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Phan Tran Minh Hung, Vo Ngoc Tuong Vi, Vo Hoang Diem Trinh, Vo Hong Tam, Thi Kim Nguyen

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Institutional quality and cash holdings: empirical evidence from an emerging market

Phan Tran Minh Hung*

Hong Bang International University,
215 Dien Bien Phu Street, Gia Dinh Ward,
Ho Chi Minh City, Vietnam
Email: hungptm@hiu.vn
*Corresponding author

Vo Ngoc Tuong Vi

First Class Logistics Company Limited,
8 Cao Thang Street, Ban Co Ward, Ho Chi Minh City, Vietnam,
Ho Chi Minh City, Vietnam
Email: tuongvingvo@gmail.com

Vo Hoang Diem Trinh

University of Economics,
The University of Danang,
71 Ngu Hanh Son Street, Da Nang City, Vietnam
Email: trinhvhd@due.edu.vn

Vo Hong Tam

University of Economics,
The University of Danang,
71 Ngu Hanh Son Street, Da Nang City, Vietnam
Email: vohongtam@due.edu.vn

Thi Kim Nguyen

Excelsia University College,
1 Cityview Road, Pennant Hills, NSW 2120, Australia
Email: thikim.nguyen@excelsia.edu.au

Abstract: This study examines the impact of institutional quality on cash holdings among firms listed on the Vietnamese stock market. Using panel data from 2011–2024 and a fixed effects model (FEM), the findings reveal a negative relationship between institutional quality and cash holdings. The analysis further identifies significant moderating mechanisms in this relationship. Specifically, profitability and dividend payment strengthen the negative effect of institutional quality on cash holdings. In contrast, financial leverage, managerial ownership and executive duality weaken this disciplinary

effect, rendering corporate cash policies less responsive to improvements in institutional quality. These findings are consistent with the agency theory and the pecking order theory.

Keywords: institutional quality; cash holdings; moderating mechanisms; Vietnam; emerging market; Provincial Competitiveness Index; PCI; corporate governance; agency theory; pecking order theory; fixed effects model; FEM; system generalised method of moments; System-GMM; panel data; precautionary cash motive.

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Biographical notes: Phan Tran Minh Hung is a Faculty Member at Hong Bang International University, Vietnam. His research focuses on educational management and corporate finance, with particular emphasis on issues relevant to emerging markets. His work has been published in several reputable international peer-reviewed journals, including *Discover Education*, *Cogent Business & Management*, *Global Business and Finance Review*, *International Journal of Economics and Business Research*, and *Journal of Economics and Development*.

Vo Ngoc Tuong Vi holds a Master's degree. Her research interests focus on finance, corporate governance, stock markets, banking, and capital market studies. She is particularly interested in examining the determinants of firm performance, investor behaviour, corporate governance practices, and the development of financial markets in emerging economies. Her future research aims to explore issues related to stock markets, banking activities, capital structure, financial performance and capital market.

Vo Hoang Diem Trinh is the Deputy Dean of the Faculty of Banking, University of Economics, The University of Danang, Vietnam. Her research interests include banking, corporate finance, and financial economics, with particular emphasis on emerging markets. Her work focuses on corporate governance, ownership structure, credit risk, financial stability, and firm performance. Recently, she has extended her research to nonlinear dynamics in inventory management, trade credit, and short-term financing decisions. Her studies employ rigorous empirical approaches and contribute to the literature on corporate and banking behaviour in transitional economies.

Vo Hong Tam holds a PhD in Accounting and is currently affiliated with the University of Economics, The University of Danang, Vietnam. He has been engaged in teaching and research at the Faculty of Accounting since 2001. His areas of expertise include management accounting, financial analysis, and the application of digital technologies in accounting. He also teaches research methodology courses for undergraduate students. His research contributions in finance include: studies on corporate credit rating assessment; determinants of firm performance, ..., as well as the publication of the textbook financial statement analysis. Besides that, he is particularly interested in sustainable development, digital transformation and AI role. His work aims to enhance accounting students' adaptability and professional competencies, thereby contributing to the development of high-quality human resources for society.

Thi Kim Nguyen holds a PhD in Property Economics from Western Sydney University and brings over 20 years of combined industry and academic experience in property, accounting and finance, and leadership. Her research focuses on property investment, accounting and finance, and ESG and sustainability. She currently teaches leadership theory and research and serves as a Principal Supervisor for Master's theses at Excelsia University College. Her work has been published in leading international journals, including the *Journal of Property Investment and Finance*, *Pacific Rim Property Research Journal*, and the *International Journal of Business Innovation and Research*.

1 Introduction

In corporate finance, cash-holding decisions represent one of the core financial policies, reflecting a firm's liquidity position, financial flexibility and risk management capacity. Firms hold cash for three fundamental motives: transactional, precautionary and speculative, with the latter two emphasising cash as a buffer against uncertainty shocks and as a means to exploit future investment opportunities (Keynes, 1936).

Building on this foundation, modern corporate finance theories primarily explain cash holding behaviour at the firm level. The free cash flow theory (Jensen, 1986) argues that excessive cash holdings may enable managerial opportunism, increasing agency costs and reducing capital allocation efficiency. In contrast, the pecking order theory (Myers and Majluf, 1984) posits that under information asymmetry and high external financing costs, firms prefer internal funds, thereby increasing demand for cash reserves. Although these theories provide important explanations for firms' cash holding motives, they mainly focus on firm-specific characteristics and often assume that the external institutional environment is exogenous and homogeneous.

From an institutional economics perspective, institutions are defined as the formal and informal rules that shape the 'rules of the game' in economic activities (North, 1990). Institutional quality affects the protection of property rights, the effectiveness of contract enforcement, transaction costs and market transparency, thereby influencing firms' access to external financing and the degree of uncertainty they face. In this context, the institutional environment does not directly determine cash holding policies; rather, it may indirectly affect precautionary motives and cash accumulation behaviour by altering financing costs, institutional risk and the extent of firms' financial constraints.

Recent empirical studies have increasingly highlighted the role of institutional quality in shaping corporate financial behaviour, particularly in emerging and transition economies. Li et al. (2023) show that institutional fragility in China, stemming from inconsistencies within legal and political systems, heightens policy uncertainty and compels firms to maintain higher cash reserves as a self-protective mechanism. Conversely, in regions with higher institutional quality, characterised by transparent governance and effective corruption control, firms tend to enjoy better access to external financing, thereby reducing their precautionary demand for cash.

In the context of developing economies where institutional environments are often incomplete and substantial disparities exist across regions and over time, the relationship between institutional quality and cash holdings becomes particularly salient. Empirical

evidence suggests that improvements in legal and economic institutions enhance firms' access to external financing and reduce precautionary cash holdings (Zhang et al., 2023).

Despite growing international evidence on the influence of institutional quality on corporate financial behaviour (Dittmar et al., 2003; Pinkowitz et al., 2006), empirical evidence in Vietnam remains limited, particularly regarding corporate cash holding policies. Vietnam provides a compelling context to examine this relationship, as it is a transition economy with an uneven institutional development across regions (World Bank, 2014). Although the stock market has expanded significantly, the institutional environment continues to face constraints on transparency, enforcement effectiveness and investor protection (Malesky et al., 2015), which can increase uncertainty and raise the cost of external financing. Moreover, substantial variation in the quality of economic governance across provinces creates meaningful local institutional differences within a unified national legal framework (VCCI/USAID, 2023; Malesky and Taussig, 2009; Malesky et al., 2015). This context allows for an examination of how local institutional quality affects corporate cash holding decisions, avoiding confounding cross-country differences and highlighting the role of institutions in shaping the liquidity behaviour of listed firms in Vietnam.

This study contributes to the existing literature in two related dimensions. First, it provides empirical evidence on the direct relationship between provincial institutional quality and the cash holding policies of listed firms in Vietnam. Second, it extends prior research by examining the moderating role of internal financial and governance mechanisms including profitability, dividend payment, financial leverage, managerial ownership and board members' participation in executive management in the relationship between institutional quality and cash-holding behaviour. By incorporating these channels, the study demonstrates that the impact of institutional environments on corporate financial decisions is not uniform but varies according to firms' internal financial conditions and governance structures. In doing so, this study explicitly extends and distinguishes itself from Tran and Nguyen (2025), who establish a negative direct effect of national-level institutional quality on cash holdings in Vietnam via an economic uncertainty channel. While that study provides important foundational evidence, it does not exploit sub-national institutional variation, does not examine firm-level moderating mechanisms and does not address the dynamic and endogenous nature of cash-holding behaviour. The present study addresses each of these limitations, offering a more granular, theoretically richer and methodologically robust account of how institutional quality shapes corporate liquidity decisions in an emerging market.

2 Literature review and research hypothesis

Theories of cash holding motives suggest that firms maintain cash reserves to meet transaction needs, hedge against liquidity risk and exploit future investment opportunities (Keynes, 1936). Among these motives, the precautionary motive particularly emphasises the role of cash as a tool that enables firms to protect themselves against uncertainty shocks and constraints in accessing external financing. This perspective implies that when uncertainty and financial risk increase, firms tend to accumulate more cash to minimise the risk of operational disruptions and the potential costs associated with financial distress.

Building on this foundation, the free cash flow theory (Jensen, 1986) and the pecking order theory (Myers and Majluf, 1984) provide complementary mechanisms to explain cross-firm differences in cash holding policies. The free cash flow theory argues that high cash balances may reflect agency problems, whereby managers have incentives to retain excess cash beyond the optimal level in order to strengthen managerial control and pursue private benefits. In contrast, the pecking order theory highlights the role of information asymmetry and external financing costs, suggesting that firms prefer internal funds over external sources of financing, particularly under market conditions in which external capital is costly or difficult to obtain.

