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Research on the Dynamic Interrelationship between Economic Policy Uncertainty and Stock Market Returns

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Abstract: This paper employs the Panel Vector Autoregression (PVAR) method to examine the dynamic interrelationship between Economic Policy Uncertainty (EPU) and stock market returns. The existing literature has not reached a consensus on the relationship between EPU and stock market returns, and there is a lack of comparative analysis of domestic and foreign EPU. Therefore, this paper is the first to incorporate domestic and foreign EPU, stock market returns, and output into a unified framework, considering the dual impact of domestic and foreign EPU shocks. Additionally, the generalizability of the results is ensured by including a large sample of nine emerging and eleven advanced economies. The main findings are as follows: First, a positive shock to foreign EPU leads to a decline in stock market returns and is stronger than the impact of domestic EPU. Second, a positive shock to stock market returns reduces both domestic and foreign EPU. Third, a rise in stock market returns promotes domestic output growth, while increases in domestic and foreign EPU suppress domestic output growth. Finally, the United States is a net exporter of EPU rather than a net importer.

Keywords: stock market returns; Economic Policy Uncertainty; panel VAR

JEL Classification: C32; E44; E60; G10

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1. Introduction

Economic Policy Uncertainty (EPU) refers to unpredictable factors related to future policy changes in macroeconomics, society, and politics. EPU increases primarily due to economic reforms, political changes, and various social and economic emergencies, profoundly impacting both national and global economies and finances. The 2008 global financial crisis significantly impacted economies worldwide, manifesting in stock market plummets, increased unemployment, sluggish demand, and sharp export declines. In response to this crisis, various countries implemented a series of stimulus measures. For instance, the United States adopted a quantitative easing monetary policy, while China introduced a four trillion CNY stimulus plan to promote economic recovery (Varma and Kapoor 2009). On the one hand, the implementation of these policies reduced the losses caused by the crisis; on the other hand, it aggravated financial market instability, leading to an increase in the EPU of various countries. Following the crisis, the global economic and financial landscape grew increasingly severe and complex, marked by uncertain events such as the European sovereign debt crisis (2009), the European immigration crisis (2015), the Brexit referendum (2016), and the China–United States trade war (2018). Furthermore, in response to the COVID-19 pandemic in 2020, countries quickly adopted proactive monetary and loose fiscal policies to provide market liquidity and avoid a Great Depression. However, these measures posed challenges to financial governance and exacerbated the uncertainty of economic policies.

EPU has a significant impact on macroeconomic fundamentals (Gilchrist et al. 2014; Handley and Limao 2015; Caggiano et al. 2017; Nowzohour and Stracca 2020). Prüser and

Schlösser (2020) used the Time-Varying Parameter Factor-Augmented Vector Autoregression (TVP-FAVAR) method to study the effects of EPU on macroeconomic variables. They found that although heterogeneity in the Impulse Response Function (IRF) results across different countries, an increase in EPU generally leads to declines in GDP, investment, and consumption, along with a rise in unemployment rates. Additionally, as a barometer of the economy, the stock market typically signals changes in economic conditions through its fluctuations. Stock prices reflect investors' expectations of future economic policy trends and confidence in economic fundamentals. Therefore, examining the relationship between EPU and the stock market helps to understand the impact of policy uncertainty on market behavior and economic stability. With the increasing occurrence of socio-economic shocks in recent years, numerous studies have demonstrated the significant influence of EPU on the stock market (Tsai 2017; Phan et al. 2018; Xu et al. 2021). For instance, Li et al. (2023) indicated that institutional changes within EPU significantly affect stock market volatility. Furthermore, Youssef et al. (2021) found that EPU had a significant positive impact on the dynamic connectedness of stock markets during the COVID-19 pandemic.

Many research results show that EPU has a negative correlation with the stock market. For instance, Arouri et al. (2016) employed the Markov switching approach to study the impact of EPU on the US stock market from 1900 to 2014. Their results indicated that increases in the EPU significantly reduce stock market returns, especially during periods of extreme volatility. Similarly, Guo et al. (2018) used the quantile regression method to examine the dependence structure between EPU and stock market returns in BRIC and G7 countries. Their findings show that, except for France and the United Kingdom, other countries support the conclusion that a rise in EPU will reduce stock market returns. Moreover, Kannadhasan and Das (2020) used a quantile regression method and found that EPU was negatively correlated with emerging Asian stock markets at all quantiles. Additionally, based on a large sample of China's A-share market, Luo and Zhang (2020) found that an increase in EPU significantly leads to stock price crash risk.

However, some studies suggest that EPU may lead to higher stock prices. In a high-EPU environment, the future is unpredictable, prompting investors to seek higher risk premiums as compensation, which can drive up stock prices (Brogaard and Detzel 2015). Through a general equilibrium model, Pástor and Veronesi (2013) found that EPU acts as compensation for stock risk premiums during economic downturns. The higher the economic uncertainty, the higher the stock risk premiums. Additionally, some research indicates that the impact of EPU on the stock market may not be significant. Wu et al. (2016) analyzed the relationship between EPU and the stock market across nine countries from 2003 to 2014 using a panel Granger causality test. Their results indicated that the relationship between EPU and the stock market is not consistent across all countries and that stock market declines following policy changes are not always validated.

What needs attention is that the stock market's performance will also impact the EPU. This is because policymakers sometimes have to change economic policies in response to skyrocketing or plummeting stock markets. Consequently, the more significant the volatility of the stock market, the higher the EPU (Antonakakis et al. 2013). Using the Bootstrap rolling window method, Li et al. (2016) found a two-way causal relationship between EPU and stock market returns in India and China during a specific period. Similarly, Yang and Jiang (2016) showed that there is a negative two-way spillover effect between EPU and the stock market based on structural VAR and DCC-MGARCH models.

In addition, in the environment of global financial integration, trade and financial ties between countries have become increasingly close, which has caused EPU to have a mutual spillover effect worldwide. As the saying goes, 'When the United States sneezes, the whole world catches a cold'. Because the United States is the world's largest economy, the impact of its development extends far beyond its borders. Therefore, when the United States Economic Policy Uncertainty (US EPU) increases, it may lead to a significant negative impact on the global economy (Kose et al. 2017). For instance, Sum (2013) used the VAR model to examine the relationship between the US EPU and the five ASEAN stock markets.

The empirical results showed that the US EPU shock has a direct negative impact on returns in these markets. Similarly, Dakhlaoui and Aloui (2016) adopted the rolling method to implement the cross-correlation function to study the volatility spillover dynamics between the US EPU and the BRIC stock markets. They found that the average return spillover between the US EPU and the BRIC stock price indices is negative, and the volatility spillover oscillates between positive and negative values. Additionally, using stochastic search specification selection (SSSS) to estimate the panel VAR model, Christou et al. (2017) studied the impact of the US EPU on stock market returns in six Pacific Rim countries. Their results showed a significant negative correlation between the US EPU shock and stock market returns in other countries except Australia. However, some studies have found that US EPU has a limited influence on the stock markets of other countries in the long run (Momin and Masih 2015).

