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The Impacts of United States' Trade Policy Uncertainty on G7 Stock Markets and Implications for Vietnam

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Abstract

This study delves into the effect of trade policy uncertainty (TPU) on stock market fundamentals amidst the growing interconnectedness among G7 economies. Utilizing a time-varying parametric vector autoregression (TVP-VAR) framework, the study encompasses the stock returns of all seven countries, unveiling moderate interdependence between variables within the pairwise network. The findings highlight that the US, UK, Italy, and Japan act as net transmitters of shocks, whereas France, Germany, and Canada function as net recipients. Furthermore, the study confirms the presence of a dynamic spillover effect among G7 stock markets over time and identifies a negative impact of US trade policy uncertainty on these markets, underscoring the necessity for policymakers and investors in developed countries to vigilantly monitor financial market conditions alongside trade and economic policies. These insights offer guidance on managing similar challenges within interconnected global for Vietnam and other emerging markets, which is essential for ensuring a more stable and predictable trading environment amidst the prevailing global economic uncertainties.

Keywords: G7 stock markets, Trade policy uncertainty, Spillover effect, United States, Vietnam.

Introduction

Trade policy uncertainty (TPU) has increasingly become a crucial factor in the global trading system, commencing in 2016. Since the Brexit referendum and Trump's election, which marked a shift away from the United Kingdom's and United States' longstanding support for low trade barriers and stable trade agreements (TAs), critical questions about this global uncertainty were wide-spread after the renegotiation and eventual withdrawal (Handley and Limao, 2022). The stock markets of G7 economies have been interlinked through general economic trends, trade relations, and financial connections, making them susceptible to economic or financial developments in one country, which can subsequently influence investor sentiment and stock prices in others.

TPU has emerged as a critical factor influencing global financial stability, with profound effects on stock markets, investment decisions, and economic growth. Over recent years, heightened TPU, particularly from the United States, has disrupted global markets through unpredictable trade policies, impacting investor confidence and capital flows. The G7 economies, which include some of the largest and most interconnected markets globally, are especially susceptible to TPU due to their extensive trade relationships and significant roles in international finance. This interconnectedness makes them highly responsive to TPU, as shifts in U.S. trade policy can lead to volatility and spillover effects across these markets, altering stock performance, economic outlooks, and investment behaviors.

Stock market volatility is extremely important for policymakers and portfolio managers when reflecting on future investment prospects and corporate health. A better understanding of the interaction between trade policy uncertainty and spillovers across different equity markets is important for investors and policymakers to make informed decisions wise plans. A growing body of empirical literature has analyzed the impact of TPU on employment, international trade, and investment.

The interdependence of global stock markets significantly reduces the risk-avoiding benefits of investing in multiple stock markets. This background makes it clear that understanding the magnitude and variability in cross-market volatility transmission is critical to international risk management in implementing hedging strategies globally and make asset allocation decisions (Riaz and Ullah, 2018). Although some studies have explored the link between trade policy uncertainty and equity markets in other markets, advanced or single markets such as the US, China and Japan, there is still little literature examining the role of US trade policy uncertainty in dynamic spillovers in the stock markets of G7 countries. We focus on the G7 stock markets because they have been the trading platforms that account for a significant proportion of international market capitalization. This study is, therefore, motivated by the importance of the impact of trade policy uncertainty on economic fundamentals, including stock markets, and the growing trend toward connectivity increases across economies. Uncertainty has cross-border impacts and for the G7 association of countries with large economies and developed financial markets.

Conducting this research is essential to understanding how U.S. TPU propagates through G7 markets, especially in periods of global instability such as the COVID-19 pandemic. By examining these spillover dynamics, the study aims to provide insights that could inform more effective risk management and policy decisions within these economies. The objective of this study is to investigate the impact of the trade policy uncertainty of the US on the spillover effect between G7 stock markets, thereby suggesting several recommendations for policymakers in controlling risks.

The implications of this research are equally relevant for emerging markets like Vietnam, which are increasingly integrated into global trade and finance. As Vietnam expands its economic ties with G7 countries, understanding the potential impact of TPU-induced volatility becomes crucial. Insights from this study can guide Vietnamese policymakers and investors in developing resilience strategies, such as diversifying trade partnerships and enhancing domestic financial stability, to better withstand external shocks from TPU and maintain economic growth amid global uncertainties.

This study delves into the effect of trade policy uncertainty (TPU) on stock market fundamentals amidst the growing interconnectedness among G7 economies. Utilizing a time-varying parametric vector autoregression (TVP-VAR) framework, the study encompasses the stock returns of all seven countries, unveiling moderate interdependence between variables within the pairwise network. It help answer the following research questions: (1) How is the spillovers among G7 stock markets over time?; (2) How does the role of US trade policy uncertainty affect the dynamic spillover effect of G7 countries' stock markets?; and (3) What are policy implications for Vietnam as a developing country and a frontier stock market?

