

## Investment and Financial Performance: The Moderating Role of Social Capital Investment



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**Abstract:** This study examines the relationship between corporate investment and financial performance among listed construction firms in Vietnam, with a particular attention to the moderating role of sector-level social capital investment. Using a panel data for 93 listed construction companies over the period 2011-2023, combined with national data on social capital investment in the construction sector, the study applies generalized least squares (GLS) estimation to assess both market-based and accounting-based performance outcomes. The results indicate that firm-level investment is positively associated with Tobin's Q and return on assets, with stronger effects observed for larger firms, reflecting their superior access to resources and capacity to absorb investment risks. However, higher levels of sectoral social capital investment significantly weaken this positive relationship. This negative moderation effect is consistent with the crowding-out mechanism, whereby intensified sector-wide investment heightens competition for scarce inputs, increases production costs, and reduces the marginal returns to firm-specific investment. By integrating firm-level behavior with sectoral investment dynamics, the study contributes to the literature on investment efficiency in capital-intensive industries and emerging markets. The findings also offer policy-relevant insights, emphasizing the importance of coordinating public and private investment strategies to avoid resource congestion and enhance long-term firm performance.

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### Introduction

Investment policies are essential parts of corporate strategy, serving as a critical driving force towards long-term growth. Brealey and Meyers (2003) define investment decisions as the process of evaluating and selecting long-term investments that align with the firm's most important goal of maximizing shareholders' wealth, while Van Horne (2002) emphasizes capital allocation to initiatives such as equipment upgrades, expansion projects, equipment replacements, and technological innovation. In this context, long-term investments in fixed assets form the foundation for corporate development, aligning strategic objectives with operational priorities and enhancing profitability via optimized resource allocation and positive cash flows. This relationship is supported by the neoclassical investment theory (Jorgenson 1963) and the resource-based view (Barney 1991), which emphasize the importance of investment decisions in firm value maximization and highlight the strategic utilization of physical resources like fixed assets to achieve competitive advantages.

There is various research that has investigated this complex relationship between investment and firm performance; however, the findings are mixed, with some identifying positive impacts (Çam *et al.* 2024; Gao *et al.* 2025; Saif *et al.* 2020; Salehi *et al.* 2022) and others indicating insignificant or negative outcomes (Lin 2022; Okwo and Ugwunta 2012).

In Vietnam, the construction sector plays an indispensable role in the country's socioeconomic growth, which is fueled by rapid urbanization and infrastructure expansion. According to Statista market report, in 2023, Vietnam's construction sector accounted for 6.27 percent of the country's total GDP. The market size of this sector is estimated to reach nearly 75 billion USD by 2025 and expected to reach over 110 billion USD by 2030, reflecting a robust compound annual growth rate of 8,1% (Credence Research 2024). The economic importance of the construction industry is not limited to its contributions to GDP. 117 public-private partnership (PPP) projects valued at USD 43 billion, and the development of 5,000 km of expressways by 2030 are among the critical infrastructure projects that it facilitates, which improve economic productivity and connectivity (Mordor Intelligence 2025). Furthermore, social housing projects, targeting 1 million units by 2030, address pressing social needs.

These developments are primarily driven by social capital investment, defined as the sum of investments from the public sector, private companies, and foreign investors across the economy (Thi Thuy Hong *et al.* 2017). The government plays a dominant role by allocating substantial resources to infrastructure areas such as highways, bridges, and social housing. The demand for construction services is stimulated by high levels of public investment, such as the 6% of GDP that was allocated to infrastructure in 2022, which presents opportunities for firms to expand their operations. Nevertheless, this also introduces obstacles, including resource competition and increasing input costs, which can reduce the efficiency of firm-level investments.

The Structure - Conduct - Performance (SCP) framework provides a theoretical lens for understanding this interplay: it posits that industry-level structures - such as market concentration, entry barriers, and resource competition shape firms' conduct (including investment decisions) and, consequently, firm performance (Scherer and Ross 1990). In this context, high sectoral capital investment moderates the relationship by fostering crowding-in effects via enhanced economic conditions (Robert J. Barro 1990) or crowding-out effects through increasing resource competition (Buiter 1977), potentially affecting the link between corporate investments and firm performance. This balance of opportunities and challenges highlights the importance of examining social capital investment's role in the construction sector's development.

For the above reasons, this research investigates the relationship between investment policy and financial performance, focusing on the moderating role of total social capital investment in this sector. By examining the Vietnamese construction industry, the study aims to address theoretical gaps and provide recommendations for policymakers and industry stakeholders to improve the investment efficiency of this sector.

This study contributes to the literature in four key ways. First, unlike prior research focusing on macroeconomic moderators such as GDP or inflation (Cevik *et al.* 2024; T. T. Doan 2020; Egbunike and Okerekeoti 2018), it extends the nexus between investment and firm performance by innovating with sectoral social capital investment as a moderating variable in an emerging market context, revealing the crowding-out effects specific to Vietnam's construction industry. Second, it provides sector-specific insights for Vietnam's construction industry - an economically vital yet understudied industry. Third, by analyzing firm-size differences, it offers an empirical finding beyond mixed results. And finally, these contributions inform policymakers and managers on balancing the social capital investment to enhance the financial development of firms in the construction industry.

After this introduction, the paper is structured as follows: Section 1 reviews the relevant literature, Section 2 outlines the research methodology, Section 3 presents the findings, and Section 4 discusses implications and conclusions.

## 1. Literature Review

### 1.1. Investment and Firm Performance

*Neoclassical theory* states that investment decisions are guided by the principle of maximizing firm value, focusing on cost efficiency and marginal returns (Jorgenson, 1963). This approach highlights the importance of aligning investment decisions with the broader goal of optimizing financial performance (U. Farooq *et al.* 2022). However, while the neoclassical perspective emphasizes optimal capital allocation, it pays limited attention to the internal characteristics that determine how effectively such investments are utilized.

Complementing this view, the resource-based theory (RBV) shifts the focus from capital allocation to resource deployment. According to RBV, in order to gain competitive advantages, firms need to wisely utilize their resources (Barney, 1991). Corporate resources are mentioned as the "assets, capabilities, organizational process, firm attributes and information knowledge" (Barney 1991) and are commonly categorized into physical resources, human resource and organizational resources (M. Farooq *et al.* 2022). Among these, physical resources – such as plant, equipment, production technology, geographic location, and access to materials (Modigliani and Miller, 1963) are particularly critical in capital-intensive industries. Taken together, these perspectives suggest that investment influences firm performance not only through the scale of capital allocation but also through the strategic utilization

of tangible assets. Therefore, the portion of investment in the firm's total assets, especially the fixed assets like machines and production lines, becomes a key determinant of financial performance.

