



How Economic Policy Uncertainty impact Supply Chain Real Earnings

Management? Evidence from China

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Abstract

Using a sample of Chinese A-share non-financial listed firms over the period 2008-2020, this study investigated whether firms exploit long-term supply chain relationships to engage in coordinated real earnings management when economic policy uncertainty rises. Baseline estimates showed that higher policy uncertainty was associated with greater supply chain real earnings management activity, consistent with the view that relationship-based trading models provide a basis for earnings coordination between firms and their supply chain counterparties. Heterogeneity analyses indicated that this effect was more pronounced among firms with stronger bargaining power and among those operating within more concentrated supply chains. A supplementary analysis revealed that supply chain real earnings management and accrual-based earnings management exhibited substitution effects under elevated uncertainty, suggesting that firms favour the more opaque, relationship-based approach as policy uncertainty rises. These findings carry implications for regulators seeking to improve macroeconomic expectations management and tighten supply chain information disclosure requirements.

1. Introduction

As the global division of labour has matured, supply chains have supplanted vertical integration as the dominant organisational form in international industry (Yeung and Coe, 2015). Effective supply chain management and the selection of appropriate transaction models have therefore become strategic imperatives for firms navigating competitive and uncertain market environments. In the context of China's economic transition, regional disparities in marketisation and persistent local protectionism impose substantial transaction costs on factor flows (He et al., 2008). These frictions have led many firms to adopt relationship-based transaction models, in which

coordination between trading partners substitutes for purely market-mediated exchange (Madhok, 1997). Sustained trading relationships with a concentrated set of suppliers and customers represent a defining feature of such relational exchange, through which firms may reduce transaction costs, enhance asset turnover, and strengthen financial performance (Patatoukas, 2012). The Chinese market is further distinguished by a comparatively high degree of supply chain concentration, which partly reflects broader socio-cultural orientations towards relational commerce and the enduring role of informal trust networks in governing inter-firm transactions (Kumar et al., 2018; Li et al., 2021). Against this background, whether Chinese firms exploit relational supply chain ties to engage in coordinated real earnings management constitutes a research question with both theoretical significance and clear relevance for market regulation and investor protection.

Firms' earnings management behaviour is closely tied to the policy environment (Brammer et al., 2008; Doherty et al., 2014; Xia et al., 2025). Recent years have witnessed a pronounced retreat from economic globalisation, accompanied by widespread restructuring of global industrial and supply chains. Compounded by the expansionary monetary policies deployed by major economies in response to COVID-19 and the subsequent Russia – Ukraine conflict, global economic policy uncertainty has risen sharply. For China specifically, these external pressures coincided with a period of decelerating growth, ongoing structural adjustment, and the unwinding of earlier stimulus programmes. In response to both domestic imbalances and heightened external uncertainty, central and local governments introduced a broad suite of counter-cyclical policy measures intended to sustain growth and guide industrial upgrading. Whilst these interventions proved consequential for economic outcomes, the resulting frequency of policy revision simultaneously amplified the degree of uncertainty that individual firms were required to navigate in their planning and operational decisions.

Firms serve as the micro-level vehicles through which macroeconomic policies propagate, whilst simultaneously constituting critical nodes in meso-level supply chains (Dopfer and Potts, 2007). Prior research has documented that elevated economic policy uncertainty heightens earnings volatility (Yang et al., 2021; Benkraiem et al., 2022) and cash flow uncertainty (Ilyas et al., 2021; Gupta, 2022), whilst also complicating managerial decision-making (Zhang et al., 2021; Lou et al., 2022; Zhang et al., 2025; Wu et al., 2026). From a supply chain perspective, suppliers and customers lie at opposite ends of the cost – revenue equation that determines firm profitability; coordination with these parties therefore represents a plausible route to earnings improvement (Bovet and Martha, 2000; Walter et al., 2001). Real earnings management conducted through supply chain relationships is grounded in the firm's actual production and sales activities, making it considerably less transparent to external observers than accrual manipulation. This opacity is particularly consequential in a context where tightening accounting and auditing standards have made accrual-based manipulation more readily detectable, potentially inducing firms to shift towards real earnings management as a lower-risk alternative. In the Chinese market, the governance of relationship-based transactions rests primarily on reputational mechanisms and relational contracts rather than purely market-based price signals (Zhou and Xu, 2012; Zeng & Ahmed, 2026; Wu, Li, Ma, & Zeng, 2025; Wu, Zeng, & Abedin, 2025). Within this institutional context, firms may engage in cooperative behaviour with upstream and downstream partners beyond the confines of immediate economic self-interest, and the accumulated relational capital in these partnerships provides the trust and stability necessary for sustained earnings coordination. Specific investments made by suppliers and customers within the supply chain further reduce

cooperation risks and lower the effective transaction costs of coordination, increasing the probability that firms will pursue coordinated real earnings management. Given these considerations, a substantive question arises as to whether Chinese listed firms collaborate with supply chain partners to manage real earnings in response to heightened economic policy uncertainty—a question that existing literature has yet to address systematically. The broader literature on financial market uncertainty further documents significant spillover effects across asset classes and sectors, underscoring the relevance of external policy shocks to firm-level decisions (Abedin et al., 2024; Lu & Zeng, 2023; Zeng & Ahmed, 2026; Zeng, Abedin, & Lucey, 2024; Wu, Zeng, & Abedin, 2025).

