

Tariff risks and stock market performance: Evidence from multivariable simultaneous quantile

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Abstract: This study investigates the asymmetric effects of tariff risk measured on both daily and monthly frequencies—on the technology and energy stock markets during the two presidential terms of Donald Trump (2017–2025). Using multivariable simultaneous quantile regression and data from 11 major economies spanning January 1, 2017 to May 30, 2025, the analysis offers new insights into how national markets differentially respond to trade policy uncertainty. Unlike previous research that primarily focuses on the U.S. or EU markets in isolation, this study takes a broader international perspective. The findings reveal that the impact of tariff risk tends to shift from negative in the lower quantiles of stock returns (poor-performing markets) to positive in the higher quantiles (strong-performing markets). This pattern suggests that trade policy uncertainty adversely affects technology and energy markets under bearish conditions but may present hedging opportunities during bullish periods. These results provide valuable implications for policymakers and investors seeking to understand the financial consequences of trade policy shocks across diverse market conditions.

Keywords: energy, simultaneous quantile, stock market, technology, Trump tariffs

1. INTRODUCTION

Effective trade policy supports global supply chains, investment, and economic growth. However, the U.S.-led tariff war under President Trump had significant economic impacts, including disrupted exports, reduced investment, and lower long-term GDP (Handley et al., 2025; York, 2025). While these macroeconomic effects are well studied, the financial market impacts especially those tied to trade policy uncertainty (TPU) remain underexplored. Existing research focuses largely on the U.S., overlooking how TPU affects global, industry-specific markets like technology and energy, which are highly exposed to supply chain and geopolitical risks. There is also limited evidence on how different countries' markets respond asymmetrically to tariff shocks. No study to date has examined cross-country responses in technology and energy sectors using high-frequency data and a simultaneous quantile regression approach. This study fills that gap by uncovering how tariff risk affects these sectors across 11 major economies, offering insights into their potential roles as hedging or diversification tools amid rising TPU.

2. METHODOLOGY AND RESULTS

Using data from January 1, 2017, to May 30, 2025, this study examines how technology and energy stock markets respond on both daily and monthly bases to tariff risks, measured by the U.S. Trade Policy Uncertainty Index (TPU_US) and the World Trade Uncertainty Index (WTUI). Our sample includes the global market and ten major economies across three regions: North America (Canada, U.S.), Europe (France, Sweden, UK), and Asia-Pacific (Australia, China, India, Japan, and Taiwan). We apply the multivariable simultaneous quantile regression approach (Das & Ghosal, 2017; Yang & Tokdar, 2017), which allows us to explore how tariff risks affect the entire distribution of stock returns, rather than just the average. This method improves upon traditional regressions by capturing heterogeneous effects across varying market conditions and levels of volatility. Preliminary tests, including skewness, kurtosis, and the Jarque-Bera test, indicate that most return series are approximately normally distributed. Both the Augmented Dickey-Fuller and Phillips-Perron tests confirm stationarity in the data, validating the use of quantile regression. Following best practice, we adopt a bandwidth of $h = 0.05$, which balances variance and bias in the estimates (Sim & Zhou, 2015; Bossman et al., 2023). Quantiles are evaluated at $\tau = \{0.05, 0.10, \dots, 0.90, 0.95\}$, allowing us to assess responses across the full spectrum of market returns.

The multivariable simultaneous quantile regression model is specified in Equation (1).

$$Y_t^\tau = \beta^\tau(X_t) + \varepsilon_t^\tau \quad (1)$$

where: Y_t denotes the return on a given technology or energy market index at period t ; X_t denotes any of risks including Tariff risk (TPU_US for daily, WTUI for monthly), energy risk (WTI future and OVX for daily, EUI for monthly), market sentiment (VIX), geopolitical risk (GPR), and economic policy risk (EPU) at period t ; τ is the τ^{th} quantile of the conditional return distribution of a given market index; $\beta^\tau(\cdot)$ is the estimated coefficient between the observed values of Y_t and X_t ; and ε_t^τ is the τ^{th} quantile residue with a zero quantile.