In summary, scholars have extensively studied the relationship between EPU and stock market returns. However, several disagreements and gaps require further exploration. Firstly, the relationship between EPU and stock market returns remains inconclusive. Secondly, while a few studies have examined the impact of stock market performance on EPU, this area is still under-researched. Moreover, although the existing literature considers the influence of foreign EPU, it has not yet integrated domestic and foreign EPU into a unified framework for comparative analysis. Therefore, this paper aims to address these gaps. Additionally, the current literature is limited in sample selection, involving few countries and small sample sizes, which hinders the generalizability and representativeness of the results. To overcome this problem, we select nine emerging economies and eleven advanced economies to reflect the varying responses to EPU shocks across different levels of economic development. Emerging and advanced economies differ in economic structure, market maturity, and policy responsiveness. Comparing their results helps to understand the mechanisms through which EPU affects stock market returns more comprehensively. This sample selection overcomes the limitations of single-country or regional studies, providing a broader perspective and higher reliability in revealing the dynamic relationship between EPU and stock market returns.

This paper selects nine emerging economies and eleven advanced economies as the research subjects and uses the PVAR method to investigate the dynamic interrelationship between EPU and stock market returns. Specifically, this paper explores the following key questions: First, how does an increase in EPU affect stock market returns? Second, how do stock market returns, in turn, influence EPU? Third, what is the impact of EPU and stock market returns on economic output? Additionally, this study explores whether domestic and foreign EPU shocks have different effects and whether these effects significantly differ between emerging and advanced economies.

The main contributions of this study are reflected in three aspects. First, it is the first to integrate domestic and foreign EPU, stock market returns, and economic output into a unified analytical framework, examining their dynamic interrelationships. Second, the sample size of this paper is substantial, studying nine emerging economies and eleven advanced economies within a panel framework and covering more turbulent periods of EPU. Finally, this paper considers the dual-layer impact of domestic and foreign EPU shocks, allowing for examining the spillover effects of international uncertainty.

The rest of this paper is organized as follows: Section 2 introduces the data and methodology. Section 3 discusses the empirical results, and key findings are summarized in Section 4.

2. Data and Methodology

2.1. Data

This study selects 9 emerging economies and 11 advanced economies along with their major stock indices, as shown in Table 1. Previous research has primarily focused on emerging economies such as Asia (Kannadhasan and Das 2020; Muzaffar and Malik 2024). In contrast, this study provides a more representative analytical framework by

encompassing a diverse sample across different geographical regions and levels of economic development. Specifically, important emerging markets in Latin America include Brazil, Chile, Mexico, and Colombia, which often face high Economic Policy Uncertainty. As typical representatives of economic growth in Asia, China and India's policy changes have a dramatic impact on the global market. Russia and Croatia add to the diversity of emerging European markets. Although South Korea is typically considered an advanced country, it is categorized as an emerging economy in this study due to its rapidly developing economic characteristics and high policy volatility.

Table 1. List of countries and major stock indices.

Panel A: Emerging Economies		**Panel B: Advanced Economies**	
Brazil	Bovespa	Belgium	BEL 20
Chile	S&P CLX IPSA	Canada	S&P_TSX Composition
China	Shanghai Composite	France	CAC 40
Colombia	FTSE Colombia	Germany	DAX 30
Croatia	CROBEX	Greece	Athens General Composite
India	BSE Sensex 30	Ireland	ISEQ Overall
Mexico	IPC MEXICO	Italy	FTSE MIB
Russia	MOEX	Japan	Nikkei 225
South Korea	KOSPI	Singapore	FTSE Singapore
		Spain	IBEX 35
		UK	FTSE 100

Notes: The classification of emerging and advanced economies is based on the IMF's World Economic Outlook report for 2023.

Regarding advanced economies, Belgium, France, Germany, Greece, Ireland, Italy, and Spain represent major economies in the Eurozone, ensuring broad coverage within the EU. Canada and the United Kingdom, as key economies in North America and Europe, exhibit strong policy stability and market maturity. Japan and Singapore are typical representatives of advanced economies in Asia, with policy changes significantly affecting regional and global markets. This study uses monthly data from January 2003 to May 2022 for empirical analysis. The selection of this sample period is based not only on data availability to ensure a balanced panel structure but also on the inclusion of turbulent phases that may increase EPU[1].

The empirical model includes four variables: stock market return (SR), domestic EPU (DEPU), foreign EPU (US_EPU), and domestic output (IPI). This paper uses the monthly closing prices of major stock indexes in various countries to calculate stock market returns. Stock price indexes are sourced from the Investing website (www.investing.com) and Yahoo Finance. The domestic and foreign EPU data come from the Economic Policy Uncertainty database[2]. Baker et al. (2016) proposed an EPU index based on keyword searches of newspaper text. Periods of rapid index increases often coincide with crises or major policy introductions, demonstrating the index's effectiveness. The index has been endorsed by Reuters and adopted by data providers like FRED, Bloomberg, and others to meet the needs of banks, hedge funds, and policymakers.

The US EPU is used as a proxy for foreign EPU because it is a benchmark for international Economic Policy Uncertainty (Das and Kumar 2018). Davis (2016) provides a measure of global Economic Policy Uncertainty (GEPU), which is the GDP-weighted average of the domestic EPU of 21 emerging and advanced countries. Although GEPU may offer additional information beyond US_EPU, its main flaw is the inclusion of each country's EPU (Abid and Rault 2021). Therefore, GEPU is used as a proxy for foreign EPU in the robustness test. Because monthly GDP data are unavailable, this paper uses the industrial production index from the CSMAR and OECD databases as a proxy for domestic output. By taking the logarithm of all original data, potential heteroscedasticity and dimensionality differences between the series are corrected. The variable is then differenced and multiplied

by 100 to analyze domestic EPU, foreign EPU, domestic output growth rate, and stock market returns.

2.2. Methodology

This study employs the PVAR model to examine the dynamic endogenous relationships between variables (SR, DEPU, US_EPU, IPI) in emerging and advanced economies. The choice of the PVAR model for this research is based on several reasons. First, the PVAR model accounts for unobservable heterogeneity among individuals. By introducing individual fixed effects, it can capture the unique characteristics of each country. Second, the PVAR model allows for the endogeneity of all variables, addressing the limitations of conventional VAR models in handling panel data. Additionally, the PVAR model can analyze data from multiple countries within a unified framework, overcoming the constraint of small sample sizes. Compared with other econometric models, PVAR offers advantages in dealing with dynamic panel data and endogeneity issues, and it can reflect the dynamic interrelationships across both time and individual dimensions. Therefore, the PVAR model is more suitable for the needs of this study.

