



**CORPORATE OPERATIONAL FLEXIBILITY AS A BUFFER AGAINST ECONOMIC
POLICY UNCERTAINTY: GLOBAL EVIDENCE AND POLICY IMPLICATIONS**

Key points

- *Global economic policy uncertainty has remained elevated in recent years, posing a significant challenge to businesses worldwide. This study finds that heightened uncertainty weakens corporate financial health. However, corporate operational flexibility serves as a buffer against these shocks. Firms with rigid cost structures face much sharper financial deterioration, whereas those capable of dynamically adjusting their operations can significantly mitigate the adverse impacts.*
- *Key drivers of operational flexibility include lower overall debt ratio, less reliance on short-term debt, stronger cash reserves, and a higher share of intangible assets. Tighter financial conditions amplify operational rigidity through distinct channels: leverage constraints disproportionately affect emerging markets and smaller firms, while short-term rollover risks primarily impact advanced economies and larger firms.*
- *These findings indicate that clear policy communication can reduce uncertainty. Integrating policy uncertainty metrics into financial stability surveillance complements traditional risk indicators. Policies that facilitate operational reconfiguration, such as supporting digital transformation, can enhance long-term corporate resilience.*

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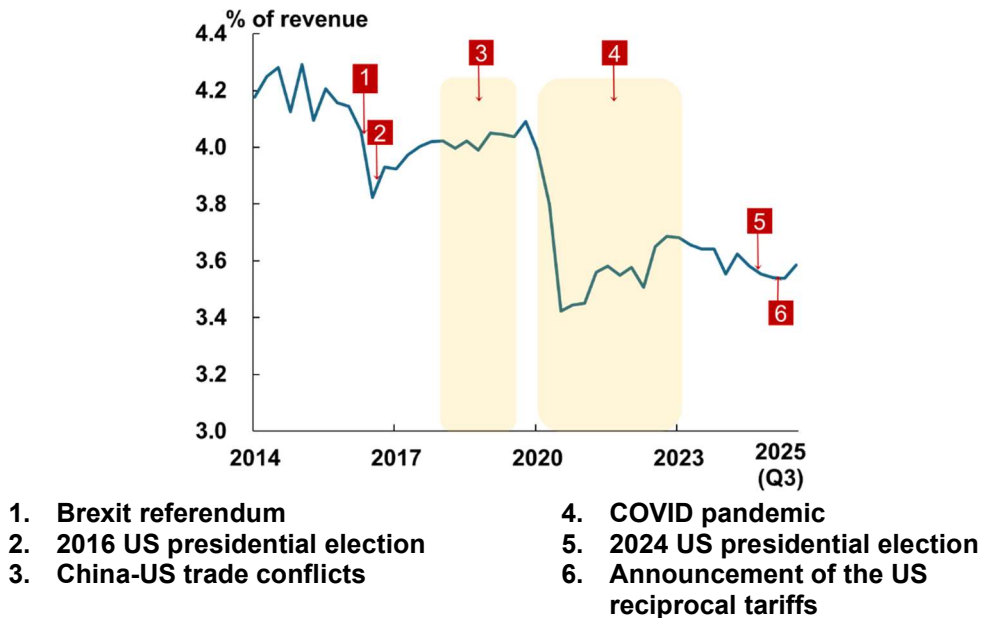
The views and analysis expressed in this paper are those of the authors, and do not necessarily represent the views of the Hong Kong Monetary Authority.

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1. INTRODUCTION

Global economic policy uncertainty has emerged as a persistent and defining feature in recent years, with sharp spikes in uncertainty measures around major events such as the global financial crisis, trade tensions, the COVID-19 pandemic and geopolitical fragmentation. Existing literature suggests that policy uncertainty weighs on corporate performance primarily through two channels. First is the real options channel, where firms adopt a “wait-and-see” approach by delaying investment and hiring due to the irreversibility of these costs (Chart 1) (Bloom, 2009; Baker et al., 2016; Gulen & Ion, 2016). Second is the financial frictions channel, where perceived political and economic risk drives up risk premia, increases borrowing costs, and tightens liquidity constraints (Gilchrist et al., 2014; Francis et al., 2014).

Chart 1. Non-financial corporate capital expenditure



Note: The blue line indicates the median capital expenditure (as % of revenue) of 3,263 non-financial listed firms globally.

Sources: Capital IQ and HKMA staff calculations.

While the aggregate negative impact of uncertainty is well-documented, significant heterogeneity exists in how individual firms withstand such shocks. Firms with limited operational flexibility may be more vulnerable to uncertainty, as rigid cost structures and funding constraints can impede timely adjustments. However, the role of corporate operational flexibility, defined as the ability of a firm to adjust its operating costs in response to external shocks, remains an underexplored mechanism in the context of global economic policy uncertainty.

The motivation for this research arises from the growing need to understand the determinants of corporate resilience in an era of heightened volatility. As policymakers and regulators monitor financial stability, distinguishing between firms capable of absorbing shocks and those that are structurally vulnerable becomes increasingly critical. Firms with high operational flexibility are more likely to preserve profit margins during periods of volatility and downturns by efficiently scaling down operations or reallocating resources. Conversely, rigid cost structures may amplify the adverse effects of policy uncertainty. Understanding this buffering effect is essential for designing effective policy supports and macro-prudential frameworks.

This study aims to bridge a gap in the literature by utilising a comprehensive dataset of non-financial listed firms across the world. Adopting the empirical methodology of Gu et al. (2018), we construct a firm-level operational inflexibility index to quantify cost rigidity and examine its interaction with the Global Economic Policy Uncertainty (GEPU) index developed by Davis (2016). By analysing the relationship between uncertainty, flexibility, and financial health, this study offers insights into how corporate agility serves as a buffer against policy uncertainty shocks. Accordingly, this paper addresses two questions:

1. How does global economic policy uncertainty affect the financial viability of firms, and to what extent does operational flexibility mitigate these adverse effects?
2. What are the key determinants of corporate operational flexibility, and how do financial conditions influence it?