This paper makes several contributions to the literature. Theoretically, whilst prior research examined the effects of economic policy uncertainty on accrual-based earnings management (e.g., Jin et al., 2019; Yung and Root, 2019; Nguyen and Vo, 2020; Choi et al., 2021; Liu et al., 2022), the consequences for real earnings management conducted through supply chains received comparatively little attention, particularly given the ongoing tightening of accounting standards and disclosure regulation that has increased the relative attractiveness of real manipulation as a management strategy. This gap is notable because supply chain real earnings management, rooted in actual operating decisions rather than accounting discretion, is not only more difficult to detect from financial statements alone, but also carries distinct implications for the efficiency of underlying production and commercial relationships. This study directly examined how economic policy uncertainty shapes firms' engagement in supply chain real earnings management, and assessed the relationship between accrual earnings management and supply chain real earnings management under conditions of elevated uncertainty. These analyses jointly enrich understanding of firms' earnings management strategies under policy uncertainty and extend the supply chain perspective on corporate financial behaviour. From a practical standpoint, the diversity of real earnings management techniques and their inherent opacity to outside observers create material obstacles for investors attempting to value firms and for regulators seeking to enforce standards (Duan et al., 2025; Ma & Appolloni, 2025). This challenge is especially acute in the Chinese context, where elevated economic policy uncertainty raises the assessment burden on both market participants and supervisory authorities (Attig et al., 2021). As China continues to advance supply chain development and economic restructuring, a clearer understanding of relationship-based real earnings management is valuable for investors assessing the credibility of reported earnings, for the effective operation of the capital market information signalling mechanism, and for policymakers seeking to improve macroeconomic expectations management and strengthen supply chain disclosure requirements. The findings are therefore of practical relevance both to capital market participants and to the regulatory authorities responsible for overseeing financial reporting and supply chain governance in China.

The remainder of the paper proceeds as follows. Section 2 develops the theoretical framework and research hypotheses. Section 3 describes the research design. Section 4 reports the empirical results and supplementary analyses. Section 5 concludes.

2. Theoretical Analysis and Research Hypotheses

Under perfectly competitive conditions, market forces are expected to guide resource allocation towards Pareto-efficient outcomes without external intervention (Hurwicz, 1973). In practice, however, the accumulation of monopoly power, the presence of externalities, cyclical fluctuations,

and recurrent financial instability mean that real-world markets routinely deviate from this ideal, rendering market failure a persistent rather than exceptional phenomenon (Lawrence and Weber, 2010; Taylor, 2011). Government intervention through deliberate economic policy thus becomes necessary to restore allocative efficiency. In the Chinese context, authorities at all levels have deployed a range of counter-cyclical economic policies to regulate aggregate demand, guide industrial development, and stimulate growth, achieving notable results in sustaining output and directing the structural upgrading of the economy (Wang et al., 2026; Qi et al., 2026).

Yet government policymaking is constrained by informational lags and the inherent difficulty of tracking a rapidly evolving economic environment, and policy responses inevitably exhibit some degree of delay. These limitations are particularly pronounced in China, where the economy is navigating a critical transition period defined by decelerating growth, structural adjustment pressures, and the absorption of legacy stimulus measures. Because this transformation has proceeded without clear historical precedent or established foreign models, policy formulation has necessarily been exploratory in character—a process sometimes described as 'crossing the river by touching the stones'. Accordingly, economic policy uncertainty in China is structurally elevated and has been formally captured in a dedicated index (Huang and Luk, 2020).

As key participants in both the broader macroeconomy and in meso-level supply networks, firms operate as conduits for economic policy transmission (Dopfer and Potts, 2007). Frequent shifts in policy impede the formation of stable expectations and influence firm-level decision-making in ways that may create incentives for earnings manipulation. Economic policy uncertainty raises earnings volatility (Yang et al., 2021; Benkraiem et al., 2022) and cash flow uncertainty (Ilyas et al., 2021; Gupta, 2022; ; Zeng, Ahmed, & Lu, 2024; Zeng, Xu, & Lu, 2024; Zeng, Abedin, & Ahmed, 2024; Zeng, 2024), whilst also complicating managerial judgement in relation to investment, financing, and disclosure (Zhang et al., 2021; Lou et al., 2022). Two channels in particular are likely to be relevant in the Chinese institutional context. First, policy uncertainty tightens financing conditions: by amplifying operational risk and destabilising cash flows, it elevates the risk premia demanded by lenders (Frijns et al., 2013; Ma & Appolloni, 2025). Given that Chinese firms depend heavily on the banking system as their primary external funding source, greater policy uncertainty induces more cautious lending postures, reducing firms' probability of securing credit. Firms facing binding financing constraints have well-documented incentives to manage reported earnings so as to appear more creditworthy and thereby improve their access to external capital. Second, policy uncertainty aggravates principal – agent conflicts: managers possess inherent informational advantages over outside stakeholders, and a deterioration in the information environment widens these asymmetries further (Sun et al., 2023; Hu et al., 2026; Chen et al., 2025), simultaneously expanding the discretion available for earnings manipulation and diminishing the likelihood that such behaviour will be detected by investors or regulators. Given that Chinese firms maintain comparatively close ties with upstream and downstream supply chain partners—ties that constitute valuable relational capital (Song et al., 2016; Yu and Huo, 2018; Zeng, Liu, Wang, & Ma, 2025; Zeng, Wu, Abedin, & Ahmed, 2025; Abedin, Goldstein, Huang, & Zeng, 2024)—deteriorating business conditions and heightened earnings uncertainty may motivate firms to exploit these relationships in coordinated real earnings management for the following reasons.

The first consideration concerns the greater opacity of supply chain real earnings management.

