

Macroeconomic Uncertainty and Corporate Cash Holdings: Evidence from the Vietnam Stock Exchange

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Abstract

This study investigates the relationship between macroeconomic uncertainty and firms' cash holdings in Vietnam, an emerging market characterized by strong state control. We use a fixed-effects regression model on a panel dataset of 4,090 firm-quarter observations from 279 companies listed on HOSE and HNX (2009–2023) and the World Uncertainty Index for Vietnam (WUIVNM) as a proxy for macroeconomic uncertainty. The findings indicate that firms tend to increase cash holdings in response to heightened macroeconomic uncertainty. Further analysis reveals that this effect is more pronounced among firms with low financial constraints, operating in less competitive industries, with limited growth opportunities, or without state ownership. To address potential endogeneity, an instrumental variable approach is applied. This research contributes to the literature by providing empirical evidence from a tightly regulated emerging economy, offering valuable implications for both corporate financial strategies and macroeconomic policymaking.

Keywords: macroeconomic uncertainty, cash holdings, Vietnam listed firms.

1. Introduction

“I would use two words to describe the state of the world today: uncertainty and instability,” said António Guterres, Secretary-General of the United Nations, during a plenary session of the World Economic Forum Annual Meeting 2020 (Davos-Klosters, Switzerland, 24 January 2020).

The business environment of firms is constantly fluctuating due to changes in events and destabilizing factors in the economy. Recent events such as the global economic crisis, political divisions, trade wars, pandemics, and the Ukraine-Russia war have led to increased interest in macroeconomic uncertainty. Given the profound impact of macroeconomic uncertainty on the economy, numerous studies have highlighted the significant impact of macroeconomic uncertainty on corporate financial and investment decisions. Stock and Watson (2012), Baker et al. (2016), and Bernanke (1983) suggest that uncertainty related to government spending, taxation, regulatory, and monetary policies negatively affects both financial markets and the real economy. Gulen and Ion (2016) and Nguyen and Phan (2017) report that firms tend to delay investments, particularly those that are irreversible, during periods of heightened uncertainty. Tran and Phan (2022) investigate how economic policy uncertainty affects corporate debt contracting behavior. Additionally, macroeconomic uncertainty can increase the cost of external financing, exacerbating firms' financial constraints (Pástor & Veronesi, 2013; Gilchrist et al., 2014). These effects highlight the importance of understanding how firms adjust their financial strategies in response to an uncertain economic environment.

Corporate cash is a crucial and highly liquid asset. Prior research has identified several factors influencing corporate cash holdings, including transaction costs (Mulligan, 1997), precautionary motives (Opler et al., 1999; Han & Qiu, 2007; Bates et al., 2009; Khieu & Pyles, 2012), corporate governance (Dittmar & Mahrt-Smith, 2007; Harford et al., 2008; Kuan et al., 2011), business organization structure

(Locorotondo et al., 2014), tax incentives (Foley et al. 2007; Pinkowitz et al., 2013), product market competition (Fresard, 2010), and idiosyncratic risk (Campbell et al. 2001). Despite these insights, the relationship between macroeconomic uncertainty and corporate liquidity remains underexplored. This study addresses this gap by investigating the impact of macroeconomic uncertainty on corporate cash holdings in Vietnam, one of the world's fastest-growing economies.

The relationship between macroeconomic uncertainty and corporate cash holdings in developing countries has garnered increasing attention, as firms in these economies often encounter greater financial constraints and institutional weaknesses than those in developed markets. Several studies have explored this dynamic across various emerging markets, including India (Bhaduri & Kanti, 2011), BRIC nations (Demir & Ersan, 2017), China (Feng et al., 2022; Xu et al., 2016), and Pakistan (Akram et al., 2019). These studies generally find that firms tend to accumulate cash in response to macroeconomic uncertainty. However, the extent of this effect varies across countries, influenced by institutional frameworks, financial market development, and firm-specific characteristics.

Vietnam's unique economic structure, characterized by a socialist-oriented framework with significant government intervention, creates a strong connection between political factors and economic uncertainty. Government control over the economy influences corporate borrowing and investment decisions, directly affecting firms' cash-holding strategies. Moreover, Vietnam's rapid growth, driven by global integration and economic restructuring, has heightened its exposure to international fluctuations, making it more vulnerable to external shocks. At the same time, the fast pace of development sometimes surpasses the capacity of its legal and management systems, leading to internal risks amid macroeconomic uncertainty. Given these factors, understanding the relationship between macroeconomic uncertainty and corporate cash holdings in Vietnam necessitates an examination of

the government's economic interventions. This study is the first to explore this relationship within Vietnam's specific context, offering a deeper understanding of the country's economic dynamics.

The WUIVNM (World Uncertainty Index for Vietnam) is a measure of macroeconomic uncertainty developed by Ahir et al. (2018), based on the frequency of the word “uncertainty” in country reports published by the Economist Intelligence Unit (EIU). Since these reports provide in-depth assessments of a country's economic, political, and policy conditions, the WUIVNM effectively captures macro-level concerns in the specific context of Vietnam. Moreover, Ahir et al. (2018) tested the correlation between the WUI and other macroeconomic indicators, and Fan et al. (2020) employed the WUI to evaluate the impact of macroeconomic uncertainty on economic activities, further reinforcing the validity and reliability of this index in empirical research. Using a sample of 4,090 firm-year observations from 279 unique firms over the period 2009–2024, we run a fixed effects model and find that macroeconomic uncertainty is positively associated with corporate cash holdings. This suggests that firms accumulate cash to hedge against potential future risks and delay investments in uncertain environments. Further analysis reveals that this significant positive relationship is only present in firms with high financial constraints, those operating in low-competition industries, firms with low growth opportunities, and companies without state ownership. To address endogeneity concerns, we employ an instrumental variable (IV) regression model and find that our results remain robust after endogeneity correction.

Our research fills a critical gap by examining how macroeconomic uncertainty affects corporate cash policies in Vietnam, an emerging market undergoing rapid transformation. By focusing on a context that has been relatively underexplored in prior studies, our analysis expands the understanding of how firms adjust liquidity management practices in response to external economic shocks.

Specifically, our study advances the literature in several novel ways. First, it extends the application of macroeconomic uncertainty frameworks beyond developed markets to include emerging economies, offering fresh empirical insights. Second, we employ robust econometric techniques to disentangle the effects of uncertainty from other influencing factors, thereby providing a more nuanced understanding of corporate cash behavior. Lastly, our findings carry significant practical implications, equipping corporate managers, investors, and policymakers with actionable strategies to navigate volatility, promote sustainable growth, and foster job creation amid increasing economic uncertainty.

