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The Impacts of Financial Market, Trade and Economic Policy Uncertainties on the Import Performance of Advanced Economies

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Abstract This study aims to examine the long-term and short-term diverse effects of economic policy uncertainty, trade policy uncertainty, and financial market uncertainties on the import performance of advanced economies. It employs the Pooled mean group autoregressive distributed lag (PMG/ARDL) method for the panel of 27 advanced economies using quarterly data from the first quarter of 1996 to the fourth quarter of 2020. The study's results reveal that local and global economic and trade policy uncertainties have significant adverse long-term effects on the import performance of advanced economies. Besides, financial market uncertainties negatively impact advanced economies' imports in the long run. Nonetheless, the results imply that domestic economic and trade policy uncertainties positively affect imports in the short run. Moreover, the Dumitrescu-Hurlin (D-H) panel causality test indicated that bidirectional causality exists between financial market and trade policy uncertainty indicators and imports. However, unidirectional causality exists between economic policy indicators and imports. The results are consistent across different sensitivity analyses. Based on these findings, we propose policy implications to control economic, trade and financial market uncertainties and thereby alleviating their impact on the import performance of advanced economies.

Keywords: import performance, economic policy uncertainty, trade policy uncertainty, financial market uncertainty, advanced economies, heterogeneous panel models

JEL Classifications: F10, F14, E44

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I. Introduction

In the past two decades, the global economy has been subject to a number of policy instabilities and fluctuations. For instance, world trade conflicts, including the United States and China (Chong & Li, 2019), sanctions imposed on Russia as a result of its actions in Ukraine, the United Kingdom's EU vote and leave (Gould-Davies, 2018), economic crises, Eurozone debt shocks, and European regulation and trade (Bekkers, 2019). Based on these changes and fluctuations, various parties have closely considered uncertainties and their effects on diverse economic activities. Multiple studies have shown that economic uncertainty is associated with both negative and positive effects on economic activities and parts. The research works have been conducted focusing on the impact of uncertainties on money demand (Hossain & Arwatchanakarn, 2020; Bahmani-Oskooee & Nayeri, 2020), inflation (Jones & Olson, 2013), output (Baker et al., 2016), oil market and gasoline (Yang & Hamori, 2021), exchange rate fluctuations (Krol, 2014), the stock market (Si et al., 2021).

Despite its growing importance, empirical research has paid less attention to the connection between import performance and economic uncertainty. Nonetheless, a few studies have empirically explored the link between imports and policy uncertainties. Some previous studies (Greenland et al., 2019; Handley, 2014; Crowley et al., 2018; Tam, 2018) find a negative association between uncertainties and total trade or export, suggesting that economic uncertainties have an adverse consequence on the trade performance of countries. Besides, Novy and Taylor (2020) examine the impacts of policy uncertainty on import performance. These studies mainly focus on a single or a few advanced economies. Besides, they are mainly concerned with the short-run association between economic uncertainty and trade. The primary reason to focus on the short-term implications of uncertainties is that they may stabilize and cease to have lasting effects. Some research works (Fang et al., 2018; Sharma, 2020) argue that uncertainties have both short-term and long-term impacts.

Hence, this study aims to investigate the short-term and long-term roles of economic policy uncertainty (EPU), trade policy uncertainty (TPU) and financial market uncertainty (FMU) on the imports of 27 countries using quarterly data for the period 1996Q1-2020Q4. We match various uncertainty indicators and control variables with the imports. More specifically, the effects of domestic EPU, domestic TPU, global EPU, global TPU, and FMU on import have been examined by applying the PMG/ARDL model. Besides, the exercises are repeated applying the CS-DL model to control for cross-sectional dependence concerns. Lastly, the D-H strategy is utilized to identify the causal link between import and uncertainty indicators (EPU, TPU, and FMU). Our results provide evidence that advanced economies' import is adversely affected by EPU and TPU in both the short and long run.

There are a number of ways in which this research differs from previous works that have

examined how EPU, TPU, and FMU affect imports. First, it is the first study to examine the role of EPU, TPU, and FMU on the imports of a panel of advanced economies, which has been masked and relatively under-researched. It also extended the analysis by controlling for the effects of local and world economic and trade policy shocks. The inclusion of various shocks to imports is justifiable because the import performance of countries can be affected by domestic policy shocks of the countries and global market policy shocks.

Second, this study is the first of its kind to investigate the roles of FMU on import performance using a volatility index for the panel of advanced economies. Sharma and Paramati (2021) and Ludvigson et al. (2020) found evidence that financial market fluctuations can severely affect output and trade. Thus, examining the financial market uncertainty's impact on imports is worthwhile.

Third, unlike previous studies, this study deals with the short and long-run effects of EPU, TPU and FMU on the imports of panel countries. Most previous studies investigate the short-run impacts of various uncertainties on trade performance based on the assumption that uncertainty may not have long-run effects. However, other studies provide evidence that uncertainty can have short- and long-run effects at a single country level (Fang et al., 2018; Sharma, 2020; Sharma & Paramati, 2021).

Fourth, this study used 27 advanced countries' quarterly data for 1996Q1-2020Q4. It employs the PMG/ARDL and CD-DL approaches that can address cross-sectional dependence and heterogeneity problems. Also, previous studies focus on yearly data, and the EPU is designed to better illustrate short-term policy unpredictability. Therefore, we use quarterly data to examine the effects of uncertainty on the import.

Finally, this study performs the D-H Panel Causality test to examine the causal relationship between import and uncertainty indicators.

II. Literature Review

Most of the traditional models use total expenditure in the import forecast. However, using disaggregated components of total expenditure in import specification is a relatively recent empirical approach (Narayan & Narayan, 2005). The aggregate income can be disaggregated into final consumption expenditure, investment, and export. Using the components of total expenditure has an advantage over the traditional aggregate import demand model because the former operates under the assumption that the import contents of all components within final expenditure are not identical. It can solve the aggregation bias problem and help examine the separate impacts of each component on import demand. Moreover, a model with disaggregated components has better predictive power than the standard import demand model (Narayan &

Narayan, 2005). Therefore, this study used disaggregated components of total expenditure in the analysis.

Some empirical studies have been undertaken to control the impacts of various indicators on countries' imports. We mainly discuss empirical studies regarding the relationship between uncertainty and imports.