Because the panel fixed effects specific to the dependent variable are related to the independent variables, the PVAR model has dynamic interdependence and cross-sectional heterogeneity problems. There will be biases if the ordinary least squares (OLSs) estimation is used (Judson and Owen 1999). To solve this problem, the Generalized Method of Moments (GMMs) can be used to estimate the PVAR model (Alvarez and Arellano 2003). Abrigo and Love (2016) use a weighting matrix to prove that the GMM estimator is a consistent estimate of the panel VAR equation, and they also verify the efficiency of the GMM in estimating panel VAR. Therefore, this paper uses the method of Abrigo and Love (2016) under the GMM framework to establish an m-variable homogeneous PVAR model with panel-specific fixed effects. It is defined as follows:

$$Y_{it} = \mu_i + \Phi_1 Y_{i,t-1} + \Phi_2 Y_{i,t-2} + \ldots + \Phi_p Y_{i,t-p} + \varepsilon_{it} \quad (1)$$

where the subscript $i = (1, 2, \ldots, N)$ represents N sample countries, $t = (1,\ 2,\ \ldots,\ T)$ denotes the time sample interval length, and p refers to the lag order. μ_i is a $(1 \times m)$ vector that acts as both the intercept term and the country-specific fixed effects. Y_{it} is a $(1 \times m)$ vector of endogenous variables, including SR, EPU, US_EPU, and IPI. The $\Phi_1,\ \ldots,\ \Phi_p$ are $(m \times m)$ coefficient matrices. ε_{it} is a random disturbance term that denotes a standard white noise process.

3. Empirical Results

Table 2 shows the descriptive statistics of emerging and advanced economies. The mean and variance of stock market returns in emerging economies are higher than those in advanced economies, indicating that the high returns of emerging economies' stock markets are accompanied by instability. The domestic EPU of advanced economies is lower than that of emerging economies and similar to the foreign EPU, which shows that advanced economies have a more robust economic and political system than emerging economies. The domestic output of emerging economies is much higher than that of advanced economies, reflecting that the focus of the world economy is gradually shifting to emerging economies. In summary, the results of all variables are more in line with reality.

Table 2. Descriptive statistics.

Variables	Mean	sd	Min	Max
Panel A: emerging economies				
SR	0.806	6.521	−40.512	29.676
DEPU	0.379	42.326	−256.406	274.269
IPI	0.182	4.510	−77.490	51.305
US_EPU	0.163	28.548	−91.889	107.653
Panel B: advanced economies				
SR	0.278	5.808	−32.673	25.620
DEPU	0.144	32.608	−171.634	204.015
IPI	0.055	3.778	−32.994	36.879
US_EPU	0.163	28.548	−91.889	107.653

Notes: SR, DEPU, and IPI are panel data, while US_EPU is time series data.

Before estimating the PVAR model, this paper conducts the Pesaran (2004) cross-sectional dependence test to examine the cross-sectional correlation of each variable. Table 3 shows that the *p*-values of all variables are close to zero, strongly rejecting the null hypothesis of cross-sectional independence and indicating significant cross-sectional correlation among all variables. First-generation panel unit root tests assume cross-sectional independence among panel units (Im et al. 2003). Cross-sectional correlation inflates the test statistics, leading to frequent rejection of the null hypothesis of unit roots and increasing the probability of Type I errors (false positives). Therefore, this paper abandons first-generation panel unit root tests in favor of Pesaran's (2007) second-generation panel unit root test. The second-generation test explicitly accounts for cross-sectional dependence by incorporating common factors or allowing correlations among units, thus providing more reliable results under the assumption of cross-sectional dependence.

Table 3. Cross-sectional dependence test.

Variables	CD Test	*p*-Value
Panel A: emerging economies		
SR	27.908 ***	0.000
DEPU	10.741 ***	0.000
IPI	6.398 ***	0.000
Panel B: advanced economies		
SR	70.155 ***	0.000
DEPU	20.355 ***	0.000
IPI	37.740 ***	0.000

Notes: *** indicates statistical significance at 1% level.

Table 4 presents the statistical results of the second-generation panel unit root test. Regardless of whether a constant term or both a constant term and a trend term are included in the model, the *p*-values for variables from emerging and advanced economies are close to zero. Consequently, the null hypothesis of the panel unit root is strongly rejected, indicating that the panel is a stationary process. For the time series data US_EPU and GEPU, the Augmented Dickey–Fuller (ADF) test is used to examine the presence of unit roots. As shown in Panel C, the null hypothesis of unit roots is strongly rejected at the 1% significance level for both US_EPU and GEPU, indicating they are stationary time series. Thus, all variables are stationary, meeting the fundamental requirements for establishing a PVAR model.

To determine the optimal lag order for the PVAR model, we use the Coefficient of Determination (CD) and the Moment Model Selection Criterion (MMSC). Andrews (1999) proposes MMSC based on Hansen's (1982) over-identification restricted J statistic and modifies three key information criteria: the Modified Akaike Information Criterion (MAIC), the Modified Bayesian Information Criterion (MBIC), and the Modified Quasi-likelihood

Information Criterion (MQIC). Panel A of Table 5 shows that both MBIC and MQIC select a first-order lag, while MAIC selects a third-order lag. Consequently, based on the results from most criteria, we establish a PVAR(1) model for emerging economies. Panel B indicates that MAIC, MBIC, and MQIC all select a first-order lag, so the PVAR(1) model is established for advanced economies.

Table 4. Unit root tests.

Variables	Constant		Constant and Trend	
	Statistic	*p* Value	Statistic	*p* Value
Panel A: emerging economies				
SR	−4.510 ***	0.000	−4.632 ***	0.000
DEPU	−6.123 ***	0.000	−6.245 ***	0.000
IPI	−5.564 ***	0.000	−5.673 ***	0.000
Panel B: advanced economies				
SR	−4.938 ***	0.000	−5.108 ***	0.000
DEPU	−6.096 ***	0.000	−6.273 ***	0.000
IPI	−5.926 ***	0.000	−6.157 ***	0.000
Panel C: foreign EPU (ADF statistic)				
US_EPU	−7.777 ***	0.000	−7.813 ***	0.000
GEPU	−7.288 ***	0.000	−7.303 ***	0.000

Notes: GEPU stands for Global EPU and is used for robustness checks. *** indicates statistical significance at a 1% level.

Table 5. Lag order selection criteria.