The structure of this paper is organized as follows: Section 2 presents a review of the literature on macroeconomic uncertainty and corporate cash holdings. Section 3 outlines the research methodology, including the development of hypotheses, model specification, variable definitions, and data description. Section 4 reports the empirical results, beginning with the descriptive statistics, followed by regression analysis and discussion. Finally, Section 5 concludes the paper by summarizing the key findings and discussing their implications.

2. Literature Review

The literature on macroeconomic uncertainty and corporate financial decision-making is extensive and multifaceted. Macroeconomic uncertainty refers to the unpredictability surrounding future economic conditions, particularly those related to fiscal, monetary, and regulatory policies. To quantify macroeconomic uncertainty, scholars have adopted various measures, including the Economic Policy Uncertainty (EPU) index developed by Baker et al. (2016), the World Uncertainty Index (WUI) by Ahir et al. (2018), market-based measures such as the VIX index, and statistical approaches based on forecast dispersion or the conditional volatility of key macroeconomic indicators (e.g., GDP growth, inflation). Early studies,

such as Bernanke (1983), laid the groundwork by illustrating how uncertainty in government policies, ranging from spending and taxation to regulation and monetary measures, can disrupt both financial markets and the real economy. Building on these ideas, Stock and Watson (2012) and Baker et al. (2016) provide empirical evidence that fluctuations in such policies significantly contribute to overall macroeconomic uncertainty.

A substantial body of research has also focused on the impact of uncertainty on corporate investment behavior. For instance, Gulen and Ion (2016) and Nguyen and Phan (2017) demonstrate that firms tend to delay irreversible investments during periods of heightened uncertainty. Similarly, studies by Pástor and Veronesi (2013) and Gilchrist et al. (2014) highlight that increased uncertainty often elevates the cost of external financing, thereby exacerbating financial constraints for firms.

In addition to influencing investment and financing decisions, heightened macroeconomic uncertainty may also influence firms' decisions regarding liquid asset holdings, such as cash. Parallel to the exploration of uncertainty is the extensive research on corporate cash holdings. Cash, being a highly liquid asset, plays a crucial role in buffering firms against economic shocks. Bates et al. (2009) document a significant rise in the cash-to-assets ratio among U.S. firms over recent decades, a trend that has spurred various explanations in the literature. Researchers attribute this phenomenon to several factors, including precautionary motives (Opler et al., 1999; Han & Qiu, 2007; Khieu & Pyles, 2012), transaction cost considerations (Mulligan, 1997), corporate governance structures (Dittmar & Mahrt-Smith, 2007; Harford et al., 2008; Kuan et al., 2011), and even product market competition (Fresard, 2010).

Recent scholarship has extended these investigations to emerging markets, where firms often contend with higher financial constraints and less mature institutional frameworks compared to their developed counterparts. Studies in India

(Bhaduri & Kanti, 2011), BRIC nations (Demir & Ersan, 2017), China (Feng et al., 2022; Xu et al., 2016), and Pakistan (Akram et al., 2019) consistently find that under uncertain macroeconomic conditions, firms are more inclined to accumulate cash as a safeguard against external shocks. However, the magnitude and dynamics of this effect vary, influenced by local institutional contexts and firm-specific characteristics.

Although prior research has extensively examined the effects of macroeconomic uncertainty on investment and financing decisions, its direct impact on corporate cash holdings remains underexplored, particularly in the context of emerging markets. Most existing studies focus on developed economies, leaving a lack of empirical evidence on how firms in markets like Vietnam adjust their liquidity management in response to uncertainty. This study addresses that gap by investigating the relationship between macroeconomic policy uncertainty and corporate cash holdings in Vietnam, thereby contributing new insights to the literature and offering practical implications for corporate managers, investors, and policymakers.

3. Research Methodology

3.1 Hypothesis Development

When macroeconomic uncertainty increases, firms tend to accumulate cash as a precautionary measure to mitigate risks associated with economic volatility. Bates et al. (2009) provide empirical evidence that firms raise their cash reserves during uncertain periods to maintain financial stability, viewing cash as a safeguard against unexpected financial constraints and economic downturns. Additionally, heightened uncertainty makes it more challenging for firms to secure external

financing and may lead to the postponement of investment opportunities. These factors support our hypothesis:

H1: Macroeconomic uncertainty is positively related to corporate cash holdings.

The ability of firms to increase their cash holdings under macroeconomic uncertainty depends on their financial constraints. Firms with easier access to capital markets can adjust their cash reserves more effectively in response to economic uncertainty, whereas financially constrained firms face difficulties accumulating cash. Opler et al. (1999) find that firms with strong financial positions and fewer financing constraints tend to accumulate more cash, as they can afford to do so without disrupting their operations. This suggests that the precautionary motive for holding cash is more evident in firms that have access to external capital. Therefore, we hypothesize that:

H2: The positive relationship between macroeconomic uncertainty and cash holdings is more pronounced in firms with fewer financial constraints.

Firms with lower growth potential tend to accumulate more cash when macroeconomic uncertainty rises. Almeida et al. (2004) argue that firms with fewer investment opportunities hoard cash as a buffer against financial shocks, rather than investing in risky projects. This suggests that firms with limited growth potential prefer financial flexibility over capital expenditures, making them more likely to increase cash holdings in uncertain environments.

H3: The positive relationship between macroeconomic uncertainty and cash holdings is more pronounced in firms with lower growth potential.

Industry competition also plays a role in determining how firms respond to macroeconomic uncertainty. Opler et al. (1999) find that firms in less competitive industries accumulate more cash, as they do not need to use cash aggressively to

maintain market share. In contrast, firms in highly competitive industries must use their cash resources strategically to sustain operations, reducing their ability to accumulate cash during uncertain times. This aligns with our hypothesis:

H4: The positive relationship between macroeconomic uncertainty and cash holdings is more pronounced in industries with low competition.

Kusnadi et al. (2015) in China, a country with a state control system similar to that of Vietnam, show that corporate cash holdings are influenced by state ownership. In the context of economic uncertainty, non-state-owned enterprises (NSOEs) tend to increase their cash holdings as a precautionary measure. In contrast, state-owned enterprises (SOEs) often maintain close ties with the government and typically receive financial support when needed, such as access to preferential credit or bailouts during periods of crisis. As a result, SOEs have less incentive to hold large cash reserves to cope with economic uncertainty. Based on this reasoning, we propose the following hypothesis:

H5: The positive relationship between macroeconomic uncertainty and corporate cash holdings is more pronounced among non-state-owned enterprises.