By addressing these questions, this study contributes to the ongoing discourse on financial stability and corporate resilience. The findings reveal that while higher policy uncertainty generally weakens corporate financial health, firms characterised by lower leverage, higher cash holdings, and greater investment in intangible assets exhibit significantly greater resilience and are better positioned to absorb such shocks.

The remainder of this paper is organised as follows. Section 2 reviews the literature on economic policy uncertainty and corporate flexibility. Section 3 outlines the methodology and data used in the study. Section 4 presents the key empirical findings regarding the buffering effect of flexibility and its determinants. Section 5 discusses the policy implications of the results, and Section 6 concludes the study.

2. LITERATURE REVIEW

The literature on economic policy uncertainty and corporate behaviour has expanded significantly over the past decade, driven by the need to understand how macroeconomic volatility affects firm-level outcomes. Broadly, this body of work has evolved from developing robust metrics to quantify uncertainty shocks to identifying the specific transmission channels, namely, real options and financial frictions, through which these shocks operate. Building on these macro-level foundations, recent research has increasingly focused on firm-level heterogeneity, highlighting how internal characteristics such as operational rigidity can either amplify or mitigate the adverse effects of external disruptions.

Empirical studies have increasingly relied on news-based indices to proxy policy-related uncertainty. Baker et al. (2016) developed the Economic Policy Uncertainty (EPU) index, which has become a widely used benchmark in macroeconomic and corporate finance analyses. Davis (2016) extended this approach by constructing the GEPU index, aggregating national EPU measures of multiple economies to capture common global policy uncertainty shocks in a tractable time series.

Meanwhile, complementary strands of research underscore that uncertainty is multi-dimensional and can be captured through alternative text- and data-driven methods. Jurado et al. (2015) constructed a measure of macro uncertainty from a large information set. Hassan et al. (2019) developed a firm-level political risk measure from earnings-call transcripts, and Caldara and Iacoviello (2022) proposed a news-based geopolitical risk index with both aggregate and firm- or industry-level extensions. These approaches are useful in delineating different sources of uncertainty and in motivating firm-level heterogeneity in exposure and sensitivity.

Regarding the real options channel, uncertainty can increase the value of waiting when investment and hiring decisions involve adjustment costs and partial irreversibility. Bloom (2009) documented that uncertainty shocks are associated with sharp declines in economic activity, consistent with firms deferring investment and hiring. Using policy uncertainty measures closely related to EPU, Gulen and Ion (2016) provided firm-level evidence that higher policy uncertainty is associated with lower corporate investment.

The financial frictions channel operates through tighter external financing conditions when uncertainty increases, raising required returns and amplifying information and agency problems. Gilchrist et al. (2014) linked uncertainty fluctuations to investment dynamics primarily through movements in credit spreads, highlighting a credit-pricing mechanism beyond the pure “wait-and-see” effect. At the micro level, Francis et al. (2014) showed that

political uncertainty is reflected in bank loan contracting via higher loan spreads, consistent with uncertainty increasing the cost of debt finance.

While the literature establishes negative average effects of uncertainty through real-side delays and tighter financing, corporate outcomes vary materially across firms. One possible explanation lies in operational rigidity within the cost structure. Anderson et al. (2003) documented “cost stickiness”, whereby operating costs adjust downward when activity levels fall, implying greater cash-flow compression during downturns. Gu et al. (2018) developed empirical proxies for operating inflexibility and linked inflexibility to risk and vulnerability, supporting the view that operational flexibility can serve as a meaningful resilience margin.

Taken together, the literature provides a measurement basis for global shocks (GEPU) and a transmission framework centred on real-side delays and financial-frictions amplification, alongside evidence of firm-level heterogeneity. This study consolidates these insights by estimating the baseline association between GEPU and corporate resilience and testing whether operating inflexibility amplifies this association.

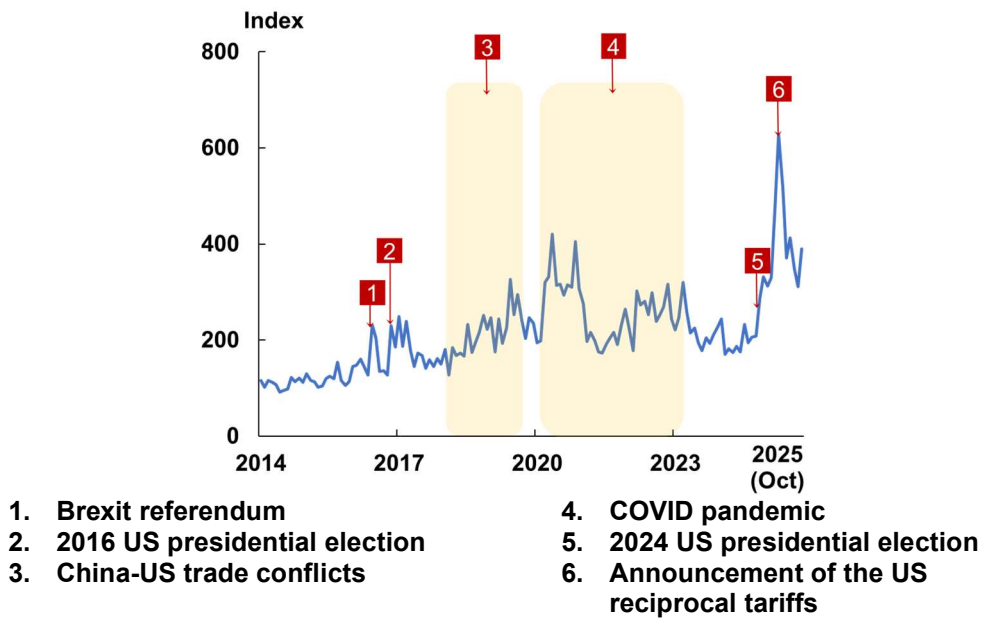
3. EMPIRICAL METHODS AND DATA

To understand how global uncertainty transmits to firm-level distress, we require reliable measures for three key variables: the global economic policy uncertainty, the firm’s financial health, and the firm’s operational inflexibility. With these components in place, we develop regression models to assess the impact of policy uncertainty and examine whether operational inflexibility amplifies the adverse effects of such uncertainty. We also explore the firm-level factors that shape operational inflexibility.