Long-term commercial relationships with supply chain partners develop an idiosyncratic character that creates scope for coordination beyond purely economic motives (De Leeuw and Fransoo, 2009). Such relationships, sustained over multiple transaction cycles, accumulate substantial relational capital in the form of mutual trust, shared knowledge, and informal governance routines that facilitate cooperative behaviour without resort to formal contracting. Under heightened policy uncertainty, firms may exploit these relationship-based ties to manage real earnings in ways that are less detectable than conventional methods such as the manipulation of expenses or production costs, precisely because they are embedded in otherwise normal commercial transactions. The second consideration relates to relationship-specific asset investments and the threat of asset stranding. In order to sustain long-term strategic partnerships and signal credible commitment, firms make dedicated investments in location, physical infrastructure, technology, and human capital tailored to the needs of key suppliers and customers (Hennig-Thurau, 2000; Hsieh et al., 2002; Wu, Zeng, Abedin, & Ahmed, 2025; Lu & Zeng, 2023). For those counterparties, declining to participate in earnings coordination risks disrupting stable relationships built over extended periods and may even trigger a partial breakdown of those ties. The consequent deterioration in the focal firm's operating condition and market value could, in turn, impair the proprietary assets held by suppliers and customers within the supply chain (Hui et al., 2012; Li et al., 2026), ultimately generating hedging losses on their specialised investments. Cooperation in real earnings management may therefore yield compensatory benefits that make participation rational for counterparties. Accordingly, suppliers and customers may also have their own incentives to assist firms in managing real earnings under elevated policy uncertainty. On the basis of the foregoing analysis, the following hypothesis was proposed:

H1: Firms significantly increase their real earnings management in supply chain in the presence of economic policy uncertainty.

3. Research Design

3.1 Sample Selection and Data Description

The analysis was based on a sample of Chinese A-share non-financial listed firms over the period 2008 – 2020. The economic policy uncertainty measure was drawn from the China Economic Policy Uncertainty Index (CNEPU) developed by Huang and Luk (2020), and all remaining financial data were sourced from the China Stock Market and Accounting Research (CSMAR) database. The sample was constructed by applying the following screening criteria: (1) firms in the financial sector were excluded; (2) firms subject to special treatment (ST) designation were removed; (3) observations with missing values on key variables were dropped; and (4) all continuous variables were winsorised at the 1st and 99th percentiles to limit the influence of extreme observations.

3.2 Definition of Key Variables

3.2.1 Real Earnings Management in Supply Chain

Supply chain real earnings management was measured using two complementary indicators. SREM1 was defined as the change in a firm's cost-of-sales ratio between the second half of the sample year and the corresponding period of the prior year; SREM2 captured the analogous change for the fourth quarter relative to the same quarter of the preceding year. Both variables measure the degree to which a firm's cost and revenue structure shifted in ways that may be

attributable to cooperative transactions with supply chain partners rather than to underlying changes in operational efficiency. Lower values of these variables indicate greater real earnings management activity within the supply chain. Three considerations support this measurement approach. First, supply chain real earnings management primarily manifests through cost reductions and revenue improvements negotiated with procurement and sales counterparties, so changes in the cost-of-sales ratio comprehensively capture both dimensions of this behaviour without requiring the researcher to separately model each side of the transaction. Second, the cost-of-sales ratio reflects a firm's underlying production and operational efficiency, which adjusts slowly over time and is relatively stable within a fiscal year; short-term deviations from the comparable period of the prior year are therefore more plausibly attributable to earnings coordination than to genuine productivity shifts, and are relatively insulated from concurrent confounding factors in the same period. Third, the measurement windows for SREM1 and SREM2 were selected to avoid temporal overlap with the measurement window for the key independent variable and to mitigate the influence of seasonal variation on reported revenues and costs, thereby reducing the risk of spurious correlation between the dependent and explanatory variables. To facilitate interpretation of regression results, negated versions—NSREM1 and NSREM2, defined as the additive inverse of SREM1 and SREM2, respectively—were employed as dependent variables in all regressions, such that higher values indicate a greater degree of supply chain real earnings management.

3.2.2 Economic Policy Uncertainty

The primary measure of economic policy uncertainty was the China Economic Policy Uncertainty Index (CNEPU) constructed by Huang and Luk (2020), based on textual analysis of major mainland Chinese newspapers. By aggregating information across multiple publications, the index mitigates the idiosyncratic heterogeneity of individual outlets whilst maintaining close correspondence with major policy decisions implemented in China (Wang et al., 2022). Monthly index values were converted to annual observations by computing arithmetic means, following the approach of Yang et al. (2019).

3.2.3 Baseline Regression Model

To examine how economic policy uncertainty influenced supply chain real earnings management, the following baseline specification was estimated:

$$NSREM1_{i,t} / NSREM2_{i,t} = \beta_0 + \beta_1 EPU_CN_t + \sum_k \beta_k Control_{i,t}^k + \sum IND + u_i + \varepsilon_{i,t} \quad (1)$$

In this model, NSREM1 and NSREM2 are the dependent variables measuring supply chain real earnings management, and CNEPU denotes the China Economic Policy Uncertainty Index. Control denotes a vector of firm-level controls comprising firm size (SIZE), the gearing ratio (LEV), Tobin's Q (TOBINQ), auditor reputation (BIG4), board ownership ratio (BDHOLD), analyst following (ATTEN), return on assets (ROA), total asset growth rate (TAGR), institutional investor ownership (INSHOLD), executive compensation (PAY), cash holding ratio (CASH), and the ownership share of the largest shareholder (TOP1). Industry fixed effects (IND) were included in preference to year fixed effects, as the latter would introduce multicollinearity given that the key explanatory variable varies only at the annual level (Correia et al., 2020). The term u_i captures time-invariant firm-level heterogeneity, β_0 is a constant, and $\varepsilon_{i,t}$ is the idiosyncratic error term. All variable definitions and measurements are detailed in Table 1.