Empirical results have proved the significant impact of investment policy on the firm's performance but normally focus on the sophisticated relationship between these two variables. For instance, Saif *et al.* (2020) focused on the negative moderating role of cash flows between corporate investment decision and performance of the company, Salehi *et al.* (2022) consider institutional ownership and board characteristics as moderators in this relationship. Lin (2022) investigated the investment in fixed assets of A-share listed companies in China and found that companies with substantial investments in assets such as property and equipment have lower performance compared to less-invested counterparts. To be more specific, Lin (2022) concluded that companies with a high portion of fixed assets usually have to bear high maintenance costs, which may reduce their financial results. Giving a more complex point of view, Grozdic *et al.* (2020) noted short-term productivity losses from capital investments but long-term gains. This can be explained by the fact that, with a high investment cost, the short-term return may be reduced; however, in the long term, these investments can lead to higher production efficiency, better product or service quality, and eventually better financial performance. These mixed findings indicate that the investment – performance relationship is neither linear nor completely positive. Instead, it appears to depend on contextual factors such as cash flow, ownership structure, financing conditions, and industrial characteristics. In emerging markets, where capital markets may be less efficient, the marginal returns to investment can vary substantially.

In the context of Vietnam, existing studies generally report that investment in technology and equipment boosts the firm's competitiveness, leading to better financial results (Doan, 2020; Phan and Phan, 2013). However, these studies tend to treat investment as an isolated firm-level decision, without explicitly considering the broader sectoral investment environment that may exaggerate the impact on firm financial results.

Drawing on the above theoretical and empirical findings, this study argues that while corporate investment is expected to enhance firm performance, the direction and magnitude of the impact are likely to be context – dependent.

Accordingly, the following hypothesis is proposed:

*H1: Corporate investment positively influences the financial performance of Vietnamese construction firms.*

## 1.2. Moderating Role of Social Capital Investment

The accelerator theory of investment, originally proposed by Clark (1917), suggests that investment levels are a function of macroeconomic outputs. During periods of high economic growth, increased demand prompts firms to expand production capacity through capital investments. Farooq *et al.* (2022) and Saif *et al.* (2020) demonstrate that macroeconomic factors significantly influence corporate investment decisions and, consequently, financial performance. However, to the best of our knowledge, considerably less attention has been given to how sectoral social capital investment interacts with firm-level investment decisions. Previous research mostly considered macroeconomic factors such as GDP, inflation, and interest rates and their impacts on financial decisions (Cevik *et al.*, 2024; Doan, 2020; Egbunike and Okerekeoti, 2018).

The Structure - Conduct - Performance (SCP) paradigm provides a useful framework for addressing this gap. Originating in industrial organization economics, SCP posits that sectoral structure, including concentration, entry barriers, and the intensity of resource competition, conditions the firm's conduct, such as investment decisions, which substantially shape the firm's performance (Scherer and Ross, 1990). In this perspective, firm outcomes are not solely determined by internal decisions but are related to sector-level structural conditions.

In industries characterized by high capital intensity and reliance on shared resources, such as the construction industry, intensified social investment can reshape competitive dynamics in two distinct ways. On one hand, it generates a crowding-in effect by improving the economic environment, reducing costs, and boosting demand (Barro, 1990). On the other hand, the crowding-out effect arises when large public investments raise interest rates and compete for resources, which eventually discourage private investment (Buiter, 1977).

Nevertheless, prior research often examines crowding-in and crowding-out effects at the macroeconomic level, without linking them to firm-level performance. In the context of Vietnam, where total social capital investment has historically accounted for a substantial share of GDP and public investment plays a dominant role in infrastructure development, these opposing forces may be particularly pronounced in the construction sector.

Therefore, rather than assuming a uniformly positive moderating impact of social investment, this study expects that sectoral social capital investment may condition the marginal return of a firm's investment. Specifically, when public investment increases within the construction sector, it may dilute the effectiveness of private corporate investment through fierce competition for capital and resources.

From the above reasoning, this study proposes the following hypothesis:

*H2: Social capital investment in the construction area negatively moderates the relationship between corporate investment and financial performance of Vietnamese construction firms.*

## 2. Data and Methodology

### 2.1. Data and Sample

This study employs a quantitative panel research design using secondary data from firm-level and macroeconomic sources. Firm-level financial and accounting data were obtained from Refinitiv (currently known as LSEG Data & Analytics), which provides standardized and internationally comparable information on publicly listed firms. These data include balance sheet items, income statement components, and key financial ratios, ensuring consistency and reliability across firms and over time. Refinitiv has been widely used in prior empirical studies in finance and corporate governance, supporting the validity of the firm-level measures employed in this study.

Macroeconomic indicators were collected from the General Statistics Office of Vietnam (GSO), the official national statistical authority. The macro-level variables include annual indicators such as GDP growth, inflation rates, and interest rates, which are incorporated to control for the broader economic environment affecting firm performance. The use of official national statistics enhances the accuracy and credibility of the macroeconomic data.

The initial sample consisted of all firms classified under the construction sector and listed on Vietnamese stock exchanges during the study period. After excluding firms with incomplete financial information or insufficient time-series observations, the final sample comprises 93 construction firms, observed annually from 2011 to 2023, yielding a balanced panel dataset. The construction sector was selected due to its economic significance in Vietnam and its sensitivity to macroeconomic conditions and regulatory changes, making it an appropriate context for examining firm-level financial outcomes.

The study period from 2011 to 2023 was chosen for three main reasons. First, it captures the post-global financial crisis phase and subsequent structural reforms in Vietnam's economy. Second, it encompasses multiple economic cycles, including periods of economic expansion and contraction, allowing for more robust inference. Third, 2023 represents the most recent year for which complete firm-level data were available at the time of analysis.

Firm-level and macroeconomic datasets were merged based on corresponding calendar years to ensure temporal consistency across variables. Data cleaning, validation, and preliminary processing were conducted using Microsoft Excel, while econometric analyses were performed using Stata. These procedures resulted in a balanced panel structure that supports the application of panel regression techniques and enhances the reliability of the empirical findings.

## 2.2. Empirical Models

### 2.2.1 Research Models

The authors propose two research models to investigate the relationships of interest. Model (1) is established to study the influence of the corporate investment index on Tobin's Q, with a particular focus on assessing the moderating effect of social capital investment in the construction sector on this relationship. Model (2) is constructed to examine the effect of the corporate investment on Return on Assets (ROA) and to evaluate the moderating role of social capital investment in the construction sector on this impact.

$$TobinQ_{it} = \alpha t + \beta_1 INV1_{it} + \beta_2 GTA_{it} + \beta_3 Cashflow_{it} + \beta_4 (LnConINV_t * INV1_{it}) + \beta_7 Firmage_{it} + \beta_8 Liquidity_t + \varepsilon_{it} \quad (1)$$

$$ROA_{it} = \alpha t + \beta_1 INV1_{it} + \beta_2 GTA_{it} + \beta_3 Cashflow_{it} + \beta_4 (LnConINV_t * INV1_{it}) + \beta_7 Firmage_{it} + \beta_8 Liquidity_t + \varepsilon_{it} \quad (2)$$

Where  $\varepsilon_{it}$  is a random error, and the variable subscripts  $i$  and  $t$  represent company  $i$  in year  $t$ . The description of variables is summarized in Table 1.