Global Economic Policy Uncertainty (GEPU) Index

To measure global policy-related uncertainty, we employ the GEPU index developed by Davis (2016) (Chart 2). This index aggregates underlying national EPU indices into a global measure using a GDP-weighted average. The national indices are constructed through computer-automated text searches of major newspapers, where an article is classified as policy-uncertainty related if it contains terms from all three categories: economy, uncertainty, and policy.

Chart 2. GEPU index



Source: Economic Policy Uncertainty.

Corporate financial viability: Altman's Z-score

Our measure of corporate financial health is derived directly from Altman's (1968) Z-score. Following the original methodology, we compute this composite indicator by combining established metrics of profitability, liquidity, leverage, and activity:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + X_5 \quad (1)$$

where:

X_1 = Working capital / Total assets

X_2 = Retained earnings / Total assets

X_3 = EBIT / Total assets

X_4 = Market capitalisation / Total liabilities

X_5 = Sales / Total assets

A lower Z-score indicates weaker financial health and a higher likelihood of financial distress. Therefore, declines in the Z-score are interpreted as deteriorations in corporate financial viability.²

Corporate operational inflexibility: Inflexibility index

Operational inflexibility is measured using a firm-level index derived from Gu et al. (2018), designed to reflect a firm’s difficulty in adjusting operating costs in response to profitability shocks. The index is calculated as the historical range of a firm’s operating costs-to-sales ratio, scaled by the volatility of its sales-to-asset ratio growth over the same period:

$$Inflex_{i,t} = \frac{\max\left(\frac{OC}{S}\right)_{i,(t-k:t)} - \min\left(\frac{OC}{S}\right)_{i,(t-k:t)}}{\sigma\left(\Delta_{yoy}\left(\frac{S}{A}\right)_{i,(t-k:t)}\right)} \quad (2)$$

where OC denotes operating costs, S denotes sales, and the max, min, and standard deviation are computed over a rolling window of k quarters.³ The numerator measures the historical range of the operating cost-to-sales ratio $\left(\frac{OC}{S}\right)$, while the denominator $\left(\sigma\left(\Delta_{yoy}\left(\frac{S}{A}\right)\right)\right)$ scales this range by the standard deviation of the yearly growth in the sales-to-asset ratio over the same period. A higher value of $Inflex_{i,t}$ indicates greater rigidity in cost adjustment relative to sales dynamics, hence implying lower operational flexibility.

To ensure comparability across industries with structurally different cost structures, we further transform $Inflex_{i,t}$ into a sector-quarter percentile rank⁴, computed within each sector and quarter. A higher percentile indicates lower flexibility. Notably, firms in advanced economies generally exhibit greater

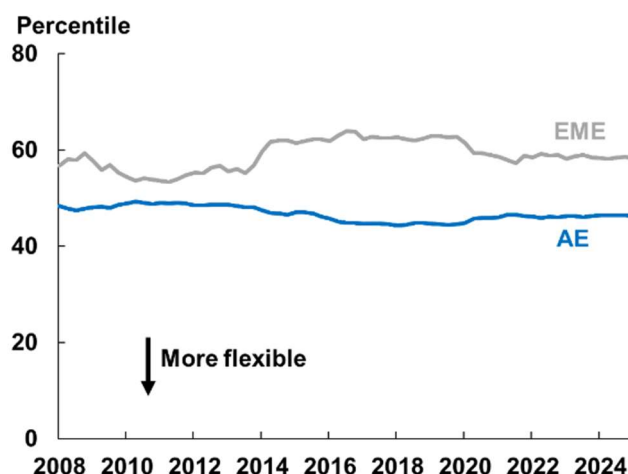
² While Altman’s (1968) Z-score was originally calibrated on US publicly traded manufacturing firms, its use in this global, multi-sector context is justified on several grounds. Most importantly, we do not rely on the original distress thresholds (i.e., $Z < 1.81$); instead, identification rests entirely on within-firm variation in the Z-score over time, with firm fixed effects absorbing time-invariant level differences arising from cross-country accounting conventions and sector-specific cost structures. The five components of the Z-score, namely working capital adequacy, retained earnings, operating profitability, leverage, and asset utilisation, also capture financially meaningful dimensions of corporate health that remain conceptually relevant across sectors and economies. Finally, the Z-score is widely used as a composite financial health measure in cross-country empirical settings (e.g., Altman et al., 2017), facilitating comparability with existing work.

³ The rolling window is 20 quarters in our estimation.

⁴ The percentile rank ranges from 0 to 100.

flexibility than their counterparts in emerging market economies (Chart 3). This AE-EME gap is also evident within Asia Pacific (APAC) economies, where firms in APAC AEs tend to be more flexible than firms in APAC EMEs within the same sector (Chart 4).

Chart 3. AEs vs EMEs: Percentile of inflexibility index



*Note: The blue and grey lines depict the average values of AEs and EMEs respectively.
Source: Bloomberg.*

Chart 4. APAC: Percentile of inflexibility index by sector

	AU	JP	HK	SG	KR	NZ	ID	TH	CN	PH	MY
Comm. services	14.7	45.1	64.7	51.9	54.6	n.a.	52.1	61.3	57.7	n.a.	74.0
Con. discretionary	24.0	49.7	45.2	33.8	50.1	14.9	37.3	51.9	53.6	65.9	73.3
Con. staples	59.6	34.5	78.3	32.9	60.7	n.a.	61.1	60.9	68.0	39.8	67.6
Energy	12.1	22.1	n.a.	73.9	n.a.	n.a.	59.9	54.3	57.5	71.7	77.7
Health care	27.1	39.2	45.7	47.9	71.1	59.7	70.5	56.0	50.6	n.a.	40.1
Industrials	26.9	44.3	41.5	67.6	58.0	37.2	67.4	59.8	63.4	76.2	69.8
I.T.	47.4	41.8	38.6	53.2	49.2	70.1	24.1	37.4	65.8	n.a.	67.8
Materials	39.4	34.9	55.3	67.6	31.4	n.a.	53.2	56.7	53.6	51.4	69.4
Real estate	18.3	31.5	43.7	35.1	n.a.	n.a.	57.3	51.0	70.4	53.4	42.5
Utilities	n.a.	36.3	52.8	n.a.	n.a.	n.a.	n.a.	60.1	40.2	n.a.	n.a.