Lag	CD	J	J *p*-Value	MBIC	MAIC	MQIC
Panel A: emerging economies						
1	−0.848	103.719	0.039	−322.122 *	−56.281	−163.808 *
2	−1.434	65.013	0.441	−275.659	−62.987	−149.008
3	−6.793	30.947	0.973	−224.557	−65.053 *	−129.568
4	−25.631	17.079	0.986	−153.257	−46.921	−89.931
Panel B: advanced economies						
1	−0.030	121.693	0.640	−557.766 *	−134.307 *	−305.639 *
2	−1.731	93.405	0.899	−501.121	−130.595	−280.510
3	−2.226	70.910	0.974	−438.684	−121.090	−249.589
4	−2.052	33.171	1.000	−391.491	−126.829	−233.912

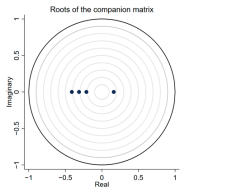
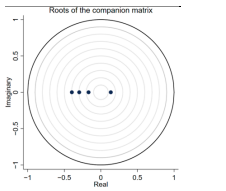
Notes: * indicates the selected optimal lag order.

Table 6 presents the eigenvalue analysis results of the PVAR model for emerging and advanced economies[3]. The real parts of the eigenvalues are negative or close to zero, and the imaginary parts are zero, indicating no oscillatory behavior. All eigenvalues have moduli less than 1, meaning they lie within the unit circle, thus satisfying the PVAR model's stability condition. Similarly, the distribution plot of the companion matrix roots confirms this. These results indicate that the model will not exhibit explosive growth over time, ensuring that the IRF reliably reflects the process of variables gradually returning to equilibrium after a shock. Specifically, the larger eigenvalue moduli in emerging economies suggest that the effects of shocks persist for a longer period. In contrast, the smaller eigenvalue moduli in advanced economies indicate greater stability, with quicker and more transient responses to shocks.

The Granger causality test is used to determine whether the past values of one variable help predict the current changes in another variable, as shown in Table 7. At the 5% significance level, there is bidirectional causality between foreign EPU and stock market returns. Additionally, stock market returns are the Granger cause for domestic EPU and domestic output. Foreign EPU is the Granger cause of domestic EPU. For emerging economies, foreign EPU is the Granger cause for domestic output. However, domestic EPU

is the Granger cause for domestic output in advanced economies. Furthermore, "ALL" refers to the joint test, which examines the Granger causality of all variables on a specific variable. The "ALL" test results are significant, indicating that all other variables collectively have a significant causal relationship with the dependent variable. This demonstrates the presence of common changes and inherent connections among the variables, confirming the existence of endogeneity.

Table 6. Eigenvalue stability condition.

Eigenvalue			Graph
Panel A: emerging economies			
Real	Imaginary	Modulus	
−0.411	0.000	0.411	
−0.313	0.000	0.313	
−0.212	0.000	0.212	
0.162	0.000	0.167	
Panel B: advanced economies			
Real	Imaginary	Modulus	
−0.397	0.000	0.397	
−0.296	0.000	0.296	
−0.169	0.000	0.169	
0.135	0.000	0.135	

Notes: The table lists the real part, imaginary part, and modulus of the eigenvalues. The graph on the right displays the distribution of the companion matrix roots.

Table 7. Granger causality test.

Excluded/Equation	SR	DEPU	IPI	US_EPU
Panel A: emerging economies				
SR	-	30.260 ***	22.097 ***	52.262 ***
DEPU	1.334	-	2.322	5.529
IPI	2.990	7.918	-	12.833 **
US_EPU	19.050 ***	22.494 ***	9.473 *	-
ALL	31.427 ***	69.415 ***	38.410 ***	70.772 ***
Panel B: advanced economies				
SR	-	32.382 ***	20.145 ***	32.371 ***
DEPU	1.764	-	6.295 **	0.003
IPI	2.539	0.094	-	1.680
US_EPU	6.381 **	7.549 ***	0.327	-
ALL	0.073 ***	50.643 ***	26.237 ***	34.844 ***

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The null hypothesis of the Granger causality test is that the past values of one variable do not significantly contribute to the prediction of another variable.

IRF is used to test the dynamic interrelationship between endogenous variables in the PVAR model. In this paper, the orthogonalized IRF is calculated based on the Cholisky decomposition, and the confidence interval is estimated by Monte Carlo simulation and Gaussian approximation with 1000 repetitions. In addition, because the orthogonalized IRF depends on the order of the variables, the order of the variables is set to US_EPU, IPI, SR, and DEPU.

Figures 1 and 2 show the IRF results of emerging economies and advanced economies, respectively. The results of the two economies are similar. For emerging economies, the shock of foreign EPU on stock market returns was significantly negative in the 0th and 1st periods, and advanced economies stabilized after the 0th period was significantly negative. This means that the positive shock of foreign EPU increase will cause a decline in stock market returns, and this concurs with the conclusions of Sum (2013), Christou et al. (2017), and Kose et al. (2017). Moreover, this article finds that the negative impact of foreign EPU

on stock market return only exists in the short term and has no significant impact in the long term. This is consistent with the results of Bahmani-Oskooee and Saha (2019). In the context of economic globalization and financial integration, the United States, as the world economic hegemon, will have a negative global spillover effect due to the rise of its EPU. First of all, when uncertainty in foreign countries increases, market participants tend to ignore the good news and have pessimistic expectations about discount rates and expected future dividends, which finally cause stock prices to fall.[4] Secondly, due to the uncertain economic situation in the future, market entities tend to choose to stay on the sidelines and postpone investment and consumption in order to make flexible decisions based on changes in the economic situation in the future. This will lead to a decline in the real economy and weaker stock market liquidity, which will cause stock prices to fall[5]. Finally, Economic Policy Uncertainty will increase the degree of financial friction, increase the cost and difficulty of external financing for companies, and lead to a decline in asset prices (Gilchrist et al. 2014).

