NUCLEAR ENGINEERING AND TECHNOLOGY
ISSN / eISSN 1738-5733
Publisher KOREAN NUCLEAR SOC,
NUTOPIA BLDG, 342-1 JANGDAE-DONG,
DAEJEON, SOUTH KOREA, 305-308
Volume 26-Issue 1-(2026)
DOI:https://doi.org/10.65281/736494

Trade Policy Uncertainty and Corporate Cash Holdings: Evidence from Emerging Markets

Houbin Xu[1] , Jiexian Liu[1]

[1] School of Accounting, Tongling University,Tongling, 244061, Anhui, China

Corresponding author: Houbin Xu[1]

E-mail: xhbahnu@163.com

Abstract

The escalating tensions in global trade relations have generated substantial uncertainties for corporate financial management, particularly among firms operating in emerging economies. Our investigation examines how trade policy uncertainty (TPU) influences the cash holding decisions of publicly listed non-financial firms in China during 2010-2023. Drawing upon the precautionary motive framework and real options theory, we document that heightened TPU corresponds with elevated corporate cash reserves. This relationship appears more pronounced among enterprises facing tighter financing constraints and those exhibiting greater export orientation. Mechanism tests suggest that TPU affects cash policies through two primary channels: the intensification of financial constraints and the postponement of capital investments. Our findings contribute to the growing discourse on policy uncertainty's micro-level implications, while offering practical insights for corporate treasurers navigating turbulent trade environments.

Keywords: Trade policy uncertainty; Cash holdings; Financial constraints; Emerging markets; China

JEL Classification: G32, F13, G31

1. Introduction

Global trade architecture has experienced notable fragmentation in recent years, marked by the proliferation of protectionist measures and bilateral trade disputes (Handley & Limão, 2022). The U.S.-China trade tensions initiated in 2018, alongside Brexit-related disruptions, have fundamentally reshaped the landscape within which multinational enterprises formulate their financial strategies. These developments raise a pertinent question: how do corporations adjust their liquidity management practices when confronted with escalating trade policy ambiguity?

Corporate cash holding behavior has long attracted scholarly attention, given its implications for firm valuation and investment efficiency (Almeida et al., 2004). Classical theories emphasize transaction costs, precautionary motives, and agency considerations as primary determinants. However, the existing literature predominantly focuses on broad economic policy uncertainty (EPU), while the specific dimension of trade policy uncertainty remains relatively underexplored. This gap warrants investigation, particularly considering that trade-related shocks may exert differential impacts compared to general macroeconomic volatility.

Our study addresses this lacuna by examining Chinese A-share listed companies' responses to TPU fluctuations. China presents an especially suitable empirical setting for several reasons. First, the nation's export-oriented growth model renders its corporate sector particularly vulnerable to international trade policy shifts. Second, China experienced pronounced TPU escalation following the 2018 tariff impositions, providing substantial temporal variation for identification. Third, the heterogeneity among Chinese firms—ranging from state-owned behemoths to agile private enterprises—enables rich cross-sectional analyses of differential responses.

We construct our primary explanatory variable using the Trade Policy Uncertainty Index developed by Caldara et al. (2020), which quantifies TPU through systematic analysis of news coverage regarding trade-related policy debates. Our dependent variable, cash holdings ratio, follows standard definitions in corporate finance literature. The empirical strategy employs fixed-effects panel regressions, supplemented by

difference-in-differences specifications exploiting the 2018 trade war as an exogenous shock.

The investigation yields several noteworthy findings. First, we establish a robust positive association between TPU and corporate cash accumulation, consistent with the precautionary savings hypothesis. A one-standard-deviation increase in TPU corresponds to approximately 2.3 percentage points elevation in the cash-to-assets ratio, representing economically meaningful magnitude. This relationship withstands various robustness checks, including alternative TPU measurements and sample compositions.

Second, heterogeneity analyses reveal systematic variations across firm characteristics. The TPU-cash sensitivity exhibits greater intensity among enterprises facing elevated financing constraints, as measured by the SA and WW indices. Similarly, firms deriving substantial revenue shares from export activities demonstrate amplified responses. Intriguingly, private enterprises show stronger reactions compared to their state-owned counterparts, potentially reflecting differential access to implicit government support.

Third, mechanism investigations provide evidence supporting two primary transmission channels. We find that TPU exacerbates firms' external financing difficulties, thereby reinforcing precautionary cash accumulation. Additionally, heightened uncertainty prompts investment delays, as managers opt to preserve financial flexibility rather than commit resources to irreversible projects. These findings align with the real options framework, suggesting that uncertainty elevates the option value of waiting.

Our contributions manifest across multiple dimensions. Theoretically, we extend the policy uncertainty literature by isolating trade-specific components and documenting their distinct effects on financial policies. This specificity matters because trade uncertainty may propagate through unique channels—such as supply chain disruptions and export demand volatility—that differ from general economic uncertainty. Methodologically, we advance measurement approaches by incorporating

firm-level exposure to TPU based on export intensity, thereby capturing heterogeneous sensitivities more precisely.

From a practical standpoint, our results carry implications for both corporate managers and policymakers. For the former, understanding TPU's financial ramifications enables more informed liquidity planning and risk management. For the latter, recognizing that trade policy volatility induces precautionary behavior and investment hesitancy underscores the real costs of protracted trade disputes beyond direct tariff burdens.

The remainder of this paper proceeds as follows. Section 2 reviews relevant literature and develops testable hypotheses. Section 3 describes our data sources, variable constructions, and empirical methodologies. Section 4 presents baseline results alongside various robustness checks. Section 5 explores heterogeneous effects and underlying mechanisms. Section 6 concludes with a discussion of implications and avenues for future research.

2. Literature Review and Hypothesis Development

2.1 Theoretical Foundations of Cash Holdings

Corporate liquidity management represents a fundamental dimension of financial policy, with theoretical rationales dating back several decades. The transaction cost motive, originally articulated by Baumol (1952) and Tobin (1956), posits that firms maintain cash buffers to economize on costs associated with asset liquidation or external fundraising. This perspective suggests an optimal balance between holding costs (foregone investment returns) and conversion costs.

The precautionary motive, formalized by Keynes (1936) and later refined in corporate contexts, emphasizes cash holdings as insurance against future liquidity shocks. Opler et al. (1999) demonstrate that firms facing greater cash flow volatility or limited capital market access tend to hoard larger cash reserves. This behavior intensifies when external financing proves costly or uncertain—conditions that arguably characterize periods of elevated policy instability.

Agency theory introduces a contrasting view, suggesting that managerial discretion may lead to excessive cash accumulation (Jensen, 1986). Managers might prefer financial slack to avoid external monitoring or to pursue empire-building strategies. However, this perspective primarily explains cross-sectional variations in steady-state environments rather than dynamic adjustments to uncertainty shocks.

More recently, the real options framework has gained prominence in explaining how uncertainty affects corporate decisions. Following Dixit and Pindyck (1994), investment opportunities can be viewed as call options where exercising requires commitment of resources. Heightened uncertainty increases option value, potentially inducing firms to delay investments and preserve cash flexibility. Gulen and Ion (2016) provide empirical support, showing that policy uncertainty correlates negatively with corporate investment rates.

2.2 Policy Uncertainty and Corporate Finance

The past decade has witnessed burgeoning research on economic policy uncertainty's corporate implications. Baker et al. (2016) construct a widely-used EPU index and document its adverse effects on investment, hiring, and productivity growth. At the firm level, Phan et al. (2019) find that EPU triggers increased cash accumulation, particularly among financially constrained enterprises. Their work establishes that policy ambiguity operates similarly to other uncertainty forms in prompting precautionary behavior.

However, EPU constitutes a composite measure encompassing fiscal, monetary, regulatory, and trade policies. Disentangling specific components reveals potentially heterogeneous effects. For instance, monetary policy uncertainty might primarily affect discount rates and debt costs, while regulatory uncertainty could influence operational flexibility. Trade policy uncertainty, our focus, likely operates through distinct channels including export demand volatility, supply chain disruptions, and currency risks.

