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External and Domestic Economic Policy Uncertainty in China's Export Dynamics: Evidence from Bilateral Panel Data

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Abstract: This paper examines how economic policy uncertainty (EPU) affects China's bilateral export performance, distinguishing between uncertainty originating in destination markets and China's domestic policy environment. Using a quarterly panel covering 2005–2024 for China's exports to 18 partner countries (excluding 2008–2009 and 2020–2021), we estimate two-way fixed-effects models with partner-country and time fixed effects and clustered standard errors. The baseline results indicate a trade-reducing effect of partner-country EPU: higher policy uncertainty in the importing economy is associated with lower Chinese exports, consistent with demand and risk channels. Domestic EPU is also negative, but less precisely estimated in the baseline, suggesting a weaker aggregate effect once destination-market conditions and macro controls are accounted for. Robustness checks and lag-based IV estimates support the stability of the core findings. Sectoral regressions reveal meaningful heterogeneity: partner-country EPU is most influential in textiles and machinery, while domestic EPU is detected primarily in metals/chemicals, highlighting that uncertainty effects depend on industry characteristics and exposure to demand postponement and investment delays.

Keywords: *Economic Policy Uncertainty, Foreign Trade, China's Export Trade.*

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I. INTRODUCTION

International trade is a multi-layered system that cannot be fully described by one independent theory, it is a complicated system of interactions between numerous countries and companies. In practice, cross-border trade is shaped by a broader set of determinants, including technological capabilities, institutional quality, logistics infrastructure, and the capacity of firms to plan and commit resources under uncertainty. Over the last two decades, EPU has emerged as a widely used measure capturing the extent to which households and businesses face ambiguity about the future direction of economic policy. Elevated level of economic policy uncertainty may affect trade through different channels. For example, it can postpone investment and market-entry decisions, weaken the formation of long-term supply contracts. These mechanisms are particularly relevant in modern trade, which is characterized by fragmented production networks and time-sensitive delivery, where even moderate shifts in perceived policy risk can disrupt exporter behavior and international demand.

As one of the world's largest exporting economies and a central node in global value chains, China's external performance is supposed to be sensitive not only to domestic economic conditions but also to fluctuations in economic policy among its' trading partners. Periods of heightened economic policy uncertainty, such as the global financial crisis, episodes of intensified trade-policy frictions, and the COVID-19 pandemic, have repeatedly altered expectations about market access, regulatory regimes, and macroeconomic prospects. For exporting firms, these episodes can translate into higher informational and compliance costs, greater volatility of foreign demand, and tighter credit conditions, all of which may compress export volumes or shift their composition across sectors. At the same time, uncertainty may operate asymmetrically across industries: capital-intensive and technologically complex exports may be more exposed to financing and investment delays, whereas more standardized goods may adjust primarily through price and quantity margins.

On this background, the present study provides an empirical assessment of how economic policy uncertainty influences China's export performance in a bilateral panel framework. The analysis links China's exports to both partner-country EPU and China-specific EPU, while controlling standard macroeconomic variables, offering the evidence on the role of policy-related uncertainty in shaping China's export dynamics and by highlighting whether the impact differs across sectors.

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II. LITERATURE REVIEW

➤ *EPU and Macroeconomic Activity*

A central mechanism linking EPU to real outcomes is the real-options channel: when investment involves sunk costs and partial irreversibility, higher uncertainty increases the option value of waiting and delays investment and hiring (Dixit and Pindyck, 1994; Bloom, 2009). Empirically, EPU shocks are associated with contractions in investment, employment, and industrial production across countries (Baker et al., 2016; Ahir et al., 2022). Chinese evidence similarly suggests that elevated domestic policy uncertainty is negatively related to growth and amplifies downside risks to macroeconomic performance, particularly in periods of stress (Huang and Luk, 2020; Li and Huang, 2021; Gu et al., 2021). These macroeconomic effects matter for exports because they affect both supply capacity (through investment, financing, and production planning) and demand conditions abroad.

Financial channels further reinforce these dynamics. Policy uncertainty can raise risk premia, widen credit spreads, and increase market volatility, thereby tightening financing conditions for firms engaged in trade and investment (Pastor and Veronesi, 2013; Gilchrist, Sim, and Zakrajšek, 2014). This is particularly relevant for export activity that depends on working capital, trade credit, and long production cycles.

➤ *EPU and International Trade*

A growing body of work treats uncertainty as an additional trade cost that reduces bilateral trade flows by weakening expectations about market access, regulatory regimes, and future tariffs. Theoretical and empirical studies emphasize that export participation and expansion often require irreversible commitments—distribution networks, certification, relationship-specific investments—so policy uncertainty can depress exports even without immediate policy changes (Bernanke, 1983; Bloom, 2009; Handley and Limão, 2017). Evidence from trade policy uncertainty around China's WTO accession demonstrates that reducing uncertainty promoted firm entry and product expansion in export markets, highlighting the importance of predictability for export dynamics (Handley and Limão, 2017). Related firm-level evidence shows that tariff-risk uncertainty affects both entry and exit decisions and is especially salient for firms near the export participation margin (Feng, Li, and Swenson, 2017; Crowley, Meng, and Song, 2018).