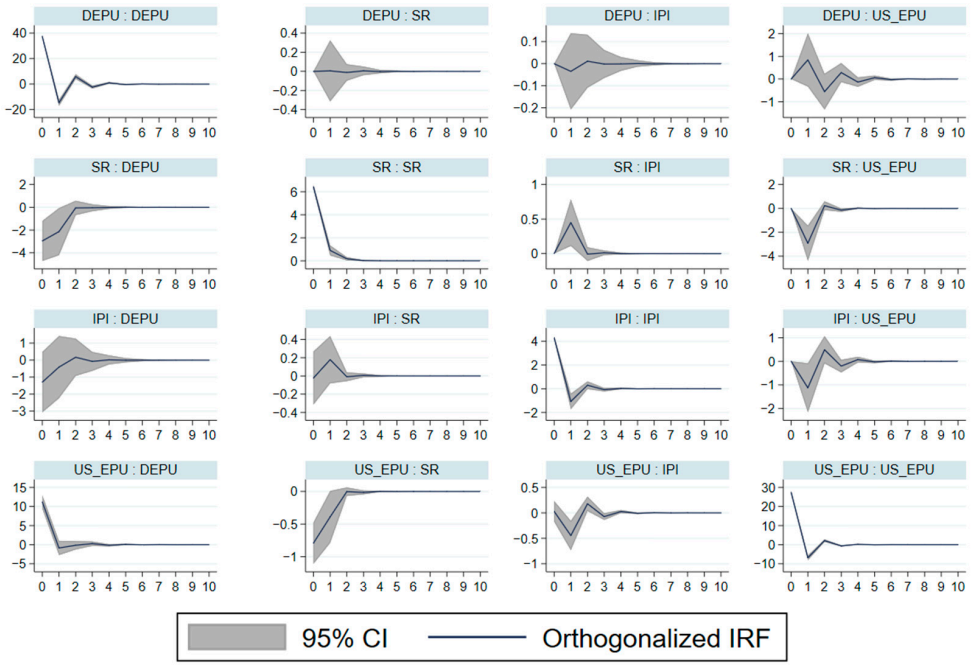


Figure 1. Orthogonalized impulse response functions for the emerging economies.

Unexpectedly, this study found that the dynamic impact of the domestic EPU of emerging and advanced economies on stock market returns is not statistically significant, but this is in line with the results of Ulrich (2012) and Wu et al. (2016) Domestic EPU and stock market returns can possibly be linked in an asymmetric or non-linear way. Domestic EPU may significantly affect stock market returns only when it exceeds a certain level, and the impact of domestic EPU will differ depending on whether the stock market is in a bearish or bullish phase (Wu et al. 2016). Moreover, for emerging economies, economic policy fluctuations are more frequent. In order to avoid losses in the value of their own assets, investors are more inclined to invest in assets with a higher yield and lower risk, such as bonds and gold. In this environment, the transmission mechanism of EPU to the stock market is correspondingly weakened. For advanced economies, the stock market has a strong ability to adjust to changes in related economic policies. Therefore, in the short term, EPU may not significantly impact the supply–demand relationship on the stock market.

The IRF results in Figures 1 and 2 also show that both the stock market returns of emerging economies and advanced economies will significantly reduce domestic EPU in the 0th and 1st periods, and the foreign EPU will drop in the 1st period. It means that the

positive shock of stock market return growth will have a negative impact on domestic and foreign EPU. This concurs with the results of Yang and Jiang (2016) and Li et al. (2016) To some extent, the trend of the stock market reflects the overall economic conditions and investors' expectations for the future. It is an important reference for decision-makers to make decisions. A stock market crash and a surge in the stock market may force decision-makers to adjust policies to ensure the smooth operation of the economy.

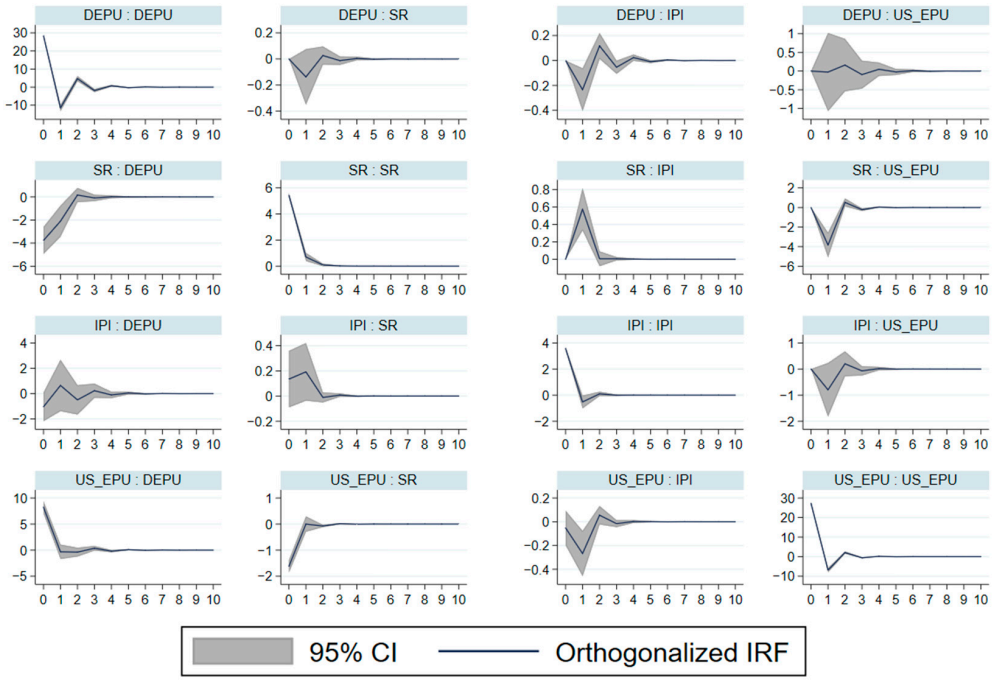


Figure 2. Orthogonalized impulse response functions for the advanced economies.

Rising stock market returns in emerging or advanced economies will promote the growth of domestic output, and the positive shock of stock market return growth will push output to rise rapidly and reach its peak in the first period, after which the impact disappears and stabilizes. This result confirms the conclusions of Masoud (2013). This result can be explained by the wealth effect. A rise in stock prices will cause an increase in the wealth of stockholders, which in turn will generate expanded consumption and, at the same time, affect the marginal propensity to consume (MPC) and promote economic growth. When the return on the stock market increases, it will attract more investors to a certain extent. For companies, lower financing costs can get more financing, thereby promoting the development of the company and the increase in output.

The positive shock of domestic and foreign EPU growth will cause a decline in domestic output in the 1st period, a rapid rebound in the 2nd period, and the 3rd and 4th periods will begin to stabilize. It shows that domestic and foreign EPU increases have a negative impact on domestic output, which is in line with Bloom et al. (2007) and Bloom's (2014) research results. When companies are hit by greater EPU, they are more cautious in investments, so they reduce investment and employment, leading to a decline in output. Moreover, the unexpected increase in EPU may bring about an increase in precautionary savings, thus curbing consumer spending and detrimental to economic growth.

In addition, it is interesting that the results also support that the United States is a net exporter of EPU but not a net importer of EPU. A positive shock of the growth of foreign EPU based in the United States will cause the domestic EPU of emerging and advanced economies to rise significantly, while the domestic EPU of emerging and advanced economies will not have a significant impact on foreign EPU. This concurs with the results of Klößner and Sekkel (2014) and Yin and Han (2014) but does not support Antonakakis et al.'s (2018) research that the United States might be a net importer of EPU.