From an institutional theory perspective, institutional quality is a fundamental determinant of corporate behaviour and financial decisions, shaping outcome through legal frameworks, property rights protection and the effectiveness of contract enforcement (North, 1990). High-quality institutions reduce legal risk, enhance transparency and increase market predictability, thereby mitigating information asymmetry between firms and capital providers (La Porta et al., 1998; Beck et al., 2006). In such a context, firms can access external financing at lower cost and with fewer constraints, reducing the precautionary motive for holding cash (Almeida et al., 2004; Chen et al., 2014). Conversely, in economies with weak institutions, inadequate law enforcement and limited investor protection, policy uncertainty and restricted access to external financing encourage firms to accumulate cash as a self-protective measure against financial shocks and liquidity risk (Dittmar et al., 2003; Kalcheva and Lins, 2007). In particular, institutional fragility is identified as a key factor driving such precautionary behaviour in transition economies (Li et al., 2023). Beyond direct effects, the corporate governance literature suggests that external institutions and internal governance mechanisms may function as either complementary or substitutive mechanisms in disciplining corporate behaviour (Aguilera et al., 2008). Specifically, in high-quality institutional environments, internal governance mechanisms such as dividend policy or the use of financial leverage can operate more effectively as disciplinary tools, thereby amplifying the influence of institutions on corporate financial decisions, including cash holding policies (Harford et al., 2008; Farooq et al., 2023). Accordingly, the impact of institutional quality on cash holdings is not purely direct but depends substantially on its interaction with internal moderating mechanisms.

Although approached from different perspectives, these theories converge on a common insight: corporate cash holding behaviour is strongly influenced by the level of uncertainty, the cost of external financing and financial constraints. However, these factors are not determined solely by firm-specific characteristics but also depend substantially on the institutional environment in which firms operate. Therefore, in transition economies such as Vietnam where institutional quality varies considerably across regions, traditional corporate finance theories that primarily focus on firm-level determinants may not fully explain cross-firm differences in cash holding policies across heterogeneous institutional settings.

The relationship between institutional quality and cash holdings may be nonlinear and contingent upon the stage of institutional development (Li et al., 2023). During the early stages of institutional reform, when the business environment remains characterised by significant uncertainty and risk, firms tend to increase cash holdings as a precautionary mechanism to cope with financial shocks and limited access to external financing. In particular, uneven development across institutional dimensions such as political, legal

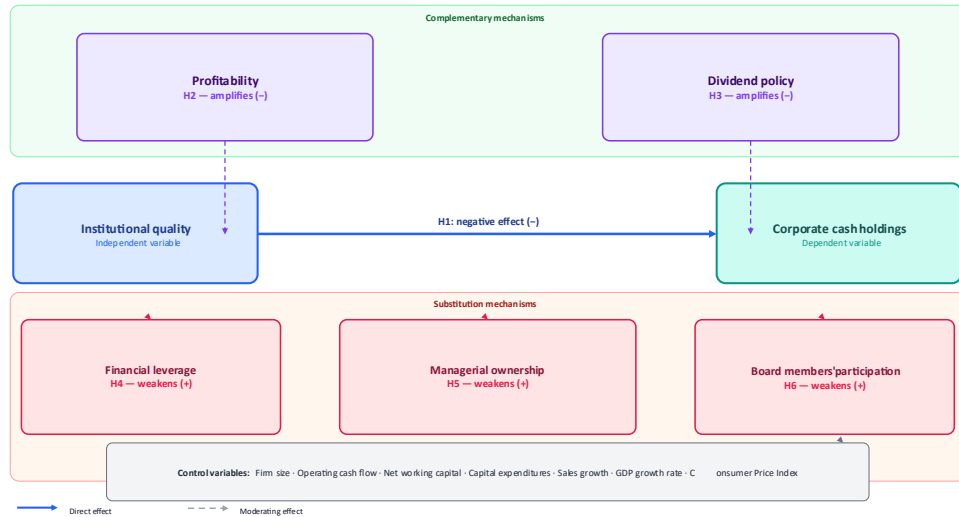
and financial systems conceptualised as institutional fragility, can heighten policy uncertainty and encourage firms to accumulate cash as a form of self-protection (Li et al., 2023).

Conversely, when institutional quality improves to a higher level – reflected in an effective legal system, stronger investor protection and more developed financial markets – the cost of external financing tends to decline, thereby weakening precautionary motives and leading firms to hold lower levels of cash. At advanced stages of institutional development, firms are more likely to reduce cash reserves due to improved access to external funding and more effective monitoring mechanisms (Zhang et al., 2023).

Recent international studies provide clear evidence on the role of institutional quality in shaping corporate cash holding policies. Specifically, Li et al. (2024), using data from 39 economies, show that firms operating in regions with higher local institutional quality tend to hold less cash, particularly under conditions of elevated risk, suggesting that stronger institutions reduce uncertainty and improve access to external financing. Complementing this finding, Chen et al. (2021), analysing a sample of multinational firms, document that improvements in corporate governance mechanisms, an important component of the institutional environment, are negatively associated with cash holdings, especially in countries characterised by weaker institutional frameworks. From a theoretical perspective, institutional quality influences corporate cash holding behaviour by reducing information asymmetry, agency costs and environmental uncertainty. When institutional quality improves, property rights and contracts are better protected, enabling firms to access external financing at lower cost and thereby reducing precautionary motives for holding cash. At the same time, an effective institutional environment strengthens market discipline and managerial monitoring, limiting opportunistic behaviour and the tendency to accumulate excess cash beyond optimal levels. Moreover, higher institutional quality contributes to lower policy risk and economic uncertainty, weakening the role of cash as a self-insurance mechanism. Accordingly, institutional quality is expected to exhibit a negative relationship with cash holdings.

Against this backdrop, the present study builds upon and explicitly departs from Tran and Nguyen (2025), who establish that national-level institutional quality – proxied by a composite World Governance Indicators index – reduces cash holdings in Vietnam primarily by mitigating economic uncertainty. While that study makes a valuable foundational contribution, three important limitations remain. First, a uniform country-level institutional proxy cannot capture the substantial governance heterogeneity across Vietnam's provinces, thereby obscuring the within-country variation most relevant to firm-level cash decisions. Second, the institutional quality-cash holdings nexus is treated as unconditional and homogeneous, leaving unexamined whether and how internal firm-level financial and governance characteristics moderate this relationship. Third, the exclusive reliance on static panel estimators does not adequately address the dynamic persistence of cash holdings or potential endogeneity. The present study addresses each of these gaps by employing a province-year institutional measure, introducing firm-level moderating mechanisms and applying system generalised method of moments (System-GMM) estimation.

Figure 1 Research framework: institutional quality, moderating mechanisms and cash holdings (see online version for colours)



Based on the theoretical framework and prior empirical evidence from both international and domestic studies, this study proposes the following hypothesis:

Hypothesis H1 Institutional quality is negatively associated with cash holdings among listed firms on the Vietnamese stock market.

From the theoretical perspective of the pecking order theory (Myers and Majluf, 1984) and agency theory (Jensen, 1986), highly profitable firms generate abundant internal cash flows that reduce precautionary liquidity needs and weaken managerial incentives to accumulate excess cash. When institutional quality improves, the disciplinary pressure from the external governance environment intensifies and profitable firms, which face lower financing constraints and bear lower marginal costs of adjusting their cash reserves are better positioned to respond to such institutional improvements by reducing their cash holdings more substantially. This complementary relationship between internal financial strength and external institutional discipline is consistent with Harford et al. (2008) and Farooq et al. (2023), who document that governance mechanisms operate more effectively in environments with stronger institutions. Accordingly, the following hypothesis is proposed:

Hypothesis H2 Profitability strengthens the negative effect of institutional quality on cash holdings.

Agency theory posits that dividend payments serve as a financial disciplinary mechanism by reducing free cash flow available for managerial discretion and increasing external monitoring pressure from shareholders (Jensen, 1986; La Porta et al., 2000). When firms commit to regular dividend distributions, managers face tighter constraints on cash accumulation and must demonstrate capital discipline. In high institutional quality environments where property rights and transparency are enhanced, dividend-paying firms are exposed to compounding governance pressures, both from market-level institutions and from the commitment signalling implicit in dividend payment, rendering

their cash holdings particularly sensitive to improvements in the institutional environment. This view is consistent with Pinkowitz et al. (2006) and Harford et al. (2008), who find that governance quality and dividend policy jointly discipline cash accumulation. Accordingly, the following hypothesis is proposed:

Hypothesis H3 Dividend payment strengthens the negative effect of institutional quality on cash holdings.

Although financial leverage generally disciplines managerial behaviour through debt covenants and creditor monitoring (Jensen, 1986; Myers and Majluf, 1984), it also creates a competing demand for liquidity. Highly leveraged firms must maintain adequate cash reserves to service debt obligations and hedge against the risk of financial distress, regardless of improvements in the external institutional environment (Opler et al., 1999; Ferreira and Vilela, 2004). Consequently, even when stronger institutions lower uncertainty and improve access to external financing, leveraged firms cannot fully translate these improvements into lower cash reserves because their debt structure imposes an independent liquidity constraint. This substitution logic, whereby debt-induced liquidity demand partially offsets the cash-reducing effect of better governance suggests that financial leverage weakens the sensitivity of cash holdings to institutional quality. Accordingly, the following hypothesis is proposed:

Hypothesis H4 Financial leverage weakens the negative effect of institutional quality on cash holdings.

Managerial ownership may align managerial incentives with shareholder interests, thereby reducing agency problems and limiting excess cash accumulation (Jensen and Meckling, 1976). However, at higher levels of ownership concentration, managerial entrenchment may intensify, leading managers to retain greater discretion over internal resources and resist external monitoring pressures including those arising from institutional improvements (Morck et al., 1988). When managers hold substantial equity stakes, they may be more inclined to rely on internally generated cash rather than accessing external capital markets, even in environments with strong institutions. This entrenchment effect means that managerial ownership can serve as an internal governance substitute that diminishes the disciplinary reach of institutional quality on cash-holding decisions, consistent with the substitution view of governance mechanisms (Aguilera et al., 2008). Accordingly, the following hypothesis is proposed:

Hypothesis H5 Managerial ownership weakens the negative effect of institutional quality on cash holdings.