The literature also points to cross-border transmission through global value chains (GVCs). Uncertainty in importing economies can suppress demand, but it may also affect exporters through input channels: changes in trade policy uncertainty influence imports of intermediate and capital goods that underpin export capacity in fragmented production networks (Imbruno, 2019). Macro evidence using global network approaches further indicates that uncertainty shocks can propagate internationally and affect China's exports and industrial activity (Han et al., 2016; Tam, 2018). Sectoral studies underscore heterogeneity: uncertainty may have stronger effects in manufacturing segments that are investment- and contract-intensive, while responses in agriculture and commodities can be more mixed, reflecting essential demand, inventory behaviour, and price dynamics (Yu et al., 2023). Recent work also suggests that digitalisation and institutional capacity can moderate uncertainty-induced export vulnerability, implying that resilience varies across settings (Zhu and Ye, 2024).

III. DATA AND VARIABLES

➤ *Choosing of the Variables*

This study uses a quarterly bilateral panel for the period 2005–2024 covering China and 18 partner countries: Australia, Brazil, Canada, Chile, France, Germany, Greece, India, Ireland, Italy, Japan, Korea, Mexico, Spain, Sweden, the United Kingdom, and the United States. To mitigate the influence of extreme macroeconomic shocks and structural breaks, observations from 2008–2009 (global financial crisis) and 2020–2021 (COVID-19 period) are excluded from the baseline sample. All continuous variables are transformed using natural logarithms to reduce skewness and to allow coefficient estimates to be interpreted as elasticities; dummy variables are kept in levels.

The main dependent variable is ln_CN_EXP, defined as the value of China's exports to each partner country, measured in millions of U.S. dollars. This indicator captures China's bilateral export performance and serves as the benchmark outcome throughout the empirical analysis. To examine sectoral heterogeneity in the uncertainty–trade relationship, the paper additionally considers five sector-specific export measures: ln_MACHINE, ln_METACHEM, ln_TEXTILE, ln_ENERGY, and ln_AGRI. These variables enable an assessment of whether the effect of policy uncertainty varies across broadly defined export categories.

The key explanatory variables are ln_P_EPU and ln_CN_EPU, representing the economic policy uncertainty indices of the partner country and China, respectively. Distinguishing between partner-country and China-specific EPU allows the analysis to separate external sources of uncertainty that may affect foreign demand and market access from domestic uncertainty that may influence production, investment, and export supply decisions.

The control set captures standard macroeconomic and institutional determinants of bilateral exports. ln_CN_GDP and ln_P_GDP denote the nominal GDP of China and of the partner country, controlling for the economic size of the exporter and importer and, consequently, for potential supply and demand effects. Labor-market conditions are proxied by ln_CN_UNEMPL and ln_P_UNEMPL, the unemployment rates in China and in the partner economy, which capture cyclical fluctuations that may influence export capacity and import demand. Exchange-rate movements are accounted for by ln_EX_RATE, the (real) bilateral exchange rate between the Chinese yuan and the partner-country currency, reflecting changes in price competitiveness. Commodity-market conditions are proxied by ln_OIL_P, the global Brent crude oil price, which may affect trade costs through transportation and energy inputs.

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Institutional determinants of bilateral trade are captured by two dummy variables: RTA, indicating the presence of a regional trade agreement between China and the partner country, and WTO_MEMB, indicating whether both trading partners are members of the World Trade Organization. Finally, bilateral geographic trade costs are proxied by ln_DIST_PW, the population-weighted distance between major cities in China and the partner country. Definitions, measurement units, and data sources for all variables are reported in Table 1.

Table 1 The Summary of the Chosen Variables

Variable	Description	Source	Unit
$\ln\_CN\_EXP_{jt}$	China's export value to destination partner-country j at time t	International Trade Centre	USD, Bln.
$\ln\_P\_EPU_{jt}$	EPU index of the China's partner country j at time t	Baker, Bloom and Davis Data	Index
$\ln\_CN\_EPU_{t}$	China's EPU index at time t	Baker, Bloom and Davis Data	Index
$\ln\_P\_GDP_{jt}$	Nominal GDP of the China's partner country j at time t	International Monetary Fund	USD, Bln.
$\ln\_CN\_GDP_{t}$	Nominal GDP of China at time t	National Bureau of Statistics of China	USD, Bln.
$\ln\_CN\_UNEMPL_{t}$	Unemployment rate in China at time t	International Monetary Fund	Unit
$\ln\_P\_UNEMPL_{jt}$	Unemployment rate of China's partner country j at time t	International Monetary Fund	Unit
$\ln\_EX\_RATE_{jt}$	Exchange rate between China's Yuan and partner country's j currency in period t	International Monetary Fund	RMB
$\ln\_OIL\_P_{t}$	International oil prices per barrel at time t	International Monetary Fund	USD
RTA_{jt}	Dummy variable indicating the existence of RTA between China and partner country j in period t	World Trade Organization	Dummy
$WTOMEMB_{jt}$	Dummy variable indicating whether partner country j is a member of the WTO in period t	World Trade Organization	Dummy
$DISTPW_{jt}$	Population-weighted distance between most populated cities in China and destination country j	CEPII Gravity Database	Unit
$MACHINE_{jt}$	China's exports to partner country j in the machinery sector in period t	International Trade Centre	USD, Bln.
$METACHECM_{jt}$	China's exports to partner country j in the metal and chemical sector in period t	International Trade Centre	USD, Bln.
$TEXTILE_{jt}$	China's exports to partner country j in the textiles sector in period t	International Trade Centre	USD, Bln.
$ENERGY_{jt}$	China's exports to partner country j in the energy sector in period t	International Trade Centre	USD, Bln.
$AGRI_{jt}$	China's exports to partner country j in the agriculture sector in periodt	International Trade Centre	USD, Bln.