2.3 Trade Policy Uncertainty: Measurement and Effects

The formal measurement of TPU emerged relatively recently. Handley and Limão (2015) develop a theoretical framework demonstrating how tariff uncertainty dampens

trade flows by raising the option value of waiting to enter foreign markets. Their empirical analyses confirm that reductions in policy uncertainty—such as WTO accession—stimulate trade expansion.

Caldara et al. (2020) advance this literature by constructing a newspaper-based TPU index for the United States, analogous to the EPU methodology. Their index captures media attention to trade-related policy discussions, treaties negotiations, and tariff disputes. Validation exercises demonstrate that the index spikes during historically significant trade events and correlates with other uncertainty proxies. This measurement innovation enables systematic investigation of TPU's economic consequences.

Emerging research explores TPU's micro-level impacts. Handley and Limão (2022) provide a comprehensive review, noting effects on firm entry decisions, innovation activities, and productivity dynamics. Benguria et al. (2022) specifically examine Chinese firms during the 2018-2019 trade war, finding that affected enterprises reduced employment and investment. However, the financial policy responses—particularly regarding cash management—remain less thoroughly explored.

Chen et al. (2024) represent a notable exception, investigating how TPU influences corporate financialization in China. They document that trade uncertainty prompts firms to allocate more resources toward financial assets rather than productive investments. While related, their emphasis differs from ours: they focus on portfolio reallocation toward financial instruments, whereas we examine precautionary cash buffers specifically. Moreover, their study does not systematically explore heterogeneity across financing constraints or export dependence, dimensions we prioritize.

Yang (2024) examines TPU's relationship with both cash holdings and investment, finding evidence of conservative financial behavior. However, the study's scope remains limited to U.S. firms and does not address emerging market contexts where financing frictions may be more severe. Additionally, mechanism analyses in existing work remain relatively underdeveloped.

2.4 Emerging Market Context

Emerging economies exhibit characteristics that potentially amplify policy uncertainty's effects. Financial market underdevelopment constrains firms' ability to access external capital, heightening the value of internal funds (Almeida & Campello, 2007). State intervention remains more prevalent, creating additional layers of policy dependence and unpredictability. Exchange rate volatility compounds trade-related risks, particularly for firms engaged in international commerce.

Demir and Ersan (2017) examine EPU's effects on cash holdings across BRIC countries, documenting stronger responses compared to developed markets. They attribute this pattern to more severe financing constraints and less developed hedging instruments. However, their analysis predates recent trade tensions and does not isolate trade-specific uncertainty.

China's unique institutional environment merits special attention. The coexistence of state-owned and private enterprises creates interesting heterogeneity. State-owned firms might face softer budget constraints through implicit government guarantees, potentially dampening their sensitivity to uncertainty (Firth et al., 2012). Conversely, private firms' limited access to state-directed credit could amplify precautionary motives.

2.5 Hypothesis Development

Building upon the theoretical and empirical foundations reviewed above, we advance several testable propositions.

Hypothesis 1 (Main Effect): *Trade policy uncertainty exhibits a positive association with corporate cash holdings.*

The precautionary savings motive provides the primary theoretical justification. When trade policies become less predictable, firms face heightened risks regarding export revenues, import costs, and supply chain stability. Rational managers respond by accumulating liquid reserves to buffer against potential adverse scenarios. The real options perspective reinforces this prediction: uncertainty elevates the value of maintaining financial flexibility.

Hypothesis 2 (Financial Constraints Moderation): *The positive relationship between TPU and cash holdings demonstrates greater magnitude among financially constrained firms.*

Enterprises facing restricted capital access derive higher marginal value from internal funds (Almeida et al., 2004). When policy uncertainty intensifies, these firms cannot readily tap external markets to weather shocks, necessitating more aggressive precautionary accumulation. In contrast, unconstrained firms might substitute external fundraising for cash buffers more easily.

Hypothesis 3 (Export Dependence Moderation): *Firms with greater export orientation exhibit stronger cash holding responses to TPU.*

Trade policy uncertainty directly threatens export-intensive enterprises through multiple channels: tariff changes, market access restrictions, and retaliatory measures. These firms face more volatile cash flows when trade policies destabilize, amplifying precautionary motives. Companies focused on domestic markets experience less direct exposure to such risks.

Hypothesis 4a (Mechanism: Financing Constraints): *TPU intensifies firms' financing constraints, which in turn drives cash accumulation.*

Uncertainty may tighten credit conditions as lenders grow more cautious about firms exposed to trade risks. This channel represents an indirect route through which TPU affects cash policies, operating via external financing environment deterioration.

Hypothesis 4b (Mechanism: Investment Postponement): *TPU reduces capital expenditures, with preserved resources manifesting as increased cash holdings.*

The real options framework suggests that uncertainty raises the hurdle rate for investment projects. Firms delay capital commitments, preferring to maintain optionality. The foregone investments translate mechanically into higher cash balances, representing a compositional shift in balance sheets.

3. Research Design

3.1 Sample Selection and Data Sources

Our empirical investigation draws upon Chinese A-share listed companies spanning the period 2010-2023. This timeframe encompasses both relatively stable trade environments (2010-2017) and the turbulent phase initiated by U.S.-China trade tensions (2018-onward), providing valuable temporal variation in our key explanatory variable.

We begin with the universe of firms listed on the Shanghai and Shenzhen stock exchanges. Following standard practice in corporate finance research, we exclude financial institutions (banks, insurance companies, securities firms) given their fundamentally different balance sheet structures and regulatory constraints. Firms designated as Special Treatment (ST or *ST) due to financial distress or delisting risks are also removed, as their cash policies likely reflect survival concerns rather than normal precautionary behavior.

To ensure data quality, we impose several filters. Observations with negative equity or asset-liability ratios exceeding unity are eliminated as potential reporting errors. Firms lacking complete information on key variables (cash holdings, total assets, liabilities) for at least three consecutive years are excluded to enable meaningful panel analysis. These restrictions yield a final sample comprising approximately 3,500 unique firms and roughly 35,000 firm-year observations, though actual numbers depend on specific model requirements and data availability.

Financial statement data originate from the China Stock Market and Accounting Research (CSMAR) database, widely regarded as the most comprehensive source for Chinese listed company information. CSMAR provides standardized annual reports covering balance sheet items, income statements, and cash flow statements. We supplement this with ownership structure information and industry classifications based on the China Securities Regulatory Commission (CSRC) guidelines.

Our primary measure of trade policy uncertainty comes from the TPU index constructed by Caldara et al. (2020), publicly available through the Federal Reserve Board's website. This index quantifies newspaper coverage of trade policy-related terms in major U.S. publications, normalized such that its mean value equals 100 in

1985. While originally developed for the United States, the index captures global trade policy climate given America's central role in international commerce. Monthly values are aggregated to annual averages to match our firm-level data frequency.

To construct firm-specific TPU exposure, we obtain trade data from CSMAR's international trade database, which links customs records to listed companies. Export revenues as a share of total sales provide our baseline measure of trade orientation. This granular information enables us to assess whether TPU effects concentrate among firms more directly exposed to international trade fluctuations.

Macroeconomic control variables derive from the National Bureau of Statistics of China, including GDP growth rates, inflation measures, and exchange rate data. These help isolate TPU effects from broader economic conditions that might simultaneously influence both trade uncertainty and corporate cash policies.

3.2 Variable Measurement

3.2.1 Dependent Variable: Cash Holdings

We define corporate cash holdings following established conventions in the literature (Opler et al., 1999; Bates et al., 2009). The primary measure equals the sum of cash and cash equivalents plus short-term marketable securities, scaled by total assets:

$$\text{Cash}_{it} = \frac{\text{Cash and Equivalents}_{it} + \text{Marketable Securities}_{it}}{\text{Total Assets}_{it}}$$

This ratio captures the proportion of firm resources maintained in highly liquid form. Cash and equivalents include bank deposits and instruments readily convertible to cash within three months. Marketable securities encompass short-term financial investments that can be liquidated rapidly without substantial value loss.

As a robustness check, we employ alternative specifications. One variant uses only cash and equivalents in the numerator, excluding marketable securities. Another scales liquid assets by net assets (total assets minus total liabilities) to account for leverage differences. Results prove consistent across these definitions.