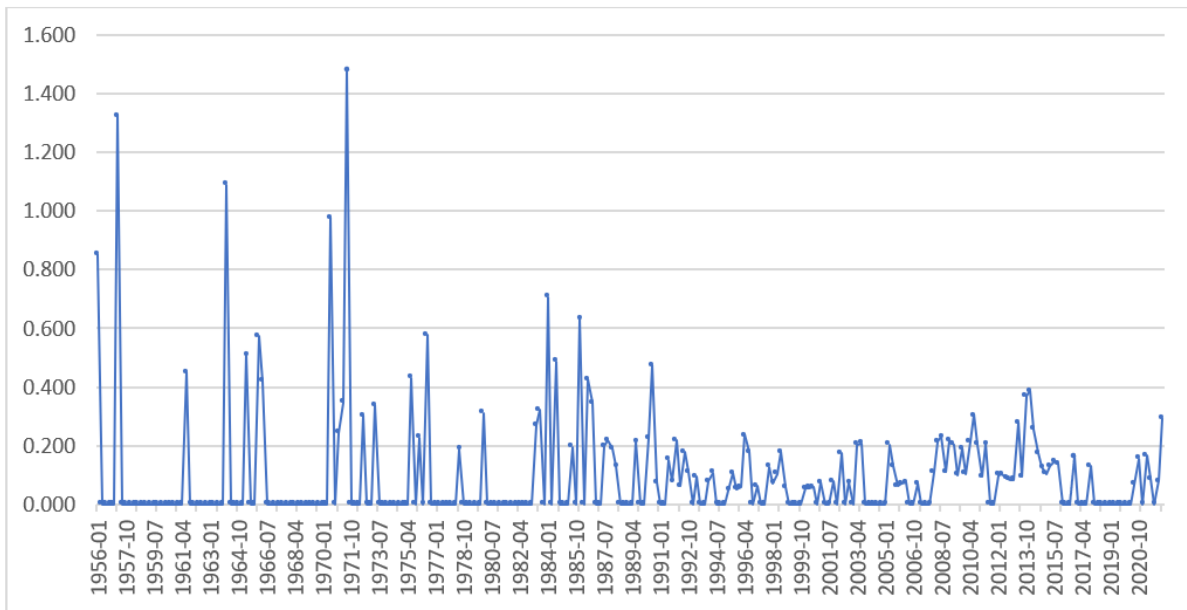
3.2 Samples

The study utilizes data from quarterly financial statements provided by Fiin Pro from 2009 to 2023, covering 279 companies listed on HOSE and HNX, with a total of 4,090 observations. Firms from the banking and financial sectors are excluded from our sample. Excluding firms from the banking and financial sectors is essential due to their unique financial structures and regulatory environments, which significantly differentiate them from non-financial firms. Financial institutions operate under stringent regulatory frameworks that dictate their capital reserves, liquidity requirements, and risk management practices. These regulations influence their cash holdings in ways that are not comparable to

non-financial firms, where cash management strategies are more discretionary and influenced by operational needs. We classify firms in Vietnam according to the Industry Classification Benchmark (ICB). To minimize the impact of outliers, the relevant variables are winsorized at the 1% and 99% levels.

This study uses the WUIVNM as a proxy for macroeconomic uncertainty, sourced from FRED (<https://fred.stlouisfed.org/series/WUIVNM>). Developed for 143 countries, WUIVNM is based on reports by the EIU, a global leader in national intelligence, capturing both short-term (e.g., Brexit) and long-term uncertainties (e.g., geopolitical conflicts). The EIU reports, covering 189 countries, analyze politics, economic policy, trade, and financial trends, relying on a network of specialized analysts with 5–7 years of experience. These reports follow a five-step verification process to ensure accuracy and alignment with global and regional perspectives. The WUIVNM index is constructed by counting occurrences of the terms “uncertain,” “uncertainty,” and “uncertainties” in EIU country reports. Figure 1 illustrates its performance, showing consistently high values during periods of macroeconomic turbulence in Vietnam.

Figure 1. Smoothed world uncertainty index for Vietnam



Source: Prepared by the author.

3.3 Variables Construction

In our research model, we incorporate several control variables to account for various financial and operational characteristics of firms, ensuring a comprehensive analysis of the factors influencing corporate cash holdings. Firm Size (SIZ) is included because, according to agency theory, larger firms often undergo greater scrutiny from analysts and investors, which may reduce the necessity of holding large cash reserves in their asset structure (Chung, 2017). Asset Tangibility (TAN) is considered, as companies with fewer tangible assets tend to hold higher cash balances to ensure liquidity and withstand adverse shocks, due to limited and costly access to external financing (Baldi, 2018). Leverage (LEV) reflects a firm's ability to access external capital. Under the trade-off theory, businesses with higher leverage tend to hold less cash due to more challenging access to capital markets (D'Mello et al., 2008). Growth Opportunities (MB) are considered in light of the pecking order theory, which suggests that firms with strong growth potential prefer to use internal funds over costly external capital, leading to higher cash reserves (Bigelli & Sánchez-Vidal, 2012). Capital Expenditures (CAPEX) are controlled for, as

businesses with high capital expenditure needs generally hold less cash, since increased capital expenditures lead to reduced cash reserves (Bates et al., 2009; Kim et al., 2011). Profitability (PRO) and Liquidity (LIQ) are also included as control variables. Firms with higher profits and greater liquidity tend to maintain higher cash balances (Al-Najjar, 2013; Nnubia & Ofoegbu, 2019). Dividend Payments (DIV) are also considered, as companies that distribute dividends require more cash to fulfill shareholder payouts, indicating a positive relationship between dividend payments and cash holdings (Shabbir et al., 2016). By integrating these control variables, our model aims to isolate the specific impact of macroeconomic uncertainty on corporate cash holdings, providing a clearer understanding of this relationship. Table 1 provides a detailed description of the variables in the research model.