Table 1. Definitions and Measurements of the Main Variables

Acronym	Specific definition	Operationalisation
<i>NSREM1</i>	Real Earnings Management in Supply Chain index 1	The opposite of the difference between an enterprise's cost of goods sold rate in the second half of the year and the cost of goods sold rate in the same period of the previous year
<i>NSREM2</i>	Real Earnings Management in Supply Chain index 2	The opposite of the difference between an enterprise's cost of goods sold rate in the fourth quarter and the cost of goods sold rate in the same period of the previous year
<i>EPU_CN</i>	China's Economic Policy Uncertainty Index	The arithmetic average of the monthly indices is converted to annual data and divided by 100
<i>SIZE</i>	Firm Size	Total assets are taken as the natural logarithm
<i>LEV</i>	Gearing Ratio	Total liabilities / Total assets
<i>TOBINQ</i>	Tobin's Q	The sum of market capitalisation and total liabilities, divided by total assets.
<i>BIG4</i>	auditor reputation	If audited by a Big 4 firm, the value is 1; otherwise, it is 0
<i>BDHOLD</i>	Board Ownership Ratio	Total board holdings / total number of shares
<i>ATTEN</i>	Analyst Attention	ln(number of analyst reports + 1)
<i>ROE</i>	Return on Assets	Net profit / Net assets
<i>TAGR</i>	Total Assets Growth Rate	The difference between the current period's total assets and the previous period's total assets, divided by the total assets of the previous period.
<i>INSHOLD</i>	Institutional Investor Ownership	The quantity of shares held by institutional investors divided by the total number of shares.
<i>PAY</i>	Executive Pay	ln(executive pay)
<i>CASH</i>	Cash Holding Ratio	Cash holdings / Total assets
<i>TOP1</i>	Top Shareholder Ownership	The quantity of shares held by the largest shareholder divided by the total number of shares.

4. Empirical Result

4.1 Descriptive Statistics

Table 2 summarises descriptive statistics for all variables. The sample means of SREM1 and SREM2 were -0.0002 and -0.0008 , respectively; by construction, NSREM1 and NSREM2 carry equal values of opposite sign. EPU_CN had a sample mean of 1.4238, with a maximum of 1.6574 and a minimum of 1.2503, reflecting meaningful time-series variation in policy uncertainty over the sample period. Summary statistics for the remaining control variables fell within plausible ranges and are not discussed individually.

Table 2. Descriptive Statistics

	N	Mean	Std.Dev	Min	Median	Max
<i>NSREM1</i>	18691	0.0002	0.0327	-0.1778	0.0001	0.1738
<i>SREM1</i>	18691	-0.0002	0.0327	-0.1738	-0.0001	0.1778
<i>NSREM2</i>	18691	0.0008	0.0526	-0.3075	0.0001	0.3061
<i>SREM2</i>	18691	-0.0008	0.0526	-0.3061	-0.0001	0.3075
<i>EPU_CN</i>	18691	1.4238	0.1254	1.2503	1.4087	1.6574
<i>SIZE</i>	18691	22.3911	1.2547	18.8849	22.2215	25.7776
<i>LEV</i>	18691	0.4398	0.1989	0.0530	0.4377	0.9976
<i>TOBIN</i>	18691	2.0583	1.3053	0.8842	1.6337	8.7646
<i>BDHOLD</i>	18691	0.0500	0.1028	0.0000	0.0007	0.6286
<i>ROE</i>	18691	0.0782	0.1051	-0.4779	0.0793	0.5427
<i>TAGR</i>	18691	0.1788	0.2928	-0.3877	0.1121	2.2861

<i>INSHOLD</i>	18691	0.4169	0.2342	0.0001	0.4287	0.8673
<i>PAY</i>	18691	14.4119	0.8626	11.1384	14.4419	16.3664
<i>CASH</i>	18691	0.1869	0.1273	0.0004	0.1538	0.9309
<i>TOP1</i>	18691	0.3487	0.1504	0.0287	0.3293	0.8941

4.2 Baseline Result

Columns (1) and (3) of Table 3 reported regression results with industry fixed effects but without control variables; columns (2) and (4) added the full set of controls. The estimated coefficients on *EPU_CN* were positive and statistically significant at the 1% level in all four specifications. The magnitude of the estimated coefficients remained stable across the parsimonious and full specifications, indicating that the association between policy uncertainty and supply chain real earnings management was not substantially driven by the control variables included. These results are consistent with Hypothesis H1 that firms increase supply chain real earnings management when economic policy uncertainty is elevated. Two complementary considerations account for this result. Within the Chinese market, firms maintain close and enduring ties with upstream and downstream supply chain partners, and these relationships constitute relational capital that enables cooperative behaviour beyond purely transactional motives. Under conditions of elevated uncertainty, firms may draw on these relationship-based ties to engage in real earnings manipulation in ways that are comparatively difficult for outside parties to detect. In parallel, supply chain counterparties also have their own incentives to cooperate: declining to assist in earnings coordination risks disrupting established long-term relationships or precipitating their breakdown. The consequent deterioration in the focal firm's value may erode the proprietary assets held by counterparties within the supply chain (Hui et al., 2012), threatening hedging losses on their specialised investments; cooperation may therefore yield compensatory benefits that outweigh the risks of participation for suppliers and customers alike. Taken together, the baseline results provided robust empirical support for Hypothesis H1.