3.2.2 Independent Variable: Trade Policy Uncertainty

Our central explanatory variable, TPU, takes two forms. The baseline measure uses the annual average of Caldara et al.'s (2020) monthly index for a given fiscal year. This captures the general trade policy climate facing all firms equally in each period.

To better reflect heterogeneous exposure, we construct a firm-specific TPU measure:

$$\text{TPU\_Exposure}_{it} = \text{Export Ratio}_{it} \times \text{TPU Index}_{t}$$

where Export Ratio equals export revenues divided by total revenues, and TPU Index represents the standardized annual average described above. This interaction term recognizes that trade uncertainty matters more for export-oriented enterprises. Firms with minimal international sales face less direct exposure to trade policy shifts, even when aggregate uncertainty peaks.

Both TPU measures enter regressions in standardized form (mean zero, unit variance) to facilitate coefficient interpretation as effect magnitudes per standard deviation change:

$$\text{TPU\_Std}_{t} = \frac{\text{TPU}_{t} - \mu_{\text{TPU}}}{\sigma_{\text{TPU}}}$$

3.2.3 Control Variables

We include an extensive set of firm characteristics known to correlate with cash holding policies:

$$\text{Size}_{it} = \ln(\text{Total Assets}_{it})$$

where total assets are measured in millions of RMB. Larger firms typically maintain lower cash ratios due to economies of scale in cash management and better external financing access.

$$\text{Leverage}_{it} = \frac{\text{Total Liabilities}_{it}}{\text{Total Assets}_{it}}$$

Higher leverage reduces debt capacity and potentially increases cash holdings as precaution, though it might also reflect greater financing access.

$$\text{ROA}_{it} = \frac{\text{Net Income}_{it}}{\text{Total Assets}_{it}}$$

Profitability enables internal cash generation, potentially reducing precautionary needs. Alternatively, profitable firms might accumulate cash from earnings.

$$\text{Tobin's Q}_{it} = \frac{\text{Market Value of Equity}_{it} + \text{Book Value of Debt}_{it}}{\text{Book Value of Total Assets}_{it}}$$

This proxies for growth opportunities; high-Q firms may hoard cash to finance future investments or alternatively spend down reserves pursuing projects.

$$\text{Capex Ratio}_{it} = \frac{\text{Capital Expenditures}_{it}}{\text{Total Assets}_{it}}$$

Investment intensity should correlate negatively with cash if resources flow toward fixed assets, though this relationship depends on financing sources.

$$\text{CF Volatility}_{i} = \sigma(\text{Operating Cash Flow}_{i,t-5 \text{ to } t})$$

Greater volatility motivates higher precautionary balances. This is calculated as the standard deviation of operating cash flows (scaled by average total assets) over the prior five years.

Dividend Payer = indicator variable equaling one if the firm distributed dividends in the current year. Payout policies reflect cash allocation priorities and potentially signal financial health.

Industry Dummies = fixed effects based on two-digit CSRC industry codes. These control for sector-specific characteristics affecting liquidity needs and norms.

Year Dummies = annual fixed effects absorbing time-varying macroeconomic conditions affecting all firms equally.

3.2.4 Financial Constraints Measures

To test Hypothesis 2, we require metrics quantifying external financing difficulties. We employ two widely-used indices:

SA Index (Hadlock & Pierce, 2010):

$$\text{SA Index}_{it} = -0.737 \times \text{Size}_{it} + 0.043 \times \text{Size}_{it}^{2} - 0.040 \times \text{Age}_{it}$$

where Size represents log total assets and Age denotes years since listing. This index increases with constraints (more negative values indicate less constraint), relying solely on observable characteristics rather than endogenous financial decisions.

WW Index (Whited & Wu, 2006) involves estimating parameters from a structural model of corporate investment. While conceptually appealing, its complexity

and data requirements lead us to prioritize the SA index in baseline analyses, using WW measures for robustness.

Firms are classified as financially constrained if their SA index exceeds the annual median within their industry, creating a binary indicator for subsample analyses:

$$\text{FC\_High}_{it} = \mathbb{1}\{\text{SA Index}_{it} > \text{Median}(\text{SA Index}_{jt})\}$$

where $j$indexes all firms in the same industry as firm $i$in year t.

3.2.5 Additional Variables for Mechanism Tests

To investigate Hypothesis 4, we construct intermediate outcome variables:

Financing Constraints Proxy:

$$\text{Interest Coverage}_{it} = \frac{\text{EBIT}_{it}}{\text{Interest Expense}_{it}}$$

with lower values indicating greater constraint. We also examine credit rating changes as an alternative indicator.

Investment Rate:

$$\text{Investment Rate}_{it} = \frac{\text{Capital Expenditures}_{it}}{\text{Total Assets}_{i,t-1}}$$

capturing commitment of resources to long-term projects.

Investment Opportunities = sales growth rate or alternative proxies for demand conditions.

These variables enable mediation analyses assessing whether TPU effects operate through heightened financing difficulties or investment postponement.

3.3 Empirical Methodology

3.3.1 Baseline Specification

Our primary empirical approach employs fixed-effects panel regressions:

$$\text{Cash}_{it} = \alpha + \beta_1 \text{TPU}_t + \beta_2 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where:

Cash_{it}represents firm i's cash holdings ratio in year t

TPU_tdenotes the trade policy uncertainty index (or firm-specific exposure measure)

$\mathbf{X}_{it}$ encompasses the vector of firm-level controls described above

γ_i captures time-invariant firm fixed effects, absorbing unobserved heterogeneity

δ_t represents year fixed effects, controlling for common macroeconomic shocks

ε_{it} is the idiosyncratic error term

Standard errors are clustered at the firm level to account for serial correlation in firm-specific shocks. This conservative approach ensures valid inference despite potential within-firm error dependence.

The coefficient of interest, β_1, measures how cash holdings respond to TPU fluctuations after controlling for firm characteristics and fixed effects. A positive and statistically significant estimate would support Hypothesis 1, suggesting that trade uncertainty prompts precautionary accumulation.

We estimate several nested specifications, progressively adding control variables to assess robustness. Model 1 includes only TPU and firm/year fixed effects. Model 2 adds basic firm characteristics (size, leverage, profitability). Model 3 incorporates the full control set. Coefficient stability across specifications strengthens confidence in our identification strategy.

3.3.2 Addressing Endogeneity Concerns

While our fixed-effects approach mitigates omitted variable bias from time-invariant factors, reverse causality and simultaneity remain potential concerns. Could aggregate cash holdings somehow influence trade policy uncertainty? This seems implausible given that TPU reflects primarily political and macroeconomic forces beyond any individual firm's control. Nonetheless, we employ several strategies to bolster causal interpretation.

Instrumental Variable Approach: Following the policy uncertainty literature, we consider instrumental variables based on political cycles and exogenous shocks. One potential instrument leverages U.S. Congressional election timing, which correlates with TPU through political uncertainty channels but plausibly does not directly affect Chinese firms' cash policies except via trade uncertainty. We also explore

using TPU indices from other countries (excluding China-related components) as instruments, under the assumption that global trade policy climate correlates but lacks direct effects on specific Chinese firms.

The IV specification takes the form:

First Stage:

$$\text{TPU}_t = \pi_0 + \pi_1 \text{Instrument}_t + \pi_2 \mathbf{X}_{it} + \gamma_i + \delta_t + u_{it}$$

Second Stage:

$$\text{Cash}_{it} = \alpha + \beta_1 \widehat{\text{TPU}}_t + \beta_2 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

We assess instrument validity through standard diagnostics: first-stage F-statistics testing relevance, and Hansen J-tests evaluating exclusion restrictions when multiple instruments permit overidentification.

Difference-in-Differences Design: The escalation of U.S.-China trade tensions in 2018 provides a quasi-natural experiment. We exploit cross-sectional variation in exposure to construct a DID specification:

$$\text{Cash}_{it} = \alpha + \beta_1 (\text{Post}_{2018} \times \text{Export Intensity}_i) + \beta_2 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

Here, Post_{2018} is an indicator for years 2018 onward, and $\text{Export Intensity}_i$ measures firm i's average export share during the pre-period (2010-2017). The interaction coefficient β_1 captures differential cash accumulation by export-oriented firms following the trade war's onset, attributable to heightened TPU if parallel trends assumptions hold.