A study by Goswami and Junayed (2006) has tried to examine the long-run relationship (cointegration) between the trade balance, income, and relative prices (or the real exchange rate) and price for the USA with 19 The Organisation for Economic Cooperation and Development (OECD) trading partners for the period 1973Q1-2004Q4. To solve short-run heterogeneity and the long-run homogeneity of the estimated coefficients, they utilized a PMG/ARDL estimator. The findings indicated that applying the PMG/ARDL estimator provides significant and theoretically consistent results. Also, Katsimi and Moutos (2011) analyze the empirical effects of income inequality on demand for imports by utilizing the USA data for the period 1948-2007. The findings show evidence of a long-run correlation within the fundamental imports equation, encompassing income inequality. Furthermore, the outcomes suggest that the enduring connection among imports, income, relative prices, and inequality persists not solely for overall real imports but also for various disaggregated import elements. Besides, Konstantakopoulou (2017) investigates fiscal policy (government expenditure) effects on import demand based on the euro area countries for 1995-2015. The study used econometric estimators that can control cross-sectional dependence and heterogeneity concerns.

A few studies attempted to investigate the impacts of uncertainty on countries' trade performance. For example, Handley (2014) and Handley and Limão (2015) explore the impact of EPU on countries' export performance. Handley's (2014) and Handley and Limo's (2015) theoretical and empirical frameworks imply that companies are delaying their market entrance due to elevated policy uncertainties to avoid incurring sunk costs of entry in light of worsening conditions in the market. A real option value may be associated with postponing entry into international markets until the uncertainty subsides. Therefore, uncertainty has an economically significant adverse effect on trade. Similarly, Armelius et al. (2014) investigate the reason why world trade declined after the financial crisis in 2008. The findings suggest that the sluggish recovery of trade following the economic downturn and global financial crisis can be attributed to financial difficulties affecting trade credits and trade-dependent investment, as well as elevated uncertainty adversely impacting trade.

A more recent investigation by Crowley et al. (2018) reveals that businesses are more inclined to abandon markets and less inclined to enter new markets when their goods are affected by an elevated degree of policy uncertainty. Similarly, Greenland et al. (2019) assess the impacts of EPU on bilateral trade flows. They applied a gravity model to determine the roles of policy uncertainty on trade, and their findings imply that a high policy uncertainty adversely affects

trade performance. Similarly, using an open economy model where investors can buy intermediate inputs from domestic and foreign markets, Novy and Taylor (2020) found a significant decrease in foreign input orders due to high policy uncertainty. In addition, enterprises' entry into export choices determines the theoretical underpinning for the effects of policy uncertainty on trade movement, particularly exports. It is founded on companies' choices to invest and enter the market and how uncertainty influences those decisions. Similarly, Borojo et al. (2022) examined the effects of TPU on the trade performance of developing economies. The findings show that the trade performance of developing economies is adversely affected by the TPU.

Sharma and Pal (2019) investigated the effect of exchange rate volatility on imports using a set of several commodities for the period 2013-2016 in the case of India. They applied a PMG/ARDL estimator to examine long-run and short-run relationships between nominal exchange rate volatility and imports. The findings show that exchange rate fluctuation has a significant adverse impact on imports both in the long and short run. Moreover, a study by Sharma and Paramati (2021) investigate the effects of financial market and economic policy uncertainties on imports in India, applying the PMG/ARDL and CS-DL models to examine the role of different indicators of uncertainty (domestic EPU, global EPU, and FMU) on Indian import. The results imply that uncertainty positively affects imports in the short run. However, it has an adverse impact on imports in the long run. Also, the study by Cevik and Erduman (2020) argued that monetary policy uncertainty (MPU) adversely impacts economic activity. Likewise, Kamara and Koirala (2023) examined the impact of MPU on the US economy using quarterly data from 1985Q1 to 2022Q3. The findings indicated that MPU shocks negatively affect the US economy's output. Likewise, Husted et al. (2017) discovered that increased MPU has enduring adverse impacts on firm-level investment, aligning with the mechanisms of investment irreversibility and financial friction channels.

Also, Fan et al. (2023) conducted a study on the influence of market uncertainty on international trade. They discovered that uncertainty in foreign markets negatively affects China's trade performance. This effect is particularly significant in industries experiencing stricter financial limitations compared to others. Ahiadorme (2021) also used monthly South African data to examine global uncertainty's repercussions. These results align with the notion that uncertainty shocks serve as crucial external factors contributing to cyclical fluctuations, with reactions in financial markets playing a pivotal role in how uncertainty shocks impact the real economy.

The studies mentioned above are mainly concerned with the short-run roles of uncertainties in the trade performances of the countries. A few empirical literature investigating the long-run and short-run effects of uncertainties on trade is limited to country-level analysis. Therefore, this study fills the gap in the literature by analyzing the short-run and long-term effects of uncertainty on import performance for the panel of advanced economies.

III. Methodology and Data

A. Method of analysis

Most empirical literature on trade employs gravity model specifications using static panel data strategies. Due to the non-stationary data behavior, however, applying these techniques will yield inadequate outcomes. Moreover, they only represent short-term dynamics. Eliminating this concern might result in a misleading regression. Therefore, panel data with a large cross-section and a larger length of time series need serious attention (Baltagi, 2001). In addition, there is a growing interest in dynamic models of panel data in which the number of time-series observations is proportional to the size of the panel groups or is relatively large. These panels are most prevalent in cross-country studies. In the majority of applications related to this type, the coefficients of interest are the long-term roles and the speed of long-term adjustment (Pesaran et al., 1999). Besides, they provide the short-run relationship between variables.

To this end, Pesaran et al. (1999) used the PMG/ARDL estimator to estimate the panel ARDL model of the association between uncertainty and import. According to Pesaran et al. (1999), the ARDL (p,q) approach can be utilized to integrate dynamic heterogeneous panel analysis into the error correction model.

The PMG/ARDL approach has the advantage of considering the dynamic variability of the adjusting process and detecting possible convergence toward the long-run equilibrium. In cases of country variability, it also gives reliable coefficients (Pesaran et al., 1999). The PMG/ARDL estimator additionally has the ability to determine whether a long-run cointegration connection exists between variables of different orders. Furthermore, the PMG/ARDL estimator assumes long-run coefficients to be consistent throughout individual nation groups, consenting for short-term estimations and error variances while enforcing intercept heterogeneity. If the long-term conditions are met, it is regarded as the best option regarding reliability and efficiency. Thus, the PMG/ARDL model has the advantage of providing both long-term and short-term estimates at the same time, irrespective of the series I(1) and I(0) mix (Pesaran & Pesaran, 1997). Therefore, an econometric model that can relate uncertainty indicators to imports is defined based on these advantages.