This study makes two significant contributions to the previous literature. First, it underscores the crucial role of the stock market in both national and global economies, presenting clear evidence of dynamic spillover effects among G7 stock markets due to trade uncertainty arising from international disputes. This empirical evaluation of directional spillovers and linkages among these markets enhances our understanding of their interconnectedness. Second, the paper investigates the impact of TPU on stock markets, providing valuable insights for international investors into risk transmission mechanisms across countries. Second, it is its policy implications for Vietnam, suggesting that as a frontier market, Vietnam could benefit from resilience strategies such as enhancing financial transparency, diversifying trade partnerships, and reinforcing domestic market stability to mitigate the effects of external volatilities.

The paper is structured into four sections. The first section provides a literature review of the relevant issues. The following section describes research methodology of the study. The subsequent section analyzes and discusses the research results of dynamic spillover across G7 stock markets and the impacts of US TPU on stock market spillovers. The last session concludes the paper and offers main policy implications for Vietnam in the years to come.

1. Literature review

Trade policy uncertainty refers to the unpredictability of future trade policies enacted by governments (Caldara, 2020). This uncertainty can result from changes in leadership, geopolitical dynamics, and trade agreement negotiations (Kyle and Limão, 2022). High trade policy uncertainty can cause businesses to hesitate in making long-term investments or strategic decisions due to potential impacts on operations, supply chains, and costs, leading to decreased trade volumes, reduced investments, and economic volatility. Industries heavily that are reliant on international trade, such as manufacturing, agriculture, and technology, find this uncertainty particularly challenging. High trade policy uncertainty can cause businesses to hesitate in making long-term investments or strategic decisions due to potential impacts on operations, supply chains, and costs, leading to decreased trade volumes, reduced investments, and economic volatility. These sectors require clear and stable trade policies for effective planning and operations (Kyle and Limão, 2022). Policymakers and governments play a vital role in managing TPU by providing consistent guidance, engaging in transparent negotiations, and fostering international cooperation, which can promote economic growth, stability, and global prosperity.

The connection of stock markets of G7 countries

The stock markets of the G7 countries (Canada, France, Germany, Italy, Japan, UK, and US) are integral to the global economy, facilitating capital formation and multinational investment. These advanced economies, led by the US, play pivotal roles in trade, technology, and finance. Germany, a leader in exports and industry, and the UK, a major financial center, are also crucial, along with Japan's high-tech innovations. Opening markets and eliminating trade barriers can boost global economic growth and strengthen cooperation among countries

The G7 countries are deeply interconnected through extensive economic relationships, where stock market performance and investor sentiment are closely linked. The cross-listing of companies among G7 nations enhances market liquidity and facilitates capital flows, resulting in highly correlated markets (Ghosh, 2021). This interconnectedness means that economic or financial developments in one G7 country can rapidly influence others, reflecting the systemic nature of their markets (Lang and Yang, 2022). Such tight linkages can lead to a domino effect during economic crises, triggering widespread market instability across the G7. While this correlation allows for diversification benefits, it also introduces systemic risks, particularly in times of heightened uncertainty, such as those caused by fluctuations in U.S. trade policies. This interconnectedness underscores financial globalization and economic interdependence (Faruk and Hasan, 2021), with developments in one market impacting the entire G7.

Impact of US trade policy uncertainty on stock markets

US's TPU significantly affects global stock markets due to their intertwined nature (Faruk and Hasan, 2021). Trade tensions and protectionist measures could disrupt global supply chains, hinder cross-border investment and reduce international trade, which could negatively impact economic growth prospects of countries around the world. Concerns about slowing global growth could affect investor sentiment and lead to a decline in stock markets worldwide. Tariffs, trade restrictions and trade disputes initiated by the United States could prompt pushback from trading partners, leading to disruptions to international trade flows and affecting US profits. As a result, stock markets in countries heavily dependent on trade with the US or directly involved in trade disputes may experience volatility and decline (Matzner, 2023).

Investors may seek safer assets like bonds or gold during trade policy uncertainty, leading to increased volatility and negative market reactions (Changmin and Lee, 2015). Countries closely linked to the US through trade and finance are particularly vulnerable (Ricardo and Julian, 2021). Policy responses, such as adjustments in monetary policy by central banks, can further affect exchange rates, trade competitiveness, and multinational profits (Chodorow-Reich, 2012; 2019). Understanding trade policy uncertainty's impact on financial markets helps investors and policymakers design effective responses and manage associated risks.

2. Research methodology

2.1. Research design

The study consisted of two phases. In Phase 1, the authors investigated the relationship between the stock markets of G7 countries, including US, Japan, Italia, Canada, UK, France and Germany. In Phase 2, the authors examined how the role of TPU affects the linkages between the stock markets of the above seven countries depending on the results from the previous phase.