### 2.2.2 Variables

*Dependent variables: Tobin's Q and ROA*

**Tobin's Q** represents the ratio of a firm's market value to the replacement cost of its assets, serving as a proxy for market valuation. It reflects both current and expected future profitability, capturing earnings potential and the value of intangible assets. As such, Tobin's Q is widely regarded as an indicator of the market's perception of

a firm's future prospects (Chung and Pruitt, 1994). Due to the difficulties in estimating replacement costs, researchers commonly apply an approximate formula as follows (Aydoğmuş *et al.* 2022).

**ROA** is a standard measure of profitability, indicating a firm's ability to generate earnings from its asset base. It expresses net income as a percentage of total assets, reflecting resource efficiency (Kieso *et al.*, 2022). Higher ROA values signal stronger profitability, while lower values indicate less efficient asset utilization. ROA also enables evaluation of resource use (Berk and DeMarzo, 2020), facilitates industry benchmarking (Higgins *et al.*, 2023), and supports trend analysis of managerial performance over time (Pandey, 2010).

*Independent variables:*

The **Investment Index** measures the proportion of the company's total assets financed by long-term capital, indicating the investment capacity of the firm in the long run. In the construction industry, where substantial investment in fixed assets such as lands, buildings, and heavy equipment is common, this index is particularly relevant due to the need for stable and long-term financing. Besides, the construction projects require extensive timelines and consistent funding to reduce liquidity risks and ensure project completion. For the above reasons, the investment index provides a reliable measure of financial stability, enabling firms to maintain capital-intensive operations while optimizing investment efficiency. Research by Saif *et al.* (2020) supports the application of this index.

$$\text{Investment index} = (\text{Fixed assets} + \text{Current assets} - \text{Current liabilities}) / \text{Total assets}$$

The **growth rate of total assets** is a suitable metric to evaluate the investment activities of construction firms since it directly reflects the expansion of asset value, including both fixed assets and current assets. In the construction industry, this metric highlights a firm's capacity to invest in infrastructure and equipment, enhancing long-term production capabilities and competitiveness in a demanding market. An increase in total assets growth implies that firms are making strategic investments to support large-scale, long-term projects. Research by Saif *et al.* (2020) used this index as a proxy for investment decisions, underscoring the importance of asset expansion. Similarly, Cordis and Kirby (2015) employed total assets growth as a comprehensive measure of investment activities. This metric is easily derived from financial statements, offering a clear indicator of investment scale.

Growth rate of total assets (GTA) = (Total assets at the end - Total assets at the beginning) / Total assets at the beginning

The **cash flow** variable is an effective proxy for investment because it reflects the internal funds available for making investments such as acquiring new plants, equipment, and expanding facilities without relying on external financing. By dividing cash generated from operations, adjusted for non-cash expenses, by fixed assets, this metric evaluates the efficiency of the firm's base asset generating funds for reinvestment. A higher ratio indicates that the firm can generate more cash per unit of fixed assets, implying a better investment capacity. This is particularly important in the construction industry, where efficient use of equipment and infrastructure directly impacts project profitability and financial performance of the firm. This measure is applied in the research of Saif *et al.* (2020)

$$\text{Cash flow} = (\text{Net income} + \text{Depreciation \& Amortization}) / \text{Fixed assets at the beginning}$$

*Moderating variable:*

The **social capital investment**, as defined by Thi Thuy Hong *et al.* (2017), represents the total investment in the economy by public, private, and foreign sources. In this study, the index is specifically applied to the construction sector to assess its influence on investment efficiency and financial performance. This focus is appropriate since the level of social capital investment in construction areas directly influences the availability of resources and investment opportunities for firms in this field to undertake large-scale projects, such as infrastructure or commercial buildings. Therefore, it is reasonable to use this index as a moderating variable to evaluate its impact on the investment efficiency and financial performance of construction firms.

*Control variables:*

**Firm age**, measured as the number of years from the company's establishment to present, serves as a control variable, reflecting the firm's experience and reputation. Older firms normally possess an established reputation, which can enhance their competitiveness in securing investment opportunities and accessing resources (Vu *et al.*, 2019). Besides, **liquidity** of the firm is represented by its current ratio, expressing its portion of current assets over total assets. High liquidity ensures financial ability, supporting investment activities without reliance on external financing (Gill, 2022). These control variables are critical factors affecting the investment efficiency and financial performance of firms in the construction industry.

The above-mentioned variables are summarized in the following table:

Table 1. Variables used in research models

Variable	Name of Variable	Definition/Measurement
<b>Dependent Variables</b>		
<i>TobinQ</i>	Firm value	Tobin's Q = Book value of total assets/ Market value of total assets
<i>ROA</i>	Return on Assets	ROA = Net income/ Total assets
<b>Independent Variable</b>		
<i>INV1</i>	Investment index	Investment Index = (Fixed assets + Current assets – Current liabilities) / Total assets
<i>GTA</i>	Growth rate of total assets	Growth Rate of Total Assets = (Total assets at the end - Total assets at the beginning) / Total assets at the beginning
<i>Cashflow</i>	Cash flow to Fixed assets	Cash Flows = (Net income + Depreciation & Amortization) / Fixed assets at the beginning
<b>Moderating Variables</b>		
<i>LnConINV</i>	Log nepe of Social Capital Investment in the construction sector	The entire amount of money spent to increase or maintain production capacity and resources to improve the living standards of the whole society within a specific period (by year).
<b>Control Variables</b>		
<i>Firmage</i>	Age of the business	Measured by the length of time it has been in existence, calculated as the difference between the year of reporting and the year the business started.
<i>Liquidity</i>	Liquidity position of the company, or its Current ratio	Current Ratio or Firm's Liquidity = Current assets/ Total assets

Source: Authors' Research

### 2.2.3 Estimation Process

This study employs a panel data estimation strategy to examine the effects of the independent variables on firm value and profitability, measured by Tobin's Q and ROA. Panel regression techniques are particularly suitable for this analysis as they allow for the simultaneous consideration of cross-sectional and time-series variations, thereby improving estimation efficiency and controlling for unobserved firm-specific heterogeneity.

The empirical analysis begins with a Pooled Ordinary Least Squares (POLS) regression to provide a baseline benchmark of the relationships between the variables, assuming homogeneity across firms and over time. While POLS offers an initial reference point, it does not account for unobserved firm-specific effects that may bias the estimates.

To address this limitation, a Random Effects Model (REM) is subsequently estimated. REM assumes that unobserved firm-specific effects are uncorrelated with the explanatory variables and is therefore more efficient than POLS when this assumption holds. The Breusch - Pagan Lagrange Multiplier test is employed to assess whether panel-level variance is present. A statistically insignificant test result ( $p$ -value > 0.05) indicates that POLS is adequate; otherwise, the presence of unobserved effects justifies the use of REM.

If the REM assumptions are violated, a Fixed Effects Model (FEM) is applied. FEM allows firm-specific effects to correlate with the regressors, thereby controlling for all time-invariant firm characteristics. The choice between REM and FEM is formally determined using the Hausman specification test, where a  $p$ -value greater than 0.05 supports REM, while a statistically significant result indicates that FEM provides consistent estimates.