Board members' participation in executive management – commonly referred to as executive duality – concentrates decision-making authority by conflating the supervisory and executive functions of corporate governance (Jensen, 1993; Fama and Jensen, 1983). When board members simultaneously hold executive positions, the independence of oversight is compromised, reducing the board's capacity to enforce disciplinary constraints on managerial cash accumulation. In such settings, managers exercise greater discretion over financial policy, making corporate cash decisions less responsive to external institutional improvements. Because the effectiveness of institutional discipline in constraining cash holdings depends partly on internal governance structures being receptive to external monitoring signals, executive duality by weakening internal governance independence acts as a substitution mechanism that attenuates the

cash-reducing effect of institutional quality. Accordingly, the following hypothesis is proposed:

Hypothesis H6 Board members' participation in executive management weakens the negative effect of institutional quality on cash holdings.

3 Research methodology and data

3.1 Empirical model

Building on the empirical modelling framework of Zhang et al. (2023) and Li et al. (2024), this study not only examines firm-level microeconomic determinants but also controls for macroeconomic conditions. Macroeconomic variables such as economic growth (GDP growth) and inflation (CPI) capture the level of business environment uncertainty as well as the cost of external financing in the economy, both of which may influence corporate cash holding decisions (Anand et al., 2018). Accordingly, these variables are incorporated into the model to control for the impact of the overall economic environment on corporate financial behaviour.

In addition, to mitigate potential endogeneity concerns, the independent variables are introduced in lagged form relative to the dependent variable. This approach helps reduce possible reverse causality between the dependent and explanatory variables, ensuring that the estimated relationships reflect the causal impact of the independent variables on cash holdings rather than bidirectional effects (Harford et al., 2009). The empirical model used to examine the relationship between institutional quality and cash holdings of listed firms in the Vietnamese stock market is specified as follows:

$$\begin{aligned} \text{CASH}_{i,t+1} = & \beta_0 + \beta_1 \text{PCI}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{CF}_{i,t} + \beta_4 \text{NWC}_{i,t} + \beta_5 \text{LEV}_{i,t} \\ & + \beta_6 \text{CAPEX}_{i,t} + \beta_7 \text{DIV}_{i,t} + \beta_8 \text{SG}_{i,t} + \beta_9 \text{GDPG}_t + \beta_{10} \text{CPI}_t \\ & + \mu_i + \varphi_p + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where i, t : firm i at time t ; CASH: cash holdings ratio; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index; μ : firm fixed effects; $\varepsilon_{i,t}$: random error term.

In this study, cash holdings (CASH) are measured as the ratio of cash and cash equivalents to total assets net of cash and cash equivalents, a proxy commonly employed in recent studies on corporate cash holding behaviour as it directly captures the level of liquidity firms maintain to cope with risk and financial constraints (Zhang et al., 2023; Li et al., 2024). Institutional quality is measured using the Provincial Competitiveness Index (PCI), which represents the local institutional environment and the quality of economic governance through dimensions such as transparency, informal costs, policy implementation effectiveness and property rights protection. In the Vietnamese context, PCI is considered an appropriate proxy for capturing institutional heterogeneity across provinces and has been widely used in empirical studies examining the impact of institutions on corporate financial decisions (Dang, 2013; Zhang et al., 2023; Li et al., 2024). The use of PCI allows this study to exploit cross-provincial institutional variation

within a single national legal framework, which is consistent with the fixed-effects regression approach.

Table 1 Variables used in the research model

<i>Variable</i>	<i>Abbreviation</i>	<i>Description</i>
Cash holdings	CASH1	(Cash and cash equivalents) / (total assets – cash and cash equivalents)
	CASH2	(Cash and cash equivalents + marketable securities) / total assets
Institutional quality	PCI	Provincial Competitiveness Index score
Firm size	SIZE	Natural logarithm of total assets
Cash flow	CF	Net cash flow from operating activities / total assets
Net working capital	NWC	(Current assets – current liabilities) / total assets
Financial leverage	LEV	financial debt / total assets
Capital expenditures	CAPEX	Expenditures on acquisition and construction of fixed assets / total assets
Dividend payment	DIV	Dividends paid divided by total assets
Sales growth	SG	The percentage change in sales from year $t - 1$ to year t
Economic growth	GDPG	GDP growth rate
Inflation	CPI	Consumer price index

3.2 Estimation methods

To examine the impact of institutional quality on the cash holding policies of listed firms in the Vietnamese stock market, this study employs a panel data framework. Given that the dataset consists of multiple firms observed over multiple years, the application of an appropriate estimation method is essential to ensure the consistency and reliability of the empirical results.

Specifically, the study adopts the fixed effects model (FEM) to control for unobserved firm-specific characteristics that are relatively time-invariant, such as risk appetite, corporate culture, or managerial capability. FEM allows for the elimination of potential bias arising from these unobservable factors while exploiting within-firm variations over time to estimate the effect of institutional quality on corporate cash holding behaviour. In addition, panel data in corporate finance commonly exhibit heteroskedasticity and serial correlation within firms over time. To address these issues, the study employs robust standard errors clustered at the firm level to ensure the reliability of statistical inference in the FEM estimations. However, since financial decisions are inherently dynamic and potential endogeneity may exist between explanatory variables and the dependent variable, the study further applies the dynamic System-GMM estimator to control for endogeneity when present. The System-GMM approach uses lagged values of variables as instruments to simultaneously address endogeneity, autocorrelation and unobserved fixed effects in dynamic panel data, thereby improving the consistency and efficiency of estimations compared with traditional static panel models (Arellano and Bover, 1995; Blundell and Bond, 1998).

Two potential identification concerns warrant explicit discussion: reverse causality from firm performance to provincial institutional quality and firm self-selection into

high-quality provinces. Regarding reverse causality, one might argue that provinces hosting more profitable or larger firms could attract higher governance quality over time, creating a spurious positive association between PCI and firm performance rather than a causal institutional effect on cash holdings. The study addresses this concern through three complementary mechanisms. First, the one-period lead structure of the dependent variable – whereby PCI is measured at time t and cash holdings at time $t + 1$ – establishes a temporal ordering that rules out contemporaneous reverse causality: cash holdings in the future cannot cause institutional quality today. Second, the inclusion of province fixed effects (φ^o) absorbs all time-invariant provincial characteristics, including structural economic conditions that might simultaneously attract both high-performing firms and strong governance. Third, the System-GMM estimator instruments current PCI with its own lagged values, which are correlated with current institutional quality but orthogonal to the current error term by construction, thereby addressing any remaining time-varying reverse causality.

Regarding self-selection, the concern is that firms with systematically different unobserved characteristics may sort into provinces based on institutional quality, creating a non-random assignment of firms to institutional environments. This concern is substantially mitigated by firm fixed effects, which absorb all time-invariant firm heterogeneity – including persistent firm quality, sector composition, or strategic preferences – that might drive both the choice of operating province and cash-holding behaviour. Identification therefore relies on within-firm, within-province variation over time, not on cross-sectional comparisons that would be susceptible to sorting bias. Furthermore, the Vietnamese institutional context renders the self-selection concern less severe than in settings where firms can easily relocate. Listed firms in Vietnam operate under a nationally unified legal framework and the registered legal domicile of a listed firm – which determines its PCI assignment – is rarely changed, as relocation requires regulatory approval and is associated with significant administrative costs (Malesky and Taussig, 2009). The PCI itself is constructed from surveys of the business community conducted independently by the Vietnam Chamber of Commerce and Industry (VCCI), capturing the perceived quality of provincial governance rather than being mechanically linked to firm-level financial outcomes. Taken together, the combination of lagged regressors, firm fixed effects, province fixed effects and System-GMM instrumentation provides a robust multi-layered defence against both reverse causality and self-selection bias in the estimated institutional quality-cash holdings relationship.

3.3 *Research data*

The study employs panel data of firms listed on the Vietnamese stock market over the period 2011 – 2024. Firm-level financial information is obtained from the FiiPro database; institutional quality data are collected from the PCI and the Provincial Governance and Public Administration Performance Index (PAPI); and corporate governance characteristics, including managerial ownership and executive directors, are compiled and cross-checked using the Vietstock database. Financial firms, including banks, insurance companies and financial leasing firms, are excluded from the sample due to substantial differences in operating characteristics, financial structure and cash management practices compared with non-financial firms. This approach is consistent with prior studies on corporate cash holding policies to ensure sample comparability and

homogeneity (Opler et al., 1999; Bates et al., 2009). In addition, firms with incomplete data for variables required in the empirical model are excluded from the analysis. To mitigate the influence of outliers, all variables are winsorised at the 2nd and 98th percentiles prior to quantitative analysis. The final dataset consists of 587 firms, yielding a total of 6,695 firm-year observations. Table 2 summarises the sample selection procedure.

Table 2 Sample selection procedure

<i>Selection criterion</i>	<i>No. of firms</i>	<i>No. of observations</i>
Initial sample: all firms listed on Vietnamese stock exchanges (2011–2024)	779	10,466
Less: financial firms, including banks, insurance companies and financial leasing firms	(165)	(2,166)
Non-financial firms	614	8,300
Less: firm-years with missing data on main and control variables	(16)	(1,190)
Less: observations lost due to one-period lead structure of dependent variable (cash at $t + 1$)	11	(415)
Final sample	587	6,695

4 Results

4.1 Descriptive statistics and correlations

Table 3 presents the descriptive statistics for all variables used in the research model.