Table 3. Baseline Regression Results

	(1)	(2)	(3)	(4)
	<i>NSREMI</i>	<i>NSREMI</i>	<i>NSREM2</i>	<i>NSREM2</i>
<i>EPU_CN</i>	0.0064*** (0.0019)	0.0065*** (0.0019)	0.0078*** (0.0030)	0.0083*** (0.0031)
<i>SIZE</i>		0.0003 (0.0002)		0.0003 (0.0003)
<i>LEV</i>		0.0043*** (0.0016)		0.0056** (0.0024)
<i>TOBIN</i>		0.0004 (0.0003)		0.0005 (0.0004)
<i>BDHOLD</i>		-0.0085*** (0.0023)		-0.0103*** (0.0033)
<i>ROE</i>		0.0392*** (0.0038)		0.0464*** (0.0064)
<i>TAGR</i>		0.0031** (0.0013)		0.0034* (0.0018)
<i>INSHOLD</i>		-0.0045*** (0.0012)		-0.0054*** (0.0018)
<i>PAY</i>		0.0006** (0.0003)		0.0011*** (0.0004)
<i>CASH</i>		0.0003 (0.0022)		0.0001 (0.0033)
<i>TOP1</i>		-0.0001 (0.0015)		-0.0013 (0.0023)
<i>Constant</i>	-0.0090***	-0.0264***	-0.0108**	-0.0374***

	(0.0032)	(0.0066)	(0.0050)	(0.0105)
<i>Ind</i>	YES	YES	YES	YES
<i>Firm</i>	YES	YES	YES	YES
<i>N</i>	18,691	18,691	18,691	18,691
<i>R</i> ²	0.0022	0.0209	0.0014	0.0119

Note: Firm-level clustering robustness criteria are in parentheses; *, ** and *** indicate a confidence level of 10%, 5% and 1% respectively.

4.3 Robustness Test

4.3.1 Alternative Measure of Economic Policy Uncertainty Indicators

To assess whether the baseline findings were sensitive to the construction of the key explanatory variable, three alternative indicators of economic policy uncertainty were employed as substitutes in the main regression specification. The first, EPU_CN_GEO, replaced the arithmetic mean of monthly index values with a geometric mean, which is less sensitive to extreme monthly readings. The second, EPU_BAKER, drew on the index developed by Baker et al. (2016) using text from the South China Morning Post, providing a measurement basis that is independent of the primary CNEPU index. The third, EPU_CN_DUM, was a binary indicator equal to one when the CNEPU value exceeded the sample-period median and zero otherwise. Table 4 reported the regression results. The estimated coefficients on EPU_CN_GEO, EPU_BAKER, and EPU_CN_DUM were all positive and statistically significant at the 1% level, confirming that the conclusions of the baseline analysis were robust to variation in how economic policy uncertainty was measured.

Table 4. Alternative Measure of Economic Policy Uncertainty Indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>NSREM1</i>	<i>NSREM2</i>	<i>NSREM1</i>	<i>NSREM2</i>	<i>NSREM1</i>	<i>NSREM2</i>
<i>EPU_CN_GEO</i>	0.0075***	0.0098***				
	(0.0019)	(0.0031)				
<i>EPU_BAKER</i>			0.0014***	0.0023***		
			(0.0001)	(0.0002)		
<i>EPU_CN_DUM</i>					0.0032***	0.0050***
					(0.0005)	(0.0008)
<i>SIZE</i>	0.0003	0.0004	-0.0004	-0.0007**	0.0003	0.0003
	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0003)
<i>LEV</i>	0.0042***	0.0055**	0.0064***	0.0090***	0.0045***	0.0058**
	(0.0016)	(0.0024)	(0.0016)	(0.0024)	(0.0016)	(0.0024)
<i>TOBIN</i>	0.0004	0.0005	0.0004	0.0005	0.0003	0.0004
	(0.0003)	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0004)
<i>BDHOLD</i>	-0.0084***	-0.0102***	-0.0103***	-0.0131***	-0.0081***	-0.0095***
	(0.0023)	(0.0033)	(0.0023)	(0.0033)	(0.0023)	(0.0033)
<i>ROE</i>	0.0391***	0.0463***	0.0415***	0.0503***	0.0399***	0.0475***
	(0.0038)	(0.0064)	(0.0038)	(0.0064)	(0.0038)	(0.0064)
<i>TAGR</i>	0.0031**	0.0034*	0.0040***	0.0048***	0.0030**	0.0032*
	(0.0013)	(0.0018)	(0.0013)	(0.0018)	(0.0013)	(0.0018)
<i>INSHOLD</i>	-0.0045***	-0.0054***	-0.0042***	-0.0048***	-0.0044***	-0.0052***
	(0.0012)	(0.0018)	(0.0012)	(0.0018)	(0.0012)	(0.0018)
<i>PAY</i>	0.0006**	0.0011***	-0.0005**	-0.0007	0.0006**	0.0011***
	(0.0003)	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0004)
<i>CASH</i>	0.0002	-0.0000	-0.0004	-0.0012	-0.0000	-0.0005
	(0.0022)	(0.0033)	(0.0022)	(0.0032)	(0.0022)	(0.0032)
<i>TOPI</i>	-0.0002	-0.0014	0.0013	0.0011	-0.0003	-0.0017
	(0.0015)	(0.0023)	(0.0015)	(0.0022)	(0.0015)	(0.0023)
<i>Constant</i>	-0.0281***	-0.0400***	0.0072	0.0142	-0.0185***	-0.0283***
	(0.0067)	(0.0106)	(0.0058)	(0.0088)	(0.0057)	(0.0087)

<i>Ind</i>	YES	YES	YES	YES	YES	YES
<i>Firm</i>	YES	YES	YES	YES	YES	YES
<i>N</i>	18,691	18,691	18,691	18,691	18,691	18,691
<i>R</i> ²	0.0211	0.0120	0.0286	0.0204	0.0226	0.0137

Note: Firm-level clustering robustness criteria are in parentheses; *, ** and *** indicate a confidence level of 10%, 5% and 1% respectively.