Note: Each cell displays the median value for the corresponding economy and sector from Q1 2024 to Q1 2025. Sectors with fewer than 3 firms during this period are marked as “n.a.”.

Source: HKMA staff estimates.

Although the operational inflexibility index is based on the concept of cost stickiness, it also captures the underlying managerial and operational adaptability. For instance, firms with greater flexibility may reconfigure activities or shift their geographical focus in response to uncertainty, leading to a lower inflexibility index level.

Data

Our sample consists of non-financial listed firms from 72 economies (including 42 advanced economies (AEs) and 30 emerging market economies (EMEs)), and spans 10 Global Industry Classification Standard (GICS) sectors⁵, with quarterly observations from Q4 2002 to Q1 2025. For the analysis of the determinants of operational flexibility, we employ an annual panel covering the period from 2004 to 2024, reflecting the relatively slow evolution of balance-sheet structure and asset composition.

4. EMPIRICAL ANALYSES

4.1 Does operational flexibility buffer the impact of global economic policy uncertainty on corporate financial health?

To quantify the impact of global economic policy uncertainty on firms' financial health, and to assess whether operational flexibility mitigates this effect, we estimate the following firm-level panel model:

$$Z_{i,t} = \alpha_i + \beta_1 GEPU_{t-1} + \beta_2 Inflex_{i,t-1} + \beta_3(GEPU_{t-1} \times Inflex_{i,t-1}) + \gamma'X_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where $Z_{i,t}$ denotes Altman's Z-score for firm i in period t . $GEPU_{t-1}$ represents the lagged GEPU index, which is common to all firms within a given period. $Inflex_{i,t-1}$ is a lagged firm-level operational inflexibility indicator constructed as a sector-period percentile rank. The interaction term, $GEPU_{t-1} \times Inflex_{i,t-1}$ captures whether firms with greater operational inflexibility experience a more pronounced deterioration in financial health when policy uncertainty increases. $X_{i,t-1}$ is a vector of lagged control variables designed to isolate the effects of policy uncertainty from broader market risk, macroeconomic conditions and firm-specific dynamics. It includes: (i) global market volatility proxied by the orthogonalised VIX, to capture time-varying risk sentiment independent of policy uncertainty⁶; (ii) firm fundamentals, represented

⁵ These non-financial firms are divided into 10 sectors according to the GICS, including energy, materials, industrials, consumer discretionary, consumer staples, health care, information technology, communication services, utilities, and real estate.

⁶ As both GEPU and VIX co-move with global episodes of heightened uncertainty, to avoid multicollinearity, we use an orthogonalised VIX measure, defined as the residual from regressing VIX on GEPU.

by firm i 's year-on-year total asset growth and its 5-year rolling standard deviation; and (iii) home-economy conditions, captured by year-on-year GDP growth and inflation in the firm's economy of residence, along with their 5-year rolling standard deviations.

The specification includes firm fixed effects (α_i), while standard errors are computed using two-way clustering at the firm and period levels.^{7 8}

Based on this specification, the marginal effect of policy uncertainty on financial health is given by:

$$\frac{\partial Z_{i,t}}{\partial GEPU_{t-1}} = \beta_1 + \beta_3 \text{Inflex}_{i,t-1} \quad (4)$$

Table 1 presents the estimates for (i) the overall sample, (ii) AEs, and (iii) EMEs, covering both the full period since Q4 2002 and a sub-sample beginning in Q1 2017, a period during which the GEPU has remained elevated. Several key observations emerge from the results:

- *Higher global policy uncertainty is associated with deteriorating corporate financial health on average.* In the full-sample estimation, the coefficient of the $GEPU_{t-1}$ (β_1) is significantly negative (Column 1), indicating that an increase in global policy uncertainty is followed by a decline in firms' Altman Z-score, reflecting weaker financial health. This finding holds true for firms in AEs as well (Column 2).
- *Higher operational flexibility mitigates the adverse impact of policy uncertainty on corporate financial health.* In the full-sample estimation (Column 1), the coefficient of the interaction term $GEPU_{t-1} \times \text{Inflex}_{i,t-1}$ (β_3) is significantly negative, implying that the negative effect of GEPU on the Z-score is more pronounced for less flexible firms. Chart 5 illustrates the implied marginal effect of GEPU on the Z-score across the distribution of the inflexibility index, while Chart 6 displays how this marginal effect varies across economies in the Asia Pacific region. The two subsample regressions show that this moderating effect

⁷ We include firm fixed effects, which absorb time-invariant firm characteristics, including country and sector membership insofar as these do not vary over time. We do not include time fixed effects in the baseline regression because GEPU varies only over time and is common across firms within each period, so a full set of period dummies would absorb its level effect.

⁸ Firm clustering allows for serial correlation in shocks within firms over time, while period clustering accounts for correlated shocks across firms within the same period, which is an important consideration given that GEPU is a common time-series regressor.

is statistically significant for EMEs (Column 3) but not for AEs (Column 2) over the full sample period. This difference may stem from stronger institutional buffers in AEs, such as deeper and more resilient financial systems that maintain liquidity and credit availability during periods of uncertainty, as well as more predictable and well-resourced policy frameworks capable of delivering credible, countercyclical responses. In such environments, variations in firm-level operational rigidity appear to have a smaller influence on firms' sensitivity to GEPUs.