Assuming that given data on periods, t = 1, 2, ..., T, and groups, i = 1, 2, ... , N, we desire to estimate an ARDL(p, q1, q2, ... , qn) model can be:

$$M_{i,t} = \sum_{j=1}^{p} \chi_{ij} M_{i,t-j} + \sum_{j=0}^{q} \beta_{ij}^{'} Y_{i,t-j} + \sum_{j=0}^{q} \alpha_{ij}^{'} X_{i,t-j} + \epsilon_{i,t} \quad (1)$$

Where $M_{i,t}$ is the imports of i-country at time t, $M_{i,t-1}$ is the lagged value of imports. $Y_{i,t}$ is (k x 1) is the vector of control variables for group i such as final consumption expenditure,

investment, export and real effective exchange rate. $X_{i,t}$ is (k x 1) is the vector of target variables for group i such as domestic TPU, domestic EPU, global economic policy uncertainty (GEPU), global trade policy uncertainty (GTPU), and FMU. χ_{ij} is the coefficient of the lagged dependent variable, β_{ij} and α_{ij} are k x 1 coefficient vectors, and $_{it}$ represents the stochastic term.

We also control variables that can show the domestic disaggregated income. The domestic aggregate income can be divided into its final expenditure components such as consumption (government final consumption spending and household final consumption expenditure), an investment that can be proxied by gross fixed capital formation, and export. We can re-arrange equation (2) to the long- and short-run cointegration dynamic panel model:

$$\Delta M_{i,t} = \rho_i M_{i,t-1} + \alpha_i' Y_{it} + \sum_{j=1}^{p-1} \chi_{ij}^* \Delta M_{i,t-j} + \sum_{j=0}^{q-1} \phi_{ij}'^* \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \eta_{ij}'^* \Delta X_{i,t-j} + \epsilon_{i,t} \quad (2)$$

Where,

$$\rho_i = -\left(1 - \Sigma_{j-1}^{p} \chi_{ij}\right) \quad (3)$$

$$\alpha_i = \Sigma_{j=0}^{q} \beta_{ij} \quad (4)$$

$$\chi_{ij}^* = -\sum_{m=j+1}^{p} \chi_{im}, \text{ j=1, 2, …, p-1} \quad (5)$$

$$\phi_{ij}^* = -\sum_{m=j+1}^{q} \beta_{im}, \text{ j=1, 2, …, q-1} \quad (6)$$

$$\eta_{ij}^* = -\sum_{m=j+1}^{q} \alpha_{im}, \text{ j=1, 2, …, q-1} \quad (7)$$

However, in panel model estimates, given the combinations of larger time series and cross-sectional dimensions, the panel dataset may suffer from a Cross-sectional dependence issue (Baltagi et al., 2005). To resolve this issue, we repeat the analysis using the CD-DL model because it simultaneously addresses cross-section dependence and heterogeneity concerns. However, it will give results inclined to short-run if the time series is not too large (Sharma & Paramati, 2021).

Finally, the D-H panel causality test is applied to determine the direction of causality between uncertainty indicators and import. The D-H panel causality test is advantageous since it considers the temporal dimension and the size of cross-sections while also analyzing imbalanced panel data. It works well even when there is reliance across sections. It also considers slope heterogeneity (Dumitrescu & Hurlin, 2012). The test is applied based on the following equation:

$$Z_{i,t} = \beta_i + \sum_{k=1}^{k} \chi_i^k Z_{i,t-k} + \Sigma_{k=1}^{k} \alpha_i^k Y_{i,t-k} + \epsilon_{i,t} \quad (8)$$

Where k is the recommended time lag and Z and Y are the potential variables for testing the causal relationship.

B. Data

Data for the variables are collected from various sources for the panel of 27 advanced economies for 1996Q1-2020Q4 based on data availability.[1] The sample of advanced economies is selected based on the IMF World Outlook Database classification.[2] Final consumption expenditure (sum of private and government consumption expenditure) and gross fixed capital formation and export are used to indicate the effects of expenditure/income on the import level. Data for consumption expenditure and gross fixed capital formation is borrowed quarterly from the IMF's International Financial Statistics (IFS), except for the USA and Canada. We used the data compiled by FRED, Federal Reserve Bank of St. Louis, for these four countries. The data was in local currency and converted to the US dollar using the local currency to the USA dollar exchange rate. The export data is utilized from IMF's International Financial Statistics (IFS) in quarterly forms.

The real effective exchange rate (NER) series considers the impacts of the relative prices of trading countries and the nominal exchange rate (Arize et al., 2017). The real effective exchange rate is the consumer price-based real effective exchange rate that is used to proxy the relative prices (Konstantakopoulou, 2017). Thus, following these studies, the real exchange rate is controlled in the estimation. Data for the real effective exchange rate is taken from the Banks for International Settlements (BIS) database in quarterly forms. Import data is borrowed from IMF's International Financial Statistics (IFS).

EPU and TPU data has been acquired from the Economics Intelligence Unit (EIU) reports as compiled by Ahir et al. (2018) for several countries. The index calculates the quarterly mean occurrence of uncertainty linked to economic and trade policy uncertainty indices. Domestic EPU, domestic TPU of import destination countries, GEPU, and GTPU are utilized in different models to examine the role of policy uncertainties on the import level. GEPU and GTPU are included based on the notion that global policy uncertainty is one of the important factors in the global economy; it can affect the overall economic performance of world countries (Hoque & Zaidi, 2020; Sharma & Paramati, 2021). Finally, a higher index value shows higher levels of policy uncertainty and vice versa.

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1) List of countries: Australia, Australia, Belgium, Hong Kong, Rep. of Croatia, Denmark, France, Germany, Greece, Ireland, Israel, Italy, Japan, Rep. of Korea, Latvia, Lithuania, Netherlands, New Zealand, Norway, Portugal, Singapore, Rep. of Slovenia, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, Canada and The United States of America

2) The classification of countries based on the IMF World Economic Outlook database is available at https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates.