A series of diagnostic tests is conducted to ensure the reliability of the estimated models. Multicollinearity is assessed using the Variance Inflation Factor (VIF), with values exceeding 10 indicating potential concerns. Heteroscedasticity is examined using the Modified Wald test for groupwise heteroscedasticity, while serial correlation is detected using the Wooldridge test for autocorrelation in panel data.

When violations of classical regression assumptions are identified, the study employs the Generalized Least Squares (GLS) estimator. GLS is appropriate in the presence of heteroscedasticity and autocorrelation, as it provides efficient and unbiased parameter estimates by allowing for a flexible variance-covariance structure. Moreover, GLS accommodates individual-specific effects within panel data settings, making it a robust estimation technique for this study (Gujarati and Porter, 2009; Wooldridge, 2015).

### 3. Research Results

#### 3.1. Descriptive Results

The descriptive statistics and correlation matrix (Tables 2 and 3) offer initial evidence on the financial conditions and interrelationships among key variables for Vietnamese construction listed firms over the period 2011-2023. The sample exhibits persistently low average profitability (mean ROA of approximately 0.05) and a low average Tobin's Q (around 0.26), indicating subdued market valuation and limited growth expectations throughout the study period. These patterns are consistent with the capital-intensive nature of the construction sector and the prolonged cost pressures faced by firms.

Table 2. Descriptive Statistics of the Variables

Variable	Observations	Mean	Standard Deviation	Min	Max
<i>TobinQ</i>	1,207	0.2586	0.1916	0.0002	1.0327
<i>ROA</i>	1,209	0.0511	0.0646	-0.3119	0.4610
<i>INV1</i>	1,207	0.6374	0.3892	-0.1979	3.1640
<i>GTA</i>	1,205	0.0770	0.2814	-1	3.6429
<i>Cashflow</i>	1,206	0.2393	0.4832	-2.0955	6.7965
<i>LnConINV</i>	1,209	11.6336	0.2883	11.1196	11.9753
<i>Firmage</i>	1,209	8.4417	4.0118	0	17
<i>Liquidity</i>	1,207	0.6548	0.2180	0	1

Source: Calculated by the Authors

Table 3. Correlation Matrix of the Variables

	<i>TobinQ</i>	<i>ROA</i>	<i>INV1</i>	<i>GTA</i>	<i>Cashflow</i>	<i>LnConINV</i>	<i>Firmage</i>	<i>Liquidity</i>
<i>TobinQ</i>	1							
<i>ROA</i>	-0.2406***	1						
<i>INV1</i>	0.0151	0.1392***	1					
<i>GTA</i>	0.0717**	0.2398***	-0.0921***	1				
<i>Cashflow</i>	-0.2937***	0.6214***	-0.1088***	0.1925***	1			
<i>LnConINV</i>	-0.0268	-0.1505***	0.0977***	-0.0518*	-0.0559*	1		
<i>Firmage</i>	0.0875***	-0.2011***	0.1292***	-0.0592**	-0.1051***	0.9063***	1	
<i>Liquidity</i>	-0.3132***	-0.0534*	-0.2395***	-0.0458	0.0957***	0.0237	0.0179	1

Note: \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: Calculated by the Authors

The correlation results reveal several notable associations. Tobin's Q is negatively correlated with both accounting-based profitability measures and cash flow, suggesting that firms with weaker operating performance and internal liquidity tend to be discounted by the market. Although these correlations do not imply causality, they indicate that market valuation in the construction sector closely reflects firms' underlying financial fundamentals rather than speculative growth prospects. By contrast, the moderate positive correlation between ROA and the investment index implies that more profitable firms are better positioned to sustain investment activity, even though the overall level of investment remains modest.

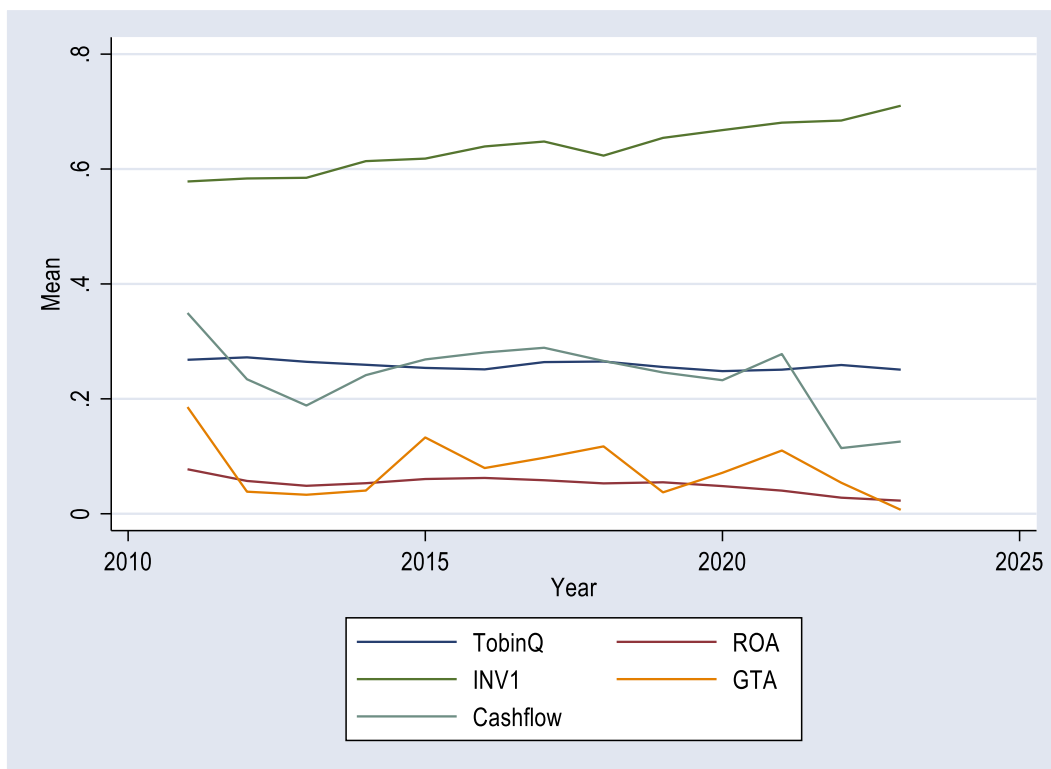
At the same time, the negative relationships between cash flow and investment, as well as between liquidity indicators and both Tobin's Q and profitability, point to binding internal financing constraints. These patterns suggest that firms facing liquidity pressure struggle to simultaneously maintain investment, profitability, and market

valuation. This finding aligns with theoretical expectations for capital-intensive industries, where investment decisions are highly sensitive to internal cash generation and financing capacity.

Firm age also appears to be an important dimension. The negative correlation between ROA and firm age, combined with the strong positive correlation between firm age and construction investment scale (LnConINV), indicates that older firms tend to be larger and more investment-intensive, but may face declining profitability. This pattern may reflect structural rigidities or lower operational flexibility among more established firms, although further econometric analysis is required to assess this relationship formally.