- *The mitigating effect of operational flexibility becomes significant in AEs after 2017, narrowing the gap with EMEs, as global policy uncertainty escalated to and remained at historically high levels.* The interaction coefficient becomes significant for AEs in the 2017Q1-2025Q1 subsample. We isolate this period as it marks the onset of increasing policy uncertainty and the weakening of global multilateral frameworks. As global trade rules became less predictable, the traditional institutional buffers in AEs eroded, resulting in less predictable domestic policy responses to external shocks. In such environments, firms in AEs may have increasingly relied on their own operational flexibility to manage GEPUs shocks.⁹

⁹ As a robustness check, we re-estimated the model excluding the COVID-19 pandemic period (Q2 2020 – Q1 2023); our results remain robust. Results are available upon request.

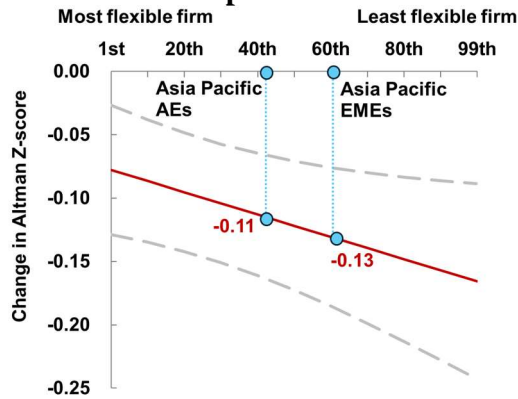
Table 1. Estimation results of Equation (3)

	<i>Full sample (Q4 2002 – Q1 2025)</i>			<i>Elevated uncertainty period (Q1 2017 – Q1 2025)</i>		
	<i>All economies</i>	<i>Advanced economies</i>	<i>Emerging market economies</i>	<i>All economies</i>	<i>Advanced economies</i>	<i>Emerging market economies</i>
<i>GEPU_{t-1}</i>	-0.001***	-0.001***	-0.001	-0.001**	-0.001***	-0.000
<i>Inflex_{i,t-1}</i>	-0.142	-0.237*	0.121	-0.094	-0.069	-0.071
<i>GEPU_{t-1} × Inflex_{i,t-1}</i>	-0.001**	-0.001	-0.002**	-0.001*	-0.001*	-0.002*
<i>VIX_{t-1}</i>	-0.014***	-0.011***	-0.022**	-0.009	-0.001	-0.022
<i>Stdev(Asset Growth)_{i,t-1}</i>	-1.563***	-1.793***	-1.060***	-1.387***	-1.996***	-0.655
<i>Stdev(GDP Growth)_{i,t-1}</i>	1.746	-1.870	8.409***	-2.469	-0.706	-3.486
<i>Stdev(Inflation)_{i,t-1}</i>	-17.925***	-11.227**	-33.707***	-23.543***	-12.521***	-31.498***
<i>Asset Growth_{i,t-1}</i>	0.604***	0.683***	0.330**	0.341***	0.371***	0.248*
<i>GDP Growth_{i,t-1}</i>	2.070***	1.119**	2.484**	1.494**	0.379	2.153***
<i>Inflation_{i,t-1}</i>	3.485***	2.389*	6.680***	5.432***	1.100	9.428***
Observations	252,954	186,731	66,223	167,341	115,799	51,542
Number of firms	8,642	5,534	3,108	8,264	5,231	3,033
Number of quarters	90	90	90	33	33	33

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: HKMA staff estimates.

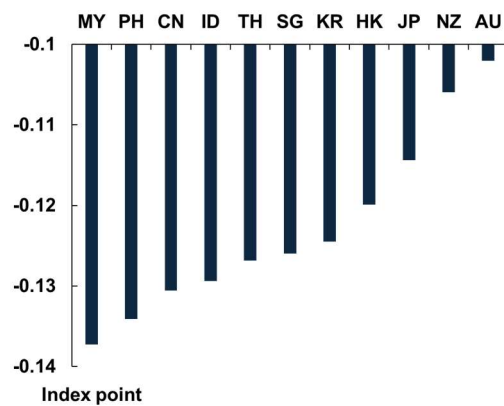
Chart 5. Marginal effects of GEPU on Altman Z-score with respect to Inflex



Note: The blue dot lines mark the median flexibility ranking and the corresponding marginal effects on firms in Asia Pacific AEs and EMEs respectively. The red line shows the estimated marginal effect of one standard deviation increase in the GEPU index (about 80 units) on firms' Altman Z-score. The dashed lines represent the 95% confidence interval of the marginal effect of the GEPU index.

Source: HKMA staff estimates.

Chart 6. Marginal effects of GEPU on Altman Z-score in APAC economies



Note: The chart shows the marginal effect of a one standard deviation increase in GEPU on firms' Altman-Z-score across APAC economies, using the median Inflex value of non-financial corporates in each economy for Q2 2024-Q1 2025.

Source: HKMA staff estimates.

Although the baseline results suggest that operational flexibility serves as a buffer on average, this effect may differ across firms depending on their size. To examine this heterogeneity, we categorise firms into three size tertiles based on total assets. Table 2 presents the results from which several key observations emerge:

- For small and medium-sized firms (the bottom and middle tertiles; Columns 1 and 2), the direct relationship between the GEPU index and financial health is insignificant over the full sample. However, the interaction term between the GEPU index and the operational inflexibility index is negative and significant. This indicates that smaller firms rely on operational agility to manage uncertainty, owing to their limited resources and tighter liquidity constraints. Nevertheless, during the period of heightened uncertainty (2017Q1–2025Q1 subsample), small firms are adversely affected by both direct GEPU shocks and the compounded impacts of operational rigidity (Column 4).
- In contrast, for large firms (the top tertile), the interaction between uncertainty and inflexibility is insignificant (Column 3). Instead, these firms exhibit a direct and significant negative relationship between the GEPU index and their Z-score. A plausible explanation lies in the dual nature of firm scale. On one hand, large firms often possess substantial

market power, enabling them to pass on the costs of operational frictions to consumers or suppliers, thereby mitigating the adverse effects of operational inflexibility. On the other hand, their massive scale requires deep integration into global capital markets. When GEPU increases, global risk repricing and tighter financial conditions directly undermine their financial health, bypassing the operational channels altogether. This direct exposure to macro-financial vulnerabilities exhibits distinct characteristics consistent with our findings in AEs.