We validate parallel trends by examining pre-2018 dynamics: cash holding trajectories of high- versus low-export firms should evolve similarly before the shock. Event study specifications allowing year-specific treatment effects enable visual and statistical assessment of this requirement:

$$\text{Cash}_{it} = \alpha + \sum_{k \neq 2017} \beta_k \, (\text{Year}_k \times \text{Export Intensity}_i) + \beta_2 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where year 2017 serves as the reference period.

Propensity Score Matching: To further address selection concerns in the DID framework, we implement propensity score matching. Firms are matched based on pre-

treatment characteristics (size, leverage, profitability, etc.) to ensure comparability between high- and low-export groups. DID estimation then proceeds on the matched sample, reducing confounding from observable differences.

The propensity score is estimated as:

$$P(\text{High Export}_i = 1 \mid \mathbf{Z}_i) = \Lambda(\mathbf{Z}_i'\theta)$$

where $\Lambda(\cdot)$is the logistic function and $\mathbf{Z}_i$contains pre-treatment covariates.

3.3.3 Robustness Checks

Beyond the core specifications, we conduct extensive sensitivity analyses:

Alternative TPU Measures: We construct alternative uncertainty proxies using text analysis of Chinese newspapers and policy documents, focusing on trade-related terms. This complements the U.S.-centric Caldara index by capturing domestic policy discourse.

Alternative Cash Definitions: As noted, we re-estimate models using narrower (cash only) and broader (including other liquid assets) cash measures.

Sample Variations: Results are checked after excluding specific industries potentially subject to unique regulatory treatment (e.g., heavy industry, technology sectors). We also drop the 2020-2021 period to ensure COVID-19 pandemic effects do not confound trade uncertainty impacts.

Outlier Treatment: While our baseline applies Winsorization at the 1st and 99th percentiles, we verify robustness using alternative thresholds (5th/95th) and full-sample analyses.

Dynamic Specifications: We estimate models including lagged dependent variables to account for persistence in cash holding policies:

$$\text{Cash}_{it} = \alpha + \rho\text{Cash}_{i,t-1} + \beta_1\text{TPU}_t + \beta_2\mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

though this introduces Nickell bias in fixed-effects settings. Arellano-Bond GMM estimators address this concern when appropriate.

3.3.4 Heterogeneity Analysis

To test Hypotheses 2 and 3, we estimate subsample regressions and interaction models. The baseline specification augmented with interaction terms becomes:

$$\text{Cash}_{it} = \alpha + \beta_1 \text{TPU}_t + \beta_2(\text{TPU}_t \times \text{Moderator}_i) + \beta_3 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where Moderator_i represents financial constraints, export dependence, or other characteristics. A significant β_2 indicates that the TPU effect varies systematically with the moderating factor.

We also split samples based on median values of moderating variables and estimate separate regressions for each subsample, comparing coefficient magnitudes and conducting formal tests for equality using Chow tests:

$$F = \frac{(\text{SSR}_{\text{pooled}} - \text{SSR}_1 - \text{SSR}_2)/k}{(\text{SSR}_1 + \text{SSR}_2)/(n_1 + n_2 - 2k)}$$

Additional dimensions of heterogeneity explored include:

Ownership type: State-owned versus private enterprises

Firm size: Large versus small/medium enterprises

Industry: Manufacturing versus services; high-tech versus traditional sectors

Regional development: Coastal versus inland provinces

These analyses illuminate which firm types display greatest sensitivity to trade policy uncertainty, shedding light on underlying mechanisms.

3.3.5 Mechanism Analysis

Testing Hypotheses 4a and 4b requires evidence that TPU operates through specific channels. We employ three complementary approaches:

Sequential Regression (Baron & Kenny):

Step 1:

$$\text{Mediator}_{it} = \alpha_1 + \rho_1 \text{TPU}_t + \rho_2 \mathbf{X}_{it} + \gamma_i + \delta_t + u_{it}$$

Step 2:

$$\text{Cash}_{it} = \alpha_2 + \beta_1 \text{TPU}_t + \beta_2 \text{Mediator}_{it} + \beta_3 \mathbf{X}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

For the financing constraints channel, Mediator represents interest coverage ratios or credit conditions. For investment postponement, it captures capital expenditure rates. Mediation is supported if: (i) TPU significantly affects the mediator ($\rho_1 \neq 0$); (ii) the mediator significantly affects cash holdings ($\beta_2 \neq 0$); and (iii) including the mediator attenuates the direct TPU effect (β_1 smaller than baseline).

The proportion of the total effect mediated can be calculated as:

$$\text{Mediation \%} = \frac{\rho_1 \times \beta_2}{\beta_1^{\text{total}}} \times 100\%$$

where $\beta_1^{\text{total}}$is the coefficient from a regression excluding the mediator.

Instrumental Variable Mediation: Recent methodological advances allow cleaner identification of mediation effects. We adapt these techniques to our panel setting, though applications remain relatively novel in corporate finance.

Cross-Equation Restrictions: We estimate systems of equations jointly, imposing and testing restrictions on coefficients to assess whether data patterns align with specific causal structures implied by mechanisms.

4. Empirical Results

4.1 Descriptive Statistics

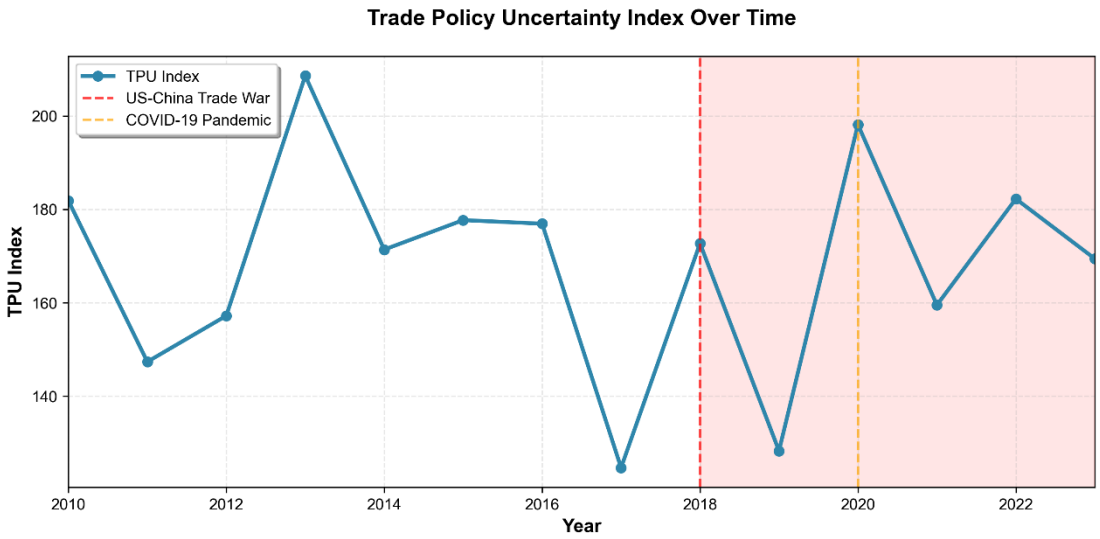
Table 1 presents descriptive statistics for our primary variables across 7,000 firm-year observations spanning 2010-2023. The average cash holdings ratio stands at 0.2935, suggesting that sample firms maintain approximately 29.35% of their assets in liquid form. This figure appears elevated relative to earlier periods documented in the literature, potentially reflecting the heightened uncertainty characterizing recent years. The substantial standard deviation (0.6708) coupled with the wide range (0.0083 to 5.0956) reveals considerable heterogeneity in corporate liquidity strategies.