Figure 1 illustrates time-series patterns in GTA, cash flow relative to assets, sectoral social capital investment, and firm performance indicators (Tobin's Q and ROA). The figure shows a pronounced decline in ROA, GTA, and cash flow relative to assets after 2021, indicating a concurrent weakening of liquidity conditions and a slowdown in asset expansion across the construction sector. These trends likely follow the government's regulations on safety, occupational health, construction safety assessment costs, overhead costs, project management standards, and labor costs implemented in February 2021 (Government of Vietnam, 2021), which increased operational expenses and contributed to the decline in cash flow and asset growth in the construction sector. The joint decline in cash flow and asset growth underscores growing constraints on firms' internal financing capacity, a critical challenge in a capital-intensive industry such as construction.

Figure 1. Yearly Average of Dependent and Independent Variables



Source: Research by the Authors

Taken together, these trends imply that the effectiveness of firm-level investment is constrained by structural liquidity limitations, especially in the post-2021 period. Reduced internal cash generation weakens firms' ability to convert investment activity into short-term growth or market valuation gains, potentially amplifying differences across firm sizes and investment contexts. These observations provide a critical backdrop for the regression analysis that follows, which formally tests how firm size and sectoral social capital investment intensity condition the relationship between investment, profitability, and market valuation.

### 3.2. Estimation Results

Following the estimation strategy described in Section 3.2.3, model selection tests indicate that the Fixed Effects Model (FEM) is preferable to POLS and REM. Diagnostic tests further reveal the presence of heteroskedasticity and serial correlation, which motivates the use of the Generalized Least Squares (GLS) estimator. The GLS results, reported in Tables 4 and 5, therefore constitute the primary basis for interpretation.

The estimation results (Table 4) provide strong evidence that firm-level investment plays a significant role in shaping both market valuation and profitability in the construction sector. Consistent with Hypothesis H1, the investment index (INV1) exhibits a positive and statistically significant association with Tobin's Q in the full sample. This finding suggests that higher levels of firm investment are systematically associated with improved market valuation. When the sample is stratified by firm size, the positive effect remains significant and is notably stronger for large firms, indicating that scale may enhance firms' ability to translate investment activity into market value.

With respect to accounting-based performance, the investment index also demonstrates a positive and significant effect on ROA across all firm size categories, supporting Hypothesis H2. Unlike Tobin's Q, the magnitude of this effect appears relatively stable across subsamples, implying that firm investment contributes to operational profitability irrespective of firm size. This result suggests that while market valuation responds heterogeneously to investment depending on scale, profitability gains from investment are more uniform (Ajibola, 2025; Dybvig and Warachka, 2012).

Table 4. Regression Output of Research Models (1) and (2) by Full Sample and Firm Size for the GLS Method

Variable	Model 1 (TobinQ)			Model 2 (ROA)		
	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)
INV1	0.8976***	2.6994***	0.8226***	0.3410***	0.3115***	0.1922**
GTA	0.0211***	0.0070	0.0285***	0.0115***	0.0098***	0.0176***
Cashflow	-0.0372***	-0.0460***	-0.0423***	0.0814***	0.0691***	0.1149***
LnConINV* NV1	-0.0819***	-0.2254***	-0.0774***	-0.0265***	-0.0242***	-0.0133*
Firmage	0.0052***	0.0117***	0.0017	-0.0012***	-0.0005*	-0.0021***
Liquidity	-0.1362***	-0.1421***	-0.1237***	-0.0183***	-0.0241***	-0.0073
Constant	0.3342***	0.2594***	0.3093***	0.0305***	0.0318***	0.0198***

Note: \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: Research by the Authors

GTA is positively associated with ROA, indicating that expansion in asset base is linked to improved operating efficiency and profitability (Badruzaman *et al.*, 2019; Maggina *et al.*, 2012). In contrast, the cash flow to total assets ratio displays a mixed relationship: it is positively related to ROA but negatively associated with Tobin's Q. This pattern suggests that while internal liquidity supports short-term profitability, higher cash holdings may be perceived by investors as indicative of limited growth opportunities or suboptimal capital allocation, thereby exerting downward pressure on market valuation (Abel, 2018; Bond *et al.*, 2011; Gugler *et al.*, 2004).

A central contribution of this study lies in the analysis of sector-level social investment as a moderating factor. The interaction term between firm-level investment (INV1) and sector-level social investment intensity (LnConINV) is negative and statistically significant for both Tobin's Q and ROA. This result indicates that higher levels of sectoral investment weaken the positive effects of firm-specific investment on performance outcomes. The moderation effect is economically meaningful and suggests diminishing marginal returns to firm investment in environments characterized by elevated sector-wide investment intensity.

Subsample analysis further reveals that the negative moderating effect of sector-level investment is more pronounced among large firms. In these firms, the interaction term exhibits larger coefficients and higher statistical significance, implying that large firms are more sensitive to sector-wide investment conditions when converting firm-level investment into market valuation and profitability (Francois *et al.*, 2024). In contrast, the moderation effect is weaker or less consistently significant for smaller firms (Gjini and Kukeli, 2012; Tran *et al.*, 2023). These results highlight the imperative for firms and policymakers to consider sector-level investment dynamics when formulating investment and resource allocation strategies in capital-intensive industries (Hasnawati, 2020).

Control variables also exhibit systematic effects. Firm age is positively associated with Tobin's Q but negatively related to ROA, suggesting that older firms benefit from reputational advantages and market recognition, while simultaneously facing declining operational efficiency (Al-Dwiry *et al.*, 2021). Liquidity is negatively associated with both Tobin's Q and ROA, indicating that higher allocations to current assets may constrain firms' ability to generate returns and market value through productive investment (Fazzari *et al.*, 1987; Jensen, 1986).

Table 5 presents the regression results examining the effect of firm-level investment on firm performance across different firm sizes and levels of social capital investment. For the full sample and smaller firms, firm investment is negatively and significantly associated with Tobin's Q, whereas the relationship becomes positive and statistically significant for larger firms. This indicates clear heterogeneity in how investment translates into market valuation across firm sizes.