Besides, FMU is proxied by the volatility index retrieved from the Chicago Board Options Exchange (CBOE). It is converted to a quarterly form using the average of daily data. This index tracks market risk and sentiment among investors in real-time. A study by Rey (2015) has indicated that exchange rate uncertainty, represented by the volatility index, significantly affects capital flows. It is included in the notion that the volatility in the US market significantly affects the world markets (Chiang et al., 2007; Diebold & Yilmaz, 2009). Therefore, based on Chiang et al. (2007), Diebold and Yilmaz (2009), and Rey (2015), we examine the effects of FMU on imports using the volatility index of the US developed by the CBOE in our analysis. Using the US volatility index is reasonable. It is more relevant to advanced economies as firms and households in these countries are relatively actively involved in the US financial market. The summary statistics of variables are given in Table 1.

Table 1. *Summary Statistics of the Variables*

Variables	Obs	Mean	Std. Dev.	Min	Max
$Lnimport_{it}$	2,700	10.548	1.501	6.262	16.098
$Lnexport_{it}$	2,700	10.489	1.607	5.756	16.088
$Lncosumption_{it}$	2,700	0.804	1.679	-0.716	7.379
$Lninvestment_{it}$	2,700	10.171	1.652	5.711	13.971
NER_t	2,696	11.032	1.582	7.520	15.121
$LnEPU_{it}$	2,700	0.147	0.588	0.000	4.158
$LnGEPU_t$	2,700	0.157	0.141	0.000	1.014
$LnTPU_{it}$	2,700	9.744	0.473	8.625	10.928
$LnGTPU_t$	2,700	-0.641	2.294	-4.605	5.161
$LnFMU_t$	2,700	1.420	0.530	0.722	4.166

Figures 1 and 2 indicate the patterns of global and high-income countries' imports and components of aggregate income. The information in the figures reveals that imports and components of aggregate income have the same pattern of fluctuations over time. Figure 3 indicates fluctuations in world imports and global EPU since 1996. When global EPU uncertainty increases, world imports tend to decrease. Therefore, inverse fluctuations can be observed from the pattern.

Figure 1. The pattern of import, export, consumption, and investment (World)

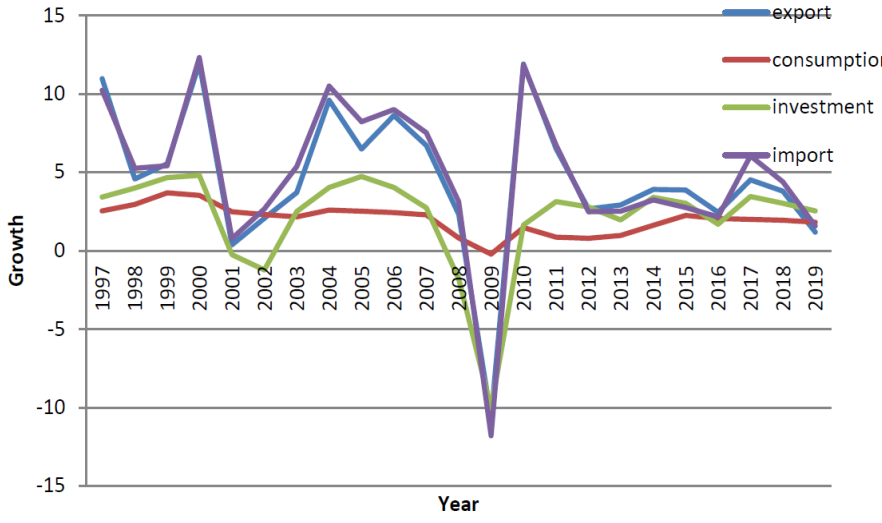


Figure 2. The pattern of import, export, consumption, and investment (High-income)

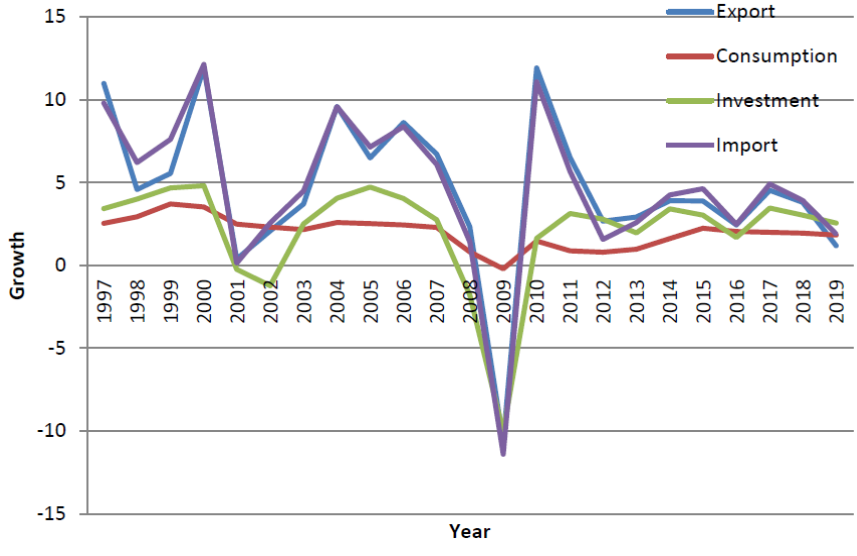
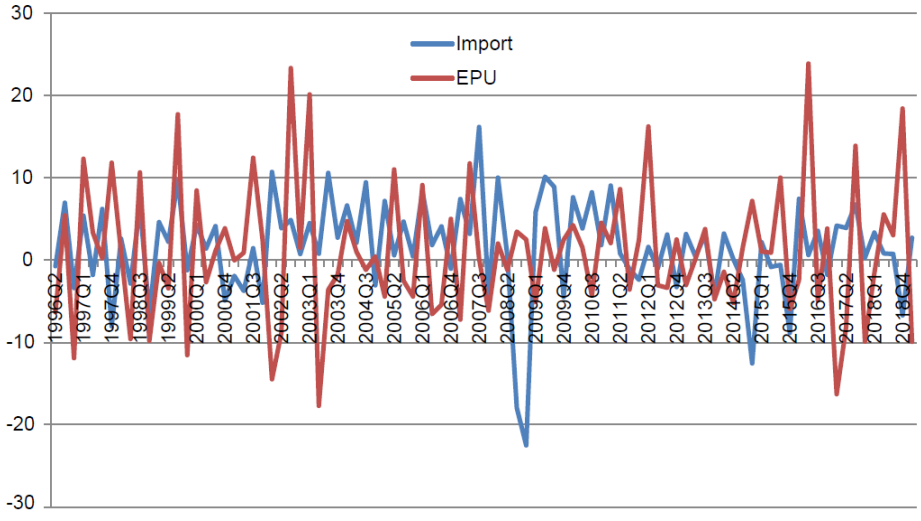


Figure 3. EPU and import



IV. Results and Discussions

A. The panel unit root tests test

The empirical analysis in this section starts with conducting panel unit root tests for the variables considered in the model specifications. We use the Levin et al. (2002) panel unit root test, which is based on the idea of common unit root procedures. The purpose of this test is to determine whether or not the absence of a unit root contradicts the null hypothesis of a unit root. As can be seen in Table 2, the results of the panel unit root test suggest that some of the chosen variables exhibit random walk behavior. However, domestic EPU, global EPU, domestic and global TPUs and FMU are found to be stationary at I(0). Thus, the test confirms that all other variables are stationary at the first difference. Besides, the dependent variable (import) is stationary at I(1). This is a requirement for the Westerlund cointegration assessment.