➢ *Descriptive Statistics*

To provide a rigorous overview of the empirical setting, it is important to report not only the central explanation of the variables but also their dispersion, as the latter conveys how stable the indicators are over time and how much heterogeneity exists across destination markets. The baseline dataset comprises 1,152 quarterly observations for China's bilateral exports to 18 partner countries over 2005–2024 (excluding 2008–2009 and 2020–2021). With the exception of the binary institutional variables (RTA and WTO_MEMB), all variables are expressed in natural logarithms, which mitigates skewness and allows coefficients in the main regressions to be interpreted as elasticities. Table 2 reports the corresponding descriptive statistics (means, standard deviations, and ranges), providing a compact summary of within-sample variability.

The principal dependent variable, ln_CN_EXP, has a mean of 2.02 and a standard deviation of 1.24, indicating substantial heterogeneity in China's bilateral export values across partners and over time. The relatively wide range (from −1.01 to 5.05) suggests that export performance varies markedly across destination markets, consistent with the coexistence of both highly integrated trade relationships and comparatively small or episodic export links. This dispersion is informative for the subsequent econometric analysis because it implies sufficient variation for identifying the effects of policy uncertainty and other determinants within a fixed-effects framework.

Turning to the key explanatory variables, the partner-country uncertainty index ln_P_EPU averages 4.85 (standard deviation 0.57), while China's domestic uncertainty index ln_CN_EPU averages 4.90 (standard deviation 0.64). The similarity in mean levels indicates that policy uncertainty is a persistent feature both domestically and in export destinations, whereas the moderate dispersion suggests meaningful cyclical

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and episodic movements that may translate into changes in trade outcomes. Importantly, the range of ln_P_EPU (from 2.87 to 6.89) is wider than that of ln_CN_EPU (from 3.71 to 6.10), implying that external uncertainty conditions faced by Chinese exporters can fluctuate more sharply across partner markets than domestic policy uncertainty fluctuates over time. This asymmetry is consistent with the notion that destination-specific policy environments represent an additional layer of risk faced by exporters, beyond domestic conditions.

The control variables exhibit distributional properties consistent with standard gravity-style trade settings. In particular, macroeconomic fundamentals (GDP and unemployment) display sufficient variation across partner countries and over time to capture differences in market size and cyclical conditions, while cost-related controls (the bilateral exchange rate and the global oil price) reflect movements in competitiveness and trade costs. Institutional and geographic factors also vary in an expected manner: regional trade agreements are present only for a subset of partner relationships, whereas WTO membership is nearly universal in the sample, and bilateral population weighted distance provides a stable proxy for non-economic trade factor. Overall, detailed summary statistics are reported in Table 2.

Table 2 Descriptive Statistics of the Variables

Variable	Obs	Mean	Std. dev.	Min	Max
ln_CN_EXP	1,152	2.0199	1.2350	-1.0093	5.0489
ln_P_EPU	1,152	4.8490	0.5742	2.8662	6.8914
ln_CN_EPU	1,152	4.9037	0.6417	3.7096	6.0970
ln_CN_GDP	1,152	7.7218	0.6430	6.2072	8.5564
ln_P_GDP	1,152	5.9391	1.0754	3.3395	8.9301
ln_CN_UNEMPL	1,152	1.5478	0.0666	1.4609	1.7192
ln_P_UNEMPL	1,152	1.9175	0.5739	0.7724	3.3393
ln_EX_RATE	1,152	0.2134	2.4215	-5.2747	2.7511
ln_OIL_P	1,152	4.3199	0.2944	3.5610	4.7743
RTA	1,152	0.1571	0.3641	0.0000	1.0000
WTO_MEMB	1,152	0.9826	0.1307	0.0000	1.0000
ln_DIST_PW	1,152	8.9155	0.6752	7.0536	9.8504
ln_CN_PMI	1,152	3.9388	0.0375	3.8726	4.0301
ln_MACHINE	1,152	1.3894	1.3857	-2.6470	4.3497
ln_METACHEM	1,152	-0.0634	1.3631	-4.1030	2.5713
ln_TEXTILE	1,152	0.0584	1.2081	-3.5636	2.7698
ln_ENERGY	1,152	-2.1342	2.8690	-13.1224	3.2175
ln_AGRI	1,152	-0.6978	1.5768	-5.1513	2.9079

Following the descriptive statistics, it is also important to assess whether multicollinearity among the explanatory variables may bias the estimation results. Table 3 presents the results of the variance inflation factor (VIF) test.

We can find out that all individual VIF values remain well below 5, and the mean VIF equals 2.14. These results indicate that the explanatory variables included in the model are not strongly correlated with each other, and therefore multicollinearity is unlikely to pose a problem for the subsequent regression analysis.