This study uses Forecast Error Variance Decomposition (FEVD) to examine the degree of mutual influence between EPU and stock market returns. The results in Table 8 show minimal differences between the short-term and long-term contribution rates of each variable. On the one hand, for emerging economies, the foreign EPU's contribution to domestic EPU, stock market returns, and output is within 7.9%, 4.6%, and 2.4%, respectively. These contributions are within 7.7%, 10%, and 1.4% for advanced economies, respectively. This indicates that foreign EPU has a strong explanatory power for domestic EPU and stock market returns in both emerging and advanced economies; however, its explanatory power for output is relatively weak. On the other hand, the contribution rates of domestic EPU to foreign EPU, stock market returns, and output in both emerging and advanced economies are less than 2% across all periods, suggesting that the explanatory power of domestic EPU for all other variables is relatively weak.

Table 8. Forecast error variance decomposition.

Response Variable	Forecast Horizon	Impulse Variable			
		US_EPU	IPI	SR	DEPU
Panel A: emerging economies					
US_EPU	1	1.000	0.000	0.000	0.000
	10	0.962	0.005	0.028	0.004
	20	0.947	0.011	0.034	0.007
IPI	1	0.000	1.000	0.000	0.000
	10	0.016	0.964	0.016	0.004
	20	0.024	0.953	0.016	0.008
SR	1	0.010	0.000	0.990	0.000
	10	0.041	0.010	0.946	0.004
	20	0.046	0.014	0.935	0.005
DEPU	1	0.067	0.001	0.010	0.923
	10	0.073	0.004	0.014	0.909
	20	0.079	0.008	0.016	0.897
Panel B: advanced economies					
US_EPU	1	1.000	0.000	0.000	0.000
	10	0.951	0.004	0.038	0.008
	20	0.931	0.010	0.050	0.009
IPI	1	0.000	1.000	0.000	0.000
	10	0.014	0.929	0.037	0.020
	20	0.014	0.927	0.038	0.021
SR	1	0.072	0.000	0.928	0.000
	10	0.095	0.010	0.893	0.002
	20	0.100	0.011	0.885	0.004
DEPU	1	0.091	0.000	0.014	0.894
	10	0.076	0.014	0.020	0.889
	20	0.077	0.019	0.022	0.883

Notes: This table presents the FEVD results for each response variable at forecast horizons of 1 period, 10 periods, and 20 periods.

In emerging economies, the contribution rates of stock market returns to foreign EPU, domestic EPU, and output are within 3.4%, 1.6%, and 1.6%, respectively. This indicates that the stock market returns in these economies have a strong explanatory power for foreign EPU but a weak explanatory power for domestic EPU and output. In advanced economies, the contribution rates of stock market returns to foreign EPU, domestic EPU, and output are within 5%, 2.2%, and 3.8%, respectively. This shows that the stock market returns have a strong explanatory power for foreign EPU, followed by output, and a weak explanatory power for domestic EPU. Overall, foreign EPU has a stronger explanatory

power than domestic EPU across all levels in both emerging and advanced economies, and stock market returns exhibit some explanatory power for foreign EPU. This conclusion is consistent with the results of the IRF analysis.

4. Conclusions

This paper takes nine emerging economies and eleven advanced economies from January 2003 to January 2021 as the research objects and uses the panel VAR method to examine the dynamic interrelationship between EPU and stock market returns. Empirical analysis demonstrates that emerging and advanced economies' results are largely similar. Specifically, the positive shock of foreign EPU growth leads to a decline in stock market returns. However, the dynamic impact of domestic EPU on stock market returns is statistically insignificant. Conversely, an increase in stock market returns results in a decrease in domestic and foreign EPU, indicating a negative two-way spillover effect between EPU and the stock market. Simultaneously, rising returns in the stock markets of emerging and advanced economies promote the growth of domestic output, while the rise in domestic and foreign EPU reduces the growth of domestic output. Finally, the results of this paper also support that the United States is a net exporter of EPU rather than a net importer.

Based on the above findings, the recommendations for decision-makers and investors are as follows. First, as the center of the world economy, the United States should strengthen the stability and continuity of economic policies to reduce the potential risks that uncertainty brings to the global economy and stock markets. Second, the local government should actively prevent the impact of other countries' economic policy changes on the country, improve regulatory efficiency, and maintain the stability of the financial market. Finally, when constructing investment portfolios, investors should actively monitor the state of economic policies in the United States, increase their understanding of news and current events, and improve their ability to interpret policies in order to form more accurate judgments about future market trends.

As a future research direction, it will be interesting to use time-varying parameter models to examine the time-varying characteristics of EPU and stock markets. In addition, more detailed indicators such as monetary policy uncertainty, trade policy uncertainty, and geopolitical risk index can be used for research.

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Appendix A

This study employs the GMM method to estimate the PVAR model. Specifically, we use the first lags of four endogenous variables as instruments to address potential endogeneity issues and apply forward orthogonal deviations to eliminate individual fixed effects. Table A1 presents the PVAR model estimation results for both emerging and advanced economies. The Final GMM Criterion Q(b) reflects the value of the GMM criterion function, and its extremely small value indicates a very high model fit with almost zero error. Thus, our GMM estimation method is effective, and the model parameter estimates are highly consistent with the sample data. Additionally, previous stock market returns have significant negative impacts on both domestic and foreign EPU and a significant

positive impact on domestic output. In contrast, the previous domestic and foreign EPU have no significant effect on stock market returns. However, the significance of these individual parameters is insufficient to explain the overall economic dynamics. Therefore, we focus on the IRF and FEVD of the PVAR model to better capture the complex dynamic interrelationship between variables.

Table A1. PVAR model estimation results.

	US_EPU	IPI	SR	DEPU
Panel A: emerging economies				
L1.US_EPU	−0.273 ***	−0.014 **	−0.010	0.115 ***
L1.IPI	−0.256 **	−0.249 ***	0.042	−0.216
L1.SR	−0.444 ***	0.070 ***	0.140 ***	−0.515 ***
L1.DEPU	0.023	−0.001	0.000	−0.393 ***
Final GMM Criterion Q(b) = 5.67×10^{-34}				
Panel B: advanced economies				
L1.US_EPU	−0.295 ***	−0.002	0.009 *	0.071 ***
L1.IPI	−0.197	−0.153 **	0.048	0.088
L1.SR	−0.707 ***	0.100 ***	0.126 ***	−0.667 ***
L1.DEPU	−0.001	−0.008 **	−0.005	−0.404 ***
Final GMM Criterion Q(b) = 8.40×10^{-34}				

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. L1 indicates the first lag of the variable.

This study conducts robustness tests in three aspects. First, we establish third-order PVAR models for emerging and advanced economies, as shown in Figures A1 and A2. Second, we use GEPU as an alternative proxy variable for foreign EPU, with the results displayed in Figures A3 and A4. Finally, we combine nine emerging and eleven advanced economies into a full sample for analysis, with the results presented in Figure A5. Clearly, all IRF estimation results are very similar to those previously discussed. Therefore, our findings are robust and reliable, accurately reflecting the dynamic interrelationship relationship between EPU and stock market returns.