Table 2. *Stationarity Test*

Variables	At level	A difference
$Lnimport_{it}$	0.545	-40.189***
$Lnexport_{it}$	2.1921	-40.189***
$Lncosumption_{it}$	1.9065	-41.645***
$Lninvestment_{it}$	-1.414	-27.028***
NER_t	-1.021	-31.611 ***
$LnEPU_{it}$	-26.922***	
$LnGEPU_t$	-7.920***	
$LnTPU_{it}$	-5.008***	
$LnGTPU_t$	-17.064***	
$LnFMU_t$	-15.609***	

Note. *** indicates the acceptance of the alternative hypothesis of unit root at the 1% significance level. The constant term is included.

B. Cointegration test

In this section, we examine the long-run equilibrium association between the variables using Westerlund (2007), Pedroni (1999), and Kao (1999) tests. These methods are the most extensively applied methods to test the cointegration relationship. Kao's (1999) cointegration test extends Engel and Granger's (1987) time series cointegration strategy to the panel models. Kao's (1999) panel test for cointegration has a null hypothesis of no cointegration. The results corroborate the rejection of the null hypothesis.

Table 3. *Kao Cointegration Test*

Kao	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Modified Dickey-Fuller t	-7.476***	-9.095***	-11.346***	-17.158***	-6.898***
Dickey-Fuller t	-6.515***	-7.440***	-8.569***	-10.898***	-6.116***
Augmented Dickey-Fuller t	2.989***	2.361***	1.702**	0.755*	3.218***
Unadjusted modified Dickey	-33.719***	-33.480***	-33.230***	-33.371***	-33.162***
Unadjusted Dickey-Fuller t	-13.941***	-13.865***	-13.777***	-13.825***	-13.750***

Note. *** and * indicate significance 1% and 10%

Moreover, we used Pedroni's (1999) and Westerlund's (2007) panel cointegration methods to test the long-run relationship. The test outcomes refute the null hypothesis, indicating that the estimated residuals display stationarity, thus revealing a notable long-term cointegration relationship among the variables at a significant level.

Table 4. *Pedroni Cointegration Test*

	Modified Phillips-Perron t	Phillips-Perron t	Augmented Dickey-Fuller t
Model (1)	-16.896***	-19.898***	-20.656***
Model (2)	-16.550***	-19.496***	-20.058***
Model (3)	-16.214***	-19.435***	-20.468***
Model (4)	-17.369***	-20.312***	-21.009***
Model (5)	-16.603***	-19.884***	-20.820***

Note. *** indicates significance 1%.

Table 5. *Westerlund Panel Cointegration Test*

Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
-2.068**	-2.346***	-2.106**	-2.511**	-2.162**

Note. *** and ** indicate significance at 1% and 5%, respectively.

Therefore, the results of all panel cointegration tests imply the existence of a long-run relationship among the variables. Therefore, we can examine the long- and short-run effects of the FMU, TPU, and EPU on the import level.

C. Long-run effects

We employ the PMG/ARDL method to examine the effects of financial market, economic and trade policy uncertainties on imports. The PMG/ARDL estimator constrains the long-run coefficients to be homogeneous across cross-sections while allowing for heterogeneity in short-run coefficients and intercepts. The long-run findings of PMG are presented in Table 6 below. Model 1 and Model 2 provide the effects of domestic and global EPU on imports, respectively. Model 3 and Model 4 present the results of domestic TPU and global TPU on import. Finally, Model 5 provides the impacts of FMU on the import performance of advanced economies. Uncertainty indicators are controlled separately based on relatively higher correlation among the indicators (Table A1).

Focusing on the long-run results of PMG/ARDL, estimates of all control variables have expected signs except for consumption expenditure. The coefficients of final consumption are positive and statistically significant in all specifications except in Model 1 and Model 5. However, its coefficients are negative and significant in Model 1 and Model 5. Moreover, the export coefficients are statistically significant and positive in all specifications. Besides, the long-run estimates of export expenditure on imports are the strongest compared to the other expenditure components. Keeping others constant, a 1% increase in exports is associated with a range of 0.992-0.988% import growth in the long run. This finding is in line with Konstantakopoulou's (2017) and Giansoldati and Gregori's (2017) results that found a substantial

positive effect of exports on the level of imports. Similarly, the investment effect is determined to exert a meaningful and positive influence on imports. However, the consumer price-based real effective exchange rate has mixed effects on imports, having negative and statistically significant effects in Model 3 and Model 5 and insignificant effects in Model 1, Model 2 and Model 4.

Table 6. *Long-Run Effect (PMG/ARDL Estimator)*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
$Lnexport_{it}$	0.988*** (0.005)	0.996*** (0.005)	0.994*** (0.005)	0.995*** (0.005)	0.992*** (0.005)
$Lncons_{it}$	-0.126*** (0.043)	0.193*** (0.054)	0.252*** (0.049)	0.267*** (0.051)	-0.256*** (0.051)
$Lninvestment_{it}$	0.084*** (0.030)	0.246*** (0.037)	0.242*** (0.034)	0.275*** (0.036)	0.218*** (0.037)
$LnNER_{it}$	-0.042 (0.035)	0.026 (0.042)	-0.069** (0.033)	-0.032 (0.036)	-0.099*** (0.035)
$LnEPU_{it}$	-0.066*** (0.017)				
$LnGEPU_{it}$		-0.046*** (0.008)			
$LnTPU_{it}$			-0.010* (0.005)		
$LnGTPU_{it}$				-0.005*** (0.001)	
$LnFMU_{t}$					-0.013** (0.006)

Note. ***p<0.01, **p<0.05 and *p<0.1. Values in parentheses are standard errors.