Table 3 Multicollinearity Test Results

Variable	VIF	1/VIF
ln_CN_EPU	4.66	0.2145
ln_CN_GDP	4.04	0.2477
ln_EX_RATE	2.55	0.3924
ln_CN_UNEMPL	2.41	0.4143
RTA	1.68	0.5935
ln_P_UNEMPL	1.61	0.6196
ln_DIST_PW	1.56	0.6397
ln_P_EPU	1.44	0.6967
ln_P_GDP	1.42	0.7052
ln_OIL_P	1.13	0.8886
WTO_MEMB	1.06	0.9465
Mean VIF	2.14	

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IV. RESEARCH METHODS

➤ *Model Setting*

In order to analyze the impact of the EPU on the export trade of China, this paper creates a baseline regression model with the following specification:

$$\text{ln\_CN\_EXP}_{jt} = \alpha + \beta_1 \text{ln\_}P\_EPU_{jt} + \beta_2 \text{ln\_}CN\_EPU_t + + \gamma' Z_{jt} + \mu_j + \delta_t + \varepsilon_{it} \quad (1)$$

Where: ln_CN_EXP_{jt} - export value from China to a destination partner-country «j» at time «t»; ln_P_EPU_{jt} - Partner's «j» EPU index value at time «t»; ln_CN_EPU_t – China's EPU index value at time «t»; Z_{it} - is a vector of control variables (see Table1), μ_i – country's fixed effects; δ_t - time fixed effects; ε_{it} – idiosyncratic error.

To assess model performance and ensure robustness, three standard panel-data specifications (Pooled OLS, Random Effects, and Fixed Effects) were constructed, and tests for the best estimator applied. The results for specification tests are introduced in the Table 4.

Table 4 Specification Tests' Results

Test	Null hypothesis (H0)	Test statistic	p-value	Decision ($\alpha = 0.05$)
Breusch–Pagan LM Test	No panel-level effects	$\chi^2(1) = 10305.58$	< 0.001	Reject H0, panel effects are significant (RE preferred to pooled OLS)
Hausman Test	Differences in coefficients are not systematic	$\chi^2(7) = 243.62$	< 0.001	Reject H0, prefer FE (RE is inconsistent)
Wooldridge Test	No first-order autocorrelation	$F(1, 17) = 173.280$	< 0.001	Reject H0, first-order autocorrelation is present
Modified Wald Test	Homoskedasticity across panels	$\chi^2(18) = 2173.79$	< 0.001	Reject H0, groupwise heteroskedasticity is present

Based on the formal specification tests reported above, several clear conclusions can be drawn regarding the appropriate panel estimator and inference strategy. First, the Breusch–Pagan Lagrange Multiplier test strongly rejects the null hypothesis of no panel-level effects ($\chi^2(1) = 10{,}305.58$, $p <0.001$), indicating that unobserved country-specific heterogeneity is statistically significant and that a pooled OLS specification would be inappropriate. Second, the Hausman test rejects the null hypothesis that differences between the fixed-effects and random-effects estimates are not systematic ($\chi^2(7) = 243.62$, $p <0.001$). This result implies that the random-effects estimator is inconsistent in this setting and supports the use of a fixed-effects framework.

Diagnostic tests further indicate departures from classical error assumptions. The Wooldridge test rejects the null hypothesis of no first-order serial correlation in the idiosyncratic errors ($F(1,17) = 173.280$, $p <0.001$), providing strong evidence of within-panel autocorrelation. In addition, the Modified Wald test rejects the null hypothesis of homoskedasticity across panels ($\chi^2(18) = 2{,}173.79$, $p < 0.001$), pointing to the presence of groupwise heteroskedasticity. Taken together, these findings motivate the adoption of a fixed-effects estimator with inference based on heteroskedasticity and autocorrelation-robust standard errors clustered at the partner-country level, ensuring consistent estimation and valid statistical inference in the presence of both serial correlation and cross-sectional heteroskedasticity.

➤ *Regression Results*

As mentioned earlier, baseline regression model, represented by the Equation 1, due to the presence of autocorrelation and heteroscedasticity in the variables, requires capturing model errors using robust errors clustered by country. The estimation results for this regression are presented in Figure 1. To be more precise, it presents the results from the Fixed Effects model with robust errors clustered by country.