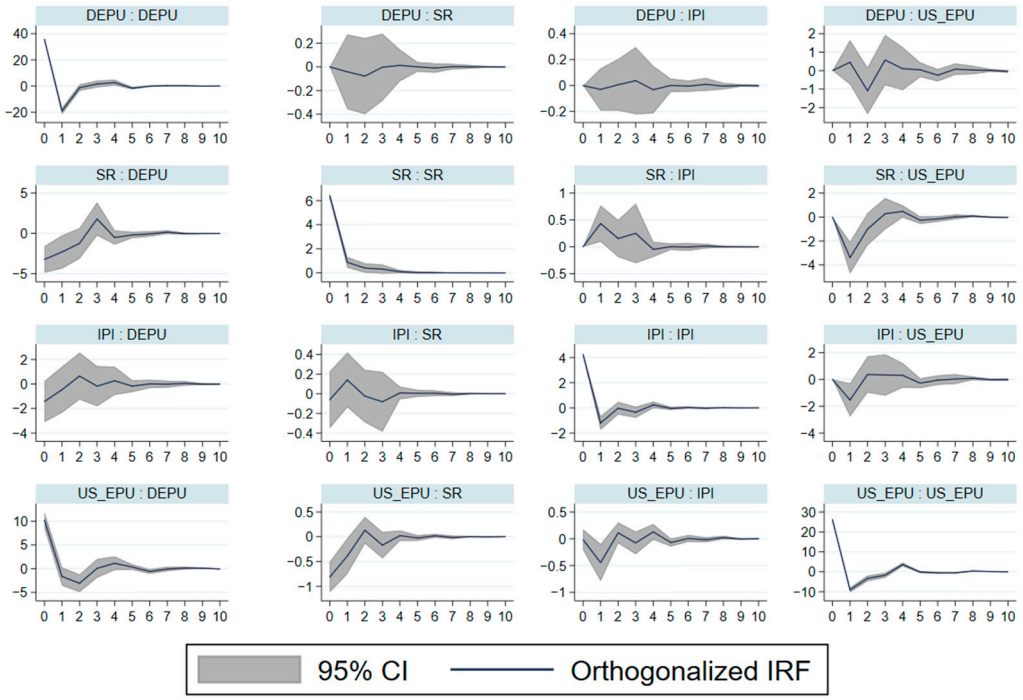

Figure A1. Orthogonalized impulse response functions for the emerging economies. Notes: based on a third-order PVAR model.

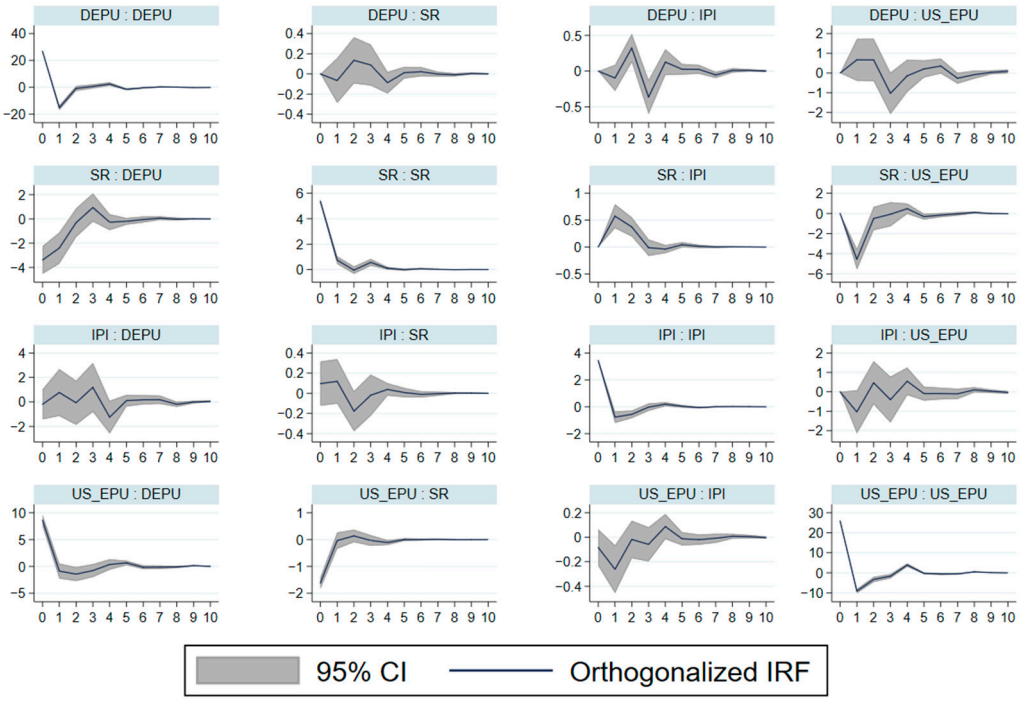

Figure A2. Orthogonalized impulse response functions for the advanced economies. Notes: based on a third-order PVAR model.

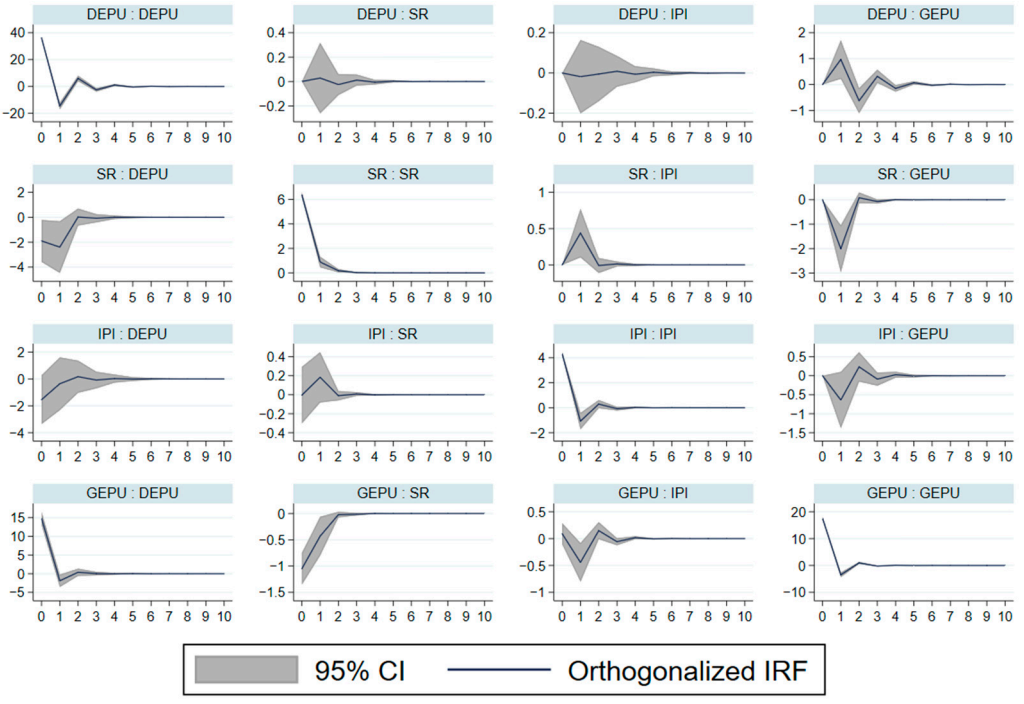

Figure A3. Orthogonalized impulse response functions for the emerging economies. Notes: GEPU is used as a proxy for foreign EPU.