4.3.2 Endogeneity Test

To address potential reverse causality—specifically the possibility that firms with greater real earnings management might themselves attract policy responses—the US Economic Policy Uncertainty Index (EPU_US) was used as an instrumental variable. The instrument satisfied two standard requirements. First, as the world's largest economy, the United States exerts substantial influence on economic policy formation in other major economies through trade and financial linkages, so China's aggregate policy uncertainty index is positively correlated with that of the United States (Li et al., 2022). Second, US economic policy uncertainty originates in domestic American political and economic conditions and is largely exogenous to the earnings management decisions of individual Chinese firms; its influence on Chinese firm behaviour is more plausibly transmitted through its effect on domestic Chinese policy uncertainty than through a direct channel (Cui et al., 2021). Table 5 reported the two-stage least squares results. In the first stage, column (1), the estimated coefficient on EPU_US was positive and significant at the 1% level, confirming a strong positive relationship between the two countries' uncertainty indices and rejecting the null hypothesis of weak identification. In the second stage, columns (2) and (3), the estimated coefficients on EPU_CN remained positive and significant at the 1% level. These results indicated that the baseline findings continued to hold following correction for reverse causality, consistent with prior evidence that economic policy uncertainty exerts measurable effects on firm-level financial behaviour and market dynamics (Zhang et al., 2025; Wu et al., 2026).

Table 5. Endogeneity Test

	(1) <i>EPU_CN</i>	(2) <i>NSREMI</i>	(3) <i>NSREM2</i>
<i>EPU_US</i>	0.0625*** (0.0007)		
<i>EPU_CN</i>		0.1419*** (0.0077)	0.2317*** (0.0127)
<i>SIZE</i>	-0.0122*** (0.0009)	0.0014*** (0.0002)	0.0022*** (0.0004)
<i>LEV</i>	0.0454*** (0.0052)	-0.0017 (0.0016)	-0.0043* (0.0024)
<i>TOBIN</i>	0.0003 (0.0007)	0.0003 (0.0003)	0.0004 (0.0004)
<i>BDHOLD</i>	-0.0562*** (0.0103)	-0.0002 (0.0023)	0.0034 (0.0033)
<i>ROE</i>	0.0144* (0.0087)	0.0383*** (0.0038)	0.0449*** (0.0064)
<i>TAGR</i>	0.0175*** (0.0031)	0.0018 (0.0013)	0.0012 (0.0018)
<i>INSHOLD</i>	0.0013 (0.0046)	-0.0040*** (0.0012)	-0.0045*** (0.0017)
<i>PAY</i>	-0.0178*** (0.0011)	0.0018*** (0.0003)	0.0032*** (0.0004)
<i>CASH</i>	0.0455*** (0.0071)	-0.0108*** (0.0022)	-0.0181*** (0.0033)
<i>TOP1</i>	0.0279*** (0.0059)	-0.0026* (0.0015)	-0.0054** (0.0022)
<i>Constant</i>	1.8171*** (0.0211)	-0.2585*** (0.0146)	-0.4204*** (0.0241)

<i>Ind</i>	Yes	Yes	Yes
<i>Firm</i>	Yes	Yes	Yes
<i>N</i>	18691	18691	18691
<i>R</i> ²	0.1025	0.0433	0.0352

Note: Firm-level clustering robustness criteria are in parentheses; *, ** and *** indicate a confidence level of 10%, 5% and 1% respectively.

4.4 Heterogeneity Test

4.4.1 Heterogeneity Test of Bargaining Ability in the Supply Chain

A firm's bargaining power within the supply chain partly determines the switching costs that counterparties would face if the trading relationship were terminated (Seal et al., 1999; Harland et al., 2007). Firms with stronger bargaining positions can typically command more favourable commercial terms and are harder for suppliers and customers to replace without incurring significant search and transition costs. When policy uncertainty worsens business conditions and makes earnings projections less reliable, firms with greater relative market strength may therefore be better positioned to initiate and sustain coordinated real earnings management, as their counterparties face higher costs from non-cooperation and have fewer viable alternative trading partners. Following Moatti et al. (2015), bargaining ability was proxied by the firm's annual market share within its industry (Bargain), calculated as the ratio of a firm's annual sales revenue to the aggregate sales revenue of all sample firms in the same industry and year. Bargain was then classified relative to industry-year medians, with Bargain_DUM equal to one for firms above the median and zero otherwise. Table 6 reported the subsample results. The estimated coefficient on EPU_CN was positive and significant at the 1% level in the high bargaining-ability subsample, whilst the corresponding coefficient in the low bargaining-ability subsample was positive but statistically insignificant across all specifications. This pattern indicated that the positive relationship between policy uncertainty and supply chain real earnings management was concentrated among firms with stronger market bargaining positions, consistent with the theoretical reasoning outlined above.