Table 2. Estimation results of Equation (3) across firm sizes

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Full sample (Q4 2002 – Q1 2025)</i>			<i>Elevated uncertainty period (Q1 2017 – Q1 2025)</i>		
	<i>Small firms</i>	<i>Mid-sized firms</i>	<i>Large firms</i>	<i>Small firms</i>	<i>Mid-sized firms</i>	<i>Large firms</i>
$GEPU_{t-1}$	-0.000	-0.000	-0.001***	-0.001**	-0.001*	-0.001*
$Inflex_{i,t-1}$	0.048	-0.192	-0.168	0.061	-0.128	-0.180
$GEPU_{t-1} \times Inflex_{i,t-1}$	-0.002**	-0.001*	-0.000	-0.002*	-0.001	-0.000
VIX_{t-1}	-0.008	-0.018***	-0.013***	-0.010	-0.013	-0.003
$Stdev(Asset\ Growth)_{i,t-1}$	-1.458***	-1.447***	-1.102***	0.200	-1.858***	-1.398***
$Stdev(GDP\ Growth)_{i,t-1}$	2.502	1.724	0.583	2.168	-3.763*	-3.255*
$Stdev(Inflation)_{i,t-1}$	-11.629**	-15.441***	-17.541***	-16.248**	-28.289***	-21.777***
$Asset\ Growth_{i,t-1}$	0.818***	0.419***	0.648***	0.609***	0.200	0.418***
$GDP\ Growth_{i,t-1}$	1.201*	3.122***	1.649***	0.339	1.925**	1.540***
$Inflation_{i,t-1}$	1.330	3.432**	4.029***	3.841**	6.776***	4.384**
Observations	56,675	86,539	108,895	37,364	59,364	69,989
Number of firms	2,669	3,924	3,719	2,358	3,535	3,531
Number of quarters	90	90	90	33	33	33

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Firm size is classified based on the distribution of total assets. Small, mid-sized, and large firms correspond to firms with total assets in the bottom third (0–33.3rd percentile), middle third (33.3rd–66.7th percentile), and top third (66.7th–100th percentile) of peers in all economies in the same GICS sector in a quarter, respectively.

Source: HKMA staff estimates.

4.2 What determines corporate operational flexibility?

The results from the previous section naturally lead to a related question: what firm characteristics are associated with greater operational flexibility, and how do broader financial conditions influence these relationships? Conceptually, four sets of factors are expected to be significant:

- *Capital structure.* More leveraged firms may have reduced flexibility to adjust operations swiftly, as they are subject to tighter constraints from debt covenants and refinancing requirements.
- *Liquidity and rollover risk.* A higher reliance on short-term debt may limit flexibility due to rollover risk, particularly when credit conditions tighten. In contrast, cash buffers can enhance operational flexibility by providing internal financing when external credit becomes costly.
- *Asset composition.* Firms with higher intangible intensity (e.g. knowledge-based and digital capital) may possess greater flexibility to reconfigure operations and redeploy resources. In contrast, firms with a “hard-asset-intensive” structure often face greater challenges in rapidly scaling down or repurposing their operations. Furthermore, a higher proportion of raw materials in inventory can enhance the ability to reallocate inputs in the short run across different product lines, thereby supporting operational adjustments.
- *Financial conditions.* Even with comparable balance sheets, firms may become more operationally rigid under tighter financial conditions if funding becomes more expensive and liquidity constraints take effect. Consequently, the impact of leverage and short-term funding exposure may intensify during periods of financial stress.

We estimate an annual firm-panel regression where the dependent variable is the firm’s operational inflexibility measure:

$$\begin{aligned}
 Inflex_{i,t} = & a_i + b_1 \frac{debt}{cap}_{i,t-1} + b_2 \frac{shortdebt}{debt}_{i,t-1} + b_3 \frac{cash}{asset}_{i,t-1} \\
 & + b_4 \frac{intangible}{asset}_{i,t-1} + b_5 \frac{raw}{inventory}_{i,t-1} + b_6 FSI_{t-1} + b_7 FSI_{t-1} \times \frac{debt}{cap}_{i,t-1} \\
 & + b_8 FSI_{t-1} \times \frac{shortdebt}{debt}_{i,t-1} + e_{i,t}
 \end{aligned} \tag{5}$$

where $(debt/cap)_{i,t-1}$ is the lagged debt-to-capital ratio; $(shortdebt/debt)_{i,t-1}$ is the lagged ratio of short-term debt to total debt; $(cash/asset)_{i,t-1}$ is the lagged cash-to-assets ratio; $(intangible/asset)_{i,t-1}$ is the lagged intangibles-to-assets ratio; and $(raw/inventory)_{i,t-1}$ is the lagged ratio of raw materials to total inventories. FSI_{t-1} denotes the lagged financial stress index.¹⁰ The interaction terms $FSI_{t-1} \times (debt/cap)_{i,t-1}$ and $FSI_{t-1} \times (shortdebt/debt)_{i,t-1}$ allow the effects of leverage and short-term funding exposure on inflexibility to vary with financial stress. The specification includes firm fixed effects (a_i), while standard errors are computed using two-way clustering at the firm and period levels.^{11 12}

Table 3 presents the estimates for (i) the full sample, (ii) AEs, and (iii) EMEs, using annual data. There are several key observations from the results.