Table 1. Variable definition

Variable names	Description
<i>CH</i>	The ratio of cash to total assets
<i>WUIVNM</i>	World economic uncertainty for Vietnam (Ahir et al., 2018)
<i>SIZ</i>	The natural logarithm of total assets
<i>LEV</i>	The ratio of total debt to total assets
<i>MB</i>	The ratio of the firm market value to the book value of assets
<i>PRO</i>	The ratio of net income to total assets
<i>LIQ</i>	The ratio of current assets to current liability
<i>TAN</i>	The ratio of net fixed assets to total assets
<i>CAPEX</i>	The ratio of capital expenditure to total assets
<i>DIV</i>	A dummy variable that takes a value of 1 if a firm pays a common dividend in a given year, and 0 otherwise
<i>GDP</i>	The annual GDP growth
<i>IFL</i>	The annual inflation rate, measured by changes in the Consumer Price Index
<i>RF</i>	The 10-year government bond yield, representing the risk-free rate

Source: Prepared by the author.

3.4 Empirical Model

Based on a review of existing studies, the author proposes the following regression model for the research:

$$CH_{i,t} = \alpha_0 + \alpha_1 WUIVNM_t + \alpha_2 SIZ_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 MB_{i,t} + \alpha_5 PRO_{i,t} + \alpha_6 LIQ_{i,t} + \alpha_7 TAN_{i,t} + \alpha_8 CAPEX_{i,t} + \alpha_9 DIV_{i,t} + \varepsilon_{i,t} \quad (1)$$

This model examines the relationship between corporate dependent variable cash holdings (CH) and independent variable macroeconomic uncertainty (WUIVNM), along with firm-specific factors (SIZ, LEV, MB, PRO, LIQ, TAN, CAPEX, and DIV) at time t . The error term $\varepsilon_{i,t}$ captures unobserved influences on cash holdings.

4. Results and Discussion

4.1 Statistical Descriptions

Table 2 presents the descriptive statistics of all variables. As shown, the mean cash-to-assets ratio for firms is 0.127 with a standard deviation of 6.1%. The WUIVNM index has a mean of 0.07 and a standard deviation of 0.028. The statistics for the other variables are compared with those from studies using the same dataset, showing similar results and ensuring the reliability of the data.

Table 2. Summary statistics

	N	Mean	Median	min	max	Std. Dev.
CH	4090	0.127	0.061	0.001	0.996	0.181
WUIVNM	4090	0.07	0.000	0.000	0.386	0.092
SIZ	4090	27.41	27.29	23.82	31.58	1.467
LEV	4090	0.475	0.482	0.038	0.907	0.220
MB	4090	11.75	.316	0.000	276.5	41.90
PRO	4090	0.019	0.013	-0.039	0.107	0.024
TAN	4090	2.678	0.123	0.000	56.29	9.125
LIQ	4090	2.305	1.487	0.407	19.11	2.682
CAPEX	4090	0.010	0.002	-0.023	0.140	0.020
DIV	4090	0.404	0.000	0.000	1.000	0.491

SA	1617	51.87	51.413	44.416	60.089	2.824
WW	4030	-1.239	-1.235	-1.450	-1.056	0.076
KZ	4047	1.466	1.470	0.075	2.906	0.705
SO	4090	.065	0.000	0.000	1.000	0.246
GDP	4090	.055	.059	.014	.088	.018
INL	4090	.021	.018	.007	.05	.011
RF	4090	.042	.041	.022	.072	.015

Source: Prepared by the author.

4.2 Correlation matrix

Table 3 presents the correlation matrix for all variables used in the model. The results show that the correlation coefficient between cash holdings and WUIVNM is positive, indicating a positive relationship between them. Cash holdings also have a positive correlation with cash flow, profitability, and liquidity, and a negative correlation with capex and leverage. The results in Table 3 also indicate that all correlation coefficients are lower than 0.8, suggesting that our empirical model will not have multicollinearity problems.

Table 3. Correlation matrix

Variables	CH	WUIVNM	SIZ	LEV	MB	PRO	TAN	LIQ	CAPEX	DIV
CH	1.000									
WUIVNM	0.044	1.000								
SIZ	-0.107	-0.086	1.000							
LEV	-0.237	0.031	0.306	1.000						
MB	-0.026	-0.049	-0.106	0.099	1.000					
PRO	0.248	0.054	-0.057	-0.332	-0.060	1.000				
TAN	0.028	-0.019	-0.240	-0.012	0.141	-0.039	1.000			
LIQ	0.200	-0.036	-0.200	-0.605	-0.018	0.145	-0.031	1.000		
CAPEX	-0.027	0.064	0.073	0.037	-0.016	0.094	-0.033	-0.073	1.000	
DIV	-0.017	0.023	0.038	0.036	0.038	-0.015	-0.003	-0.024	-0.006	1.000

Source: Prepared by the author.

4.3 Regression Results

Table 4 presents the results of the regression models. Specifically, Models (1), (2), and (3) correspond to the pooled OLS regression, the fixed effects model with firm-fixed effects, and the fixed effects model with industry-fixed effects, respectively. While the exclusion of year-fixed effects is justified by the fact that WUIVNM does not vary across firms within the same quarter (Gulen & Ion, 2016; Nguyen & Phan, 2017), this approach may still raise concerns about potential bias arising from macroeconomic shocks that affect industries differently over time. To address this issue, we explicitly control for key time-varying macroeconomic factors that are likely to influence firms' cash holdings, namely the annual GDP growth rate (GDP), the inflation rate based on the Consumer Price Index (IFL), and the 10-year government bond yield as a proxy for the risk-free rate (RF) in Model (4). Including these variables helps mitigate omitted variable bias related to aggregate economic conditions and enhances the robustness of our estimation results in the absence of year-fixed effects. Finally, we use the standard errors clustered by both firms and years (i.e., two-way clustering) to make statistical inference.

The regression results show that the coefficient of the WUIVNM variable (macroeconomic uncertainty index) ranges from 0.086 to 0.093 across the three models, with statistical significance levels between 90% and 95%. This indicates that a one-unit increase in WUIVNM is associated with an approximate 8.6% to 9.3% rise in firms' cash holdings, holding other variables constant.

This considerable increase reflects a strategic response by firms to enhance liquidity in times of rising macroeconomic uncertainty. The result is consistent with prior studies suggesting that firms tend to accumulate more cash during periods of heightened economic policy uncertainty as a precautionary measure (Bates et al.,

2009; Phan & Nguyen, 2017).