Table 5. Regression Output of Research Models (1) and (2) with Quantile-based Moderator by Full Sample and Firm Size for the GLS Method

Variable	Model 1 (TobinQ)			Model 2 (ROA)		
	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)
<i>INV1</i>	-0.0427***	0.0772***	-0.0502***	0.0374***	0.0277***	0.0409***
<i>GTA</i>	0.0247***	0.0072	0.0277***	0.0121***	0.0101***	0.0190***
<i>Cashflow</i>	-0.0376***	-0.0447***	-0.0418***	0.0815***	0.0682***	0.1145***
<i>LnConINV_q</i> <i>uantile*</i> <i>INV1</i>						
2	-0.0106	-0.0382***	-0.0123	-0.0051*	-0.0009	-0.0016
3	-0.0242**	-0.0742***	-0.0311**	-0.0095***	-0.0041	-0.0066
<i>Firmage</i>	0.0033***	0.0059***	-0.0004	-0.0016***	-0.0010***	-0.0023***
<i>Liquidity</i>	-0.1455***	-0.1239***	-0.1372***	-0.0191***	-0.0217***	-0.0073
Constant	0.3587***	0.3201***	0.3303***	0.0339***	0.0358***	0.0210***

Note: \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

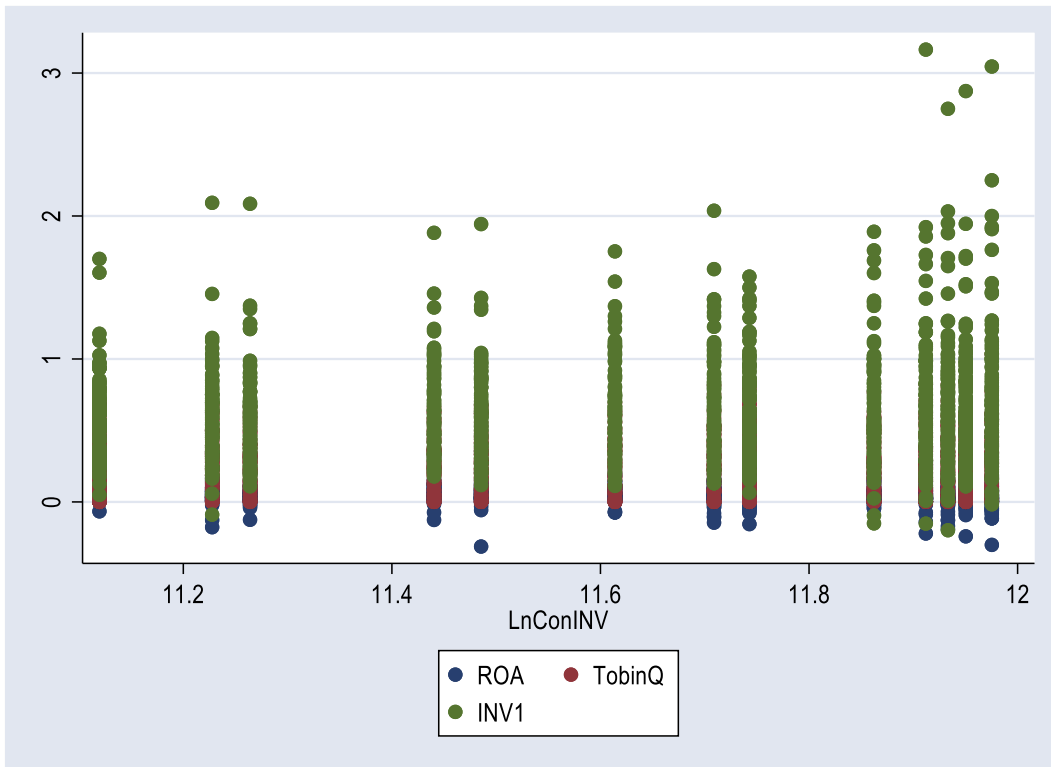
Source: Research by the Authors

The interaction terms between firm investment and higher quantiles of social capital investment are predominantly negative and significant, particularly for large firms, suggesting that increased social investment intensity weakens the marginal valuation effect of firm investment. These results point to nonlinear moderation effects in the investment–valuation relationship.

In contrast, firm investment is positively and significantly associated with ROA across the full sample as well as both firm size subsamples. The interaction terms with social capital investment are generally weaker and less consistently significant, indicating that accounting-based profitability is less sensitive to variation in social investment intensity. This suggests that while firm investment reliably improves operational performance, its effect on market-based valuation is more heterogeneous and contingent on firm size and the social investment environment.

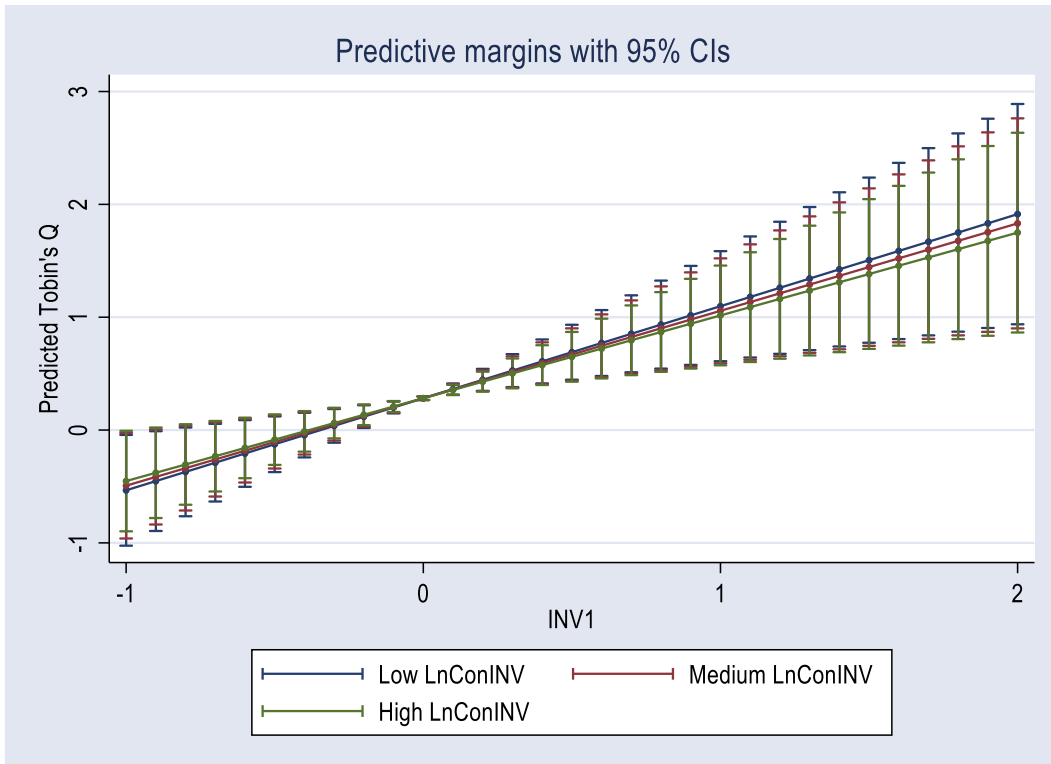
Figure 2 presents a scatterplot that classifies firms into three quantiles based on the intensity of sector-level social capital investment in the construction sector. The figure provides an initial visual indication that the relationship between firm-level investment and performance outcomes is heterogeneous across sectoral investment environments. Firms operating in low-investment environments (first quantile) display a clearer and more stable association between firm investment and performance, whereas observations in high-investment environments (third quantile) exhibit greater dispersion, suggesting increased variability in investment outcomes under conditions of elevated sectoral investment intensity.