- *Debt reliance is associated with lower flexibility, particularly in EMEs.* In the full sample, the estimated coefficient on *Debt/Capital* (b_1) is significantly positive (Column 1), indicating that firms with higher leverage exhibit greater operational inflexibility. This relationship is more pronounced in EMEs (Column 3), suggesting that leverage constraints are more binding in environments with less developed credit markets.
- *Short-term debt exposure affects corporate operational flexibility in AEs.* The estimated coefficient of short-term debt share (b_2) is significantly positive in AEs (Column 2). This indicates that in AEs with more developed financial systems, leverage is widespread and does not serve as a strong differentiator. Instead, variations in operational flexibility are more closely linked to firms' liability maturity structures and the associated rollover and liquidity risks.
- *Liquidity buffers enhance flexibility.* The estimated coefficient for the cash-to-assets ratio (b_3) is significantly negative in the full sample

¹⁰ The Financial Stress Index (FSI) is estimated by the US Office of Financial Research (OFR). The OFR FSI is commonly used as a proxy for global financial stress indicator. Indeed, the OFR FSI is designed as "a daily market-based snapshot of stress in global financial markets," incorporating five categories of indicators (credit, equity valuation, funding, safe assets and volatility) across the US, other AEs and EMEs. This multi-regional construction supports its suitability as a global financial conditions proxy.

¹¹ We include firm fixed effects, which absorb time-invariant firm characteristics, including country and sector membership insofar as these do not vary over time. We do not include time fixed effects because FSI varies only over time and is common across firms within each period, so period dummies would absorb its level effect, rendering b_6 unidentified.

¹² Firm clustering allows for serial correlation in shocks within firms over time, while period clustering accounts for correlated shocks across firms within the same period, which is an important consideration given that GEPU is a common time-series regressor.

(Column 1), with a larger magnitude observed in EMEs (Column 3). This suggests that internal liquidity plays a critical role in enabling operational adjustments, especially in economies with less developed credit markets.

- *Intangible intensity is associated with greater flexibility.* The estimated coefficient on *Intangibles/Assets* (b_4) is negative and highly significant across all specifications (Columns 1-3). This finding aligns with the notion that intangible-based capital (e.g. digital and knowledge assets) enables firms to reconfigure operations and reallocate resources more swiftly than firms dependent primarily on physical capital.
- *Inventory composition is significant for short-run adjustment, particularly in AEs.* A higher share of raw materials in inventories is associated with greater flexibility in the full sample and in AEs (Columns 1-2).
- *Financial stress amplifies inflexibility through distinct balance-sheet channels in EMEs versus AEs.* In EMEs, the significantly positive interaction between financial stress and leverage ($FSI \times Debt/Capital$; Column 3) suggests that tighter financial conditions intensify the binding nature of leverage constraints, consistent with shallower credit markets where external financing is more difficult to substitute and refinancing capacity is more constrained. In AEs, the stronger interaction between financial stress and short-term debt exposure ($FSI \times shortdebt/debt$; Column 2) indicates that financial stress primarily erodes flexibility through rollover and liquidity risk.

Table 3. Estimation results of Equation (5)

	(1) <i>All economies</i>	(2) <i>Advanced economies</i>	(3) <i>Emerging market economies</i>
<i>debt/cap</i> _{<i>i,t-1</i>}	0.033**	0.020	0.046**
<i>shortdebt/debt</i> _{<i>i,t-1</i>}	0.030***	0.050***	-0.006
<i>cash/asset</i> _{<i>i,t-1</i>}	-0.106**	-0.077	-0.136**
<i>intangible/asset</i> _{<i>i,t-1</i>}	-0.401***	-0.341***	-0.489***
<i>raw/inventory</i> _{<i>i,t-1</i>}	-0.0002***	-0.0003***	0.044
<i>FSI</i> _{<i>t-1</i>}	0.0004	0.001	-0.004
<i>FSI</i> _{<i>t-1</i>} × <i>debt/cap</i> _{<i>i,t-1</i>}	0.005*	0.004	0.009*
<i>FSI</i> _{<i>t-1</i>} × <i>shortdebt/debt</i> _{<i>i,t-1</i>}	0.002	0.005*	-0.001
Observations	33,517	22,796	10,721
Number of firms	4,571	2,709	1,862
Number of years	21	21	21

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Source: HKMA staff estimates.

Like the firm-size analysis in Section 4.1, we apply the same asset-based tertiles to explore how the determinants of operational flexibility vary (Table 4).

- *For small- and medium-sized firms, the penalty of high leverage on operational flexibility becomes evident primarily during periods of financial stress.* While baseline leverage does not significantly constrain flexibility under normal conditions, the interaction term between leverage and financial stress is significantly positive (Columns 1 and 2). This indicates that when aggregate credit conditions tighten (i.e. FSI increases), highly levered small firms quickly exhaust their available debt capacity. Constrained by debt obligations and excluded from external credit markets, these firms lose the financial flexibility necessary to pivot or adjust their operations, rendering them operationally rigid.¹³
- *Rollover risks represent a primary constraint on large firms' flexibility during financial stress.* While baseline leverage and cash buffers are significant determinants of operational flexibility in normal periods, short-term debt exposure becomes the more pressing issue when financial conditions tighten. This underscores that near-term liquidity risk is a major friction for large corporations during a crisis. When faced with the need to refinance short-term obligations in a stressed market, large firms often redirect available capital away from operational adjustments to manage the maturing debt, significantly undermining their operational flexibility.

¹³ It is worth noting that for small firms, the overall marginal effect of financial stress on operational flexibility depends critically on their leverage. The negative standalone FSI coefficient (Column 1) suggests that unlevered small firms initially exhibit greater flexibility during stress, reflecting their natural agility to swiftly cut variable costs compared to larger peers (Cheng et al., 2011). However, the positive interaction term shows that this advantage erodes quickly with debt. For leveraged small firms, covenant pressures and limited refinancing options restrict their ability to adjust, meaning financial stress ultimately amplifies their operational rigidity.