In the first phrase, to explore dynamic connectivity in a time-varying manner, we used the TVP-VAR approach introduced by Antonakakis and Gabauer (2017). It should be noted that the TVP-VAR Connection Method enhances the original connection method proposed by Diebold and Yilmaz (2009). This improvement is achieved by allowing the variance-covariance matrix to fluctuate, following the principles of Koop and Korobilis (2014), through the use of Kalman filter estimation with forgetting factors. Our method thus accomplishes two main goals, namely: (i) minimizing the problem of choosing an arbitrary scroll window size, which can lead to highly volatile or over-smoothed parameters; and (ii) preventing the removal of important data points. This approach ensures a more accurate and comprehensive analysis.

In the next stage, we used OLS regression to determine the role of TPU in the connection between the stock markets of the seven of the above-mentioned countries.

2.2. Research data and method

2.2.1. Data collection

First, the data about the United States TPU will be taken from the constantly updated dataset in https://www.matteoiacoviello.com/tpu.htm.

Second, the data about stock market index of America, Japan, England, Germany, France, and Canada period from August 2003 to February 2024 (taken from https://finance.yahoo.com/quote/%5EN225/history; https://www.investing.com/indices/s-p-tsx-composite-historical-data

Thirdly, regarding control variables:

The geopolitical risk (GPR) index: The news-based GPR index is derived by counting the occurrence of words related to geopolitical tensions in leading international newspapers, such as the New York Times, the Wall Street Journal, and the Financial Times.

Economic policy uncertainty index: each monthly national EPU index value is proportional to the proportion of domestic articles discussing economic policy uncertainty during that month (https://www.policyuncertainty.com/global_monthly.html).

2.2.2. Research method

To answer the research question and test the theoretical model on whether spillovers and connections between stock markets of G7 countries occur and how the role of TPU affects that spillover, this dissertation using the following quantitative methods: Regression analysis with data evaluated through TVP-VAR (Time-Varying parameter Var) model and regression model.

This study explores the role of US's TPU in volatility spillovers between countries' stock markets. Specifically, the TVP-VAR model is used to capture dynamically fluctuating spillover effects among seven representative countries, and we obtain overall and directional spillover indices. Then, the impulse response function based on the VAR model is applied to capture the dynamic effect of TPU on the overflow chain. TVP - VAR model (VAR model with parameters changing over time - Time-Varying Parameter VAR model) includes K explanatory variables, p lags. Thus, the number of parameters to be estimated in the VAR model or each K equation will have $(1 + pK)$ parameters to be estimated. To explore dynamic connectivity in a time-varying manner, we use the TVP-VAR method introduced by Antonakakis and Gabauer, 2017. The TVP-VAR method combines the connection method of Diebold and Yilmaz (2009) and (Koop and Korobilis, 2014). This framework allows for time-varying variances through Kalman Filter estimation with omitted factors.

The TVP-VAR(p) model can be expressed as:

$$y_t = \beta_t z_{t-1} + \varepsilon t \quad \varepsilon t \,|F_{t-1} \sim N(0, S_t) \tag{1}$$

$$vec(\beta_t) = vec(\beta_{t-1}) + v_t \quad v_t|F_{t-1} \sim N(0, R_t) \tag{2}$$

where y_t and $z_t - 1 = [y_t - 1, \ldots, y_t - p]'$ respectively represent $N \times 1$ and $Np \times 1$ dimensional vectors. β_t is an $N \times Np$ dimensional time-varying coefficient matrix and εt is an $N \times 1$ dimensional vector of error disturbance with an $N \times N$ time-varying variance-covariance matrix. S_t $vec(\beta_t)$, $vec(\beta_{t-1})$ and v_t are $N^2p \times 1$ dimensional vectors and R_t is an $N^2p \times N^2p$ dimensional matrix.

To calculate the generalized impulse response functions (GIRF) and generalized error variance decomposition (GFEVD) (Koop et al., 1996; Pesaran and Shin, 1998), we need to transform the TVP-VAR to a TVP-VMA using the Wold representation theorem:

$$y_t = \sum_{j=0}^{\infty} L' W_t^j L \varepsilon_{t-j} \tag{3}$$

$$y_t = \sum_{j=0}^{\infty} A_{it} \varepsilon_{t-j} \tag{4}$$

where $L = [I_N, \ldots, 0_p]'$ is an $Np \times N$ dimensional matrix, $W = [\beta t; I_{N(p-1)}, 0_{N(p-1)\times N}]$ is an $Np \times Np$ dimensional matrix. The GIRFs represent the responses of all variables following a shock in variable i. We compute the differences between a J-step-ahead forecast where once variable i is shocked and once where variable i is not shocked. The difference can be accounted to the shock in variable i, which is given by:

$$GIRF_t\,(J, \delta_{j,t}, F_{t-1}) = E(\,Y_{t+j}\,/\varepsilon_{j,t} = \delta_{j,t}, F_{t-1}) - E(Y_{t+j}\,|F_{t-1}) \tag{5}$$

$$\varphi^g_{j,t}(J) = \frac{A_{j,t} S_t \varepsilon_{j,t}}{\sqrt{s_{ij,t}}} \frac{\delta j,t}{\sqrt{s_{ij,t}}}\,,\ \delta j,t = \sqrt{s_{ij,t}} \tag{6}$$