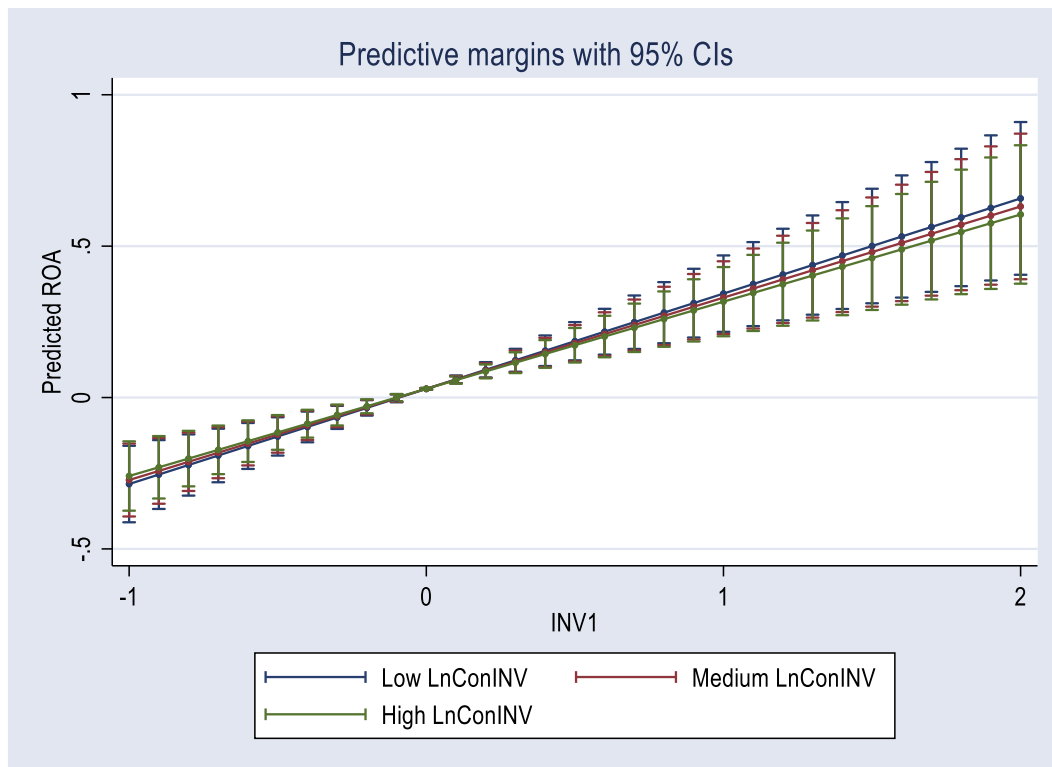
Figure 2. Scatterplot of Firm Performance and Investment Index versus Sectoral Social Capital Investment



Source: Research by the Authors

Figure 3. Predicted marginal effects (with 95% confidence intervals) of firm-level investment on Tobin's Q and ROA differentiated by sectoral social capital investment at quantile levels





Source: Research by the Authors

Figure 3 further substantiates this pattern by illustrating the predicted marginal effects of firm-level investment on ROA and Tobin's Q across different levels of sectoral social capital investment. The interaction plots show that firm investment is positively associated with both profitability and market valuation across all quantiles; however, the magnitude and precision of these effects differ markedly. For ROA, the marginal effect of firm investment remains positive and relatively stable across sectoral investment levels, as evidenced by overlapping confidence intervals, indicating that profitability gains from investment are comparatively robust to variations in sectoral social investment intensity. In contrast, the marginal effect on Tobin's Q weakens as sectoral investment intensity increases, accompanied by wider confidence intervals at higher quantiles. This pattern indicates growing uncertainty in how markets value firm-level investment in environments characterized by high sector-wide investment, suggesting that elevated sectoral investment may attenuate the valuation benefits of firm investment more strongly than its operational profitability effects.

These patterns highlight the presence of heterogeneity and nonlinearities in the investment–performance relationship, underscoring the importance of accounting for sectoral context and firm characteristics. To assess the stability and reliability of these findings, the following section conducts robustness tests using alternative model specifications and subsample analyses.

### 3.3. Robustness Tests

To assess the robustness of the findings, additional estimations were conducted using alternative model specifications. First, the models were re-estimated without including the moderating variable representing sector-level social investment (Table 6). Second, quantile-based regressions were employed to examine whether the estimated relationships vary across different levels of sectoral investment intensity (Table 7).

The results reported in Table 6 indicate that, in the absence of the moderator, firm-level investment performance exhibits a negative influence on Tobin's Q in the full sample. This contrasts with the baseline results and suggests that omitting sector-level investment conditions alters the estimated relationship between firm investment and market valuation. The persistence of this pattern across specifications highlights the sensitivity of Tobin's Q to contextual factors and underscores the importance of accounting for sector-level dynamics when evaluating firm valuation effects (Dybvig and Warachka, 2015; Tharavanij, 2024).

When the sample is divided by firm size, heterogeneous effects remain evident. For smaller firms, the negative relationship between firm investment performance and Tobin's Q persists, whereas for larger firms, the coefficient becomes positive and statistically significant. This finding is consistent with the baseline results and indicates that firm size systematically conditions how investment activity is reflected in market valuation.

With respect to operating performance, measured by ROA, firm-level investment maintains a positive and statistically significant effect across all firm size categories. This result remains stable across alternative specifications, providing strong evidence that investment activity contributes to profitability regardless of firm size or model formulation.

Table 6. Regression Output by Full Sample and Firm Size, excluding Moderator

Variable	Model 1 (TobinQ)			Model 2 (ROA)		
	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)	Full Sample (N=1,203)	Large Firms (n = 620)	Smaller Firms (n = 579)
<i>INV1</i>	-0.0524***	0.0274**	-0.0696***	0.0325***	0.0265***	0.0384***
<i>GTA</i>	0.0239***	0.0076	0.0256***	0.0118***	0.0096***	0.0182***
<i>Cashflow</i>	-0.0373***	-0.0499***	-0.0391***	0.0813***	0.0683***	0.1145***
<i>Firmage</i>	0.0023**	0.0015	-0.0024*	-0.0021***	-0.0012***	-0.0027***
<i>Liquidity</i>	-0.1437***	-0.1491***	-0.1455***	-0.0172***	-0.0221***	-0.0082***
Constant	0.3642***	0.3863***	0.3506***	0.0368***	0.0380***	0.0242***

Table 7. Regression Results by Moderator Quantiles

Variable	Model 1 (TobinQ)			Model 2 (ROA)		
	Quantile 1	Quantile 2	Quantile 3	Quantile 1	Quantile 2	Quantile 3
<i>INV1</i>	0.0033	0.0409***	-0.0530***	0.0563***	0.0268***	0.0276***
<i>GTA</i>	0.0682***	0.0603***	0.0219**	0.0189***	0.0117***	0.0245***
<i>Cashflow</i>	-0.0660***	-0.0867***	-0.0571***	0.1027***	0.0825***	0.0626***
<i>Firmage</i>	0.0138***	0.0199***	0.0180***	-0.0021***	-0.0020***	-0.0031***
<i>Liquidity</i>	-0.2302***	-0.1829***	-0.2729***	-0.0081	-0.0438***	0.0004
Constant	0.3667***	0.2238***	0.2657***	0.0142***	0.0607***	0.0411***

Note for Table 6 and Table 7: \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: Research by the Authors

The quantile regression results presented in Table 7 further support the robustness of the moderating role of sector-level investment intensity. In the lowest quantile of sectoral investment, firm-level investment demonstrates the strongest positive association with both Tobin's Q and ROA. As sectoral investment intensity increases, the magnitude of the investment coefficient declines, particularly for Tobin's Q, and becomes weaker or insignificant in the highest quantile. In contrast, the positive association between firm investment and ROA remains statistically significant across quantiles, although its magnitude diminishes at higher levels of sectoral investment (Sündal, 2023, Fazzari *et al.*, 1987).