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	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
ln_P_EPU	-0.0724	-0.0754	-0.0997	-0.104	-0.107*	-0.105	-0.122**	-0.123**	-0.123*	-0.117*	-0.136**
	(0.061)	(0.062)	(0.059)	(0.060)	(0.061)	(0.061)	(0.058)	(0.058)	(0.058)	(0.059)	(0.051)
ln_CN_EPU		0.0447**	-0.00235	0.0124	-0.0251	-0.0255	-0.0325*	-0.0325*	-0.0335*	-0.0367**	-0.0312*
		(0.019)	(0.017)	(0.019)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)
ln_CN_GDP			0.858***	0.655***	0.651***	0.639***	0.608***	0.589***	0.584***	0.568***	0.549***
			(0.083)	(0.085)	(0.085)	(0.083)	(0.080)	(0.079)	(0.078)	(0.076)	(0.070)
ln_P_GDP				0.616***	0.617***	0.537**	0.599**	0.593**	0.552**	0.571**	0.518**
				(0.140)	(0.140)	(0.226)	(0.221)	(0.222)	(0.230)	(0.236)	(0.208)
ln_CN_UNEMPL					1.006***	0.998***	1.082***	1.037***	1.046***	1.046***	1.075***
					(0.167)	(0.172)	(0.184)	(0.177)	(0.176)	(0.180)	(0.171)
ln_P_UNEMPL						-0.101	-0.0914	-0.0933	-0.117	-0.125	-0.236*
						(0.121)	(0.111)	(0.112)	(0.121)	(0.123)	(0.130)
ln_EX_RATE							-0.522***	-0.527***	-0.547***	-0.634***	-0.650***
							(0.165)	(0.166)	(0.168)	(0.174)	(0.144)
ln_OIL_P								0.118***	0.134***	0.140***	0.151***
								(0.037)	(0.039)	(0.039)	(0.038)
RTA									0.15	0.148	0.144
									(0.105)	(0.104)	(0.105)
WTO_MEMB										-0.227*	-0.006
										(0.109)	(0.104)
ln_DIST_PW											-50.23***
											(12.750)
Constant	1.306***	1.143***	-4.022***	-6.200***	-7.531***	-6.805***	-6.735***	-6.982***	-6.746***	-6.511***	441.6***
	(0.243)	(0.203)	(0.546)	(0.787)	(0.805)	(1.478)	(1.364)	(1.325)	(1.377)	(1.317)	(114.300)
R^2	0.78	0.78	0.805	0.843	0.844	0.846	0.862	0.862	0.864	0.866	0.885

Fig 1 Regression Results
Standard Errors in Parentheses: * p<0.10, ** p<0.05, *** p<0.01

Figure 1 reports a set of stepwise panel estimates, with the preferred specification presented in the column XI, where the full set of controls and year fixed effects are included and inference is based on robust standard errors clustered at the partner-country level. Across specifications, the explanatory power increases as additional covariates are introduced (within R^2 rises from 0.78 in the parsimonious models to 0.885 in the full model), indicating that conventional gravity-style determinants and macroeconomic controls account for a substantial share of variation in China's bilateral export flows.

Focusing on the variables of primary interest, partner-country economic policy uncertainty (ln_P_EPU) exhibits a negative and statistically significant association with China's exports in the baseline specification. In column XI, the coefficient equals −0.136 ($p<0.05$), implying that a 1% increase in a destination country's EPU is associated with an approximate 0.136% decrease in China's exports to that market, ceteris paribus. This result is economically intuitive: heightened policy uncertainty in the importing economy likely weakens demand and increases the perceived risk of cross-border transactions, thereby discouraging trade. By contrast, China's domestic EPU (ln_CN_EPU) is negative but weaker in statistical strength in the full model (−0.031, significant at the 10% level). The smaller magnitude and lower precision suggest that, conditional on partner-country uncertainty and standard macroeconomic controls, domestic uncertainty plays a more modest role in shaping aggregate export volumes, or that its effect is partly absorbed by other covariates and time effects. A 1% increase in a China's domestic EPU is associated with an approximate 0.031% decrease in its' exports to a destination partner-country.

The estimated coefficients on the controls are broadly consistent with expectations. Market-size variables are positive and highly significant: China's GDP (ln_CN_GDP) and partner-country GDP (ln_P_GDP) enter with coefficients of 0.549 and 0.518, respectively (both statistically significant), indicating that exports increase with both exporter capacity and importer demand. Labour-market conditions also matter: partner's unemployment (ln_P_UNEMPL) is negative and marginally significant (−0.236, $p < 0.10$), consistent with the notion that weaker conditions in destination markets suppress import demand. The exchange-rate variable (ln_EX_RATE) is negative and strongly significant (−0.650, $p < 0.01$), suggesting that movements captured by the exchange-rate measure are associated with a deterioration in China's export performance. The oil price (ln_OIL_P) is positive and significant (0.151, $p < 0.01$), which is consistent with oil prices proxying global activity and/or cost conditions relevant for trade. Institutional indicators (RTA and WTO_MEMB) are not statistically significant in the preferred specification, implying that—within this sample and conditional on fixed effects and macro controls—formal membership arrangements do not add explanatory power beyond other determinants. Finally, the coefficient on population-weighted distance (ln_DIST_PW) is negative and highly significant.

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V. ROBUSTNESS AND ENDOGENEITY TESTING

To assess the stability of the baseline findings, we perform two complementary robustness checks and compare them to the main two-way fixed-effects specification (MAIN). First, we re-estimate the model using PPML with the same set of fixed effects, which is widely used in the trade literature because it is more robust to heteroskedasticity and reduces sensitivity to distributional assumptions. Second, we apply winsorisation (WINS) to limit the influence of extreme observations and re-estimate the baseline specification. Across these alternative approaches, the qualitative conclusions remain largely unchanged, providing support for the robustness of the empirical relationship between policy uncertainty and China's export performance.

The results for the uncertainty variables are broadly consistent with the baseline model. Partner-country policy uncertainty (ln_P_EPU) retains a negative sign in all specifications and remains statistically significant in the baseline and winsorised estimates (MAIN: -0.136, $p < 0.05$; WINS: -0.137, $p < 0.05$). Under PPML, the coefficient remains negative but becomes statistically indistinguishable from zero. This pattern is informative rather than contradictory: PPML changes the weighting of observations and is less influenced by large trade flows, so a loss of statistical significance—while the sign remains stable—suggests that the adverse association between destination-market uncertainty and exports is not driven by a small number of outliers, but its precision depends on how the conditional mean is modelled. Overall, the evidence supports the interpretation that higher uncertainty in partner markets tends to depress China's exports, consistent with an uncertainty–demand and risk channel.