Regarding our target variables, domestic EPU and global EPU have adverse effects on the import performance of advanced economies in the long run. The magnitude of the coefficient of domestic EPU is 0.066, implying that the 1% increase in domestic EPU results in a 0.066% decrease in imports. Likewise, the coefficient of global EPU is 0.046, inferring that the 1% increase in global EPU results in a 0.046% decrease in the import performance of advanced economies. Therefore, domestic EPU has relatively greater adverse impacts on imports than global EPU. Besides, domestic TPU and global TPU have negative and significant impacts on imports in the long run. The results infer that a 1% increase in local TPU and GTPU results in a 0.01% and a 0.005% decrease in the import performance of advanced economies, respectively. Likewise, FMU significantly negatively affects the import performance of advanced economies.

Moreover, the analysis is repeated, excluding all control variables to control for collinearity concerns. The results are reported in Table A2 in Appendix A. No significant variation exists between baseline results and results reported in Table A2.

D. Short-run effects and error correction estimation

This section focuses on error correction model (ECM) results, which present the short-run effect and speed of adjustment. The short-run results of PMG/ARDL models are reported in Table 7 below. Model 1 and Model 2 report the short-run impacts of domestic EPU and global EPU on imports, respectively. Model 3 and Model 4 provide results of domestic TPU and global TPU on the import performance of advanced economies in the short run. Lastly, Model 5 reports the effects of FMU on imports.

Table 7. *Short-Run Effect and Error Correction Estimation (PMG/ARDL Estimator)*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
ECM	-0.202*** (0.050)	-0.196*** (0.047)	-0.199*** (0.050)	-0.197*** (0.051)	-0.196*** (0.050)
$Lnexport_{it}$	0.453*** (0.98)	0.450*** (0.096)	0.449*** (0.100)	0.452*** (0.101)	0.442*** (0.103)
$Lncons_{it}$	0.176** (0.071)	0.152* (0.079)	0.187*** (0.067)	0.189*** (0.065)	0.184*** (0.068)
$Lninvestment_{it}$	0.106*** (0.041)	0.109** (0.044)	0.105** (0.042)	0.107*** (0.041)	0.107*** (0.039)
$LnNER_{it}$	0.081 (0.057)	0.062 (0.063)	0.089 (0.056)	0.076 (0.054)	0.093* (0.054)
$LnEPU_{it}$	0.014** (0.007)				
$LnGEPU_{it}$		-0.005 (0.006)			
$LnTPU_{it}$			0.003** (0.001)		
$LnGTPU_{it}$				0.006 (0.001)	
$lnFMU_t$					-0.003 (0.004)
_cons	0.143*** (0.038)	0.009 (0.013)	0.079*** (0.020)	0.037*** (0.014)	0.151*** (0.038)
Obs.	2669	2669	2669	2669	2669

Note. ***p<0.01, **p<0.05 and *p<0.1. Values in parentheses are standard errors.

The results spotlight that the coefficients of error correction terms are negative and statistically significant at a substantial level. Therefore, the results show the existence of a long-run relationship among the variables.

Based on the results of PMG/ARDL, the coefficients of final consumption are positive and statistically significant in all specifications in the short run, implying that the level of consumption expenditure is one of the important determinants of import in the short run. The

results are in line with the findings of Giansoldati and Gregori (2017). Similarly, the export coefficients are statistically significant and positive in all specifications. The results further imply that export has the largest impact on the import performance of advanced economies in the short run. This finding is consistent with Konstantakopoulou's (2017) and Giansoldati and Gregori's (2017) results that found a high positive impact of exports on advanced countries' imports. Similarly, the coefficients of investment are positive and statistically significant in all specifications. The results support the findings of Konstantakopoulou (2017) argued that investment spending has robust positive effects on imports. However, the real effective exchange rate has insignificant effects on imports except for Model 5, which shows the positive effect of the real exchange rate on import performance at a 10% level of significance.

Turning to variables of our interest, the coefficients of domestic uncertainty indicators (domestic EPU and TPU) are positive and statistically significant (Table 7). A percent increase in domestic EPU results in a 0.014% increase in imports to advanced economies. Likewise, a percent increase in domestic TPU leads to a 0.003% increase in imports of advanced economies. Therefore, domestic EPU and TPU have significant positive effects on imports, implying that economic and trade policy shocks positively affect the import performance of advanced economies in the short run. The results are congruent with the findings of Sharma (2020) contended that economic uncertainties result in higher imports in the short term. However, FMU, global EPU and TPU have insignificant effects on the import performance of advanced economies in the short run. These findings can be justified as policy uncertainty is more vital in the long run than short-run uncertainty (Barrero, 2017).

V. Causality Test

The presented long-run estimates solely provide the results of the variables' relationship. They do not, however, show a causal connection between variables. As a result, the D-H panel causality assessment was used to evaluate the association between uncertainty indicators and imports. Table 8 summarizes the findings of the causality test.

The test findings imply bidirectional causality between domestic and global TPU and import. Similarly, there is bidirectional causality between FMU and import. However, a one-way causality exists between economic policy uncertainties (domestic and global EPU) and import, running from economic policy uncertainty indicators to import.

Table 8. *The H-D Test for a Causal Association between Uncertainty Indicators and Import*

Causal relationship			Z-stat.	War-stat
$Import_{it}$	↔	FMU_t	-2.851***	0.223
FMU_t		$Import_{it}$	13.000***	4.538
EPU_{it}	→	$Import_{it}$	7.160***	2.948
$Import_{it}$	N	EPU_{it}	-0.620	0.831
$GEPU_{it}$	→	$Import_{it}$	23.432***	7.377
$Import_{it}$	N	$GEPU_{it}$	-1.477	0.597
$GTPU_{it}$	↔	$Import_{it}$	2.164***	1.589
$Import_{it}$		$GTPU_{it}$	-2.595**	4.551
TPU_{it}	↔	$Import_{it}$	2.162**	1.588
$Import_{it}$		TPU_{it}	3.530***	14.177

Note. ***p<0.01 and **p<0.05. « bidirectional causality and ® represents one-way causality.