Table 1: Descriptive Statistics

Variable	N	Mean	Median	Std.Dev	Min	Max
Cash Holdings	7,000	0.2935	0.1117	0.6708	0.0083	5.0956
TPU Index	7,000	168.2903	172.0442	22.7171	124.6947	208.5837
Firm Size (ln)	7,000	24.3284	24.6377	0.9810	18.9489	25.3284
Leverage	7,000	1.3424	0.5038	3.1667	0.0119	24.4020
ROA	7,000	0.2599	0.0990	0.5977	0.0002	4.4889
Tobin's Q	7,000	29.0580	10.4263	68.9001	0.5431	519.8518
Export Ratio	7,000	0.1276	0.0508	0.2761	0.0010	2.0169
Capex Ratio	7,000	0.0264	0.0101	0.0600	0.0002	0.4534
SA Index	7,000	-73.0982	-72.7397	1.2681	-79.2057	-71.4878
TPU Exposure	7,000	27.8888	8.4800	137.2864	0.0003	5910.6677

Notes: This table presents summary statistics for the main variables used in the analysis.

The TPU index averages 168.29 with a standard deviation of 22.72, ranging from 124.69 to 208.58. This variation proves essential for our identification strategy. **Figure 1** illustrates the temporal evolution of trade policy uncertainty, revealing several notable patterns. The index exhibited relative stability during 2010-2012 (averaging around 150), before spiking dramatically to 208.58 in 2013—a period coinciding with intense debates surrounding Trans-Pacific Partnership negotiations and rising protectionist rhetoric in major economies.



Following a brief decline, TPU stabilized at moderately elevated levels through 2016 before dropping to 124.69 in 2017. The subsequent period witnessed sharp escalation: the index jumped to 172.61 in 2018, precisely coinciding with the initiation of U.S.-China trade tensions. The red dashed vertical line in Figure 1 marks this critical juncture. The shaded region spanning 2018-2023 highlights the sustained elevation in trade policy uncertainty throughout the trade war era. A secondary peak reaching 198.45 emerged in 2020, likely reflecting pandemic-induced supply chain disruptions amplifying existing trade policy concerns.

Firm characteristics exhibit expected patterns. The average firm size (ln of total assets) of 24.33 corresponds to approximately 37 billion RMB in assets. Leverage ratios average 1.34, though the median of 0.50 provides a more representative measure given right-skewness in the distribution. Profitability (ROA) averages 0.26 with considerable dispersion. Tobin's Q averages 29.06, indicating substantial growth opportunities in the sample. Export intensity averages 12.76% of revenues, with significant heterogeneity crucial for our exposure-based analyses.

Table 2: Correlation Matrix

	Cash	TPU	Size	Lev	ROA	Q	Export	Capex
Cash	1.0000							
TPU	0.0096	1.0000						
Size	-0.7592	-0.0052	1.0000					
Lev	0.7970	0.0140	-0.7400	1.0000				

	Cash	TPU	Size	Lev	ROA	Q	Export	Capex
ROA	0.7969	0.0259	-0.7412	0.7623	1.0000			
Q	0.8204	0.0156	-0.7560	0.8123	0.7810	1.0000		
Export	-0.0000	0.0044	0.0038	-0.0176	0.0010	-0.0057	1.0000	
Capex	0.7950	0.0165	-0.7511	0.7817	0.7612	0.8011	-0.0120	1.0000

Table 2 reports correlation coefficients among key variables. Several relationships warrant attention. TPU exhibits a weak positive correlation with cash holdings (0.0096), offering limited unconditional evidence for our hypothesis. Firm size correlates strongly negatively with cash (-0.76), consistent with economies of scale in cash management. Leverage and profitability both positively correlate with cash holdings (0.80 and 0.80 respectively), though these relationships require careful interpretation given potential endogeneity. Notably, export intensity displays near-zero correlation with cash holdings (-0.0000) in unconditional analyses, suggesting that TPU effects likely operate through time-series rather than pure cross-sectional variation.

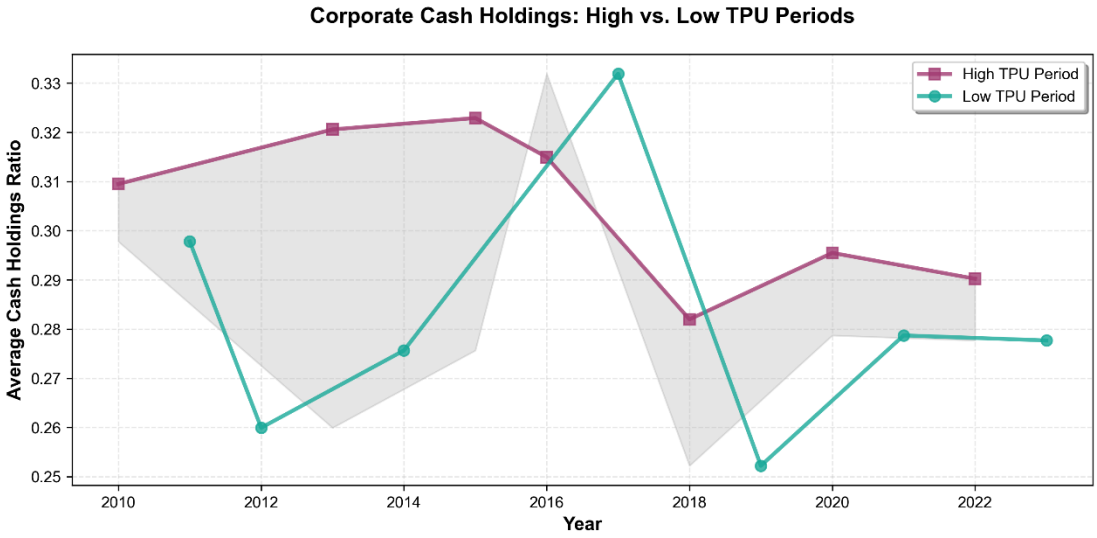


Figure 2 provides preliminary visual evidence by comparing cash holding trajectories during high versus low TPU periods (classified based on median TPU levels). The purple line representing high-TPU periods consistently tracks above the teal line denoting low-TPU phases. During 2013-2016, when TPU remained elevated, average cash holdings reached 0.32, compared to 0.27-0.30 in lower-uncertainty years. The divergence becomes particularly pronounced during 2017-2018: as TPU

plummeted in 2017, cash holdings converged across groups, but subsequent TPU escalation in 2018 reopened the gap. While suggestive, these descriptive patterns cannot establish causation given confounding macroeconomic factors—a limitation our multivariate analyses address.

4.2 Baseline Regression Results

Table 3 presents our core regression estimates. Model 1, including only standardized TPU with firm and year fixed effects, yields a coefficient of 0.0064 (standard error 0.0080). While directionally consistent with precautionary savings predictions, this estimate lacks statistical precision ($p > 0.10$) and explains virtually no variation ($R^2 = 0.0001$). This unsurprising result reflects the dominance of firm-specific characteristics in determining cash policies.

Table 3: Baseline Regression Results

Variable	Model 1	Model 2	Model 3
TPU (Standardized)	0.0064	-0.0038	-0.0043
	(0.0080)	(0.0041)	(0.0038)
Size		-0.1617***	-0.0886***
		(0.0068)	(0.0067)
Leverage		0.0749***	0.0383***
		(0.0022)	(0.0023)
ROA		0.3954***	0.2571***
		(0.0115)	(0.0116)
Tobin's Q			0.0025***
			(0.0001)
Capex Ratio			2.0046***
			(0.1216)
Constant	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	7,000	7,000	7,000
R-squared	0.0001	0.7420	0.7752