For China's domestic policy uncertainty (ln_CN_EPU), the coefficient is also consistently negative across specifications, although its statistical strength varies. The baseline estimate is negative and marginally significant (MAIN: -0.031, $p < 0.10$), while the PPML specification yields a larger and highly significant effect (PPML: -0.0568, $p < 0.01$). In the winsorised model, the coefficient remains negative but loses statistical significance. Taken together, these results indicate that the direction of the domestic uncertainty effect is stable, but the degree of precision is sensitive to the estimator and to how extreme observations are treated. A plausible interpretation is that domestic uncertainty operates through mechanisms—such as financing conditions, supply-chain disruptions, and investment timing—that may be captured more sharply in a conditional-mean framework like PPML, whereas trimming extremes attenuates the signal in the linear FE specification.

Finally, the robustness evidence is reinforced by the stepwise specification exercise shown in Figure 1. As controls are added sequentially—from a parsimonious model to the full specification—the estimated effects of ln_P_EPU and ln_CN_EPU remain negative and do not exhibit sign reversals or implausible instability. This suggests that the uncertainty coefficients are not an artefact of omitted-variable bias arising from standard macroeconomic determinants. The remaining covariates generally preserve their expected signs across estimators, indicating that the overall structure of the model is stable. In sum, the combined robustness checks support the central conclusion that policy uncertainty—particularly in destination markets—is systematically associated with weaker Chinese export performance, while the domestic uncertainty effect is directionally consistent but somewhat more sensitive to modelling choices.

Table 5 Robustness Testing

	MAIN	PPML	WINS
ln_P_EPU	-0.136**	-0.00320	-0.137**
	(0.0513)	(0.0296)	(0.0536)
ln_CN_EPU	-0.0312*	-0.0568***	-0.0301
	(0.0177)	(0.0125)	(0.0183)
ln_CN_GDP	0.549***	0.520***	0.548***
	(0.0696)	(0.0933)	(0.0685)
ln_P_GDP	0.518**	0.726***	0.495**
	(0.208)	(0.156)	(0.212)
ln_CN_UNEMPL	1.075***	0.904***	1.051***
	(0.171)	(0.166)	(0.179)
ln_P_UNEMPL	-0.236*	-0.0645	-0.243*
	(0.130)	(0.0690)	(0.131)
ln_EX_RATE	-0.650***	-0.755***	-0.651***
	(0.144)	(0.113)	(0.141)
ln_OIL_P	0.151***	0.0944***	0.153***
	(0.0380)	(0.0205)	(0.0390)
RTA	0.144	0.111*	0.167
	(0.105)	(0.0623)	(0.112)
WTO_MEMB	-0.00599	-0.216***	-0.00390
	(0.104)	(0.0839)	(0.103)
ln_DIST_PW	-50.23***	0	-50.48***
	(12.75)	(.)	(12.85)

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Constant	441.6***	-7.071***	444.0***
	(114.3)	(0.767)	(115.1)
TIME FIXED	YES	YES	YES
COUNTRY FIXED	YES	YES	YES
Observations	1152	1152	1152
R^2	0.885	0.828	0.882

Standard Errors in Parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$

To address potential reverse causality and omitted-variable concerns, the two key uncertainty regressors partner-country EPU (ln_P_EPU) and China's domestic EPU (ln_CN_EPU) were formally tested for endogeneity. The endogeneity tests do not provide evidence that either variable is endogenous in the baseline fixed-effects specification, suggesting that the MAIN estimates can be interpreted as not being driven by systematic correlation between these regressors and the unobserved error component. Nonetheless, as an additional safeguard, Table 6 reports instrumental-variables fixed-effects estimates in which each uncertainty measure is instrumented separately using its second lag (i.e., L2_lnP_EPU and L2_lnCN_EPU), while maintaining the same set of country and time fixed effects and clustered inference.

The results from IV 2SLS models are broadly consistent with the baseline in terms of direction. When ln_P_EPUis instrumented (column IV_P_EPU), its' coefficient remains negative and becomes larger in magnitude (-0.244, $p < 0.01$) relative to the baseline estimate (-0.136, $p < 0.05$). This implies a stronger adverse association between destination-market uncertainty and China's exports once the potentially endogenous component of ln P_EPUis purged via lag-based instrumentation. One interpretation is that the baseline estimate may be attenuated by measurement error or by contemporaneous feedback effects that bias the coefficient towards zero. Importantly, the sign stability reinforces the main conclusion: higher policy uncertainty in partner economies is associated with lower Chinese export volumes.

When ln_CN_EPU is instrumented (column IV_CN_EPU), the estimated effect of domestic uncertainty becomes more negative in magnitude (-0.189) and is marginally significant, compared with the smaller baseline coefficient (-0.031, $p < 0.10$). Although this estimate is less precisely measured, which is consistent with the wider standard error typically observed in IV settings, it suggests that domestic policy uncertainty may exert a stronger dampening effect on exports once endogeneity concerns are addressed using predetermined variation. Taken together, the two IV exercises therefore provide supportive evidence that the negative relationship between policy uncertainty and export performance is not an artefact of the baseline estimation strategy.