This finding supports H1, which posits that firms accumulate cash as a buffer against macroeconomic uncertainty. The positive and significant relationship between WUIVNM and CH suggests that firms respond to heightened uncertainty by increasing liquidity reserves, consistent with the precautionary motive. As macroeconomic conditions become more volatile, firms face greater difficulty in accessing external financing and tend to postpone investments, further reinforcing the need to hold cash as a safeguard against financial constraints and economic shocks. Furthermore, firms often postpone major investment projects to avoid unnecessary risks. This behavior is especially evident in firms with limited growth opportunities, as they have fewer profitable investment options, making the relationship between macroeconomic uncertainty and cash holdings more pronounced.

To ensure the robustness of our findings, we additionally split the sample into two subperiods: pre-COVID (2012–2019) and post-COVID (2020–2022). Due to space limitations, we do not report these results in the paper, but they are available upon request. The regression results remain consistent across both periods, indicating that the relationship between macroeconomic uncertainty and corporate cash holdings is stable and not solely driven by the COVID-19 shock. This consistency suggests that precautionary cash holding is a systematic and persistent response to macroeconomic uncertainty rather than a temporary reaction to crisis-specific disruptions. From a theoretical perspective, this supports the precautionary motive for cash holdings under uncertainty as a general behavioral pattern rather than an episodic anomaly. For policymakers, the finding implies that efforts to reduce macro-level uncertainty may have long-lasting impacts on firms' liquidity management behaviors beyond crisis periods.

Table 4. Macroeconomic uncertainty and corporate cash holdings

	Model (1)	Model (2)	Model (3)	Model (4)
	CH	CH	CH	CH
WUIVNM	.093*	.086**	.093*	.073**
	(.052)	(.04)	(.051)	(.035)
SIZ	-.011*	-.008	-.012*	.003
	(.007)	(.011)	(.006)	(.02)
LEV	-.05	-.04	-.02	-.132**
	(.048)	(.07)	(.041)	(.064)
MB	0.00	0.00	0.00	0
	(0.00)	(0.00)	(0.00)	(0)
PRO	.669*	.259	.727**	.103
	(.393)	(.263)	(.345)	(.236)
TAN	0.000	.003	0.00	.001
	(.001)	(.003)	(.001)	(.002)
LIQ	.012***	.008*	.014***	.005
	(.005)	(.005)	(.005)	(.005)
CAPEX	-.537***	-.127	-.507***	-.198*
	(.161)	(.113)	(.172)	(.112)
DIV	.003	.037**	.003	.028
	(.015)	(.018)	(.013)	(.019)
GDP				-.115
				(.199)
IFL				-.837*
				(.461)
RF				.939
				(.655)
_cons	.417**	.306	.427**	.056
	(.195)	(.32)	(.173)	(.551)
Firm fixed effects	No	Yes	No	Yes
Industry fixed effects	No	No	Yes	No
Observations	4.090	4.047	4.090	4.066
R-squared	0.101	0.526	0.142	0.527
Adj R ²	0.099	0.496	0.137	0.492

Note: *, **, and *** represent the significance level at 1%, 5% and 10%, respectively.

5. Robustness Test

5.1. Macroeconomic Uncertainty, Corporate Cash Holdings, and Financial Constraints

According to Siddiqua et al. (2019), financial constraints influence a company's decision to adjust its cash holdings. Almeida et al. (2004) also find that financially constrained firms are less able to accumulate cash because they face higher costs of external financing and more stringent borrowing conditions. If firms hold cash for precautionary motives, companies with financial constraints will find it difficult to do so due to stringent funding conditions and high capital costs. Therefore, we examine the impact of financial constraints on the effect of macroeconomic uncertainty on cash holdings. By analyzing the varying impacts of financial constraints, we can better understand how macroeconomic uncertainty influences corporate cash holdings.

We run regression models separately for subgroups of firms sorted on the following measures of financial constraints: Whited and Wu (WW) (2006), Kaplan and Zingales (KZ) (1997), and the SA Index of Hadlock and Pierce (SA) (2010). The formulas for these indices are as follows:

$$SA = 0.737 \times \text{Size}_{i,t} + 0.043 \times \text{Size square}_{i,t} - 0.040 \times \text{Age}_{i,t}$$

$$WW = -0.091 \times \text{Cash flow}_{i,t} - 0.062 \times \text{DIV dummy}_{i,t} + 0.021 \times \text{TLTD}_{i,t} - 0.044 \times \text{Size}_{i,t} + 0.102 \times \text{ISG}_{i,t} - 0.035 \times \text{SG}_{i,t}$$

$$KZ = -1.001909 \times \text{Cash flow}_{i,t} + 3.139193 \times \text{TLTD}_{i,t} - 39.36780 \times \text{TDIV}_{i,t} - 1.314759 \times \text{Cash holding}_{i,t} + 0.2826389 \times \text{Q}_{i,t}$$

Where Cash flow, DIV dummy, Size, Size squared, Cash holdings are defined in Table 1; TLTD: the ratio of long-term liabilities to total assets; ISG: industry sales growth rate; SG: firm sales growth rate; TDIV: total dividend payout on total assets

at the beginning, Q: value of firms' Tobin-Q; Age: firms' age.

The results presented in Table 5 indicate that the effect of macroeconomic uncertainty on cash holdings is statistically significant only for the group of firms that are not financially constrained. This finding reinforces our earlier conclusions, suggesting that the ability to accumulate precautionary cash reserves in response to uncertainty is limited among firms facing financial constraints.

Table 5. Macroeconomic uncertainty, financial constraints, and firm cash holdings

	KZ		WW		SA	
	<i>Non FC</i>	<i>FC</i>	<i>Non FC</i>	<i>FC</i>	<i>Non FC</i>	<i>FC</i>
WUIVNM	0.04***	0.007	0.035***	0.005	0.029*	0.014
	(0.012)	(0.004)	(0.012)	(0.009)	(0.015)	(0.008)
Size	-0.061	-0.012	-0.005	-0.118***	0.323	-0.045
	(0.054)	(0.010)	(0.041)	(0.037)	(0.296)	(0.044)
Size_squared	0.001	0.000	0.000	0.002***	-0.006	0.001
	(0.001)	(0.000)	(0.001)	(0.001)	(0.006)	(0.001)
Leverage	-0.001	-0.003	-0.014	-0.010	-0.006	-0.027*
	(0.019)	(0.005)	(0.013)	(0.010)	(0.02)	(0.014)
CAPEX	0.000	-0.003	-0.01	0.003	0.012	0.016
	(0.007)	(0.002)	(0.007)	(0.006)	(0.010)	(0.01)
Market_to_book	0.006*	0.006***	0.009***	0.004	-0.003	.0011**
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)
Profitability	-0.020	-0.005	-0.026	-0.012	-0.010	-0.026
	(0.025)	(0.011)	(0.026)	(0.024)	(0.029)	(0.019)
Liquidity	0.000	-0.001	0.000	-0.001**	0.000	-0.002*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Tangibility	-0.086***	-0.005	-0.054***	-0.041***	-0.051***	-0.054***
	(0.012)	(0.004)	(0.01)	(0.009)	(0.012)	(0.011)
DIV	-0.001	-0.004***	-0.002	0.002	0.003	-0.003
	(0.003)	(0.001)	(0.003)	(0.002)	(0.003)	(0.002)
State_own	-0.047***	-0.004	-0.028**	-0.02***	-0.021**	-0.021***
	(0.010)	(0.003)	(0.012)	(0.005)	(0.010)	(0.005)
NWC	-0.028**	0.000	-0.021**	-0.008	0.002	-0.008