Table 3 Descriptive statistics

<i>Stats</i>	<i>CASH1</i>	<i>CASH2</i>	<i>PCI</i>	<i>SIZE</i>	<i>CF</i>	<i>NWC</i>
N	6695	6695	6695	6695	6695	6695
Mean	0.1230	0.1098	63.6032	27.2617	0.0045	0.2252
Median	0.0675	0.0711	64.5600	27.1588	0.0016	0.1938
SD	0.1566	0.1137	4.1400	1.5363	0.0686	0.2199
Min	0.0019	0.0020	53.4000	24.2894	−0.1883	−0.1894
Max	0.7677	0.5012	70.6100	31.0640	0.1963	0.7479
<i>Stats</i>	<i>LEV</i>	<i>CAPEX</i>	<i>DIV</i>	<i>SG</i>	<i>GDPG</i>	<i>CPI</i>
N	6695	6695	6695	6695	6695	6695
Mean	0.2191	0.0455	0.0312	0.1227	6.0398	4.6202
Median	0.1936	0.0216	0.0190	0.0705	6.4222	3.2529
SD	0.1867	0.0597	0.0383	0.3938	1.7173	4.2450
Min	0	0	0	−0.6007	2.5537	0.6312
Max	0.6254	0.2623	0.1724	1.7390	8.5375	18.6777

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth; CPI: annual consumer price index.

Table 4 Correlation matrix

	CASH1	CASH2	PCI	SIZE	CF	NWC	LEV	CAPEX	DIV	SG	GDPG	CPI
CASH1	1											
CASH2	0.890***	1										
PCI	-0.0804***	-0.111***	1									
SIZE	-0.151***	-0.162***	0.130***	1								
CF	0.182***	0.159***	-0.0188	0.0102	1							
NWC	0.302***	0.349***	0.0460***	-0.336***	0.0192	1						
LEV	-0.325***	-0.338***	(0.0239)	0.414***	-0.0154	-0.593***	1					
CAPEX	-0.0644***	-0.0745***	-0.0680***	0.0828***	-0.0498***	-0.230***	0.159***	1				
DIV	0.262***	0.266***	-0.0416***	-0.133***	-0.0308*	0.309***	-0.351***	0.0154	1			
SG	-0.0174	-0.0107	-0.0529***	0.0409***	0.101***	-0.0420***	0.0500***	-0.0862***	-0.0947***	1		
GDPG	0.00877	-0.00508	-0.142***	-0.0273*	-0.0413***	-0.0038	0.00923	0.0618***	0.0299*	0.106***	1	
CPI	0.0580***	0.120***	-0.342***	-0.113***	0.0108	-0.0373**	0.0208	0.0685***	0.0359**	0.0456***	0.0340**	1

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital;

LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate;

CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dividend payment (DIV) has an average value of 0.0312, indicating that listed firms distribute cash dividends equal to about 3.12% of total assets on average during the sample period.

Table 4 presents pairwise correlations. PCI is negatively associated with both cash measures, providing preliminary evidence consistent with H1. Notably, correlation magnitudes among regressors remain below conventional thresholds (0.8) that would signal severe multicollinearity, supporting the feasibility of the multivariate specifications (Klein, 1962; Gujarati, 2009).

Table 5 Baseline regression results

<i>Variables</i>	<i>Model</i>	
	<i>CASH1_{i,t+1}</i>	<i>CASH2_{i,t+1}</i>
	(1)	(2)
PCI _{i,t}	−0.0034*** (0.0008)	−0.0030*** (0.0005)
SIZE _{i,t}	−0.0054 (0.0051)	−0.0041 (0.0039)
CF _{i,t}	0.3542*** (0.0308)	0.2140*** (0.0205)
NWC _{i,t}	0.0509** (0.0221)	0.0754*** (0.0183)
LEV _{i,t}	−0.1205*** (0.0206)	−0.0543*** (0.0191)
CAPEX _{i,t}	−0.0086 (0.0301)	−0.0239 (0.0214)
DIV _{i,t}	0.1951* (0.0998)	0.1302* (0.0745)
SG _{i,t}	0.0018 (0.0040)	0.0027 (0.0031)
GDPG _t	0.0001 (0.0006)	−0.0011** (0.0005)
CPI _t	0.0007 (0.0005)	0.0020*** (0.0004)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,695	6,695
Number of firms	587	587

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditure; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

4.2 Regression results

4.2.1 Baseline regression results

Table 5 reports fixed-effects regressions with firm-clustered robust standard errors. Specifically, Models (1) and (2) employ, respectively, (cash and cash equivalents) / (total assets minus cash and cash equivalents) and (cash and cash equivalents plus marketable securities)/total assets as dependent variables. Based on Hypothesis H1 which predicts a negative relationship between institutional quality and cash holdings among Vietnamese listed firms, the estimated coefficients on institutional quality (PCI) are expected to be negative and statistically significant.

The baseline regression results reported in Table 5 show that the estimated coefficients on institutional quality (PCI) are negative and statistically significant at the 1% level in both models, indicating that improvements in provincial institutional quality are associated with lower cash holdings. In other words, these results confirm an inverse relationship between institutional quality and firms' cash holding behaviour.

Beyond statistical significance, the estimated coefficients carry meaningful economic magnitude. The coefficient on PCI in Model (1) is -0.0034 , indicating that a one-unit increase in the PCI score is associated with a reduction in CASH1 of approximately 0.34 percentage points, holding all other variables constant. Given that the standard deviation of PCI in the sample is 4.14 points, a one-standard-deviation improvement in provincial institutional quality is associated with a reduction in CASH1 of approximately 0.0141 (i.e., -0.0034×4.14), which corresponds to approximately 11.5% of the sample mean of CASH1 (0.1230). The result for CASH2 is comparable: a one-standard-deviation increase in PCI is associated with a decline in CASH2 of approximately 0.0124, equivalent to 11.3% of the sample mean of CASH2 (0.1098). To contextualise the full range of institutional variation in Vietnam, firms located in provinces at the top of the PCI distribution score approximately 25 points higher than those at the bottom. Applying the estimated coefficient, this full range of institutional quality is associated with a difference in CASH1 of approximately 0.085 – equivalent to 69% of the sample mean – underscoring the economically substantive role of provincial governance quality in shaping corporate liquidity in Vietnam. These magnitudes are broadly comparable to those reported by Li et al. (2024) and Zhang et al. (2023) for institutional quality effects on cash holdings in other emerging markets, providing further confidence that the estimates are economically reasonable.

This finding is consistent with agency theory (Jensen, 1986), which suggests that an effective institutional environment strengthens external monitoring mechanisms and constrains managerial incentives to accumulate cash for private benefits. At the same time, the result aligns with the pecking order theory (Myers and Majluf, 1984), whereby improved institutional quality reduces information asymmetry and external financing costs, thereby lowering firms' need to maintain precautionary cash reserves to mitigate financial constraints. The evidence is also consistent with Zhang et al. (2023) and Li et al. (2024), who document that institutional quality plays a critical role in reducing firms' reliance on cash as a self-insurance mechanism in emerging economies. In the Vietnamese context, where substantial variation in governance quality and administrative efficiency exists across provinces despite a unified national legal framework, improvements in provincial institutional quality reduce policy uncertainty, enhance transparency and facilitate firms' access to external financing. As a result, firms operating

in provinces with stronger institutional environments face lower precautionary liquidity needs and are less inclined to accumulate excess cash reserves. These findings therefore highlight the important role of provincial-level institutions in shaping corporate liquidity policies in Vietnam.

Regarding the control variables, operating cash flow (CF) exhibits a positive and statistically significant effect at the 1% level in both models, suggesting that firms generating higher internal cash flows tend to maintain larger cash reserves (Opler et al., 1999; Almeida et al., 2004; Bates et al., 2009). Similarly, net working capital (NWC) also shows a positive and significant coefficient, reflecting the role of internal financial resources in shaping corporate cash holding decisions (Opler et al., 1999; Ferreira and Vilela, 2004). Financial leverage (LEV) carries a negative and statistically significant coefficient at the 1% level across both models, implying that debt serves as a financial disciplinary mechanism that constrains excessive cash accumulation (Jensen, 1986; Opler et al., 1999; Ferreira and Vilela, 2004). Other variables, including firm size (SIZE), capital expenditures (CAPEX) and sales growth (SG), do not exhibit statistically significant effects in either model (Opler et al., 1999; Ferreira and Vilela, 2004). The dividend variable (DIV) shows a positive coefficient and is statistically significant at the 10% level in Model (1), while remaining insignificant in Model (2) (Opler et al., 1999; Pinkowitz et al., 2006).

4.3 Robustness checks

To verify the robustness of the baseline results, this study conducts several additional tests using alternative empirical specifications and variable measurements. Specifically, robustness checks include alternative cash-holding measures, an alternative proxy for institutional quality, an alternative model specification and a dynamic model to address potential endogeneity and persistence in cash-holding behaviour. These analyses ensure that the main findings are not driven by model specification or measurement choices.

4.3.1 Alternative cash-holding measures

The study further employs alternative measures of cash holdings. Specifically, CASH3 is measured as the ratio of cash and cash equivalents to total assets (Adza et al., 2025; Mura, 2025). In addition, CASH4 is defined as the ratio of cash and cash equivalents plus marketable securities to total assets net of cash and marketable securities (Dittmar et al., 2003; Xiong et al., 2023).

Table 6 re-estimates the baseline model using alternative proxies (CASH3 and CASH4). The PCI coefficients remain negative and significant at the 1% level across both specifications, indicating that the main conclusion is not sensitive to how cash holdings are scaled. The stability of sign and significance across measures strengthens confidence that the institutional quality-cash holdings relationship is systematic rather than an artefact of variable construction.