Table 6. Heterogeneity Test- firm's Bargaining Ability

	(1)	(2)	(3)	(4)
	<i>NSREMI</i>	<i>NSREMI</i>	<i>NSREM2</i>	<i>NSREM2</i>
	<i>Bargain_DUM</i> =1	<i>Bargain_DUM</i> =0	<i>Bargain_DUM</i> =1	<i>Bargain_DUM</i> =0
<i>EPU_CN</i>	0.0135*** (0.0029)	0.0039 (0.0024)	0.0191*** (0.0044)	0.0043 (0.0039)
<i>SIZE</i>	0.0010*** (0.0004)	0.0003 (0.0004)	0.0016*** (0.0005)	0.0003 (0.0006)
<i>LEV</i>	0.0071*** (0.0025)	0.0037* (0.0020)	0.0088** (0.0035)	0.0050* (0.0030)
<i>TOBIN</i>	0.0014** (0.0006)	0.0003 (0.0003)	0.0022*** (0.0008)	0.0001 (0.0004)
<i>BDHOLD</i>	-0.0017 (0.0052)	-0.0117*** (0.0027)	0.0018 (0.0067)	-0.0150*** (0.0038)
<i>ROE</i>	0.0131*** (0.0038)	0.0497*** (0.0049)	0.0187** (0.0073)	0.0572*** (0.0083)
<i>TAGR</i>	-0.0007 (0.0026)	0.0035** (0.0014)	-0.0019 (0.0033)	0.0040* (0.0021)
<i>INSHOLD</i>	-0.0046** (0.0020)	-0.0043*** (0.0015)	-0.0065** (0.0030)	-0.0048** (0.0022)
<i>PAY</i>	0.0001 (0.0004)	0.0009** (0.0004)	0.0008 (0.0006)	0.0014** (0.0006)
<i>CASH</i>	0.0038 (0.0031)	-0.0008 (0.0028)	0.0058 (0.0045)	-0.0014 (0.0040)
<i>TOP1</i>	0.0005 (0.0023)	-0.0008 (0.0020)	0.0041 (0.0035)	-0.0037 (0.0029)

<i>Constant</i>	-0.0520*** (0.0110)	-0.0249** (0.0102)	-0.0879*** (0.0169)	-0.0298* (0.0161)
<i>Ind</i>	YES	YES	YES	YES
<i>Firm</i>	YES	YES	YES	YES
<i>N</i>	5,098	13,593	5,098	13,593
<i>R</i> ²	0.0165	0.0273	0.0144	0.0150

Note: Firm-level clustering robustness criteria are in parentheses; *, ** and *** indicate a confidence level of 10%, 5% and 1% respectively.

4.4.2 Heterogeneity of Supply Chain Concentration

Firms that concentrate their purchasing or sales activities with a small number of key counterparties tend to accumulate higher levels of asset specificity within those relationships, creating strong incentives to preserve established trading arrangements so as to avoid stranding specialised investments (Zhu et al., 2021; Li et al., 2026). A higher degree of supply chain concentration is associated with greater bilateral dependency: the focal firm depends on a small number of counterparties for a large share of its procurement or sales activities, and those counterparties similarly depend on the focal firm for a significant portion of their own revenues or costs. This interdependence creates a commercial context in which both parties have strong incentives to maintain the stability of their relationship, particularly under conditions of elevated uncertainty when identifying and on-boarding alternative partners becomes more difficult and costly. Under elevated policy uncertainty, which simultaneously worsens the business environment and complicates earnings forecasting, counterparties in highly concentrated supply chains may therefore be more willing to accede to coordination requests from focal firms, both to protect these long-term relationships and to limit potential losses from asset stranding (Grewal and Tansuha, 2001; Sarimveis et al., 2008). Consequently, higher supply chain concentration was expected to amplify the positive effect of policy uncertainty on supply chain real earnings management. Supplier concentration was measured as the ratio of purchases from the top five suppliers to total annual purchases (TS5), and customer concentration as the ratio of sales to the top five customers to total annual sales (TC5), both of which are disclosed in firms' annual reports. Binary indicators TS5_DUM and TC5_DUM were set equal to one for firms above the industry-year median on the respective concentration measure and zero otherwise. Supplementary Table 1 reported the subsample regression results. Columns (1)–(4) addressed supplier concentration heterogeneity: the estimated coefficients on EPU_CN in the higher-concentration subsamples were positive and significant at the 1% level across both dependent variable specifications, whilst those in the lower-concentration subsamples were positive but statistically insignificant. Columns (5)–(8) reported analogous results for customer concentration, yielding the same pattern. These outcomes indicated that the positive effect of policy uncertainty on supply chain real earnings management was more pronounced among firms with more concentrated supply chain structures, consistent with the view that asset specificity and bilateral dependency facilitate earnings coordination under conditions of elevated uncertainty.

4.5 Further Testing: Relationship with Accrual Earnings Management

From a theoretical standpoint, a firm's choice among earnings management methods reflects the relative costs and benefits of each approach. As accounting standards have tightened and regulatory scrutiny has increased over the sample period, the litigation and compliance risks associated with accrual earnings management have risen substantially (De George et al., 2016; Duan et al., 2025; Wang et al., 2026). At the same time, real earnings management conducted through supply chain relationships remains more difficult for auditors to detect, as it is embedded

in actual operating decisions rather than accounting entries. If firms facing elevated policy uncertainty elect to substitute towards real earnings management conducted through supply chain relationships—which is less visible to auditors and regulators—then the two methods would exhibit substitution effects. Alternatively, firms may combine both types to attain particular reporting targets, weighting each according to their own circumstances and comparative costs, in which case complementary effects would be expected. The direction of this relationship under elevated uncertainty warranted direct empirical investigation. Accrual earnings management was estimated using a modified Jones model:

$$\frac{TA_{i,t}}{A_{i,t-1}} = b_0 \frac{1}{A_{i,t-1}} + b_1 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + b_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t} \quad (2)$$

$$NDA_{i,t} = \hat{b}_0 \frac{1}{A_{i,t-1}} + \hat{b}_1 \frac{\Delta REV_{i,t} - REC_{i,t}}{A_{i,t-1}} + \hat{b}_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) \quad (3)$$

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \quad (4)$$

In these expressions, i indexes the firm and t the year. TA is total accruals, calculated as the difference between operating profit and net cash flow from operating activities. ΔREV denotes the change in operating revenue and ΔREC the corresponding change in accounts receivable. PPE represents net fixed assets and A denotes total assets. NDA is the non-discretionary component of accruals, and DA captures discretionary accruals potentially subject to managerial manipulation. Equations (2) and (3) were estimated by industry-year cross-section; the fitted coefficients from equation (2) were substituted into equation (3) to obtain NDA, and discretionary accruals DA were then recovered from equation (4). The absolute value of DA, denoted ABSDA, served as the accrual earnings management measure, with larger values indicating more pronounced accrual manipulation.