Table 1 presents the effects of trade uncertainty on technology and energy markets at both daily and monthly frequencies. At the daily level, technology and energy markets show varied responses to trade uncertainty. In the lower quantiles (below 0.50), most markets in both sectors experience negative impacts, indicating that trade risk tends to worsen returns during weaker market conditions. In contrast, in the higher quantiles (above 0.50), positive effects are observed across many technology and energy markets. Notable exceptions include France, India, and Sweden, where trade uncertainty has no significant impact on technology markets, and Japan, where no significant effect is found on the energy market. At the monthly level, results differ. Technology markets in the global market, Canada, China, France, Taiwan, and the U.S. show no significant response to U.S. trade policy uncertainty across all quantiles. Similarly, for energy markets, no significant impacts are observed in Australia, Canada, France, the UK, and the U.S., regardless of the quantile level.

Table 1 Impacts of Trade Uncertainty on Technology and Energy Markets (Daily and Monthly)

Panel A: Technology Markets													Panel B: Energy Markets												
tpu: us, daily													tpu: us, monthly												
tau	Global	AU	CA	CH	FR	IN	JP	SW	TA	UK	US		tau	Global	AU	CA	CH	FR	IN	JP	SW	TA	UK	US	
0.05	-0.149*	-0.353	-0.444***	-0.315**	-0.287*	-0.149	-0.157	-0.284**	-0.24***	-0.183	-0.15*		0.05	-0.088	-156.136	18.954	-47.393	11.539	-17.443	44.214	4.607	51.457	-3.492**	6.604	
0.10	-0.041	-0.167	-0.333***	-0.252**	-0.166*	-0.134**	-0.157**	-0.135**	-0.168**	-0.007	-0.042		0.10	0.086	39.895	13.795	-49.032	23.675	-14.341	39.864	23.767	19.358	-2.092	3.149	
0.15	-0.060	-0.171**	-0.287***	-0.146**	-0.105	-0.092***	-0.106	-0.133***	-0.101***	0.030	-0.065		0.15	-0.076	29.367	19.460	9.976	26.30	-9.464	30.514	24.228	32.869	-0.486	2.074	
0.20	-0.061*	-0.135**	-0.232***	-0.160**	-0.067	-0.103***	-0.075	-0.098**	-0.093**	0.018	-0.058*		0.20	-0.079	64.719**	19.404	24.228	3.459	-11.750	27.148*	21.596	-33.437	-0.659**	8.117	
0.25	-0.078***	-0.113***	-0.199***	-0.077	-0.074	-0.049	-0.068	-0.056	-0.094*	0.002	-0.071**		0.25	-0.424	44.520	14.263	17.572	0.851	-20.333	23.606***	11.325	-3.972	-0.669*	7.704	
0.30	-0.043	-0.076	-0.146***	-0.072	-0.068	-0.044	-0.035	-0.053*	-0.062	-0.020	-0.058*		0.30	-0.268	49.312*	9.931	21.572	-0.027	-30.513	15.793*	10.781	-20.681	-0.572	6.399	
0.35	-0.021	-0.024	-0.095***	-0.041	-0.065	-0.044	-0.034	-0.040	-0.037	-0.035	-0.029		0.35	-0.247	24.175	8.766	20.707	6.078	-29.639	28.89***	27.511	19.041	-0.380	5.010	
0.40	-0.003	0.000	-0.083***	-0.033	-0.037	-0.034	-0.043	-0.035	-0.013	-0.014	-0.010		0.40	-0.141	21.553	7.859	12.655	1.846	-22.190	28.57***	14.324	19.736	-0.291	4.223	
0.45	0.011	0.004	-0.064**	0.020	-0.015	-0.022	-0.021	-0.014	0.017	-0.013	0.009		0.45	-0.101	18.248	3.475	9.978	14.342	-47.731**	14.403*	16.114	21.889	-0.417	3.334	
0.50	0.010	0.009	-0.040	0.045	0.001	-0.027	-0.035	0.006	0.045	-0.025	0.017		0.50	-0.018	6.407	2.703	1.902	18.747	-42.092*	15.016	13.301	26.073	-0.004	0.746	