Table 6 Robustness test – alternative measures of cash holdings

Variables	Model	
	CASH3 _{i,t+1}	CASH4 _{i,t+1}
	(1)	(2)
PCI _{i,t}	−0.0024*** (0.0004)	−0.0040*** (0.0007)
SIZE _{i,t}	0.0021 (0.0026)	0.0068 (0.0044)
CF _{i,t}	0.5462*** (0.0104)	0.9261*** (0.0239)
NWC _{i,t}	0.1055*** (0.0123)	0.1890*** (0.0236)
LEV _{i,t}	−0.0700*** (0.0126)	−0.0863*** (0.0214)
CAPEX _{i,t}	0.0395** (0.0153)	0.0492* (0.0269)
DIV _{i,t}	0.1359*** (0.0391)	0.2093*** (0.0770)
SG _{i,t}	−0.0044*** (0.0014)	−0.0101*** (0.0026)
GDPG _t	0.0014*** (0.0005)	0.0031*** (0.0010)
CPI _t	0.0024*** (0.0004)	0.0048*** (0.0008)
CONSTANT	0.1835*** (0.0589)	0.1719* (0.0968)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,695	6,695
Number of firms	587	587

Notes: CASH3 and CASH4: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Clustered robust standard errors at the firm level are reported in parentheses.

4.3.2 Alternative institutional quality measure

The study employs the PCI to measure institutional quality and documents an inverse relationship between institutional quality and cash holdings among listed firms in Vietnam. To test the robustness of the results and reduce reliance on a single institutional

proxy, the study further employs corruption control (TN) as an alternative measure of institutional quality.

Table 7 Robustness test – an alternative measure of institutional quality

<i>Variables</i>	<i>Model</i>	
	<i>CASH1_{i,t+1}</i>	<i>CASH2_{i,t+1}</i>
	(1)	(2)
PCI _{i,t}	−0.0110*** (0.0036)	−0.0073*** (0.0026)
SIZE _{i,t}	−0.0111** (0.0046)	−0.0101*** (0.0035)
CF _{i,t}	0.3601*** (0.0312)	0.2199*** (0.0207)
NWC _{i,t}	0.0489** (0.0223)	0.0738*** (0.0184)
LEV _{i,t}	−0.1086*** (0.0201)	−0.0423** (0.0187)
CAPEX _{i,t}	−0.0054 (0.0305)	−0.0183 (0.0216)
DIV _{i,t}	0.2107** (0.0975)	0.1467** (0.0740)
SG _{i,t}	0.0026 (0.0041)	0.0035 (0.0031)
GDPG _t	−0.0001 (0.0007)	−0.0011** (0.0005)
CPI _t	0.0013** (0.0005)	0.0025*** (0.0004)
CONSTANT	0.4967*** (0.1179)	0.4173*** (0.0898)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,732	6,732
Number of firms	587	587

Notes: CASH1 and CASH2: cash holdings; TN: corruption control; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

Corruption control reflects the level of transparency and integrity of the provincial institutional environment and is measured based on the transparency component of the Provincial Governance and PAPI. Using corruption control as an alternative proxy for institutional quality is consistent with corporate finance theory, which suggests that corporate cash-holding decisions are influenced by the institutional environment and the level of uncertainty surrounding decision-making (Opler et al., 1999; Ferreira and Vilela, 2004). Prior studies have likewise employed alternative institutional proxies, including transparency and corruption control, to examine the robustness of the relationship between institutions and corporate financial policies (Dittmar et al., 2003; Bates et al., 2009; Chen et al., 2021).

Following this approach, the model is re-estimated using corruption control (TN) as the main independent variable, while the dependent variable is alternatively measured by CASH1 and CASH2 and the set of control variables remains unchanged from the baseline specification. The estimation results are presented in Table 7.

The results show that the coefficients on corruption control (TN) are again negative and significant at the 1% level, corroborating the baseline evidence that stronger corruption control corresponding to a more transparent institutional environment is associated with lower levels of cash holdings. This reduces concerns that results are driven by idiosyncrasies of institutional quality, thereby reinforcing the robustness and reliability of the study's empirical results.

4.3.3 An alternative model

The study conducts an additional specification test by modifying the research model. Specifically, we re-specify the model by using cash holdings measured contemporaneously (time t) rather than $t + 1$ while retaining the same set of explanatory and control variables as in the baseline model. The modified research model is specified as follows:

$$\begin{aligned} \text{CASH}_{i,t} = & \alpha_0 + \alpha_1 \text{PCI}_{i,t} + \alpha_2 \text{SIZE}_{i,t} + \alpha_3 \text{CF}_{i,t} + \alpha_4 \text{NWC}_{i,t} + \alpha_5 \text{LEV}_{i,t} \\ & + \alpha_6 \text{CAPEX}_{i,t} + \alpha_7 \text{DIV}_{i,t} + \alpha_8 \text{SG}_{i,t} + \alpha_9 \text{GDPG}_t + \alpha_{10} \text{CPI}_t \\ & + \mu_i + \varphi_p + \varepsilon_{i,t} \end{aligned} \quad (2)$$

These variables are detailed in Table 8

The institutional quality coefficients remain negative and highly significant across all models in Table 8, suggesting that the documented relationship does not hinge on the lead structure of the dependent variable and is robust to this alternative timing convention. Overall, the results from the alternative model specification confirm that the inverse relationship between institutional quality and cash holdings persists even after adjusting the model structure and the measurement of the dependent variable. This evidence further supports the robustness and reliability of the study's main findings for listed firms in Vietnam.

Table 8 Robustness test – an alternative model

<i>Variables</i>	<i>Model</i>	
	<i>CASH1_{i,t+1}</i>	<i>CASH2_{i,t+1}</i>
	(1)	(2)
PCI _{i,t}	−0.0044*** (0.0008)	−0.0040*** (0.0005)
SIZE _{i,t}	0.0084* (0.0051)	0.0016 (0.0041)
CF _{i,t}	0.8526*** (0.0238)	0.5044*** (0.0163)
NWC _{i,t}	0.1747*** (0.0220)	0.1739*** (0.0179)
LEV _{i,t}	−0.1007*** (0.0204)	−0.0254 (0.0192)
CAPEX _{i,t}	0.0740*** (0.0274)	0.0382* (0.0216)
DIV _{i,t}	0.2602*** (0.0839)	0.1824*** (0.0620)
SG _{i,t}	−0.0103*** (0.0030)	−0.0020 (0.0027)
GDPG _t	0.0013** (0.0005)	−0.0002 (0.0004)
CPI _t	0.0003 (0.0004)	0.0014*** (0.0003)
CONSTANT	0.1460 (0.1144)	0.2852*** (0.0989)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	7,124	7,124
Number of firms	595	595

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

4.3.4 A dynamic model

To address potential endogeneity concerns and capture the dynamic nature of corporate cash-holding behaviour, the study employs a dynamic model by incorporating the lagged dependent variable into the model specification. This approach helps control for omitted variable bias, serial correlation and potential reverse causality between cash holdings and firm-specific financial factors. The modified dynamic model is specified as follows:

$$\begin{aligned} \text{CASH}_{i,t+1} = & \alpha_0 + \alpha_1 \text{CASH}_{i,t} + \alpha_2 \text{PCI}_t + \alpha_3 \text{SIZE}_{i,t} + \alpha_4 \text{CF}_{i,t} + \alpha_5 \text{NWC}_{i,t} \\ & + \alpha_6 \text{LEV}_{i,t} + \alpha_7 \text{CAPEX}_{i,t} + \alpha_8 \text{DIV}_{i,t} + \alpha_9 \text{SG}_{i,t} + \alpha_{10} \text{GDPG}_t \\ & + \alpha_{11} \text{CPI}_t + \varphi_p + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Model (3) is estimated using the System-GMM approach proposed by Blundell and Bond (1998), which extends the difference GMM method developed by Arellano and Bond (1991). This method allows the use of appropriate lagged variables as instruments to address endogeneity concerns while simultaneously controlling for the dynamic behaviour of the dependent variable. Moreover, System-GMM is particularly suitable for panel datasets characterised by a short time dimension and a large cross-sectional dimension, as well as for unbalanced panel data such as that used in this study (Roodman, 2009).

The diagnostic test results indicate that the p-values of the AR(2) test are 0.562 and 0.560, respectively, both exceeding 0.10, suggesting the absence of second-order serial correlation in the residuals. The AR(1) test yields p-values of 0.000 in both models, confirming the presence of first-order serial correlation in the first-differenced residuals, as expected under a correctly specified dynamic model. In addition, the Hansen test for instrument validity yields p-values of 0.181 and 0.278, indicating that the null hypothesis of instrument exogeneity cannot be rejected. The number of instruments is 76 in Model (1) and 85 in Model (2). Both of which are well below the number of firms in the sample (587), satisfying the instrument count rule of thumb recommended by Roodman (2009) to avoid instrument proliferation and the associated bias in the Hansen test p-value towards 1. Therefore, the estimates obtained from the System-GMM model are considered reliable.

The results reported in Table 9 show that the estimated coefficients on institutional quality (PCI) remain negative and statistically significant in both models. This finding confirms that the inverse relationship between institutional quality and cash holdings persists even after accounting for dynamic adjustment and instrument-based identification.