Overall, the robustness tests confirm that the main findings of the study are not driven by a specific model specification or sample partition. While firm-level investment consistently enhances profitability, its effect on market valuation is heterogeneous and sensitive to firm size and sector-level investment conditions. These results reinforce the reliability of the baseline estimates and support the validity of the study's core conclusions.

#### 4. Discussions

The findings of this study provide important insights into how effectiveness of firm-level investment is conditioned by sector-level investment dynamics in capital-intensive industries. While investment at the firm level is generally associated with improved financial performance, the results demonstrate that these benefits are neither uniform nor unconditional. Instead, they depend critically on firm size and the intensity of sectoral social capital investment, highlighting the importance of industry context in shaping investment outcomes.

Supporting Hypothesis 1, the results indicate that investment policy has a positive and significant impact on market valuation (Tobin's Q) and profitability (ROA), consistent with the neoclassical theory and resource-based theory. Strategic investments enhance production capacity, operational efficiency, and shareholder value by enabling firms to expand scale, optimize resources, and create competitive advantages. However, this effect is stronger in large firms due to their better access to resources and better risk management, while smaller firms face constraints such as overinvestment or lack of scale.

Another highlighted finding of this research is the negative moderating role of sector-level social investments in the relationship between investment and firm performance, which confirms Hypothesis 2. High levels of sector-wide investment intensify competition for shared inputs, such as skilled labor, capital, and construction materials, thereby raising input costs and constraining resource availability. This crowding-out mechanism reduces the marginal returns to firm-level investment, particularly in environments characterized by elevated sectoral investment intensity. As a result, additional investment by individual firms yields diminishing gains in both profitability and market valuation.

This moderating effect is especially pronounced at higher levels of sectoral social investment (quantile 3), where the positive impact of firm investment on Tobin's Q weakens substantially or turns negative. These findings suggest that when sector-wide investment approaches saturation, firms compete more aggressively over scarce resources rather than expanding productive capacity efficiently. Consequently, market participants may discount firm-level investment, perceiving lower expected returns in highly congested investment environments.

The results are also consistent with the SCP framework, which posits that industry structure shapes firm behavior and performance outcomes (Bartolini *et al.*, 2023; Batten and Vo, 2018). In this context, high sectoral social capital investment represents a structural condition characterized by intensified competition and resource congestion. This environment constrains firms' strategic choices, increases operational costs, and shifts firm conduct toward defensive strategies focused on cost containment rather than value-enhancing expansion. Performance outcomes, therefore, reflect not only firm-specific decisions but also structural limitations imposed by the broader investment environment. By empirically quantifying this sectoral moderation effect, the study extends the SCP framework to an emerging market setting and highlights its relevance for capital-intensive industries (Gjini and Kukeli, 2012; Jensen, 1986).

Firm size further mediates these dynamics. The stronger negative moderation observed among large firms suggests that scale amplifies exposure to sector-level crowding-out effects. Large firms typically pursue capital-intensive strategies and rely heavily on shared inputs, making them more vulnerable to rising input prices and resource scarcity when sector-wide investment is high. Smaller firms, by contrast, may retain greater operational flexibility or adopt more selective investment strategies, allowing them to partially mitigate these pressures. This heterogeneity underscores that crowding-out effects are not uniform across firms and that size can both enhance investment capacity and increase structural vulnerability.

Finally, the roles of liquidity and firm age underscore the importance of strategic resource management. While firm age may confer reputational advantages and market recognition, it can also be associated with organizational rigidity and higher overhead costs, which weaken profitability. Similarly, excessive liquidity holdings may reflect conservative investment behavior that limits engagement in value-creating opportunities, thereby reducing both profitability and market valuation. Together, these findings suggest that adaptability, efficient capital allocation, and sensitivity to sector-level conditions are critical for sustaining performance as firms mature and as competitive pressures intensify.

## Conclusions and Further Research

Based on the results, policy implications aimed at enhancing investment efficiency and financial performance for firms in the construction sector include the following:

For government and regulatory authorities: Balance sector-level social investment to mitigate the crowding-out effect by prioritizing projects that complement private firms to share resources. Additionally, support smaller firms through preferential credit programs and tax reductions for strategic investments. Furthermore, monitor sector-investment quantiles to adjust policies, for instance, by limiting public investments in saturated areas to create space for private firms.

For firms in the construction sector: Large firms should diversify their resource sources to reduce the dependence on social investment, optimizing firm-level investment toward high-value projects to counter crowding-out. In addition, smaller firms need to avoid overinvestment by improving cash flow and liquidity management to maintain a stable ROA. Overall, firms should apply the SCP framework to align investment strategies with sector structures, such as collaborating with the state to secure resources.

In conclusion, this research found that firm-level investments positively drive performance of Vietnamese listed construction companies; however, sectoral social capital investment negatively moderates this link, particularly via crowding-out in high-investment contexts, as supported by SCP theory. However, the study has several limitations. Firstly, it mainly focuses on listed firms, limiting the generalizability to unlisted or smaller firms. Secondly, the study is specific to Vietnam's construction industry, restricting cross-sector applicability. Thirdly, this study relies solely on secondary data without addressing endogeneity. Future research could extend the analysis to unlisted firms or other sectors for comparative insights, employ instrumental approaches to mitigate endogeneity, or incorporate qualitative data to explore managerial perceptions of crowding out effects.

## Declarations

### Credit Authorship Contribution Statement:

**Nguyen Ngoc Khanh Linh:** Conceptualization, investigation, data curation, writing – original draft, writing – review and editing;

**Nguyen Thu Ha:** Conceptualization, methodology, software, formal analysis, data curation, validation, visualization, writing – original draft, writing – review and editing;

**Do Phuong Thao:** Conceptualization, writing – original draft, writing – review and editing.

**Declaration of Competing Interest:** The authors report there are no competing interests to declare.

**Declaration of Use of Generative AI and AI-assisted Technologies:** Generative AI and AI-assisted technologies were used in the preparation of this work to assist with language refinement, grammar correction, and stylistic improvements. The AI tools did not contribute to the development of research questions, theoretical framework, methodology, data analysis, or conclusions. All intellectual contributions, interpretations, and final decisions remain the responsibility of the author.

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