0.55	0.014	0.012	0.007	0.068	0.011	-0.012	-0.001	0.022	0.047	-0.027	0.013		0.55	0.005	7.184	5.498	17.252	8.569	-45.791*	14.694	14.16	19.573	-0.026	-2.265	
0.60	0.024	0.024	0.061	0.085**	0.037	0.013	0.024	0.022	0.081**	-0.038	0.037		0.60	0.062	6.218	7.682	-8.455	8.683	-21.211	9.920	8.745	14.716	-0.043	0.943	
0.65	0.042*	0.006	0.093*	0.117**	0.038	0.015	-0.005	0.010	0.104**	-0.037	0.040		0.65	0.062	-15.177	8.045	7.133	4.823	-23.237	8.660	9.924	11.709	0.046	0.710	
0.70	0.061***	0.009	0.113**	0.137**	-0.003	0.033	0.020	-0.014	0.147***	-0.015	0.054**		0.70	-0.008	-8.672	6.089	5.622	24.268	-5.301	6.533	5.339	12.508	0.359	-0.258	
0.75	0.084**	0.057	0.129**	0.176**	-0.017	0.034	0.046	-0.040	0.156***	0.043	0.096***		0.75	-0.061	-0.760	3.842	-1.033	18.328	-10.295	1.562	12.650	10.663	0.436	-1.202	
0.80	0.105***	0.095	0.173***	0.27***	0.004	0.040	0.046	-0.035	0.194***	0.058	0.129***		0.80	0.052	63.533	5.158	-5.541	24.790	-17.683	-0.056	9.170	6.448	0.399	-2.732	
0.85	0.12***	0.165**	0.280***	0.353***	0.037	0.038	0.081	-0.001	0.239***	0.088**	0.158***		0.85	-0.202	-1.343	-4.645	10.506	23.703	-18.997	-15.676	-24.011	10.437	0.273	-4.086	
0.90	0.136***	0.31***	0.362***	0.342***	0.035	0.035	0.155**	-0.017	0.333***	0.116**	0.222***		0.90	-0.449	26.209	12.366	1.137	12.282	-23.378	-15.307	-39.243*	-0.829	0.266	-1.566	
0.95	0.199**	0.493**	0.466***	0.372**	0.142	0.031	0.229***	0.073	0.324***	0.144	0.255***		0.95	-0.279	20.466	-4.204	2.457	1.429	-32.092	-35.787***	-37.177**	-14.806	1.154	-1.865	

Note: The τ^{th} quantiles are under the tau columns. ***, **, and * represent the statistical significance levels of 1%, 5%, and 10%, respectively. AU Australia CA Canada CH China FR France IN India JP Japan SW Sweden TA Taiwan UK the United Kingdom US the United States.

3. CONCLUSIONS

The results indicate that the daily impacts of trade risk on technology and energy markets shift from negative effects in lower return quantiles to positive effects in higher return quantiles across most markets. This pattern suggests that TPU tends to harm these sectors during periods of market stress but may offer hedging opportunities in stronger, bull-market conditions. In contrast, the monthly results reveal the presence of markets that appear unaffected by TPU. Specifically, the technology and energy markets in Canada, France, and the U.S. show no significant monthly responses to trade risk, implying that the longer-term or spillover effects of tariff-related uncertainty in these economies may be limited compared to the more immediate daily impacts. Future research could expand the scope by exploring the effects of tariff and trade risks on other key industries such as automotive, pharmaceuticals, and agriculture. Incorporating firm-level data would also allow for micro-level insights into risk exposure, considering factors such as firm size, trade intensity, and market share. In addition, future studies could examine the long-term consequences of TPU, particularly its role in reshaping global supply chains and influencing capital allocation decisions across sectors and regions.

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