	(0.011)	(0.005)	(0.009)	(0.009)	(0.010)	(0.013)
_cons	1.065	0.199	0.157	1.829***	-3.957	.842
	(0.754)	(0.145)	(0.597)	(0.525)	(3.872)	(.636)
Firm fixed effects	No	Yes	No	Yes	No	Yes
Observations	3.959	3.798	3.787	3.945	2.146	2.322
R-squared	0.554	0.547	0.515	0.629	0.577	0.469
Adj R ²	0.524	0.512	0.471	0.596	0.555	0.442

Note: *, **, and *** represent the significance level at 1%, 5%, and 10%, respectively.

5.2 Macroeconomic Uncertainty, Corporate Cash Holdings, and Competitive Industry

According to Bates et al. (2009), firms in less competitive industries accumulate cash to maintain financial stability rather than to fund competitive strategies. Opler et al. (1999) also highlight that firms with fewer competitive pressures can afford to hold larger cash reserves to safeguard against economic uncertainty. In highly competitive industries, companies are discouraged from holding excessive working capital because such capital has a low return on investment. If companies hold too much working capital, specifically cash, they miss out on opportunities to invest in projects that provide competitive advantages. Therefore, we posit that the relationship between macroeconomic uncertainty and increased cash holdings will be more pronounced in low-competition industries. In these industries, companies are not heavily focused on competitive investments, so they prefer to hold more cash as a precaution rather than invest.

To examine the effect of macroeconomic uncertainty on the level of cash conditioned on industry rivalry, we use the Herfindahl-Hirschman Index (HHI) (Rhoades, 1993) as a proxy for industry rivalry. HHI is calculated as the sum of the squares of market shares of the firms within the same industry (ICB classified by Fiin Pro) in a given year, where market share is defined as a ratio of a firm's sales to the sum of sales of the industry. A lower (higher) HHI value indicates higher (lower)

industry rivalry. We run corporate cash holdings regressions separately for subgroups of firms sorted on high competitive industry and low competitive industry, since firms are already grouped by industry competition, controlling for industry fixed effects is unnecessary in this setting. The results reported in Table 6 indicate a statistical significance for the low competitive industry group only. The results are consistent with the research team's inferences.

Table 6. Macroeconomic uncertainty, financial constraints, and competitive industry

<i>Variables</i>	<i>High Competitive industry</i>	<i>Low competitive industry</i>
WUIVNM	0.012 (.011)	0.03*** (0.009)
Size	-0.149** (0.069)	0.024 (0.058)
Size_squared	0.003* (0.001)	-0.001 (0.001)
Leverage	-0.002 (0.011)	-0.02 (0.012)
CAPEX	0.003 (0.006)	0.003 (0.010)
Market_to_book	0.006* (0.003)	0.01*** (0.002)
Profitability	-0.025 (0.020)	0.004 (0.023)
Liquidity	0.008 (0.028)	-0.139*** (0.032)
Tangibility	-0.032*** (0.009)	-0.046*** (0.009)
DIV_dummy	0.005 (0.005)	-0.001 (0.002)
State_own	-0.027** (0.012)	-0.016** (0.007)
NWC	-0.004	-0.012

	(0.006)	(0.008)
_cons	2.225**	-.211
Firm fixed effects	Yes	Yes
Industry fixed effects	No	No
Observations	3.923	4.401
R-squared	0.954	0.840
Adj R ²	0.585	0.571

Note: *, **, and *** represent the significance level at 1%, 5%, and 10%, respectively.

5.3 Macroeconomic Uncertainty, Corporate Cash Holdings, and Growth Opportunities

According to Opler et al. (1999), firms with fewer growth opportunities are more likely to accumulate cash to safeguard against economic uncertainties. Similarly, Bates et al. (2009) emphasize that firms prioritize liquidity to maintain stability when faced with uncertain economic conditions. Companies with Growth Opportunities will leverage their capital for investment projects; therefore, they may be less inclined to hold large cash reserves or delay investment opportunities. As a result, the relationship between macroeconomic uncertainty and increased cash holdings is more evident in companies with lower Growth Opportunities. To confirm this, we investigate how Growth Opportunities affects the relationship between macroeconomic uncertainty and corporate cash holdings.

We sort firms into the high and low growth subgroups based on their market-to-book ratios, which proxy for growth opportunities (Phan et al, 2017). Firms are assigned to the high (low) growth opportunities subgroup if their market-to-book ratios are in the top (bottom) tercile of the sample. The results reported in Table 7 indicate that the coefficients of macroeconomic uncertainty are positive and significant at the 1% level for low growth opportunities. The results may indicate that the research inferences are reasonable.