To examine the relationship between accrual earnings management and supply chain real earnings management under conditions of economic policy uncertainty, ABSDA was introduced as an additional regressor within the baseline specification:

$$NSREM1_{i,t} / NSREM2_{i,t} = \beta_0 + \beta_1 EPU_CN_t + \beta_2 ABSDA_{i,t} + \sum_k \beta_k Control_{i,t}^k + \sum IND + u_i + \varepsilon_{i,t} \quad (5)$$

In this model, NSREM1 and NSREM2 retain their roles as dependent variables, EPU_CN is the China Economic Policy Uncertainty Index, and ABSDA is the accrual earnings management measure; all other components followed the baseline specification. Supplementary Table 2 reported the results. The estimated coefficients on EPU_CN were positive and significant at the 1% level across both specifications, consistent with the baseline findings. The estimated coefficients on ABSDA were negative and significant at the 1% level in both columns, indicating that higher accrual earnings management was associated with lower supply chain real earnings management, conditional on the level of policy uncertainty. This inverse relationship suggested that firms tended to substitute towards supply chain real earnings management rather than accrual manipulation when economic policy uncertainty was elevated, likely reflecting the comparatively lower detection risk associated with relationship-based real earnings management that is embedded in ordinary commercial transactions.

5. Conclusions and Policy Recommendations

5.1 Conclusions

Against a backdrop of significant global economic disruption, China's economy has faced simultaneous pressures from decelerating growth, structural adjustment, and the unwinding of prior stimulus policies. As governments at various levels responded with wide-ranging counter-cyclical measures, the resulting policy flux reduced the predictability of the regulatory environment and complicated firm-level planning, creating conditions conducive to coordinated real earnings management within supply chains. Whilst most prior research concentrated on the effects of economic policy uncertainty on accrual-based earnings management, this study shifted attention to the less-examined consequences for real earnings management conducted through supply chain relationships, where the relational character of inter-firm ties in the Chinese market provides a distinctive institutional foundation for such behaviour. The analysis, based on Chinese A-share non-financial listed firms over 2008–2020, showed that rising economic policy uncertainty prompted firms to increase their supply chain real earnings management activity. Heterogeneity analyses indicated that this effect was stronger among firms with greater bargaining power and among those embedded in more concentrated supply chain structures, consistent with the theoretical mechanisms proposed. A supplementary test demonstrated that, under elevated uncertainty, real earnings management and accrual earnings management exhibited substitution effects—firms tended to shift towards the more opaque, relationship-based approach when policy uncertainty rose, consistent with a strategic preference for methods that are harder for auditors and regulators to detect. These findings also contribute to a growing body of research examining the effects of information environment, disclosure quality, and firm behaviour under economic policy uncertainty. They further complement the broader literature on financial market uncertainty and cross-asset spillover dynamics.

5.2 Policy Recommendations

China's persistent domestic structural imbalances and an increasingly complex international economic environment will continue to bear on the country's economic transformation in the years ahead. The evidence presented in this paper suggests that economic policy uncertainty distorts firms' reporting behaviour in systematic ways that are difficult to detect through conventional regulatory mechanisms, and that addressing this requires coordinated action across multiple policy domains. The findings of this study yield three practical implications for policy. First, the government and relevant authorities should invest in developing more systematic and evidence-based macroeconomic management tools, with particular attention to maintaining policy coherence and continuity across adjustment cycles. A key priority is to improve the foresight and forward-guidance dimensions of economic policy, so that firms are better able to form stable expectations about the regulatory environment. Clearer and more consistent policy signals would reduce the incentives for managers to engage in earnings manipulation as a defensive response to regulatory uncertainty, whilst also improving the quality of investment and financing decisions by reducing the uncertainty premium that firms must incorporate into their planning. Second, government bodies at all levels should strengthen direct communication with firms, especially small and medium-sized enterprises, and establish structured feedback mechanisms through which firms can convey their operational circumstances to policymakers. More effective consultation channels would improve the quality of policy design by ensuring that the experience and constraints of a broad range of firms are reflected in policy formulation, enabling more targeted intervention and reducing the distortions arising from poorly calibrated or insufficiently differentiated policy instruments. Such feedback mechanisms can also help ensure that regulatory

adjustments affecting supply chain transactions are well understood and implemented consistently across industries and regions. Third, as China continues to develop its supply chains, supervisory authorities should devote specific attention to regulating real earnings management conducted through relationship-based transactions. The current audit and disclosure framework was largely designed with accrual-based manipulation in mind and may be poorly suited to detecting real earnings management that is embedded in commercial negotiations with suppliers and customers. Authorities should formulate and refine standards governing the format, scope, and content of supply chain information disclosure, with particular emphasis on material transactions with major suppliers and customers that are likely to influence investment decisions. Enhanced and more granular disclosure requirements, especially for firms with highly concentrated supply chain relationships, would strengthen investor protection and improve the informational efficiency of the capital market (Duan et al., 2025; Li et al., 2026; Wang et al., 2026), thereby supporting the broader goal of transparent and fair capital market operation in China.

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