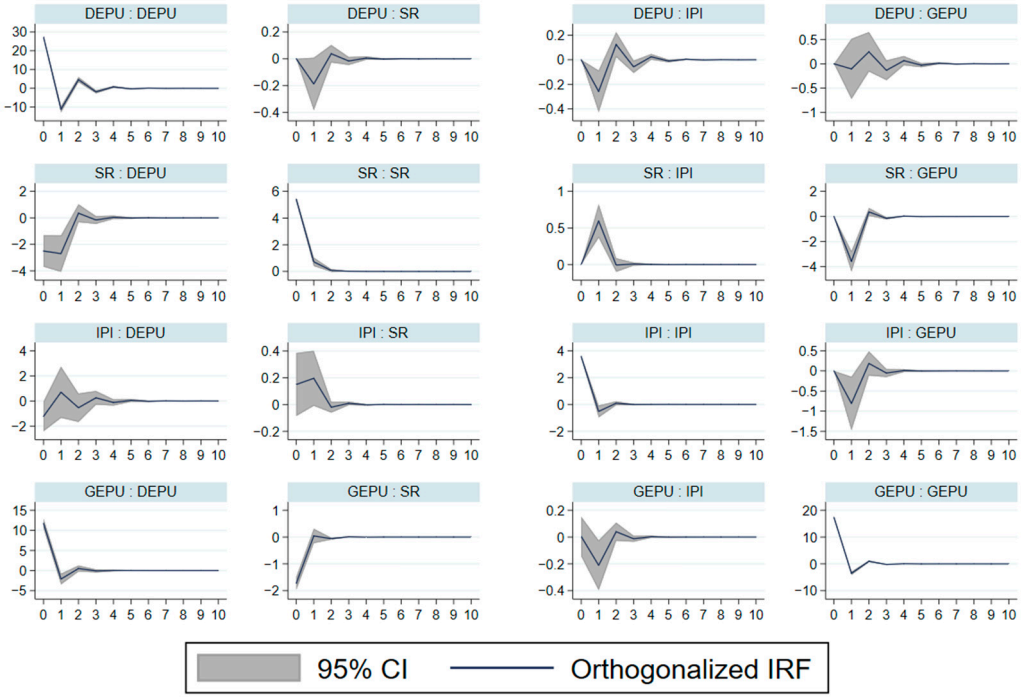

Figure A4. Orthogonalized impulse response functions for the advanced economies. Notes: GEPU is used as a proxy for foreign EPU.

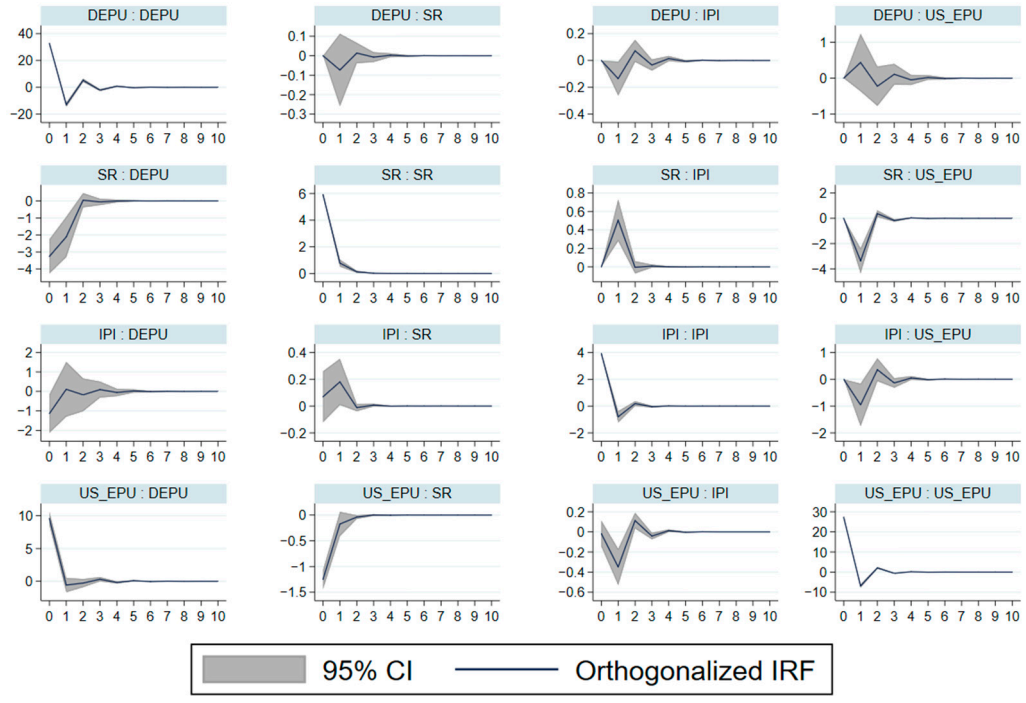

Figure A5. Orthogonalized impulse response functions for the full sample. Notes: the full sample analysis uses a first-order PVAR model.

Notes

1 Events that may increase EPU turbulence during the sample period include the Gulf War II (2003), the Global Financial Crisis (2008), the European Sovereign Debt Crisis (2009), the European Immigration Crisis (2015), the Brexit referendum (2016), the China–United States trade war (2018), the COVID-19 pandemic (2020), and the Russia-Ukraine war (2022).

2 More details about the EPU index can be obtained from www.policyuncertainty.com (accessed on 2 August 2024).

[3] In the PVAR model constructed using level variables, some eigenvalues lie on the unit circle, indicating that the model does not satisfy stability conditions. This implies that any minor shock can lead to permanent changes in the variables, preventing the economic system from gradually returning to equilibrium after a shock.

[4] The discounted valuation method of future cash flow in modern financial theory shows that stock price is the net present value of future cash flow. The net present value is affected by two factors: expected future dividend and expected future discount rate.

[5] According to the Real Option, investment behavior and consumption behavior of households and enterprises can be regarded as a Real Option that can be obtained by the decision-making body to be able to invest and consume in the future.

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