4	BOARD4	+	-* (0.060)	-* (0.058)	n.s.	Rejected (sign reversed)
H5	BOARD5	-	-* (0.083)	n.s.	*** (0.007)	Partially supported
H6	FRQ	+	*** (0.001)	*** (0.015)	n.s.	Rejected (sign reversed)
H7	AGE	+	n.s.	n.s.	*** (0.019)	Rejected (sign reversed)
H8	LEVERAGE	+/-	n.s. (-)	*** (0.000)	n.s. (-)	Partially supported (+ROE)
H9	SIZE	+	*** (0.000)	*** (0.000)	*** (0.000)	Fully supported
H10	LIQUIDITY	+	n.s.	*** (0.044)	*** (0.010)	Partially supported
H11	FIXED	+	*** (0.000)	*** (0.000)	*** (0.000)	Rejected (sign reversed)
H12	GDP	+	*** (0.003)	*** (0.000)	*** (0.000)	Rejected (sign reversed)
H13	INFLATION	-	*** (0.071)	*** (0.005)	*** (0.000)	Rejected (sign reversed)

Of the thirteen hypotheses, only H9 (firm size) receives full support across all three performance dimensions. H3 (female board ratio → ROA and ROE) and H8 (leverage → ROE) receive partial support. H5 (CEO duality, negative → ROS and ROA) is partially supported in the expected direction. The remaining hypotheses either fail to achieve statistical significance or are rejected due to empirical direction reversals. Particularly notable are the reversals for FRQ (H6), AGE (H7 for ROS), FIXED (H11), GDP (H12), and INFLATION (H13)—all requiring context-specific interpretation. The strong dominance of firm size as the key determinant across all dimensions represents a novel finding not previously documented for the Vietnamese securities sector, emerging clearly only when the full industry spectrum (rather than large HOSE-listed firms alone) is examined. n.s. denotes not statistically significant. $p < 0.10$; $p < 0.05$; $p < 0.01$. The signs (+/-) indicate the direction of the estimated relationship.

Key Findings

This study provides the most comprehensive evidence yet available on the determinants of financial performance across the Vietnamese securities industry, covering 80 firms and 238 firm-year observations over the 2022–2024 period. Five principal findings emerge from the FGLS estimation. First and most importantly, firm size is the most consistent and economically significant positive determinant across all three-performance metrics (ROA, ROE, ROS), providing full support for H9. This finding unique to the broad-sample analysis and not evident in the HOSE-only subsample reveals that scale economies are the dominant performance driver in Vietnam's securities industry in terms of asset efficiency, equity returns, and profit margins. Second, female board representation is a robust positive governance determinant of asset and equity returns (ROA and ROE), supporting agency theory and gender diversity hypotheses, although not extending to profit margin efficiency. Third, CEO duality is associated with significantly lower profit margins, confirming the agency-theoretic prediction that power concentration weakens governance discipline over revenue and cost management. Fourth, the fixed asset ratio shows a consistently negative relationship with all performance dimensions an unexpected finding that likely reflects transition costs and scale dependencies in technology investment among smaller firms, contrasting with the positive relationship found in capital-intensive industries. Fifth, the GDP-performance decoupling observed in 2022 (when GDP growth peaked while the market declined severely) is robustly confirmed across the full industry sample, highlighting that macroeconomic fundamentals and securities sector profitability can systematically diverge in an emerging market undergoing monetary tightening.

Implications for Management

For securities company managers, the firm size finding has direct strategic implications: organic growth in assets under management and trading volumes, or inorganic growth through mergers and acquisitions among smaller firms, represents the highest-return strategic path available to most Vietnamese securities companies. Smaller firms that cannot achieve competitive scale organically should consider strategic combinations, technological partnerships, or market specialization to compensate for scale disadvantages. The female board ratio finding recommends a concrete governance action: increasing the proportion of female board members appears to deliver measurable returns on both assets and equity, suggesting that gender diversity targets should be treated as performance-enhancing rather than purely compliance-oriented initiatives. The CEO duality finding recommends a clear structural governance change: separating the roles of board chair and CEO improves profit margin discipline and should be a priority for family-controlled or founder-led securities companies where duality is prevalent.

Implications for Policy and Regulation

For the SSC and related regulatory bodies, the strong firm size effect suggests that policies facilitating industry consolidation—including simplified M&A approval processes, coordinated technology licensing frameworks, and capital adequacy thresholds that create incentives for scale—could enhance overall sector performance and stability. The evidence on female board representation supports the adoption of gender diversity guidelines or voluntary targets for securities company boards, aligned with international governance standards and Vietnam's broader gender equity policy objectives. The negative fixed asset ratio effect, combined with the positive side effect, suggests that regulatory policies supporting shared technology infrastructure (e.g., co-investment in trading platforms among smaller firms) could help smaller companies achieve greater technological efficiency without absorbing the performance drag of individually high fixed asset ratios.

Limitations and Future Research Directions

This study faces several important limitations. The three-year panel (2022–2024) limits the temporal scope and forecloses the application of dynamic GMM methods that could more rigorously address endogeneity in the governance-performance relationship. The corporate governance data for non-listed firms are drawn from self-reported disclosures, which may be less reliable than listed-firm mandatory disclosures. The FRQ measure, while theoretically grounded, may capture different accounting

phenomena in smaller, less-audited firms than in large listed entities, potentially contaminating the FRQ-performance relationship. Future research should extend the panel as additional annual reports become available, enabling longer time-series estimations; apply system-GMM to address potential reverse causality between firm size, governance choices, and performance; incorporate explicit digital transformation metrics (e.g., app downloads, automated order ratios) as performance determinants; and use matching methods or propensity score weighting to control for market-tier selection effects in cross-tier comparisons.

CONCLUSION

The objectives of this study were to determine the primary determinants that affect the financial performance of firms in Vietnam's securities sector through the combined impacts of corporate governance, financial attributes of firms, and macroeconomic factors. A quantitative panel research design was used through the use of data from 80 securities firms within a period of three years (2022–2024). The analysis involved four regression methods, including pooled OLS, fixed effects model (FEM), random effects model (REM), and feasible generalized least squares (FGLS). Financial performance was measured using ROA, ROE, and ROS. From the FGLS analysis, there was substantial evidence that firm size is a highly consistent determinant of performance, having a highly significant effect on ROA ($\beta=0.0099$), ROE ($\beta=0.0140$), and ROS ($\beta=0.0747$, $p<0.001$). Board-level gender is found to have a positive impact on ROA and ROE, whereas CEO duality has a negative effect on the performance of ROS. On the contrary, fixed assets ratio and GDP growth rate are found to have a negative impact on performance, whereas the inflation rate is found to have a positive effect on ROE and ROS. The results reveal that economies of scale, diverse corporate governance, and strategic investment decisions are the key determinants of securities firms' performance. The study offers valuable insights to the managers in terms of scale creation, good corporate governance structure, and efficient investments, as well as to the policymakers regarding regulatory strategies.

Data Availability

Financial data are publicly available from HOSE (hsx.vn), HNX (hnx.vn), SSC disclosure portals, and company annual reports. Macroeconomic data are obtained from the General Statistics Office of Vietnam (gso.gov.vn).

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