Table 9 Robustness test – a dynamic model

<i>Variables</i>	<i>Model</i>	
	<i>CASH1_{i,t+1}</i>	<i>CASH2_{i,t+1}</i>
	(1)	(2)
PCI _{i,t}	−0.0055*** (0.0019)	−0.0016*** (0.0005)
SIZE _{i,t}	0.0116 (0.0154)	0.0026 (0.0021)
CF _{i,t}	−0.0072 (0.1346)	−0.0618* (0.0336)
NWC _{i,t}	0.0759 (0.0649)	0.0165 (0.0154)
LEV _{i,t}	−0.0992*** (0.0384)	−0.0511*** (0.0096)
CAPEX _{i,t}	0.0674 (0.1386)	−0.0071 (0.0227)
DIV _{i,t}	1.2975* (0.6986)	0.2754*** (0.0813)
SG _{i,t}	−0.0138 (0.0185)	−0.0040 (0.0037)
GDPG _t	−0.0015 (0.001)	−0.0012*** (0.0005)
CPI _t	0.0014 (0.0014)	0.0017*** (0.0003)

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors are reported in parentheses. The results are estimated using the two-step System-GMM estimator with Windmeijer (2005) finite-sample corrected standard errors. The dependent variables are at time $t + 1$. For CASH1, GMM-type instruments for the difference equation are constructed from lagged levels of the dependent variable beginning at the third lag ($t - 3$) and all available subsequent lags, collapsed into a single instrument column per time period following Beck and Levine (2004) and Roodman (2009) to prevent instrument proliferation. For CASH2, the instrument set is restricted to the third lag only ($t - 3$). In both specifications, instruments are consistent with the additional moment conditions of Blundell and Bond (1998). The PCI index, firm-level financial variables and macroeconomic controls are treated as strictly exogenous and entered as standard IV instruments in both equations. Forward orthogonal deviations are applied in place of first differences to maximise the use of available observations.

Table 9 Robustness test – a dynamic model (continued)

Variables	Model	
	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)
CASH1 _{i,t}	0.4242*** (0.1496)	
CASH2 _{i,t}		0.5625*** (0.0556)
CONSTANT	-1.7992 (2.9474)	-0.5363* (0.3017)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
AR1P	0.000	0.000
AR2P	0.562	0.56
HANSEN P	0.181	0.278
No. of instruments	76	85
Observations	6,695	6,695
Number of firms	587	587

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors are reported in parentheses. The results are estimated using the two-step System-GMM estimator with Windmeijer (2005) finite-sample corrected standard errors. The dependent variables are at time $t + 1$. For CASH1, GMM-type instruments for the difference equation are constructed from lagged levels of the dependent variable beginning at the third lag ($t - 3$) and all available subsequent lags, collapsed into a single instrument column per time period following Beck and Levine (2004) and Roodman (2009) to prevent instrument proliferation. For CASH2, the instrument set is restricted to the third lag only ($t - 3$). In both specifications, instruments are consistent with the additional moment conditions of Blundell and Bond (1998). The PCI index, firm-level financial variables and macroeconomic controls are treated as strictly exogenous and entered as standard IV instruments in both equations. Forward orthogonal deviations are applied in place of first differences to maximise the use of available observations.

4.4 Moderating mechanisms

In this study, the impact of institutional quality on cash holdings is examined as potentially heterogeneous across firms, depending on differences in financial structure and internal governance mechanisms. Accordingly, the moderating variables are conceptualised into two distinct channels:

- 1 complementary mechanisms, which are expected to amplify the cash-reducing effect of institutional quality

- 2 substitution mechanisms, which may weaken the disciplinary role of the institutional environment.

4.4.1 Profitability

In this study, profitability is measured using two indicators, namely return on assets (ROA) and return on equity (ROE). Specifically, ROA is calculated as earnings before interest and taxes (EBIT) divided by total assets (Laghari et al., 2023; Timbate et al., 2024), while ROE is defined as EBIT divided by shareholders' equity. The use of EBIT rather than net income as the numerator is deliberate and methodologically justified for two reasons. First, EBIT-based measures isolate operating performance by abstracting from differences in capital structure and tax regimes across firms and years, thereby providing a cleaner signal of a firm's core earnings capacity that is not confounded by financing decisions or tax planning (Laghari et al., 2023). This is particularly important in an emerging market context such as Vietnam, where corporate tax rates and interest expense deductibility have varied over the sample period 2011–2024, making net income less comparable across firms and time. Second, because the study examines how profitability moderates the relationship between institutional quality and cash holdings, the relevant construct is the firm's capacity to generate internal funds from operations – a concept more accurately captured by EBIT than by net income, which embeds the financing structure that may itself be endogenous to the cash-holding decision (Timbate et al., 2024). This definition is consistent with recent empirical studies on cash holdings in emerging markets (Laghari et al., 2023; Timbate et al., 2024). The analysis focuses on the estimated coefficients on the interaction term between institutional quality and profitability.

Table 10 examines whether profitability amplifies the disciplinary effect of institutional quality. The estimated coefficients on the interaction terms between institutional quality and profitability ($PCI * ROA$ and $PCI * ROE$) are negative and statistically significant at the 1% level across all model specifications, indicating that the cash-reducing effect of improved institutional quality is stronger for more profitable firms. In other words, for firms with higher profitability, improvements in the institutional environment lead to a stronger reduction in cash holdings compared to less profitable firms.

This finding suggests that firms with stronger operating performance and abundant internal resources face a reduced need to maintain precautionary liquidity buffers when institutional conditions improve. As institutional quality lowers uncertainty and external financing costs, profitable firms are better positioned to rely on internal cash flows rather than excess cash reserves to manage financial risk. Consequently, the disciplining role of institutional quality becomes more pronounced among financially strong firms.

These results are consistent with the pecking order theory (Myers and Majluf, 1984), which posits that firms with greater internal financing capacity depend less on precautionary cash holdings. Accordingly, profitability functions as a complementary governance mechanism that strengthens the effectiveness of institutional discipline in constraining excessive cash accumulation, indicating that external institutional improvements and internal financial strength jointly reinforce corporate liquidity discipline.

Table 10 The moderating effect of profitability

Variables	Model			
	CASH1 _{i,t+1}	CASH2 _{i,t+1}	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)	(3)	(4)
PCI _{i,t}	−0.0017** (0.0007)	−0.0014*** (0.0005)	−0.0022*** (0.0007)	−0.0019*** (0.0005)
PCI _{i,t} * ROA _{i,t}	−0.0292*** (0.0088)	−0.0284*** (0.0059)		
PCI _{i,t} * ROE _{i,t}			−0.0130*** (0.0039)	−0.0127*** (0.0029)
ROA _{i,t}	1.9609*** (0.5681)	1.8960*** (0.3782)		
ROE _{i,t}			0.8542*** (0.2462)	0.8363*** (0.1811)
SIZE _{i,t}	−0.0056 (0.0050)	−0.0042 (0.0038)	−0.0053 (0.0051)	−0.0040 (0.0038)
CF _{i,t}	0.3424*** (0.0297)	0.2034*** (0.0199)	0.3457*** (0.0304)	0.2055*** (0.0203)
NWC _{i,t}	0.0472** (0.0223)	0.0725*** (0.0185)	0.0507** (0.0221)	0.0751*** (0.0182)
LEV _{i,t}	−0.1012*** (0.0213)	−0.0373* (0.0200)	−0.1107*** (0.0214)	−0.0441** (0.0197)
CAPEX _{i,t}	−0.0292 (0.0297)	−0.0419** (0.0210)	−0.0221 (0.0301)	−0.0376* (0.0216)
DIV _{i,t}	0.1145 (0.0981)	0.0590 (0.0721)	0.1587 (0.0985)	0.0932 (0.0733)
SG _{i,t}	−0.0006 (0.0041)	0.0007 (0.0031)	0.0001 (0.0041)	0.0009 (0.0031)
GDPG _t	0.0000 (0.0006)	−0.0013*** (0.0005)	0.0000 (0.0006)	−0.0012*** (0.0005)
CPI _t	0.0008* (0.0005)	0.0021*** (0.0004)	0.0008 (0.0005)	0.0021*** (0.0004)
Constant	0.3844*** (0.1191)	0.2983*** (0.0939)	0.4118*** (0.1185)	0.3251*** (0.0916)
Firm fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	6,695	6,695	6,695	6,695
Number of firms	587	587	587	587

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; ROA: return on assets; ROE: return on equity; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

In terms of economic magnitude, the estimated coefficient on $PCI * ROA$ is -0.0292 . Given that the sample standard deviation of ROA is approximately 0.069, a one-standard-deviation increase in ROA amplifies the marginal effect of a one-unit PCI increase on CASH1 by an additional 0.0020 (i.e., -0.0292×0.069). This implies that for a firm whose ROA is one standard deviation above the sample mean, the total marginal effect of PCI on CASH1 is approximately -0.0054 (baseline -0.0034 plus interaction -0.0020), which is approximately 59% stronger than the baseline effect. Evaluated at a one-standard-deviation increase in PCI (4.14 points), this translates to an additional reduction in CASH1 of approximately 0.0083, or 6.7% of the sample mean, attributable solely to the complementary effect of profitability. These magnitudes confirm that profitability is not merely a statistically significant moderator but one with substantive economic content.

4.4.2 Financial leverage

In this study, financial leverage (LEV) is calculated as total debt divided by total assets, reflecting the extent to which firms rely on borrowed capital in their financing structure (Uddin et al., 2022; Timbate et al., 2024). This measurement is consistent with both theoretical arguments and empirical evidence on the relationship between capital structure and corporate cash-holding policies (Jensen, 1986; Myers and Majluf, 1984; Opler et al., 1999; Ferreira and Vilela, 2004). The analysis focuses on the estimated coefficients on the interaction term between institutional quality and financial leverage.

Table 11 evaluates leverage as a moderator. The estimated coefficients on the interaction term between institutional quality and financial leverage ($PCI * LEV$) are positive and statistically significant at the 1% level, indicating that financial leverage weakens the negative relationship between institutional quality and cash holdings. This finding implies that in firms with higher leverage, the disciplinary effect of the institutional environment in constraining excessive cash accumulation becomes less pronounced compared to firms with lower leverage levels.

The result suggests that leverage alters the sensitivity of corporate cash policies to institutional improvements. When firms operate with higher debt burdens, liquidity decisions are more strongly shaped by debt-related financial risk and repayment commitments, thereby limiting the extent to which enhanced institutional quality translates into lower cash reserves. Accordingly, financial leverage acts as a substitution mechanism that partially offsets the disciplining role of institutional quality, as firms' cash-holding behaviour becomes less responsive to external institutional improvements.