$$\varphi^g_{j,t}(J) = s_{ij,t}^{-1/2} A_{j,t} S_t \varepsilon_{j,t} \tag{7}$$

where $\varphi^g_{j,t}(J)$ is the GIRFs of variable j, J represents the forecast horizon, $\delta j,t$ is the selection vector with value of one on the j-th position and zero otherwise, and F_{t-1} is the information set until $t - 1$. Then, we compute the GFEVD that can be interpreted as the variance share one variable has on others. The calculation is as follows:

$$\tilde{\varphi}^g_{ij,t}(J) = \frac{\Sigma_{t=1}^{J-1} \varphi_{ij,t}^{2g}}{\Sigma_{j=1}^{N} \Sigma_{t=1}^{J-1} \varphi_{ij,t}^{2g}} \tag{8}$$

with $\Sigma_{j=1}^{N}\tilde{\varphi}_{ij,t}^{g}(J) = 1$ and $\Sigma_{j=1}^{N}\ \tilde{\varphi}_{ij,t}^{N}(J) = N$. Based on the GFEVD, we can build the total connectedness index (TCI) as follows:

$$C_t^g(J) = \frac{\Sigma_{i.j=1,i\neq j}^{N}\tilde{\varphi}_{ij,t}^{g}(J)}{\Sigma_{i.j=1}^{N}\tilde{\varphi}_{ij,t}^{g}(J)} \times 100 = \frac{\Sigma_{i.j=1,i\neq j}^{N}\tilde{\varphi}_{ij,t}^{g}(J)}{N} \times 100 \quad (9)$$

The connected approach allows to examine how a shock in one variable spills over to other variables. First, the shock transmitted from variable *i* to all other variables *j*, i.e., the total directional connectedness *TO* others can be defined as:

$$C_{i\rightarrow j,t}^{g}(J) = \frac{\Sigma_{i.j=1,i\neq j}^{N}\tilde{\varphi}_{ij,t}^{g}(J)}{\Sigma_{j=1}^{N}\tilde{\varphi}_{ij,t}^{g}(J)} \times 100 \quad (10)$$

Second, the shock that variable *i* receives from all other variables *j, i.e* the *total directional connectedness FROM others* can be defined as:

$$C_{i\leftarrow j,t}^{g}(J) = \frac{\Sigma_{i.j=1,i\neq j}^{N}\tilde{\varphi}_{ij,t}^{g}(J)}{\Sigma_{j=1}^{N}\tilde{\varphi}_{ij,t}^{g}(J)} \times 100 \quad (11)$$

Finally, the net total directional connectedness can be given by subtracting the total directional connectedness TO others from the total directional connectedness FROM others:

$$C_{i,t}^{g}(J) = C_{i\rightarrow j,t}^{g}(J) - C_{i\leftarrow j,t}^{g}(J) \quad (12)$$

This net total directional connectedness can be interpreted as the influence of variable *i* on the analyzed network. If the net total directional connectedness of variable *i* is positive, variable *i* influences the network more than being influenced by it. This also means that variable *i* is a shock transmitter. On the other hand, if the net total directional connectedness is negative, variable *i* is driven by the network, meaning that it is a shock receiver.

As the net total directional connectedness is an aggregated measure and sometimes masks important underlying dynamics, we want to calculate the net pairwise directional connectedness (NPDC), which informs about the bilateral transmission process between variables *i* and *j*:

$$NPDC_{ij}(J) = \tilde{\varphi}_{ji,t}(J) - \tilde{\varphi}_{ij,t}(J) \quad (13)$$

A positive (negative) value of NPDC*ij*(J) indicates that variable *i* is driving (driven by) variable *j*.

After completion of determining of the spillover characteristic of monetary among countries, to fulfil the aim of the study, this article uses OLS regression model approach.

$$TCI = \beta 0 + \beta 1TPUUSA + \beta 2GPR + \beta 3EPU + \in \quad (14)$$

3. Results and discussion

3.1. Dynamic spillover across G7 stock markets

3.1.1. Descriptive statistics

Figure 1 exhibits the evolution of the series of stock market during the sample period from august 2003 to 2024. In general, stock martkets of G7 countries exhibit similar trends. All seven variables peaked and bottomed in 2008-2010, 2016, and especially 2019-2021. These periods coincide with economic events, such as economic crisis in 2008 , the Brexit event in June 2016, the US Presidential election results on November, 9 2016, US-China trade war in 2019 and the outbreak of Covid-19 Pandemic in 2020-2021.