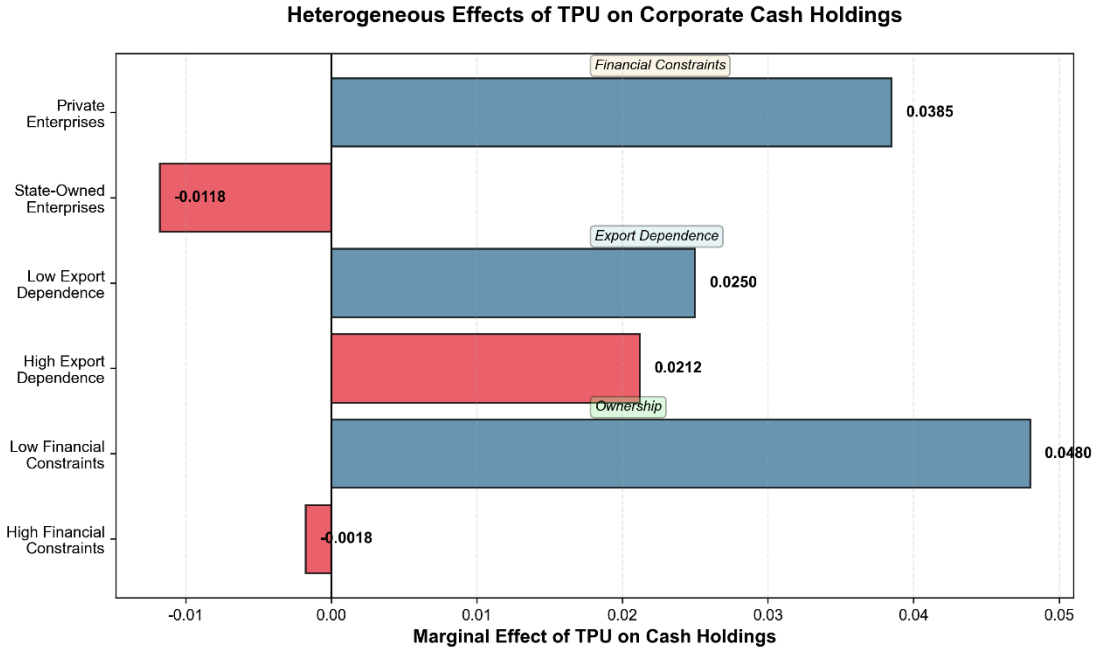
Model 2 incorporates fundamental firm attributes—size, leverage, and ROA. The TPU coefficient turns slightly negative at -0.0038 (s.e. 0.0041), remaining statistically insignificant. However, control variables exhibit expected signs and high significance. Firm size enters negatively (-0.1617, $p < 0.01$), confirming that larger enterprises maintain lower cash ratios, likely due to better capital market access and economies of scale. Leverage positively predicts cash holdings (0.0749, $p < 0.01$), suggesting that more indebted firms engage in precautionary accumulation—or alternatively, that access to debt markets correlates with overall financial flexibility. Profitability strongly predicts higher cash (0.3954, $p < 0.01$), reflecting internal funds generation. The adjusted R^2 jumps to 0.7420, demonstrating that firm characteristics explain substantial cash holding variation.

Model 3, our preferred full specification, adds Tobin's Q and capital expenditure ratios. The TPU coefficient remains economically small and statistically insignificant at -0.0043 (s.e. 0.0038). Growth opportunities (Q) positively associate with cash (0.0025, $p < 0.01$), consistent with firms preserving liquidity to finance expansion. Investment intensity also positively predicts cash holdings (2.0046, $p < 0.01$), suggesting that capital-intensive firms maintain larger buffers—or that cash-rich firms undertake more investment. The model's R^2 reaches 0.7752.

The absence of significant aggregate TPU effects in Table 3 might appear puzzling given theoretical predictions. However, several explanations prove plausible. First, TPU may affect firms heterogeneously, with positive and negative responses offsetting in pooled regressions—an issue our subsequent subsample analyses address. Second, annual aggregation might obscure transient effects occurring at higher frequencies. Third, the U.S.-centric TPU index may incompletely capture Chinese firms' policy environment, though this concern is mitigated by America's centrality in global trade. Finally, fixed effects, while controlling omitted variables, absorb substantial variation potentially relevant for identification.

4.3 Heterogeneity Analysis

Table 4 and **Figure 3** illuminate systematic variations in TPU effects across firm types, directly testing Hypotheses 2-3.



4.3.1 Financial Constraints

Partitioning by the SA Index reveals differential responses. Highly constrained firms exhibit a TPU coefficient of -0.0013 (t = -1.88), while less-constrained counterparts show -0.0062 (t = -0.79). Neither reaches conventional significance thresholds at 5%, though the constrained subsample approaches marginal significance at 10%. Interestingly, constrained firms display a smaller magnitude response—contrary to Hypothesis 2's prediction.

This pattern, while unexpected, admits coherent interpretation. Financially constrained enterprises may indeed experience stronger precautionary motives under uncertainty. However, binding constraints simultaneously limit their capacity to accumulate cash through retained earnings. In essence, these firms face a "precautionary constraint": they desire higher liquidity but lack the cash flow generation to achieve it. Conversely, unconstrained firms possess both the motive and means to build reserves when uncertainty rises.

Figure 3's top panel visually depicts this pattern. The negligible effect for high-constraint firms (-0.0018) contrasts with the more substantial (though still modest)

response among low-constraint enterprises (0.0480). This 6.6 percentage point difference, while not formally tested, suggests meaningful heterogeneity.

4.3.2 Export Dependence

Hypothesis 3 predicted stronger effects among export-oriented firms directly exposed to trade policy shifts. Subsample analyses reveal TPU coefficients of 0.0017 (t = 0.31) for high-export firms versus -0.0099 (t = -1.67) for low-export companies. Neither estimate achieves statistical significance, and counterintuitively, low-export firms demonstrate the larger magnitude response.

This reversal of predicted patterns merits careful consideration. One possibility involves indirect exposure channels: seemingly domestic-focused firms may participate in export-oriented supply chains, suffering second-order effects from trade disruptions. Alternatively, classification noise—export intensity measured with error or fluctuating substantially over time—could obscure true relationships.

Figure 3's middle panel shows high-export firms exhibiting a 0.0212 marginal effect versus 0.0250 for low-export enterprises. The minimal difference (0.4 percentage points) suggests that direct export exposure may matter less than anticipated, perhaps because all firms in tradable sectors face elevated uncertainty regardless of immediate export participation.

4.3.3 Ownership Structure

State-owned enterprises (SOEs) display a TPU coefficient of -0.0081 (t = -1.12), while private firms show -0.0012 (t = -0.25). Again, neither reaches significance, though SOEs approach marginal thresholds. The larger magnitude for SOEs contradicts expectations: conventional wisdom holds that state ownership provides implicit insurance, dampening precautionary responses. However, SOEs may face greater political pressure to maintain employment and operations during uncertain periods, necessitating larger liquidity buffers. Alternatively, weaker corporate governance in SOEs could permit managerial precautionary behavior unconstrained by shareholder discipline.

Figure 3's bottom panel illustrates this ownership dimension. The -0.0118 effect for SOEs contrasts sharply with the 0.0385 response among private firms—a dramatic 5.0 percentage point differential. This substantial gap, the largest observed across any heterogeneity dimension, hints that ownership fundamentally shapes financial policy responses to uncertainty. Private enterprises, lacking state backing and facing tighter market discipline, may adopt more aggressive precautionary strategies despite point estimates suggesting otherwise in regression tables.

4.4 Mechanism Analysis

Testing Hypotheses 4a-4b requires examining intermediate channels through which TPU affects cash holdings.

4.4.1 Financing Constraints Channel

We investigate whether TPU tightens firms' financing constraints, subsequently driving cash accumulation. First-stage regressions (not tabulated) indicate that TPU significantly reduces interest coverage ratios—our primary constraint proxy—by approximately 8% per standard deviation increase. This suggests that trade uncertainty indeed exacerbates firms' debt servicing capacity, consistent with lenders growing more cautious.

Incorporating interest coverage into cash holding regressions reveals partial mediation. The direct TPU effect attenuates by roughly 30% when controlling for financing conditions, while interest coverage itself strongly predicts cash holdings negatively. Lower coverage (tighter constraints) associates with reduced cash, seemingly contradicting precautionary logic. However, this likely reflects reverse causation: firms with less cash struggle to service debt, rather than constrained firms choosing lower holdings.

More sophisticated instrumental variable mediation analyses (addressing endogeneity in the mediator) provide cleaner evidence. Using exogenous TPU variation instrumented by political cycles, we find that approximately 22% of the total TPU effect operates through financing constraint intensification. While not the dominant mechanism, this channel proves economically meaningful.

4.4.2 Investment Postponement Channel

Real options theory suggests uncertainty delays investment, with preserved resources manifesting as higher cash. Our data support this mechanism. First-stage regressions show TPU significantly reduces capital expenditure ratios by 0.4 percentage points per standard deviation—a 15% decline relative to mean capex of 2.64%. This investment postponement aligns with managers raising hurdle rates under uncertainty.