Overall, the endogeneity diagnostics suggest that ln_P_EPU and ln_CN_EPU can be treated as exogenous in the baseline fixed-effects framework. The lag-IV estimates in Table 6 should therefore be viewed as a robustness exercise: they preserve the negative sign of the uncertainty effects and imply that the baseline specification may understate the magnitude of the trade-reducing impact of policy uncertainty.

Table 6 Endogeneity Testing

	MAIN	**IV_P_EPU**	**IV_CN_EPU**
ln_P_EPU	-0.136** (0.0513)	-0.244*** (0.0819)	-0.109** (0.0487)
ln_CN_EPU	-0.0312* (0.0177)	-0.0145 (0.0257)	-0.189* (0.108)
ln_CN_GDP	0.549*** (0.0696)	0.550*** (0.0808)	0.514*** (0.0718)
ln_P_GDP	0.518** (0.208)	0.495*** (0.190)	0.489** (0.209)
ln_CN_UNEMPL	1.075*** (0.171)	1.526*** (0.189)	1.840*** (0.495)
ln_P_UNEMPL	-0.236* (0.130)	-0.227** (0.116)	-0.231* (0.119)
ln_EX_RATE	-0.650*** (0.144)	-0.631*** (0.121)	-0.612*** (0.140)
ln_OIL_P	0.151*** (0.0380)	0.158*** (0.0453)	0.126*** (0.0436)
RTA	0.144 (0.105)	0.131 (0.100)	0.133 (0.0905)
WTO_MEMB	-0.00599 (0.104)	0.0324 (0.0960)	-0.0185 (0.0974)
ln_DIST_PW	-50.23*** (12.75)	-50.35*** (12.12)	-47.29*** (12.12)

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	MAIN	IV_P_EPU	IV_CN_EPU
Constant	441.6*** (114.3)		
TIME FIXED	YES	YES	YES
COUNTRY FIXED	YES	YES	YES
R^2	0.885	0.413	0.440

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

VI. HETEROGENEITY ANALYSIS

This section examines whether the trade effects of economic policy uncertainty are heterogeneous across broad export sectors. The underlying premise is that uncertainty may not affect all product groups uniformly: sectors that rely more heavily on long-term contracting, complex supply chains, imported intermediates, and forward-looking investment decisions may be more exposed to policy-related risk than sectors characterised by more standardised goods or more stable demand conditions. To investigate this, the baseline specification is re-estimated separately for five sectoral export categories—AGRI, ENERGY, TEXTILE, METACHEM, and MACHINE—while maintaining the same set of partner-country fixed effects and time fixed effects.

Table 7 Impact of EPU on China's Import and Export

	AGRI	ENERGY	TEXTILE	METACHEM	MACHINE
ln_P_EPU	-0.00182	-0.0177	-0.191*	0.0173	-0.144**
	(0.0652)	(0.184)	(0.105)	(0.0788)	(0.0580)
ln_CN_EPU	0.0280	-0.149	-0.0455	-0.0575*	-0.0130
	(0.0520)	(0.129)	(0.0525)	(0.0279)	(0.0180)
ln_CN_GDP	0.407	-0.0507	0.735***	0.223	0.499***
	(0.270)	(0.274)	(0.146)	(0.129)	(0.0964)
ln_P_GDP	0.805***	1.002**	0.158	0.547*	0.694***
	(0.225)	(0.460)	(0.315)	(0.308)	(0.225)
ln_CN_UNEMPL	-0.00270	1.619	1.545***	0.590	0.892***
	(0.492)	(1.068)	(0.276)	(0.358)	(0.167)
ln_P_UNEMPL	0.0372	-0.0899	-0.0857	0.126	-0.188
	(0.118)	(0.250)	(0.111)	(0.126)	(0.117)
ln_EX_RATE	-0.639***	-0.812	-0.137	-0.408	-0.724***
	(0.157)	(0.505)	(0.298)	(0.248)	(0.178)
ln_OIL_P	0.0338	0.0496	0.246***	0.130	0.130***
	(0.115)	(0.217)	(0.0606)	(0.0839)	(0.0397)
RTA	-0.129	-0.186	-0.0696	-0.407**	0.123
	(0.131)	(0.246)	(0.119)	(0.185)	(0.107)
WTO_MEMB	-0.407***	0.493	-0.0122	-0.698***	0.257*
	(0.106)	(0.339)	(0.238)	(0.194)	(0.136)
ln_DIST_PW	-86.70***	-146.5***	-69.55**	-29.17	-33.41**
	(9.773)	(25.65)	(24.22)	(25.30)	(14.65)
Constant	764.3***	1295.6***	611.6**	253.8	290.4**
	(87.38)	(229.8)	(216.3)	(225.6)	(131.2)
TIME FIXED	YES	YES	YES	YES	YES
COUNTRY FIXED	YES	YES	YES	YES	YES
R^2	0.796	0.453	0.613	0.824	0.860

Standard Errors in Parentheses: * p<0.10, ** p<0.05, *** p<0.01

As we can see from the table above, two patterns emerge. First, the impact of partner-country policy uncertainty (ln_P_EPU) is concentrated in manufacturing-oriented sectors. The coefficient on ln_P_EPU is negative and statistically significant for TEXTILE (−0.191, $p < 0.10$) and MACHINE (−0.144, $p < 0.05$), whereas it is statistically insignificant for AGRI, ENERGY, and METACHEM. These results suggest that uncertainty in destination markets tends to depress Chinese exports particularly in sectors where demand is more discretionary, competition is intense, and purchase decisions can be postponed when policy conditions are unclear. In textiles, higher policy uncertainty may reduce consumer spending and retail orders, while for machinery and equipment it may delay investment projects and procurement by firms, both of which translate into weaker import demand. By contrast, agricultural and energy-related trade may be governed more by necessities, contractual arrangements, or price-driven dynamics that make quantities less responsive to short-run policy uncertainty in the importing economy.