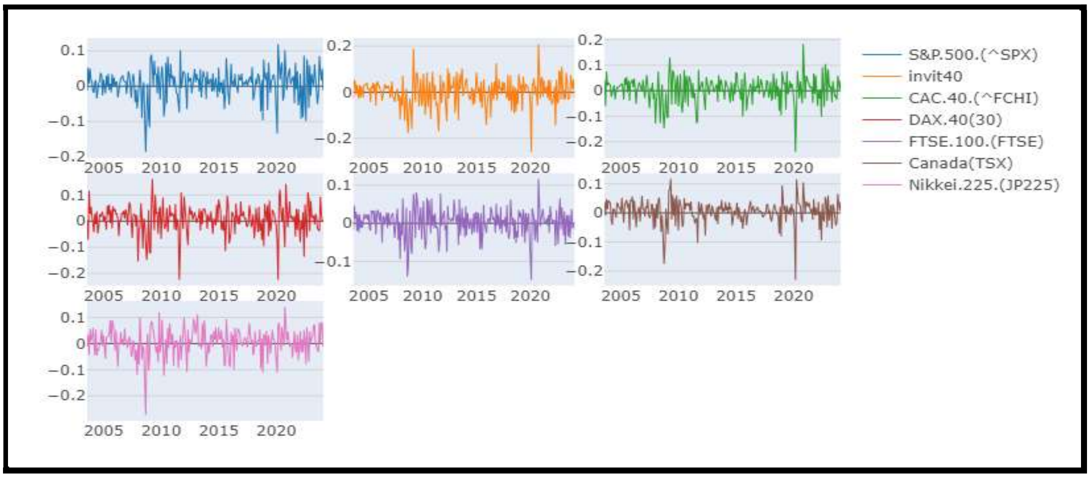
Firstly, U.S. TPU emerges as a primary driver of volatility, with the U.S. transmitting substantial spillovers to other G7 markets, especially during high-stakes events. During globally disruptive periods such as COVID-19, TPU combined with the pandemic uncertainties led to intensified risk aversion, resulting in significant fluctuations across G7 stock indices. We observe some common patterns among seven countries that every government here is adjusting profit investment activities in accordance with the domestic and international stock market situation in particular .

Secondly, G7 countries such as the U.S., Canada, Japan, France, the UK, and Germany show similar patterns in profits, with periods of high and low trends occurring almost in tandem. The evolution of profits across these nations is dynamic and varies in scale, reflecting the interconnected nature of their economies. While some markets experience larger swings in response to TPU, others show more moderated reactions. This variability highlights the asymmetry in how profits are affected by TPU across the G7, with certain markets more susceptible to profit declines during high TPU periods, such as COVID-19, than others.

Thirdly, Italy and Germany, despite being primarily net receivers, displayed significant sensitivity to U.S. TPU. Italy's reliance on export markets made it vulnerable to U.S.-induced volatility, while Germany, with strong U.S. trade ties, experienced amplified spillovers during the COVID-19 crisis. In contrast, France exhibited moderate sensitivity with limited spillover capacity, reflecting its relatively diverse economy.

Figure 1: Time series plot of 7 stock markets from August 2003 to February 2024

(watching from left to right, up and down)



Source: Authors'calculation, using R language.

Table 1 reports descriptive statistics of the G7's countries stock market for the variables. The positive mean of values of these variables indicates market growth over the considered period. Regarding variance, DAX.40.30 is the variable with the most volatility or vulnerability with the highest variance index. The FTSE100 is the least volatile variable. These return series show skewness and kurtosis, indicating that these chains are normally distributed, in which the CAC.40.FCHI, FTSE.100, Nikkei.225, Canada.TSX, S.P.500.SPX, invit40 is the left-skewed variable. More specifically, the Jarque-Bera statistic has shown that all these returns have a normal distribution with a significance level of 10%. Finally, we find evidence suggesting that series are autocorrelated, making it legitimate for the choice of a TVP-VAR model with time-varying covariances.

Table 1: Descriptive statistics of the G7's countries stock market for the variables

Metric	SandP.500.SPX	invit40	CAC.40.FCHI	DAX.40.30	FTSE.100	Nikkei. 225.JP225	Canada. TSX
Mean	0.007	0.001	0.004	0	0.002	0.005	0.004
Variance	0.002	0.004	0.003	2.289***	0.001	0.003	0.002
Skewness	0.793***	0.506***	-0.707***	0	-0.728***	-0.850***	-1.377***
Excess kurtosis	1.786***	2.014***	2.304***	0	1.670***	2.484***	5.839***
JB	58.697***	42.275***	75.217***	0	50.519***	93.241***	429.021***
ERS	4.752***	4.573***	-3.626***	-0.197	4.298***	5.751***	7.742***
Q(10)	8.945	6.334	6.032	-0.065	3.675	6.071	5.533
Q^2(10)	55.197***	5.912	10.977***	2.289***	29.986***	10.033*	599.***

Notes: ***, **, and * denote significance at 1%, 5% and 10% significance levels, respectively; Skewness: D'Agostino (1970) test; Kurtosis: Anscombe and Glynn (1983) test; JB: Jarque and Bera (1980) normality test; ERS: Stock et al. (1996) unit root test; Q(10) and Q2(10): Fisher and Gallagher (2012) weighted portmanteau test.

Source: Authors' calculation.

Table 2 reports the results of the average dynamic connectivity analysis. Each row of this table corresponds to the individual contribution of each variable to the forecast error variance of all other variables in our network while each column shows the forecast error variance that the other variables contributed to each individual variable. Elements on the main diagonal represent individually variable effects while off-diagonal elements represent effects from/to other elements.