Table 4. Estimation results of Equation (5) across firm sizes

	(1) <i>Small firms</i>	(2) <i>Mid-sized firms</i>	(3) <i>Large firms</i>
<i>debt/cap</i> _{<i>i,t-1</i>}	0.028	0.031	0.067***
<i>shortdebt/debt</i> _{<i>i,t-1</i>}	0.038*	0.038**	0.033**
<i>cash/asset</i> _{<i>i,t-1</i>}	-0.035	-0.060	-0.150**
<i>intangible/asset</i> _{<i>i,t-1</i>}	-0.246*	-0.100	-0.535***
<i>raw/inventory</i> _{<i>i,t-1</i>}	-0.0004***	0.021	0.046
<i>FSI</i> _{<i>t-1</i>}	-0.006**	0.000	0.002
<i>FSI</i> _{<i>t-1</i>} × <i>debt/cap</i> _{<i>i,t-1</i>}	0.011*	0.006*	0.002
<i>FSI</i> _{<i>t-1</i>} × <i>shortdebt/debt</i> _{<i>i,t-1</i>}	0.005	0.000	0.004*
Observations	5,687	11,722	15,701
Number of firms	994	1,950	2,077
Number of years	21	21	21

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Firm size is classified based on the distribution of total assets. Small, mid-sized, and large firms correspond to firms with total assets in the bottom third (0–33.3rd percentile), middle third (33.3rd–66.7th percentile), and top third (66.7th–100th percentile) of peers in all economies in the same GICS sector in a quarter, respectively.

Source: HKMA staff estimates.

5. POLICY IMPLICATIONS

The findings of this study provide a valuable framework for policymakers navigating elevated global economic policy uncertainty. While higher policy uncertainty systematically undermines corporate financial health, our analysis highlights operational flexibility as a significant mitigating factor. Because this flexibility is closely linked to underlying financing structures and can be eroded when financial stress amplifies leverage or rollover risks, supporting corporate resilience requires a multi-dimensional policy approach. Accordingly, we outline four main policy implications derived from these findings.

First, maintaining policy predictability through clear and consistent communication can help reduce uncertainty spillovers to firms' investment decisions and funding conditions. Although global uncertainty shocks often lie beyond the control of domestic authorities, avoidable uncertainty stemming from ambiguous policy objectives or inconsistent signals can exacerbate the "wait-and-see" behaviour and increase risk premia. Clear articulation of policy frameworks and contingencies, especially during stress episodes, can therefore mitigate precautionary responses and stabilise financing conditions.

Second, uncertainty indicators may be integrated more systematically into financial-stability monitoring and stress testing. Global uncertainty measures (such as the GEPU index) can enhance existing risk dashboards and scenario design, particularly when combined with firm-level vulnerability metrics. In this context, monitoring frameworks may place greater emphasis on the joint incidence of high leverage, reliance on short-term debt, low liquidity buffers, and high operating-cost rigidity, as these characteristics are associated with weaker adjustment capacity and more pronounced declines in financial health during periods of elevated uncertainty.

Third, the results underscore the critical role of financing structures in determining firms' operational flexibility, implying that deepening funding markets and strengthening liquidity backstops can enhance resilience during periods of uncertainty. Policies that foster stable local-currency funding and reduce refinancing frictions may help limit rollover risks and prevent temporary financial stress from compelling otherwise viable firms to abruptly scale back operations. The analysis further reveals that the dominant constraints vary across economies and firm sizes: in EMEs and among smaller firms, tighter financial conditions tend to amplify rigidity primarily through leverage constraints, whereas in AEs and for larger firms, stress often undermines flexibility more through short-term funding and liquidity risks. This heterogeneity underscores

the importance of targeting financial-stability tools to specific economic and firm characteristics.

Finally, firms with higher intangible intensity tend to exhibit greater operational flexibility, consistent with activities that are easier to reconfigure and resources that are more readily redeployed. This suggests that policies promoting knowledge-based and digital investments, alongside enhanced financial intermediation and legal frameworks that better accommodate intangible-heavy balance sheets, may strengthen corporate resilience to uncertainty shocks.

6. CONCLUSION

This study examines whether corporate operational flexibility mitigates the adverse effects of global economic policy uncertainty on firms' financial viability. Using a large panel of non-financial listed firms, we find that higher levels of global economic policy uncertainty, as measured by the GEPU index, are associated with lower levels of Altman Z-score. Importantly, this negative relationship is more pronounced among operationally inflexible firms, consistent with the notion that rigid cost structures and limited adjustment capacity amplify the impact of uncertainty shocks, leading to deteriorated firm-level financial health.

We also document systematic relationships between operational flexibility and firms' balance-sheet and asset structures. In general, firms with higher leverage and greater reliance on short-term debt tend to exhibit lower flexibility, while stronger cash buffers and higher intangible intensity are associated with greater flexibility. Moreover, tighter financial conditions can amplify these effects, with evidence indicating that the binding constraints vary across country groups and firm sizes: in EMEs and among smaller firms, financial stress appears to reduce flexibility primarily through overall debt constraints, whereas in AEs and among larger firms, the interaction with short-term funding exposure becomes more salient.

Taken together, these results highlight key policy implications for financial stability. First, clear, consistent and timely policy communication can help reduce uncertainty and limit its impact on corporate investment decisions and funding conditions. Second, uncertainty measures such as the GEPU index, when combined with firm-level indicators of operating-cost rigidity, can enhance traditional leverage and liquidity metrics in vulnerability monitoring and macro stress testing by capturing firms' adjustment capacity. Third, deepening funding markets and strengthening liquidity backstops can alleviate specific financial

frictions that constrain operational flexibility, highlighting the need for targeted macro-prudential tools to address leverage constraints in EMEs and smaller firms, and rollover risks in AEs and larger firms. Finally, where appropriate, policies that reduce barriers to operational reconfiguration, such as supporting digital transformation, skills upgrading, and financing for intangible-intensive firms, can bolster long-term corporate resilience.

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