In terms of economic magnitude, the estimated coefficient on $PCI * LEV$ is $+0.0107$ (Model 1, Table 11). Given that the sample mean of LEV is 0.219 and the standard deviation is approximately 0.187, a one-standard-deviation increase in leverage reduces the marginal cash-reducing effect of a one-unit PCI increase by 0.0020 (i.e., 0.0107×0.187). For a highly leveraged firm at the 75th percentile of the leverage distribution ($LEV \approx 0.35$), the net marginal effect of PCI on CASH1 is approximately $-0.0034 + (0.0107 \times 0.35) = -0.0034 + 0.0037 = +0.0003$, implying that the disciplining effect of institutional quality is effectively neutralised. This demonstrates that among highly leveraged firms, external institutional improvements fail to translate into meaningful reductions in cash holdings, underscoring the economic importance of the substitution effect.

Table 11 The moderating effect of financial leverage

Variables	Model	
	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)
PCI _{i,t}	−0.0055*** (0.0013)	−0.0048*** (0.0009)
PCI _{i,t} * LEV _{i,t}	0.0107*** (0.0034)	0.0090*** (0.0023)
LEV _{i,t}	−0.7927*** (0.2156)	−0.6168*** (0.1473)
SIZE _{i,t}	−0.0076 (0.0050)	−0.0059 (0.0037)
CF _{i,t}	0.3533*** (0.0306)	0.2133*** (0.0204)
NWC _{i,t}	0.0557** (0.0219)	0.0794*** (0.0181)
CAPEX _{i,t}	−0.0046 (0.0300)	−0.0205 (0.0212)
DIV _{i,t}	0.1823* (0.0991)	0.1195 (0.0736)
SG _{i,t}	0.0018 (0.0040)	0.0027 (0.0031)
GDPG _t	0.0001 (0.0006)	−0.0012** (0.0005)
CPI _t	0.0006 (0.0005)	0.0019*** (0.0004)
Constant	0.6846*** (0.1328)	0.5647*** (0.0967)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,695	6,695
Number of firms	587	587

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

4.4.3 Dividends

Dividend payment is measured as dividends paid divided by total assets (DIV), capturing dividend payout intensity as a proportion of the firm's asset base. This continuous measure is consistent with Pinkowitz et al. (2006) and Harford et al. (2008), who similarly scale dividend distributions by total assets to proxy for the extent to which internal cash resources are committed to payout obligations. The analysis focuses on the estimated coefficients on the interaction term between institutional quality and dividend payment.

Table 12 investigates dividend payment as a moderating channel using dividend payout intensity measured as cash dividend payment divided by total assets. The estimated coefficients on the interaction term between institutional quality and dividend payment (PCI * DIV) are negative and statistically significant across the models. This finding indicates that higher dividend payout intensity strengthens the negative relationship between institutional quality and cash holdings. In other words, among firms that distribute larger cash dividends relative to total assets, the disciplining effect of the institutional environment in limiting excessive cash accumulation becomes stronger.

This result suggests that dividend payments reduce free cash flow available for managerial discretion while simultaneously increasing monitoring pressure from shareholders, thereby weakening precautionary and self-serving motives for holding excess cash. As institutional quality improves and governance transparency increases, these disciplinary forces jointly reinforce firms' incentives to maintain lower cash reserves. Because DIV is measured as cash dividend payment divided by total assets rather than a binary dividend-paying indicator, the interaction effect should be interpreted continuously: firms with higher payout intensity exhibit a stronger institutional-discipline effect on cash holdings than firms with lower payout intensity.

Consistent with agency theory, dividends serve as an internal governance mechanism that constrains agency costs and enhances financial discipline (Jensen, 1986; La Porta et al., 2000). Accordingly, dividend policy operates as a complementary governance mechanism that amplifies the effectiveness of institutional quality in shaping corporate liquidity policies among Vietnamese listed firms.

In terms of economic magnitude, the estimated coefficient on PCI * DIV in Model (1) of Table 12 is -0.0469 (at the 5% significance level). Because DIV is a continuous ratio (cash dividend payment divided by total assets; sample mean = 0.0312, SD = 0.0383), the interaction effect is interpreted continuously: for a firm whose dividend payout intensity is one standard deviation above the sample mean (DIV = 0.0695), the total marginal effect of a one-unit PCI increase on CASH1 is $-0.0021 - (0.0469 \times 0.0695) = -0.0021 - 0.0033 = -0.0054$, compared to -0.0021 for a firm with zero dividend payout. This implies that the cash-reducing effect of institutional quality is approximately 2.6 times stronger for high-payout firms. Evaluated at a one-standard-deviation increase in PCI (4.14 points), a firm at mean plus one SD of DIV reduces its CASH1 by an additional 0.0136 relative to a non-payer, equivalent to approximately 11.1% of the sample mean. This differential highlights the economically material role of dividend payout intensity in amplifying institutional discipline over corporate liquidity.

Table 12 The moderating effect of dividend payment

Variables	Model	
	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)
PCI _{i,t}	−0.0021** (0.0008)	−0.0018*** (0.0006)
PCI _{i,t} * DIV _{i,t}	−0.0469** (0.0197)	−0.0465*** (0.0144)
DIV _{i,t}	3.1544** (12.7490)	3.0625*** (0.9255)
SIZE _{i,t}	−0.0062 (0.0051)	−0.0049 (0.0038)
CF _{i,t}	0.3531*** (0.0307)	0.2130*** (0.0205)
NWC _{i,t}	0.0521** (0.0220)	0.0766*** (0.0181)
LEV _{i,t}	−0.1203*** (0.0205)	−0.0540*** (0.0190)
CAPEX _{i,t}	−0.0093 (0.0302)	−0.0245 (0.0213)
SG _{i,t}	0.0021 (0.0040)	0.0030 (0.0031)
GDPG _t	0.0002 (0.0006)	−0.0011** (0.0005)
CPI _t	0.0007 (0.0005)	0.0020*** (0.0004)
Constant	0.4340*** (0.1213)	0.3459*** (0.0923)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,695	6,695
Number of firms	587	587

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; DIV: dividend payment; SIZE: firm size; CF: cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

4.4.4 Managerial ownership

In this study, managerial ownership is measured using three indicators. Specifically, MO represents managerial ownership; BO measures board ownership; and EO captures executive ownership. The analysis focuses on the estimated coefficients on the interaction terms between institutional quality and managerial ownership.

Table 13 The moderating effect of managerial ownership

Variables	Model					
	CASH1 _{i,t+1}	CASH2 _{i,t+1}	CASH1 _{i,t+1}	CASH2 _{i,t+1}	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)	(3)	(4)	(5)	(6)
PCI _{i,t}	-0.0050*** (0.0010)	-0.0043*** (0.0007)	-0.0051*** (0.0010)	-0.0043*** (0.0007)	-0.0045*** (0.0009)	-0.0040*** (0.0006)
PCI _{i,t} * MO _{i,t}	0.0001*** (0.0000)	0.0001*** (0.0000)				
PCI _{i,t} * BO _{i,t}			0.0001*** (0.0000)	0.0001*** (0.0000)		
PCI _{i,t} * EO _{i,t}					0.0002*** (0.0001)	0.0002*** (0.0001)
MO _{i,t}	-0.0076*** (0.0024)	-0.0063*** (0.0019)				
BO _{i,t}			-0.0085*** (0.0024)	-0.0069*** (0.0020)		
EO _{i,t}					-0.0130*** (0.0047)	-0.0119*** (0.0033)
SIZE _{i,t}	-0.0035 (0.0056)	-0.0028 (0.0041)	-0.0036 (0.0056)	-0.0028 (0.0041)	-0.0036 (0.0057)	-0.0027 (0.0041)
CF _{i,t}	0.3549*** (0.0319)	0.2144*** (0.0216)	0.3549*** (0.0319)	0.2145*** (0.0215)	0.3556*** (0.0320)	0.2145*** (0.0216)
NWC _{i,t}	0.0581** (0.0235)	0.0783*** (0.0195)	0.0576** (0.0234)	0.0780*** (0.0195)	0.0595** (0.0235)	0.0797*** (0.0196)
LEV _{i,t}	-0.1284*** (0.0218)	-0.0666*** (0.0195)	-0.1286*** (0.0218)	-0.0666*** (0.0195)	-0.1282*** (0.0218)	-0.0669*** (0.0195)
CAPEX _{i,t}	-0.0278 (0.0292)	-0.0295 (0.0222)	-0.0282 (0.0291)	-0.0297 (0.0222)	-0.0233 (0.0295)	-0.0269 (0.0223)
DIV _{i,t}	0.1851* (0.1038)	0.1275* (0.0773)	0.1840* (0.1038)	0.1266 (0.0773)	0.1807* (0.1031)	0.1221 (0.0768)

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; MO: managerial ownership; MBO: board ownership; EO: executive ownership; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

Table 13 The moderating effect of managerial ownership (continued)

Variables	Model					
	CASH1 _{i,t+1}	CASH2 _{i,t+1}	CASH1 _{i,t+1}	CASH2 _{i,t+1}	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)	(3)	(4)	(5)	(6)
SG _{i,t}	-0.0003 (0.0043)	0.0012 (0.0034)	-0.0003 (0.0043)	0.0011 (0.0034)	-0.0009 (0.0043)	0.0006 (0.0034)
GDPG _t	0.0001 (0.0006)	-0.0010** (0.0005)	0.0001 (0.0006)	-0.0010** (0.0005)	0.0000 (0.0006)	-0.0011** (0.0005)
CPI _t	0.0009* (0.0005)	0.0021*** (0.0004)	0.0009* (0.0005)	0.0021*** (0.0004)	0.0009* (0.0005)	0.0021*** (0.0004)
Constant	0.5415*** (0.1370)	0.4471*** (0.1015)	0.5494*** (0.1368)	0.4521*** (0.1013)	0.5227*** (0.1393)	0.4312*** (0.1020)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,342	6,342	6,342	6,342	6,342	6,342
Number of firms	582	582	582	582	582	582

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; MO: managerial ownership; MBO: board ownership; EO: executive ownership; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

Table 13 reports the moderating role of managerial ownership using three alternative proxies, including managerial ownership (MO), board ownership (BO) and executive ownership (EO). Across all specifications, the estimated coefficients on the interaction terms between institutional quality and managerial ownership (PCI * MO, PCI * BO and PCI * EO) are all positive and statistically significant at the 1% level, indicating that higher levels of internal ownership attenuate the negative effect of institutional quality on cash holdings. In other words, as ownership concentration among managers, board members, or executives increases, corporate cash policies become less responsive to improvements in the institutional environment.