Table 2: Averaged dynamic connectedness table

Index	SandP.500	invit40	CAC.40 (^FCHI)	DAX.40 (30)	FTSE.100	Canada (TSX)	Nikkei.225	Contribution from others
SandP.500	35.55	19.78	0.53	1.34	22.95	2.03	17.82	64.45
invit40	21.46	37.52	1.19	0.95	21.72	1.67	15.48	62.48
CAC.40	24.66	26.59	4.99	2.31	24.23	1.53	15.68	95.01
DAX.40(30)	24.58	23.67	2.69	8.16	22.74	1.42	16.74	91.84
FTSE.100	23.92	21.34	0.56	1.04	36.32	1.29	15.54	63.68
TSX	26.34	18.06	0.58	1.2	23.53	14.92	15.38	85.08
Nikkei.225	21.05	17.66	0.67	0.73	18.14	1.19	40.57	59.43
Contribution to others	142.01	127.1	6.22	7.57	133.31	9.13	96.64	521.97
Inc. Own	177.56	164.62	11.21	15.73	169.63	24.05	37.21	cTCI/TCI
NET directional connectedness	77.56	64.62	-88.79	-84.27	69.63	-75.95	37.21	87.00/74.57

Source: Authors' calculation.

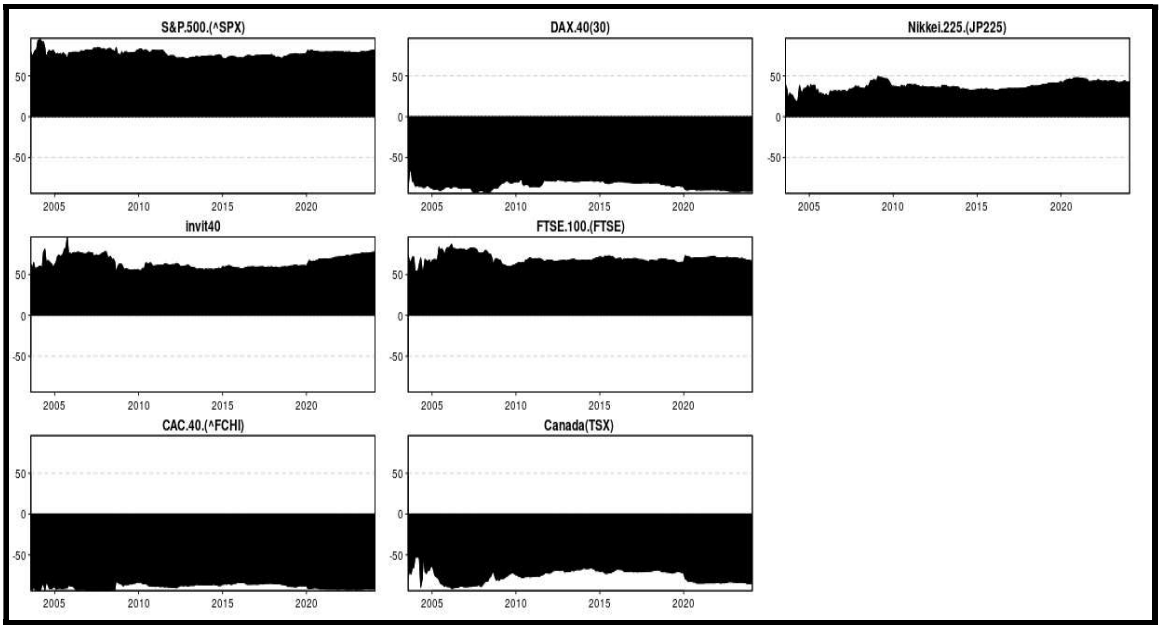
As can be seen in Table 2, the total connectedness index is about 74.57%, indicating a high level of interdependence between the variables in our network. On average, we observe that for the SandP 500 stock returns, Nikkei.225, invit40, FTSE.100 affect the returns of other stocks such as CAC.40.(^FCHI), DAX.40(30), Canada(TSX). Although it shows some interesting observations about interesting and the level of total connectedness index between stock markets, these results correspond to aggregate measures that consider the entire sample period. The use of averages may mask some of the trade, economic, and geopolitical policy uncertainties that occurred during the sample period and may lead to significant deviations from the TCI value averages. Therefore, we will proceed with the dynamic approach. The aim was to identify specific periods that influence the associations between our variables over time.

The total connectedness index among seven stock markets changes over time, reflecting the dynamic nature of G7 market volatility due to globalization, economic cooperation, trade agreements, and financial integration (Salah and Khasawneh, 2022). This index is sensitive to crises, with low-frequency components contributing mainly to volatility spillovers, while high-frequency components react to market shocks.