VI. Sensitivity Analysis

Concerns of cross-sectional dependence that may result from unobserved and ignored common components are not addressed in PMG/ARDL (Breitung & Pesaran, 2008). Estimators can be inconsistent if cross-sectional dependence is ignored (Baltagi, 2014). The CS-DL method, presented by Chudik and Pesaran (2015), aims to address this issue. Thus, to deal with this cross-sectional dependence, we repeat the assessment with the CD-DL approach, which concurrently addresses both dependence and heterogeneity issues. Chudik, Grossman, and Pesaran (2016) point out that short-run estimations need not be computed independently with the CS-DL approach. Table 9 provides details of these findings.

The results align with those obtained from the PMG/ARDL estimator, as presented in Table 6. The coefficients of the control variables exhibit anticipated signs and achieve statistical significance at a notable level. Final consumption expenditure has mixed effects on import performance. Besides, investment expenditure and exports have a significant positive effect on imports. The real effective exchange rate coefficients have the expected sign, however, its effect is significant in Model 3 and Model 4, implying a negative relationship between the exchange rate and import.

Furthermore, domestic EPU and TPU significantly negatively affect the import performance of advanced economies. Besides, Global EPU, global TPU and MPU also adversely affect the import performance of advanced economies. These results are consistent with the long-run estimates of PMG/ARDL reported in Table 6.

Table 9. *The Effects of Uncertainties on Import (CS-DL Estimator)*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
$Lnexport_{it}$	0.943***	0.915***	0.920***	0.937***	0.924***
	(0.016)	(0.019)	(0.004)	(0.018)	(0.018)
$Lncons_{it}$	0.407***	0.348***	0.236***	0.315***	-0.366***
	(0.055)	(0.063)	(0.014)	(0.058)	(0.060)
$Lninvestment_{it}$	0.379***	0.335***	0.222***	0.304***	0.356***
	(0.054)	(0.062)	(0.013)	(0.058)	(0.059)
$LnNER_{it}$	-0.018	-0.013	-0.016***	-0.023*	-0.012
	(0.012)	(0.014)	(0.003)	(0.013)	(0.013)
$LnEPU_{it}$	-0.004**				
	(0.002)				
$LnGEPU_{it}$		-.003**			
		(0.001)			
$LnTPU_{it}$			-0.001*		
			(0.001)		
$LnGTPU_{it}$				-0.014**	
				(0.007)	
$lnMPU_{t}$					-0.003*
					(0.002)
Obs.	2668	2669	2669	2669	2669
R-squared	0.890	0.880	0.880	0.890	0.750
Panels	27	27	27	27	27

Note. ***p<0.01, **p<0.05 and *p<0.1. Values in parentheses are standard errors.

In addition to employing the CD-DL method, the FMOLS method is applied. This method tackles the bias arising from the endogeneity of the regressors by integrating the Phillips and Hansen (1990) semi-parametric correction into the OLS estimator. Therefore, considering the data integration properties and limited sample size, this study also applied the Pedroni (2000) FMOLS technique. The results are reported in Table 10.

Table 10. *The Effects of Uncertainties on Import (FMOLS Estimator)*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
$Lnexport_{it}$	0.930***	1.183***	0.976***	0.976***	0.971***
	(0.028)	(0.098)	(0.029)	(0.029)	(0.029)
$Lncons_{it}$	-0.186**	1.172***	0.905***	0.905***	-0.976***
	(0.088)	(0.099)	(0.088)	(0.088)	(0.089)
$Lninvestment_{it}$	0.237***	1.001***	0.958***	0.958***	0.993***
	(0.085)	(0.032)	(0.092)	(0.092)	(0.092)
$LnNER_{it}$	-0.014	0.030	0.025	-0.025	-0.025
	(0.022)	(0.022)	(0.023)	(0.023)	(0.023)
$LnEPU_{it}$	-0.769***				
	(0.222)				

Table 10. *Continued*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
$LnGEPU_{it}$		-0.127** (0.063)			
$LnTPU_{it}$			-0.091*** (0.030)		
$LnGTPU_{it}$				-0.095*** (0.016)	
$lnMPU_t$					-0.023*** (0.007)
Obs.	2695	2695	2695	2695	2695
R-squared	0.723	0.762	0.808	0.715	0.806
Panels	27	27	27	27	27

Note. ***p<0.01, **p<0.05 and *p<0.1. Standard errors are in parentheses.

The findings are in line with the baseline results reported in Table 6. All uncertainty indicators have adverse effects on the import performance of advanced economies.

VII. Discussions and Policy Implications

The study deals with the dynamic heterogeneous panel analysis of the relationship between uncertainties and imports. The import function is extended to consider the effects of the financial market, economic and trade policy uncertainties on the import performance of a panel of 27 advanced economies for 1996Q1-2020Q4 using quarterly data. We applied the PMG/ARDL to simultaneously assess the effect of uncertainties on imports in the short and long run. Besides, the CD-DL model is applied to control for cross-sectional dependence concerns and robustness analysis. Moreover, we used the disaggregated components of total expenditure (total consumption expenditure, investment, and export) as control variables in the model specification, which is a relatively recent research approach.

The study's findings indicate that the estimated coefficient of domestic EPU is negative and statistically significant, implying that domestic EPU has adverse impacts on the import of advanced countries in the long run (see Table 6). Similarly, the coefficient of global EPU is negative and economically significant in the long-run analysis, revealing that the global EPU has a robust negative effect on imports in the long run. Therefore, economic policy uncertainties deter import activities of advanced economies due to heightened risk perceptions among businesses and investors. Cautious spending and investment decisions of investors reduce demand for imported goods, resulting in cutting imported inputs. Nonetheless, domestic EPU has relatively greater adverse impacts on imports than global EPU in the long run.

Domestic TPU has a significant adverse impact on the import performance of advanced economies in the long run (Table 6). Likewise, the coefficient of global TPU is negative and statistically significant in the long run, implying that global TPU adversely affects the import performance of advanced economies. Therefore, both local and global TPUs have a notable influence on import performance within advanced economies. Businesses face difficulties predicting market conditions and organizing import activities amidst uncertain trade policies. This uncertainty often results in postponed investment decisions and decreased import orders as businesses aim to manage risks effectively (Handley & Limão, 2015). Furthermore, uncertainties in trade policies can disrupt supply chains, elevate import costs, and reduce the level of imports. Additionally, fluctuations in trade policies can diminish business confidence, subsequently lowering consumer demand for imported goods.