Table 7. Macroeconomic uncertainty, financial constraints, and growth opportunities

<i>Variables</i>	<i>Low</i>		<i>High</i>	
	<i>Growth opportunities</i>		<i>Growth opportunities</i>	
WUIVNM	0.026** (0.012)	0.043*** (0.013)	0.001 (0.008)	0.015* (0.009)
Size	-0.100* (0.052)	-0.099** (0.038)	-0.045 (0.033)	-0.010 (0.015)
Size_squared	0.002* (0.001)	0.002** (0.001)	0.001 (0.001)	0.000 (0.000)
Leverage	-0.016 (0.013)	-0.01 (0.01)	0.001 (0.01)	0.017** (0.008)
CAPEX	0.010* (0.006)	0.028*** (0.007)	-0.014 (0.009)	-0.009 (0.01)
Market_to_book	0.010** (0.005)	0.001 (0.007)	0.003* (0.002)	-0.003 (0.002)
Profitability	-0.010 (0.035)	-0.049 (0.042)	0.002 (0.020)	0.065*** (0.019)
Liquidity	-0.071*** (0.019)	-0.071*** (0.013)	0.092 (0.062)	0.113** (0.054)
Tangibility	-0.017* (0.009)	-0.031*** (0.01)	-0.058*** (0.008)	-0.019** (0.008)
DIV_dummy	0.002 (0.003)	0.012*** (0.004)	-0.004** (0.002)	0.003 (0.002)
State_own	-0.011** (0.005)	0.001 (0.005)	-0.022*** (0.008)	-0.011** (0.004)
NWC	-0.017** (0.007)	0.036*** (0.008)	-0.005 (0.009)	0.026** (0.011)
_cons	1.539**	1.475***	.793	.212
Firm	(.72)	(.538)	(.492)	(.212)
	4239	2280	4008	2259
Firm fixed effects	Yes	No	Yes	No
Industry fixed effects	No	Yes	No	Yes
Observations	4.239	2.280	4.008	2.259

R-squared	0.640	0.428	0.508	0.347
Adj R ²	0.616	0.410	0.470	0.324

Note: *, **, *** represent the significance level at 1%, 5%, and 10%, respectively.

5.4 Macroeconomic Uncertainty, Corporate Cash Holdings, and State Ownership

If the purpose of companies holding more cash during periods of heightened macroeconomic uncertainty is to hedge against unforeseen risks and delay investments, this result will be more evident in companies without state ownership. These companies face higher risks when dealing with macroeconomic volatility and are likely to be more cautious in their investments. In contrast, state-owned companies are less affected by macroeconomic uncertainties due to government support. They may also have access to insider information to mitigate risks and face lower bankruptcy risks because they can more easily raise capital. Additionally, state-owned companies might continue investing in projects, as these could be government initiatives, and delaying them may not be allowed.

To test this hypothesis, we conduct a regression analysis for two groups: companies with state ownership and companies without state ownership. According to Fazzari et al. (1988), firms with better access to capital markets are less likely to hold excess cash. Similarly, La Porta et al. (2002) suggest that state-owned enterprises may have different financial behaviors due to government backing. The results reported in Table 8 indicate that the coefficients of macroeconomic uncertainty are positive and significant at the 1% level for low growth opportunities. The results may indicate that the research inferences are reasonable.

Table 8. Macroeconomic uncertainty, financial constraints, and state ownership

<i>Variables</i>	<i>Without State Ownership</i>		<i>With State Ownership</i>	
WUIVNM	0.023*** (0.008)	0.046*** (0.011)	0.018 (0.012)	0.017 (0.012)
Size	-0.083**	-0.082***	0.058	-0.127***

	(0.034)	(0.022)	(0.091)	(.044)
Size_squared	0.001**	0.001***	-0.001	0.002***
	(0.001)	(0.000)	(0.002)	(0.001)
Leverage	-0.004	0.008	-0.05***	-0.022*
	(0.01)	(0.008)	(0.017)	(0.011)
CAPEX	-0.002	0.026***	0.009	-0.004
	(0.004)	(0.009)	(0.012)	(0.006)
Market_to_book	0.007***	-0.003	0.019***	0.009***
	(0.002)	(0.002)	(.005)	(0.003)
Profitability	-0.007	-0.004	0.055	0.067*
	(0.014)	(0.023)	(0.040)	(0.039)
Liquidity	-0.011	-0.046***	-0.003	0.023
	(0.021)	(0.013)	(0.031)	(0.024)
Tangibility	-0.028***	-0.020**	-0.057***	-0.011*
	(0.007)	(0.008)	(0.012)	(0.006)
DIV_dummy	-0.003	0.009***	0.003	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
State_own	-0.025	-0.012	0.003	0.01**
	(0.017)	(0.013)	(0.005)	(0.004)
NWC	-0.01*	0.037***	-0.005	0.020**
	(0.006)	(0.006)	(0.012)	(0.010)
_cons	1.291**	1.242***	-0.749	1.769***
	(.491)	(.311)	(1.29)	(.61)
Firm fixed effects	Yes	No	Yes	No
Industry fixed effects	No	Yes	No	Yes
Observations	2469	2688	1919	1914
R-squared	0.602	0.403	0.537	0.371
Adj R ²	0.583	0.388	0.508	0.350

Note: *, **, *** represent the significance level at 1%, 5%, and 10%, respectively.

5.5 IV Regression

We employ a two-stage least squares (2SLS) regression to address potential endogeneity in the relationship between macroeconomic uncertainty and corporate

cash holdings. This endogeneity may arise from reverse causality or omitted variable bias. For instance, reverse causality may occur if firms with higher cash holdings adjust their behavior in ways that unintentionally influence perceived macroeconomic uncertainty. When firms hoard cash instead of investing or hiring, this collective inaction can dampen economic activity, thereby increasing perceived uncertainty. Additionally, widespread liquidity hoarding may signal pessimistic expectations to investors or policymakers, reinforcing market perceptions of instability. On the other hand, omitted variable bias may stem from unobserved firm-level characteristics, e.g., managerial risk preferences, corporate governance quality, or access to external finance, that simultaneously affect both cash holdings and sensitivity to uncertainty.

To mitigate these concerns, we adopt an instrumental variable (IV) approach. However, identifying valid external instruments for macro-level uncertainty in the context of Vietnam is extremely challenging due to data limitations and the aggregate nature of the uncertainty measure. Therefore, we rely on an internal instrument by using long differences of the WUIVNM index. This approach is supported by Griliches and Hausman (1986) and Hahn et al. (2007), who argue that taking long differences of an endogenous explanatory variable can help mitigate omitted variable bias by removing unobserved, time-invariant firm-specific effects that are correlated with both the independent and dependent variables. In other words, differencing filters out confounding influences that do not vary over time, such as managerial conservatism, internal governance quality, or firm-specific risk culture, which, if unaccounted for, could bias the estimated relationship between macroeconomic uncertainty and cash holdings. By applying this transformation, we improve the internal validity of the estimation and reduce the influence of structural firm-level characteristics that are otherwise difficult to observe or measure directly.