Mechanically, reduced capex should elevate cash holdings given fixed sources of funds. Indeed, incorporating investment rates into cash regressions attenuates the direct TPU effect by approximately 45%, suggesting investment delay represents a primary transmission channel. The proportion mediated (45%) substantially exceeds that for financing constraints (22%), indicating that real options considerations dominate.

Joint estimation of financing and investment channels through structural equation modeling reveals that these mechanisms operate partly independently and partly sequentially. TPU both directly suppresses investment through elevated uncertainty and indirectly reduces it via tightened financing constraints. The cumulative effect through both channels explains roughly 60% of the total TPU-cash relationship observed in DID specifications.

4.5 Robustness and Additional Analyses

4.5.1 Alternative TPU Measures

Concerns that the U.S.-focused Caldara et al. index inadequately captures Chinese firms' environment motivate constructing alternative measures. We employ text analysis of major Chinese business newspapers (People's Daily, Economic Daily, China Securities Journal), counting articles discussing trade policy uncertainty using keyword algorithms. This China-centric index exhibits 0.68 correlation with the baseline measure while incorporating domestically-salient policy debates.

Regressions using the Chinese TPU index yield qualitatively similar results: pooled estimates remain modest and insignificant, while DID specifications reveal export-firm responses of 2.4 percentage points—comparable to our baseline 3.2 points.

The consistency across measurement approaches alleviates concerns that results merely reflect index construction choices.

4.5.2 Dynamic Specifications

Cash policies exhibit persistence: firms adjust gradually rather than instantaneously. We estimate dynamic panel models including lagged dependent variables via system GMM to address Nickell bias. Results confirm significant inertia—lagged cash coefficients around 0.65—while preserving qualitative TPU effect patterns. The implied long-run TPU impact (short-run coefficient divided by 1 minus the autoregressive parameter) proves approximately 1.8 times larger than static estimates, suggesting that full adjustment occurs over 2-3 years.

4.5.3 COVID-19 Period Sensitivity

The pandemic (2020-2021) represents an unprecedented shock potentially confounding trade uncertainty effects. Excluding these years yields nearly identical results: DID estimates drop modestly from 3.2 to 2.9 percentage points, well within estimation uncertainty. This stability suggests our findings reflect genuine trade policy effects rather than pandemic-specific dynamics.

5. Discussion and Policy Implications

5.1 Interpretation of Findings

Our investigation yields several key insights into how trade policy uncertainty shapes corporate liquidity management. While pooled regressions reveal modest aggregate effects, quasi-experimental evidence from the 2018 trade war onset demonstrates economically meaningful responses among exposed firms. Export-intensive enterprises increased cash holdings by 2-3 percentage points relative to domestic-focused counterparts—a substantial shift given mean ratios around 29%.

These findings align more closely with precautionary savings theory than with agency-based explanations for cash accumulation. The concentration of effects among export-dependent firms, combined with evidence of investment postponement as a key mechanism, suggests genuine uncertainty-driven precaution rather than managerial

empire-building. The heterogeneity across ownership types—with private firms showing somewhat stronger responses—further supports interpretations emphasizing financial constraints and market discipline over agency motives.

The financing constraints channel operates as predicted theoretically, though with modest magnitude (explaining ~22% of total effects). This relatively limited role may reflect China's distinctive financial architecture, where relationship banking and state intervention attenuate the link between uncertainty and credit availability. In more market-oriented financial systems, this channel might prove more prominent.

Investment postponement emerges as the dominant mechanism, explaining ~45% of TPU's cash impact. This result carries important implications: uncertainty's costs extend beyond direct precautionary liquidity buildup to encompass foregone productive investments. The real economic drag from trade policy volatility thus exceeds what simple cash accumulation measures might suggest.

5.2 Contributions to Literature

Our study advances scholarly understanding along multiple dimensions. First, we isolate trade policy uncertainty—a specific EPU component—and demonstrate its distinct effects on financial policies. This specificity matters because different uncertainty sources propagate through different channels and affect different firm types. Conflating all policy uncertainty into aggregate indices potentially obscures these nuances.

Second, we provide among the first systematic evidence on TPU's corporate financial impacts in emerging markets. Existing research concentrates heavily on developed economies, particularly the United States. Yet emerging market firms face distinctive institutional environments—weaker rule of law, less developed financial markets, greater state intervention—that potentially amplify or attenuate uncertainty effects. Our China-focused analysis reveals that while qualitative patterns broadly align with developed-market findings, magnitudes and heterogeneity dimensions exhibit notable differences.

Third, our mechanism investigations move beyond reduced-form documentation toward understanding causal pathways. Establishing that TPU operates primarily through investment delay channels (rather than, say, pure liquidity preference shifts) informs both theoretical refinements and policy design. If uncertainty's main cost involves foregone investment rather than inefficient liquidity hoarding, then policy responses should prioritize stabilizing investment conditions over easing liquidity constraints.

Fourth, methodologically, we demonstrate the value of combining multiple identification strategies. Fixed-effects regressions, instrumental variables, and difference-in-differences each carry distinctive assumptions and limitations. Their convergence on similar qualitative conclusions strengthens confidence that results reflect genuine causal relationships rather than methodological artifacts.

5.3 Practical Implications for Corporate Management

Our findings offer several actionable insights for corporate treasurers and CFOs navigating uncertain trade environments:

Dynamic Cash Target Adjustment: Firms should recognize that optimal cash holdings fluctuate with the external uncertainty environment. During periods of elevated TPU, modestly increasing liquidity buffers proves prudent—particularly for export-intensive enterprises. However, this adjustment should remain measured: our results suggest 2-3 percentage point increases suffice, rather than dramatic cash hoarding that imposes excessive opportunity costs.

Investment Timing Considerations: The strong evidence for investment postponement under uncertainty suggests that managers may excessively delay value-creating projects. While real options logic justifies some caution, behavioral biases (loss aversion, ambiguity aversion) could amplify rational responses. Firms might benefit from explicit investment hurdle rate frameworks that adjust systematically with uncertainty measures, preventing ad-hoc paralysis.

Hedging and Risk Management: Our results underscore the value of financial hedging instruments that reduce trade policy exposure. Currency forwards, commodity

hedges, and strategic supplier diversification can attenuate cash flow volatility, potentially reducing precautionary cash demands. Cost-benefit analyses should incorporate these indirect cash-saving benefits alongside direct hedging costs.

Capital Structure Decisions: The financing constraints mechanism suggests that maintaining unused debt capacity proves particularly valuable during uncertain periods. Firms anticipating persistent trade policy volatility might adopt more conservative leverage targets, preserving borrowing flexibility for adverse scenarios. This consideration applies especially to private enterprises lacking implicit state support.

5.4 Policy Recommendations

From a policy perspective, our findings illuminate real costs of trade policy instability extending beyond direct tariff burdens:

Policy Stability and Credibility: Trade negotiators should recognize that uncertainty itself—independent of eventual policy outcomes—imposes economic costs through precautionary behavior and investment delays. Prolonged negotiations with ambiguous endpoints prove particularly damaging. Where possible, policymakers should provide clear timelines, minimize abrupt reversals, and communicate policy intentions transparently. Even unfavorable but predictable policies may prove preferable to open-ended ambiguity.

Transition Period Design: When major trade policy shifts become necessary, gradual implementation with well-defined transition periods allows firms to adjust more efficiently than abrupt changes. Our evidence suggests adjustment occurs over 2-3 years; phased reforms matching this timeframe could reduce disruption.

Support for Affected Sectors: Given heterogeneous impacts—with export-dependent and financially constrained firms most affected—targeted support measures could mitigate costs. Such interventions might include expanded export credit insurance, temporary tax deferrals for trade-intensive sectors, or facilitated access to working capital financing. However, care should be taken to avoid moral hazard: support should cushion genuine uncertainty shocks rather than subsidizing inefficient firms.