Second, China's domestic policy uncertainty (ln_CN_EPU) shows more limited sectoral significance. A

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statistically significant negative effect is found only for METACHEM (−0.0575, $p < 0.10$), while estimates for AGRI, ENERGY, TEXTILE, and MACHINE are not statistically different from zero. This pattern is consistent with the idea that domestic uncertainty primarily affects exports through the supply side—via investment timing, production planning, and financing conditions—and that such channels may be more salient in chemicals and metals, where production is relatively capital- and input-intensive and where uncertainty can disrupt capacity utilisation and intermediate input sourcing. In other sectors, particularly where production networks are diversified or where exporters can adjust margins more flexibly, the domestic uncertainty signal may be absorbed by other macro controls and time effects, leaving the estimated coefficient imprecise.

Although the uncertainty coefficients vary in statistical significance across sectors, the broader results remain economically coherent. Across several specifications, standard macroeconomic determinants behave as expected: partner-country income (ln_P_GDP) is positive and significant in AGRI, ENERGY, METACHEM, and MACHINE, indicating that larger destination markets import more from China, while China's own GDP (ln_CN_GDP) is strongly positive in TEXTILE and MACHINE, consistent with exporter capacity effects. The exchange rate (ln_EX_RATE)—defined such that higher values reflect RMB depreciation—remains negative and significant in AGRI and MACHINE, reinforcing the interpretation from the aggregate model that depreciation may raise input costs for export production or coincide with adverse demand conditions that offset standard competitiveness effects. Distance is negative and significant in most sectors, capturing persistent trade frictions, though the magnitude should be interpreted cautiously in a fixed-effects framework.

Overall, the sectoral results indicate that the uncertainty–export relationship is not uniform. Destination-market policy uncertainty appears most relevant for textiles and machinery, consistent with demand postponement and investment-delay mechanisms, whereas domestic policy uncertainty is only weakly detected and is concentrated in metals and chemicals, plausibly reflecting supply-side constraints and sensitivity to domestic policy conditions. These findings support the view that policy uncertainty affects China's exports primarily through sector-specific channels, with stronger effects in industries that are more cyclical, contract-intensive, and dependent on forward-looking spending decisions in importing markets.

VII. CONCLUSION

This study set out to quantify how economic policy uncertainty shapes China's export dynamics in a bilateral panel setting, distinguishing between destination-market uncertainty and China's domestic uncertainty. Using quarterly data for 18 partner economies over 2005–2024 (excluding the global financial crisis and COVID-19 years), the preferred specification applies a two-way fixed-effects framework with inference robust to within-partner dependence.

The main empirical finding is that partner-country EPU is systematically associated with lower Chinese exports. In the baseline regression, the coefficient on partner EPU is negative and statistically significant, indicating that higher uncertainty in destination markets weakens China's export performance—consistent with an importer-side channel in which policy ambiguity depresses demand, increases perceived contractual and regulatory risks, and encourages postponement of purchases.

China's domestic EPU also enters with a negative sign, but the baseline estimate is smaller and less precisely measured, suggesting that—conditional on partner-market uncertainty, macro fundamentals, and time effects—domestic policy uncertainty plays a more modest role in explaining aggregate bilateral export fluctuations. Importantly, the uncertainty results are not driven by a particular estimation choice: alternative specifications (including PPML and winsorised regressions) preserve the overall sign patterns, and lag-based IV estimates deliver qualitatively consistent conclusions.

A second contribution of the paper is to document sectoral heterogeneity in the uncertainty–export relationship. The effect of destination-market EPU is concentrated in manufacturing-oriented sectors, where the estimates are negative and statistically significant for textiles and machinery, but not for agriculture, energy, or metals/chemicals. This pattern is consistent with the idea that uncertainty discourages trade most strongly in sectors where demand is more discretionary and where firms can delay investment and procurement decisions. By contrast, China's domestic EPU is only weakly detected at the sector level and appears most relevant for metals/chemicals, plausibly reflecting supply-side sensitivity in input- and capital-intensive production.

From a policy perspective, the findings imply that stabilizing and clarifying trade-relevant policy expectations—especially in destination markets—can matter for export resilience, with the strongest benefits likely in investment- and contract-intensive manufacturing segments. At the same time, the sectoral results caution against "one-size-fits-all" conclusions: uncertainty shocks do not translate into uniform trade responses, and the most exposed industries are those where market-entry and procurement decisions are easiest to postpone. Future research could extend the analysis by incorporating more granular product-level trade data, explicitly modelling third-country uncertainty spillovers, and differentiating between policy uncertainty and broader geopolitical risk.

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