During 2003-2004, 2008-2009, and 2020-2021, spillover effects peaked as G7 countries showed signs of economic recovery and increased investment from major economies. The interconnectedness of G7 stock markets increased through economic trends and mutual influence. The 2008 financial crisis intensified this connectivity, as investor sentiment turned negative and risk aversion spread globally. The crisis exposed weaknesses in the financial system, leading to regulatory reforms and a prolonged recovery period.

From the above analysis, we can see the dynamism in the connection between stock markets due to the dependence on investment assets and production enterprises in G7 countries. At each diffusion stage, we see that global real economic activity and investor confidence indicators have a significant impact on the short-term, medium-term and long-term volatility spillover effects of the stock market contracts between countries.

Figure 2: Net directional connectedness



Source: Authors' calculation, using R language.

To further analyze the dynamic spillover effect of the connectedness index among stock markets, we calculate the time-varying net directional linkages. This method identifies whether a variable is a net transmitter or receiver of shocks. The results in Figure 2 show that the US, Japan, the UK, and Italy experience fluctuating spillovers, while Germany, France, and Canada are more affected by these spillovers.

Brexit has notably impacted the UK stock market, causing spillovers into other G7 markets. Japan's Nikkei 225, as a major exchange, influences G7 markets. Italy's economic activities also create spillover effects, particularly in Germany and France.

Germany, France, and Canada are highly influenced by fluctuations in major economies like the US, Japan, the UK, and Italy due to their close trade relationships. Economic downturns in these countries can trigger global sell-offs, affecting investment environments worldwide (Bhowmik, 2022). The interconnectedness of global finance means that fluctuations in one major stock market can spread to others.

3.2. The impacts of US TPU on stock market spillovers

3.2.1. Descriptive statistics

Table 3 illustrates the statistical synthesis of the four variables TPUUSA, GPR, EPU and TCI. This summary provides a quick overview of the central tendency and dispersion of the “TPUUSA” and “TCI” data sets. We can see in Table 4.3 that all four variables have 247 observations. Regarding the TPUUSA variable, the average value is approximately 51.00491, the average TCI value is approximately 86.99539. This shows that there is a relatively large spread of the data around the mean. The standard deviation of TPU USA is 45.43711 and TCI is 2.209589, TPUUSA has larger fluctuations than the "TCI" variable.

The standard deviation of the TCI variable is about 2.209589, which indicates that the variability of the observed values around the mean is about 2.209589. The standard deviation of the TPUUSA variable is about 45.43711, the standard deviation of the GPR variable is about 33.65591, the standard deviation of the EPU variable is 78.65358. The larger the standard deviation value, the higher the volatility of the data.

Table 3: Descriptive statistics of TPU USA and TCI

		Mean	Std. Dev.	Min	Max
TCI	247	86.99539	2.209589	82.5551	92.59222
TPU USA	247	51.00491	45.43711	11.29912	266.0045
GPR	247	99.68128	33.65591	58.42077	318.9549
EPU	247	156.4775	78.65358	49.22455	431.5649

Source: Authors' calculation.

3.2.2. Regression model

The table shows that increased US TPU(TPUUSA) correlates with decreased monetary policy spillovers among G7 stock markets, indicating various economic dynamics or market behaviors. This result aligns with recent studies suggesting that TPUUSA leads to global economic instability, reducing connectivity among G7 stock markets. Kim (2015) found that US TPU can cause volatility and instability in the global economy, affecting connectivity among the stock markets of G7 countries, thus, when USA TPU increased, TCI tended to decrease. The study of Shabbir (2023) figured out that TPUUSA has a larger negative impact on stock returns and a smaller positive impact on volatility in a bearish regime compared to a bullish regime, indicating that TPU reduces stock returns more and increases volatility less during market downturns (Qi & Ning, 2022) found that EPU is considered to have a stronger impact on G7 stock market connectivity than TPUUSA. USA TPU focuses on US trade policy, but EPU can have a widespread impact on the global economy, including factors such as monetary policy, fiscal policy, and economic stimulus measures, the impact of the EPU may be felt more strongly in reducing the connectivity of G7 stock market. Tsai (2017) noted that US trade policy instability triggers strong spillovers to global stock markets, with decreased connectivity indicating the US as the source of these spillovers. TPUUSA's negative impact on stock returns intensifies, causing market connectivity disruptions, increased uncertainty, and negative effects on capital flows and market sentiment in G7 stock markets.

Table 4: Regression result of the full sample model

TCI	Coef	SE Coef	T-value	P-value	95% Conf. Interval	
TPUUSA	-.0228862	.0026238	-8.72	0.000	-.0280544	-.0177179
GPR	-.0047055	.0032589	-1.44	0.150	-.01112409	.0017139
EPU	-.0065757	.00115	-5.72	0.000	-.0088409	-.0043105
_cons	89.66057	.3565801	251.45	0.000	88.95819	90.36295

Source: Authors' calculation.