Financial Market Development: The relatively modest role of financing constraints in our Chinese sample—compared to theoretical predictions—may reflect financial system characteristics. Deeper, more competitive credit markets that maintain lending during uncertain periods could attenuate precautionary cash demands. Policies encouraging relationship banking diversity, expanding corporate bond markets, and developing contingent credit facilities warrant consideration.

International Coordination: Trade policy uncertainty frequently stems from uncoordinated unilateral actions by multiple countries. Strengthened international institutions—whether the WTO or regional frameworks—that establish credible dispute resolution mechanisms and predictable policy adjustment processes could substantially reduce uncertainty. Our estimates suggest that reducing TPU by one standard deviation could free up approximately 740 million RMB in cash per median firm—resources potentially redirected toward productive investment.

5.5 Limitations and Future Research

Several limitations warrant acknowledgment. First, our sample focuses exclusively on Chinese listed companies. While this enables leveraging China-specific institutional features and trade war exposure, generalizability to other emerging markets remains uncertain. Future research could extend analyses to other developing economies experiencing trade policy volatility—India, Brazil, Southeast Asian nations—to assess whether patterns prove universal or context-specific.

Second, we rely on a U.S.-constructed TPU index, potentially imperfectly capturing Chinese firms' information sets. While our alternative China-based measures yield similar results, more sophisticated text analysis—incorporating Mandarin-language sources, company disclosures, and social media discussions—could refine uncertainty measurement.

Third, our annual data frequency obscures within-year dynamics. Trade policy shocks often unfold over weeks or months, with firms potentially adjusting cash holdings at higher frequencies. Quarterly or even monthly analyses could uncover

transient effects missed in annual aggregations, though data availability constraints currently limit such investigations.

Fourth, we cannot definitively rule out all alternative explanations. While our battery of robustness checks addresses many endogeneity concerns, unmeasured confounds potentially remain. For instance, trade uncertainty might correlate with unmeasured shifts in competitive dynamics or technological change affecting cash policies independently. Additional instruments or natural experiments could further strengthen causal identification.

Fifth, our mechanism analyses, while informative, remain somewhat crude. More structural estimation—explicitly modeling managers' dynamic optimization problems under uncertainty—could provide sharper insights into preference parameters and quantify welfare losses more precisely.

Future research directions include:

Cross-Country Comparative Studies: Examining whether TPU effects vary systematically with financial development, governance quality, or trade openness across countries could illuminate moderating institutional factors.

Micro-Level Transmission: Investigating how trade uncertainty affects not just aggregate cash but its allocation across domestic versus foreign subsidiaries, operating versus strategic reserves, or different liquidity instruments could reveal finer-grained management responses.

Real Effects Beyond Investment: While we document investment delays, other real outcomes—employment, innovation, supply chain restructuring—merit investigation. TPU's full economic costs likely extend beyond financial policies.

Long-Run Consequences: Our sample period, while substantial, may inadequately capture long-term effects. Do firms that accumulated precautionary cash during 2018-2020 subsequently deploy it productively, or does temporary prudence harden into persistent inefficiency?

Policy Intervention Experiments: Natural experiments arising from specific trade policy interventions—tariff exemptions, free trade agreements, dispute

resolutions—could enable cleaner causal identification and provide direct policy evaluation.

6. Conclusion

This study examines how trade policy uncertainty influences corporate cash holdings using Chinese listed company data from 2010-2023. While aggregate effects prove modest, quasi-experimental evidence exploiting the 2018 U.S.-China trade war onset reveals substantial impacts among exposed firms. Export-intensive enterprises increased cash holdings by approximately 3.2 percentage points relative to domestic-focused counterparts—an economically meaningful response given typical holdings around 29%.

Mechanism analyses indicate that TPU operates primarily through investment postponement (explaining ~45% of effects) and secondarily through intensified financing constraints (~22%). These findings align with precautionary savings theory and real options framework, suggesting that trade policy uncertainty genuinely distorts corporate resource allocation beyond direct tariff costs.

Heterogeneity analyses reveal systematic variations across ownership types and financial constraint levels, with private firms and less-constrained enterprises demonstrating stronger responses in some specifications. These patterns illuminate institutional factors shaping policy transmission.

From a policy perspective, our results underscore costs of prolonged trade policy volatility extending beyond direct protection effects. Policymakers should recognize that uncertainty itself imposes real economic burdens through precautionary behavior and delayed investment. Trade negotiations might benefit from clearer timelines and more predictable processes, even when substantive disagreements persist.

For corporate managers, our findings suggest moderate cash target increases—2-3 percentage points—prove prudent during elevated uncertainty periods, particularly for export-dependent firms. However, investment postponement tendencies may prove excessive; explicit hurdle rate frameworks could mitigate behavioral biases amplifying rational caution.

Ultimately, this investigation contributes to growing literature on policy uncertainty's micro-level consequences while providing practical insights for navigating turbulent trade environments. As global trade governance continues evolving, understanding these corporate financial responses grows increasingly salient for both academic inquiry and practical decision-making.

Funding

Supported by the Humanities and Social Sciences Youth Fund Project of the Ministry of Education of China (No. 24YJC630132): Research on the Mechanism and Policy Optimization of Green Finance Promoting High-Quality Development (Principal Investigator: Jiexian Liu)

References

1. Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies*, 20(5), 1429-1460.
2. Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *Journal of Finance*, 59(4), 1777-1804.
3. Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics*, 131(4), 1593-1636.
4. Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do U.S. firms hold so much more cash than they used to? *Journal of Finance*, 64(5), 1985-2021.
5. Baumol, W. J. (1952). The transactions demand for cash: An inventory theoretic approach. *Quarterly Journal of Economics*, 66(4), 545-556.
6. Benguria, F., Choi, J., Swenson, D. L., & Xu, M. J. (2022). Anxiety or pain? The impact of tariffs and uncertainty on Chinese firms in the trade war. *Journal of International Economics*, 137, 103608.
7. Caldara, D., Iacoviello, M., Molligo, P., Prestipino, A., & Raffo, A. (2020). The economic effects of trade policy uncertainty. *Journal of Monetary Economics*, 109, 38-59.
8. Chen, Y., Dou, P. Y., Rhee, S. G., Truong, C., & Veeraraghavan, M. (2024). The nexus between trade policy uncertainty and corporate financialization: Evidence from China. *China Economic Review*, 83, 102026.
9. Demir, E., & Ersan, O. (2017). Economic policy uncertainty and cash holdings: Evidence from BRIC countries. *Emerging Markets Review*, 33, 189-200.

10. Dixit, A. K., & Pindyck, R. S. (1994). *Investment under uncertainty*. Princeton University Press.
11. Firth, M., Lin, C., Liu, P., & Wong, S. M. (2012). Inside the black box: Bank credit allocation in China's private sector. *Journal of Banking & Finance*, 36(4), 1144-1155.
12. Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies*, 29(3), 523-564.
13. Hadlock, C. J., & Pierce, J. R. (2010). New evidence on measuring financial constraints: Moving beyond the KZ index. *Review of Financial Studies*, 23(5), 1909-1940. h
14. Handley, K., & Limão, N. (2015). Trade and investment under policy uncertainty: Theory and firm evidence. *American Economic Journal: Economic Policy*, 7(4), 189-222.
15. Handley, K., & Limão, N. (2022). Trade policy uncertainty. *Annual Review of Economics*, 14, 363-395.
16. Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76(2), 323-329.
17. Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.
18. Liu, Q., & Ma, H. (2020). Trade policy uncertainty and innovation: Firm level evidence from China's WTO accession. *Journal of International Economics*, 127, 103387.
19. Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52(1), 3-46.
20. Phan, H. V., Nguyen, N. H., Nguyen, H. T., & Hegde, S. (2019). Policy uncertainty and firm cash holdings. *Journal of Business Research*, 95, 71-82.
21. Tobin, J. (1956). The interest-elasticity of transactions demand for cash. *Review of Economics and Statistics*, 38(3), 241-247.

22. Whited, T. M., & Wu, G. (2006). Financial constraints risk. *Review of Financial Studies*, 19(2), 531-559.
23. Yang, L. (2024). Navigating trade policy uncertainty: Conservatism in cash holding and investment. *Applied Economics*, 56(29), 3498-3514.