In the short term, the results implied that domestic EPU and TPU favorably affect imports of advanced economies (Table 7). Thus, an increase in domestic EPU and TPU can surge imports of advanced economies in the short run (Sharma, 2020). Amid uncertain economic policies, businesses may perceive growth opportunities or anticipate regulatory changes that could benefit import activities. This anticipation may drive up import orders as businesses aim to secure supplies or take advantage of potential market shifts. Furthermore, during periods of economic uncertainty, governments might enact expansionary measures or offer incentive packages, stimulating domestic demand and thereby increasing imports. Besides, the heightened EPU and TPU within the domestic economic landscape result in ambiguous policy trajectories that could lead to volatile productivity. This could ultimately foster a heightened reliance on imports and increase imports in the short run (Sharma, 2020).

Moreover, FMU has significant negative impacts on imports of advanced economies in the long run (Table 6). The results can be loosely explained that when uncertainty prevails in financial markets, it discourages import activities due to increased risk perceptions among businesses and investors. This cautious sentiment reduces demand for imported goods as spending and investment decisions become more conservative (Novy & Taylor, 2020). Moreover, uncertainty in financial policies can induce exchange rate volatility, impacting import costs and trade competitiveness. Additionally, unstable financial environments may restrict access to credit and financing, thereby constraining import-related transactions. Therefore, the effects of FMU on import performance emphasize the necessity of stable and predictable financial conditions to support the trade performance of advanced economies.

These findings align with theoretical and empirical expectations that firms cut their intermediate inputs import when there is high uncertainty. In other words, in the face of high uncertainty, firms may adopt a cautious approach, postponing investment until the uncertainty has been resolved and cutting their import (Greenland et al., 2019). It is also comparable with the work of Novy and Taylor (2020), which uses an approach in which enterprises minimize

their fixed ordering costs by purchasing intermediate inputs from domestic as well as global suppliers and maintaining inventories of both. Firms lower intermediate input inventory holdings in reaction to increased uncertainty, as reflected by stock market volatility, with the effect being more pronounced for imported inputs. Consequently, a substantial reduction in foreign input purchases is anticipated in response to elevated policy uncertainty.

Furthermore, the findings of this study are congruent with the theoretical basis of Handley (2014), and Handley and Limão (2015) suggest that elevated policy uncertainties force businesses to delay entry to the market to circumvent incurring sunk entry costs considering deteriorating market conditions. Hence, it has the potential to generate a real option value associated with delaying entry into foreign markets until the economic uncertainty is resolved. Therefore, uncertainty can adversely affect the trade performance of countries. Additionally, the results of this research are compatible with the option theory of investment that argues that EPU shares a substantial part as a factor affecting investment expenditure and forecasts that when trade, economic, and financial uncertainties are high, firms postpone the decision to enter into a trade, therefore, adversely impact the demand for intermediate inputs import.

Besides, regarding global EPU and TPU, the findings of this analysis are backed by theories and current empirical studies. For instance, EPU and TPU shocks in one nation can ripple to other nations and influence their import through the global value chain and trade connections (Tam, 2018). Therefore, these findings make sense, given that international trade has greatly increased companies' exposure to EPU, TPU, and FMU from other countries, spreading uncertainty worldwide.

Finally, the D-H panel causality test against CSD is utilized to determine the causal relationship between uncertainty indicators and imports. The D-H panel causality test indicated that bidirectional causality exists between uncertainty indicators and import. The implication of the bidirectional relationship between uncertainty indicators and import is that domestic and global economic and trade policy uncertainties delay the decisions of firms to invest and import intermediate inputs. Similarly, households tend to cut consumption and imports, affecting imports. Similarly, fluctuations in imports will result in uncertainties.

Therefore, the results of this study are unique and significant because they fill the gaps in previous studies. Previous studies that analyze the effects of different policy uncertainties for a single nation or panel of economies in the time-series data context ignore important information retained in the cross-sectional data. Besides, earlier studies mostly emphasize the short-run impacts of uncertainties while overlooking the long-term ones, making it difficult to get new information in the incident of changes over time. These gaps are retained in this study.

From a policy implications angle, this study calls for timely investigations of the causes and sources of EPU and TPU (domestic or global). Moreover, it recommends immediate and effective counter policies to address economic and trade uncertainties. Also, a robust policy

implication to mitigate economic and trade policy uncertainties in advanced economies and minimize their adverse impact on import performance involves fostering transparency and communication in policymaking. Therefore, governments in advanced economies should prioritize clear and consistent communication of economic and trade policies to businesses, investors, and the public. This can be achieved through regular updates, consultations with stakeholders, and transparent decision-making processes.

Besides, subject to the globalized world, global economic shocks are easily transmitted to countries; thus, it needs collective policy actions to control EPUs and TPUs. Similarly, minimizing continuing trade tensions and war, which significantly add to global economic and trade policy uncertainty, is recommended. Thus, policymakers should strive for greater international cooperation and coordination to reduce uncertainties stemming from global trade tensions and economic fluctuations.

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Appendix

Table A1. *Correlation Coefficients*

Variables	a	b	c	d	e	f	g	h	i	j
$Lnimport_{it}$(a)	1									
$Lnexport_{it}$(b)	0.98	1								
$Lncons_{it}$(c)	0.66	0.65	1							
$Lninvt_{it}$(d)	0.66	0.65	0.55	1						
$LnNER_{it}$(e)	0.04	0.07	0.11	0.16	1					
$LnEPU_{it}$(f)	-0.10	0.10	0.12	0.10	-0.01	1				
$LnGEPU_{it}$(g)	-0.19	0.19	0.07	0.06	0.00	0.40	1			
$LnTPU_{it}$(h)	0.07	0.07	0.03	0.04	-0.06	0.72	0.32	1		
$LnGTPU_{it}$(i)	-0.08	0.08	0.03	0.03	0.01	0.27	0.60	0.43	1	
$lnFMU_t$(j)	-0.07	-0.08	-0.03	-0.03	0.01	-0.04	-0.05	-0.08	-0.65	1

Table A2. *Effects of Economic, Trade and Financial Uncertainty on Import Performance*

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
$LnEPU_{it}$	-0.029*** (0.006)				
$LnGEPU_{it}$		-0.474*** (0.074)			
$LnTPU_{it}$			-0.057* (0.029)		
$LnGTPU_{it}$				-0.003** (0.001)	
$LnFMU_t$					-0.021*** (0.006)

Note. ***p<0.01, **p<0.05 and *p<0.1. Standard errors are in parentheses.