4. Conclusions and policy implications for Vietnam

4.1. Conclusion

This article aims to understand the dynamic spread of G7 regional stock markets and the impacts of US TPU(TPUUSA) from 2003 to 2024. We examine the stock returns of the seven countries using a time-varying parameter vector autoregression (TVP-VAR) framework and the monthly TPUUSA index from Caldara (2020). Our results show moderate interdependence between the G7 stock markets, influenced by specific events over time. Furthermore, stock markets between countries are largely influenced by developments and events in the relationship during a particular period of time. The US, UK, Italy, and Japan markets have the main impact on the remaining countries such as France, Germany, and Canada - the transmission - receiving countries. In which, the two largest financial markets, the UK and the US, have more transmission to other countries in the region. We also find that US TPU negatively impacts the spillover dynamics among G7 stock markets. This interdependence reduces the risk-avoiding benefits of diversified investments, underscoring the importance of understanding TPUUSA's effects on cross-market volatility for international risk management and asset allocation.

4.2. Policy implications for Vietnam

The influence of US TPU and G7 stock market volatility on emerging economies like Vietnam is multifaceted, with far-reaching consequences for stock market stability, investor confidence, and economic resilience. According to Bianconi, Esposito, and Sammon (2021), U.S. TPU has a notable impact on China's stock returns, especially for industries highly dependent on U.S. trade policies. They found that firms in sectors more exposed to TPU experience increased volatility and a risk premium, as investors demand compensation for heightened uncertainty associated with U.S. policy shifts. This effect is particularly pronounced in industries reliant on Chinese inputs, where exposure to globalization further amplifies TPU's impact on stock returns. Similarly, He, Lucey, and Wang (2021) documented that TPU has a sustained negative impact on the Chinese stock market, as seen during periods of intense U.S.-China trade conflicts. These spillovers from the U.S. to other countries can have prolonged effects, where the initial shock in the form of policy uncertainty leads to sustained stock price volatility in economies connected to the U.S. through trade.

Adding another layer to this complex dynamic is the role of G7 market volatility, which further exposes emerging markets to economic and financial shocks. As observed by Mensi, Maitra, and Vo (2021), volatility spillovers from major G7 stock markets have asymmetric effects, disproportionately affecting emerging economies. These effects are particularly stark during periods of economic downturns or global crises, where "bad" volatility - volatility driven by negative economic shocks - is more likely to spill over to emerging markets, exacerbating fluctuations in their stock markets. For Vietnam, G7 volatility presents unique challenges. Vietnamese firms listed on U.S. exchanges (Vinfast, for example) are likely to experience increased volatility in their stock prices as international investors react to adverse conditions in G7 markets, including those of the U.S., the European Union, and Japan. The interconnectedness of stock markets means that shocks originating in the G7 can reverberate globally, and emerging market firms with international listings may feel the impact in the form of heightened stock price fluctuations, potential capital outflows, and reduced investor confidence. This dynamic places added pressure on Vietnamese cross-listed firms, which may need to proactively communicate stability measures and risk management strategies to reassure investors in times of elevated G7 volatility.

In light of these findings, there are several critical implications for emerging/frontier markets and Vietnam in particular. For emerging economies broadly, the connectedness to G7 markets underscores the importance of building resilience through diversified trade relationships and strengthened domestic economic policies. Mensi *et al.* (2021) emphasized that the asymmetric nature of volatility spillovers from G7 countries to emerging markets highlights a need for policy measures that can absorb external shocks without destabilizing local markets. This might include developing stronger regulatory frameworks, enhancing liquidity in domestic financial markets, and creating supportive fiscal policies that can buffer economic impacts from external volatility. By implementing policies that encourage a balanced, diverse economic structure, emerging markets can reduce their vulnerability to G7-induced shocks.

For Vietnam, these implications are especially relevant given its positioning within global supply chains and its rising status as an alternative manufacturing hub to China. Vietnam's export-oriented economy, particularly in sectors such as manufacturing, is vulnerable to the fluctuations associated with both TPU and G7 volatility. One important policy recommendation is for Vietnam to pursue trade diversification proactively and actively. By expanding its trade partnerships beyond the U.S. and China, Vietnam can reduce dependency on any single market, thereby mitigating the risk of being overly impacted by TPU or changes in U.S. - China trade relations. Moreover, supporting domestic industries that can cater to both local and foreign demand could help stabilize cash flows for Vietnamese companies when external demand fluctuates.

Another key strategy for Vietnam is enhancing its domestic financial markets. Improved market stability and transparency can offer local companies and foreign investors a more secure investment environment, which may help counterbalance the effects of G7 market volatility. Vietnamese companies, especially those cross-listed internationally, should consider strengthening their communication with investors about how they manage external risks, including U.S. TPU and G7 market volatility. Disclosure and transparent communication can play a critical role in building investor confidence, as it demonstrates a company's proactive stance in addressing potential risks.

Furthermore, Vietnam's policymakers could introduce measures to encourage investment in sectors less exposed to international market volatility, such as sectors focused on domestic consumption. Supporting the development of these sectors can build up a more balanced economy that does not rely solely on export-driven growth. This diversification within the economy can provide Vietnam with a stronger internal buffer, which can absorb external shocks and maintain steady growth even in times of global economic uncertainty.

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