These findings suggest that internal ownership structures partially substitute for external institutional discipline. When ownership is concentrated among executives or board members, stronger internal control may reduce reliance on external monitoring mechanisms; however, higher ownership concentration may simultaneously enhance managerial power and increase incentives to retain cash for internal resource control, thereby weakening the disciplining role of institutional quality. This evidence is consistent with an extended agency theory perspective, which posits that internal governance mechanisms and external institutional environments may function as substitutive forces in shaping corporate financial policies. In the Vietnamese context, characterised by substantial institutional heterogeneity across provinces, higher managerial ownership diminishes the transmission of institutional discipline to corporate liquidity decisions. Accordingly, managerial ownership operates as a substitution

governance mechanism that weakens the cash-reducing effect of institutional quality, highlighting the interaction between internal power structures and external institutional environments in determining corporate liquidity policies.

In terms of economic magnitude, the estimated coefficients on the interaction terms $PCI * MO$, $PCI * BO$ and $PCI * EO$ are all +0.0001 (Models 1–6, Table 13). Given that MO , BO and EO are measured as percentage shareholding (0–100 scale), a one-standard-deviation increase in managerial ownership (approximately 10 percentage points) reduces the marginal cash-reducing effect of a one-unit PCI increase by approximately 0.0010 (i.e., 0.0001×10). For firms with managerial ownership at the 75th percentile (approximately 20 percentage points), the net marginal effect of PCI on $CASH1$ is reduced by 0.0020, equivalent to approximately 59% of the baseline PCI effect (−0.0034). These magnitudes confirm that even modest levels of ownership concentration materially attenuate the disciplinary reach of institutional quality on cash holdings.

4.4.5 *Executive directors*

From an agency theory perspective, executive directors may alter the effectiveness of internal monitoring and the degree of separation between governance and managerial functions (Jensen, 1986). When board members are directly involved in executive roles, managerial authority tends to become more concentrated, leading firms to rely more heavily on internal control mechanisms rather than external discipline imposed by the institutional environment. In the context of institutional quality, executive directors therefore act as a moderating mechanism by influencing how sensitive corporate cash policies are to improvements in institutional conditions. Specifically, when monitoring and executive powers are less clearly separated, the disciplining effect of institutional quality on cash-holding behaviour may be weakened. Accordingly, this study focuses on the estimated coefficients on the interaction term between institutional quality and executive directors.

Table 14 examines whether leadership duality moderates the relationship between institutional quality and cash holdings. The estimated coefficients on the interaction term between institutional quality and executive directors ($PCI * DDUAL$) are positive and statistically significant at the 1% level, indicating that leadership duality weakens the negative effect of institutional quality on cash holdings. This finding implies that when managerial power becomes more concentrated, the disciplinary effect of the institutional environment on corporate cash decisions is reduced compared to firms with a clearer separation between monitoring and executive functions (Finkelstein and D'Aveni, 1994; Jensen, 1993; Doidge et al., 2007).

The result suggests that internal governance mechanisms can alter the strength of the influence exerted by external institutional conditions on financial decisions. Under leadership duality, firms tend to maintain a certain level of cash reserves to support managerial strategic flexibility, even when the institutional environment becomes more transparent and stable. This evidence is consistent with the view that corporate power structures and institutional environments interact and complement each other in shaping corporate financial policies (Doidge et al., 2007; Harford et al., 2008).

Table 14 The moderating effect of executive duality

Variables	Model	
	CASH1 _{i,t+1}	CASH2 _{i,t+1}
	(1)	(2)
PCI _{i,t}	−0.0061*** (0.0013)	−0.0053*** (0.0009)
PCI _{i,t} * DDUAL _{i,t}	0.0014*** (0.0005)	0.0012*** (0.0004)
DDUAL _{i,t}	−0.0875*** (0.0309)	−0.0765*** (0.0244)
SIZE _{i,t}	−0.0028 (0.0056)	−0.0021 (0.0041)
CF _{i,t}	0.3562*** (0.0321)	0.2156*** (0.0216)
NWC _{i,t}	0.0597** (0.0235)	0.0795*** (0.0196)
LEV _{i,t}	−0.1283*** (0.0218)	−0.0665*** (0.0194)
CAPEX _{i,t}	−0.0176 (0.0297)	−0.0211 (0.0224)
DIV _{i,t}	0.1826* (0.1032)	0.1253 (0.0770)
SG _{i,t}	−0.0009 (0.0043)	0.0007 (0.0033)
GDPG _t	−0.0001 (0.0007)	−0.0012** (0.0005)
CPI _t	0.0010** (0.0005)	0.0022*** (0.0004)
Constant	0.5945*** (0.1422)	0.5027*** (0.1067)
Firm fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	6,346	6,346
Number of firms	582	582

Notes: CASH1 and CASH2: cash holdings; PCI: institutional quality; SIZE: firm size; CF: operating cash flow; NWC: net working capital; LEV: financial leverage; CAPEX: capital expenditures; DIV: dividend payment; SG: sales growth; GDPG: annual GDP growth rate; CPI: annual consumer price index. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Firm-clustered robust standard errors are reported in parentheses.

In terms of economic magnitude, the estimated coefficient on $PCI * DDUAL$ in Model (1) of Table 14 is +0.0014. Given that the baseline PCI effect on CASH1 is -0.0061 (in Table 14, Model 1), executive duality ($DDUAL = 1$) reduces the net marginal effect of PCI on CASH1 to $-0.0061 + 0.0014 = -0.0047$, representing a 23% attenuation of the institutional discipline effect. Evaluated at a one-standard-deviation increase in PCI (4.14 points), firms with executive duality hold approximately 0.0058 more cash than otherwise equivalent firms without duality, solely due to the weaker transmission of institutional discipline. This magnitude is economically meaningful and confirms that leadership structure plays a significant role in moderating how external institutional improvements translate into corporate liquidity decisions.

5 Conclusions

This study examines the impact of provincial institutional quality on cash holdings among firms listed on the Vietnamese stock market over the period 2011–2024. Using a FEM with firm-clustered robust standard errors and a System-GMM estimator to address dynamic adjustment and potential endogeneity, the results consistently confirm that higher provincial institutional quality, proxied by the PCI is significantly and negatively associated with cash holdings. A one standard deviation improvement in PCI is associated with a reduction in cash-to-assets of approximately 11.5% of the sample mean, a magnitude that is economically substantial and consistent with findings from other emerging markets (Li et al., 2024; Zhang et al., 2023). This finding supports Hypothesis H1 and is consistent with both agency theory and the pecking order theory: stronger institutions reduce information asymmetry and external financing costs, thereby weakening precautionary motives for holding excess cash.

Beyond the direct effect, the study identifies five firm-level mechanisms that moderate the institutional quality-cash holdings relationship. Profitability (H2) and dividend payout intensity (H3) strengthen the negative effect of institutional quality on cash holdings, operating as complementary governance channels: profitable firms and high dividend payout firms are better positioned to reduce cash reserves as institutional conditions improve. By contrast, financial leverage (H4), managerial ownership (H5) and executive duality (H6) weaken the disciplinary effect of institutional quality, acting as substitution mechanisms that partially insulate corporate liquidity from external institutional improvements. All five moderating hypotheses are supported by the empirical results.

These findings carry important theoretical and policy implications. Theoretically, they demonstrate that the relationship between institutional quality and corporate financial decisions is not homogeneous but is contingent upon internal financial and governance characteristics. This extends the corporate governance literature by showing that external institutions and internal firm-level mechanisms interact as either complements or substitutes in shaping cash-holding behaviour (Aguilera et al., 2008; Harford et al., 2008). Furthermore, by exploiting within-country, cross-provincial variation in institutional quality through the PCI, this study demonstrates that sub-national institutional heterogeneity constitutes an important and previously underexplored determinant of corporate liquidity decisions in emerging markets.

For policymakers, the results underscore the value of improving provincial governance quality through greater transparency, more effective regulatory enforcement

and reduced informal costs of doing business, as a means of improving capital allocation efficiency among listed firms. Provinces that score higher on the PCI are associated with firms that maintain meaningfully lower precautionary cash buffers and, by extension, greater deployment of capital into productive investments. For firm managers and investors, the findings highlight that the effectiveness of external institutional discipline depends critically on internal governance arrangements: firms with more concentrated ownership structures or weaker board independence benefit less from provincial governance improvements, suggesting targeted complementary reforms at the firm level.

This study is not without limitations. The analysis is restricted to publicly listed Vietnamese firms, limiting the generalisability of findings to unlisted or state-owned enterprises. Moreover, while the PCI effectively captures provincial governance quality, it may not fully reflect the multidimensional nature of institutional environments. Future research could extend this work by examining potential nonlinear effects of institutional quality on cash holdings (e.g., using PCI² terms), by exploring additional moderating channels such as financial development or market competition intensity and by applying similar frameworks to other emerging markets with comparable intra-country institutional variation.

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Declarations

All authors declare that they have no conflicts of interest.

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