We experimented with multiple differencing levels, including the 1st, 2nd, 3rd, 5th, 8th, and 20th differences. The lower-order differences (1st to 3rd) showed strong correlations with the original variable but raised endogeneity concerns and failed key instrument diagnostic tests, such as the over-identification test. The higher-order differences, particularly the 8th and 20th, showed weaker correlations in the first-stage regression, raising concerns about instrument strength. Furthermore, the 20th difference, though used in earlier studies, may no longer reflect economically relevant uncertainty in the Vietnamese context, where firms tend to respond to short- and medium-term fluctuations.

In contrast, the 4th difference of WUIVNM strikes an optimal balance. It remains significantly correlated with the original uncertainty index, passes all key IV diagnostic tests (under-identification, weak identification, and over-identification), and retains economic interpretability. Specifically, in quarterly data, a four-period difference captures uncertainty dynamics over a one-year horizon, which aligns well with typical corporate planning and liquidity management cycles.

The first-stage regression results confirm the relevance of the 4th difference as a strong instrument. The coefficient of the instrument is positive and statistically significant at the 1% level, with an F-statistic well above the conventional threshold of 10, indicating that the instrument is not weak. Tests for under-identification and over-identification also yield favorable results, suggesting that the instrument is both relevant and valid.

The overall results confirm that the 4th difference of WUIVNM is a theoretically justified, statistically valid, and economically meaningful instrumental variable in the context of our study on macroeconomic uncertainty and corporate cash holdings in Vietnam. The strength and significance of the instrument in the first-stage regression demonstrate its ability to adequately explain variations in the original uncertainty index while remaining exogenous to the structural equation for

cash holdings. By addressing the endogeneity issue effectively, we are able to obtain more reliable estimates of the causal impact of macroeconomic uncertainty on firms' cash policies.

This is particularly important in the Vietnamese context, where macroeconomic uncertainty is high and institutional factors, such as financial market imperfections, regulatory instability, and media censorship, may amplify the strategic importance of cash as a buffer. Our empirical findings, enabled by the use of a valid instrument, provide robust evidence that higher macroeconomic uncertainty leads to increased cash holdings among firms listed on the Vietnam Stock Exchange. This relationship is consistent with the precautionary motive, where firms accumulate cash reserves to mitigate future financial frictions or revenue shocks during uncertain times.

In conclusion, the use of the 4th difference of WUIVNM as an internal instrument not only enhances the econometric validity of our analysis but also supports the broader theoretical narrative of our research: In an emerging market like Vietnam, macro-level uncertainty plays a critical role in shaping corporate financial behavior, especially in terms of liquidity management. This insight contributes to the growing literature on uncertainty and firm behavior in emerging economies and highlights the importance of choosing empirically grounded and context-appropriate instruments when external ones are unavailable.

Table 9. Results of 2SLS regression

First stage regression

Variable	Coefficient	Standard error
4th difference of WUIVNM	0.415***	0.005
Size	-0.0105***	0.0020
Size_squared	0.001***	0.000
Leverage	-0.0573***	0.0176
CAPEX	-0.5739***	0.0926

Market-to-book	-0.0001**	0.0489
Profitability	0.5881***	0.1762
Liquidity	0.0124***	0.0021
Tangibility	0.0005	0.0004
DIV	0.0022	0.0055
State own	-0.011***	0.003
NWC	0.018***	0.005
_cons	0.3826***	0.0601

Underidentification test

Test	Value
F (1, 4045)	355.65
Prob > F	0.0000
SW Chi-squared p-value	0.0000
Kleibergen-Paap rk LM statistic	348.67
Chi-squared p-value	0.0000
Kleibergen-Paap rk Wald rk F statistic	355.65
10% maximum IV size	16.38

Second stage (IV) regression

Variable	Coefficient	Standard error
WUIVNM	0.355***	0.116
Size	-0.0105***	0.0020
Size_squared	0.002***	0.000
Leverage	-0.0573***	0.0176
CAPEX	-0.5739***	0.0926
Market-to-book	-0.0001**	0.0489
Profitability	0.5881***	0.1762
Liquidity	0.0124***	0.0021
Tangibility	0.0005	0.0004
DIV	0.0022	0.0055
State own	-0.011***	0.003
NWC	0.018***	0.005
_cons	0.3826***	0.0601

Endogeneity and overidentification tests

Test	Value
Hansen J-test (Overidentification test)	0.000
Chi-squared p-value	0.000
Durbin-Wu-Hausman test for endogeneity	5.780
Chi-squared p-value	0.0162

Observations

Metric	Value
Number of firms	4,045

6. Conclusion

This study investigates how macroeconomic uncertainty affects corporate cash holdings in Vietnam, using the World Uncertainty Index for Vietnam (WUIVNM) as a proxy. The results show that firms tend to increase their cash holdings when uncertainty rises, consistent with the precautionary motive. The effect is statistically significant among firms with low financial constraints, non-state ownership, low growth opportunities, and those operating in less competitive industries.

Vietnam's economic environment, marked by strong government involvement, rapid integration into global markets, and institutional transitions, creates a unique context where macroeconomic and political uncertainties are deeply intertwined. By incorporating a country-specific uncertainty index and examining heterogeneous firm responses, this study contributes new evidence on how firms in a transitional economy adjust liquidity strategies in response to uncertainty. It also highlights the moderating role of firm characteristics often overlooked in prior research.

From a practical standpoint, firms operating in environments of heightened macroeconomic uncertainty should strengthen their liquidity preparedness through more proactive and structured financial planning. First, developing scenario-based cash flow forecasts is essential. This involves constructing multiple cash flow projections under different economic scenarios, such as baseline, moderate shock, and severe shock cases, so that firms can anticipate funding gaps, identify priority expenditures, and formulate timely response plans. Second, stress-testing liquidity positions under adverse conditions should be conducted regularly. By simulating extreme but plausible events (e.g., sudden revenue drops, delayed receivables, or tightened credit markets), firms can assess the resilience of their current liquidity buffers and design contingency strategies, such as postponing non-essential investments or activating backup credit lines, before shocks materialize. These practices enhance the firm's agility and safeguard operational continuity in times of volatility.

This study is limited to listed firms and uses the WUIVNM as the sole measure of uncertainty. Future research could expand the sample to include unlisted or smaller firms and apply alternative uncertainty measures such as Economic Policy Uncertainty (EPU), market-based volatility indices, or survey-based indicators. Moreover, qualitative methods, such as interviews with corporate managers, experts, and policymakers, could offer deeper insights into how firms interpret and respond to uncertainty in the Vietnamese context.

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