Economic Issues, Vol. 30, Part 1, 2025

On the Link between European Policy Uncertainty and Export Earnings of European Countries

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Abstract

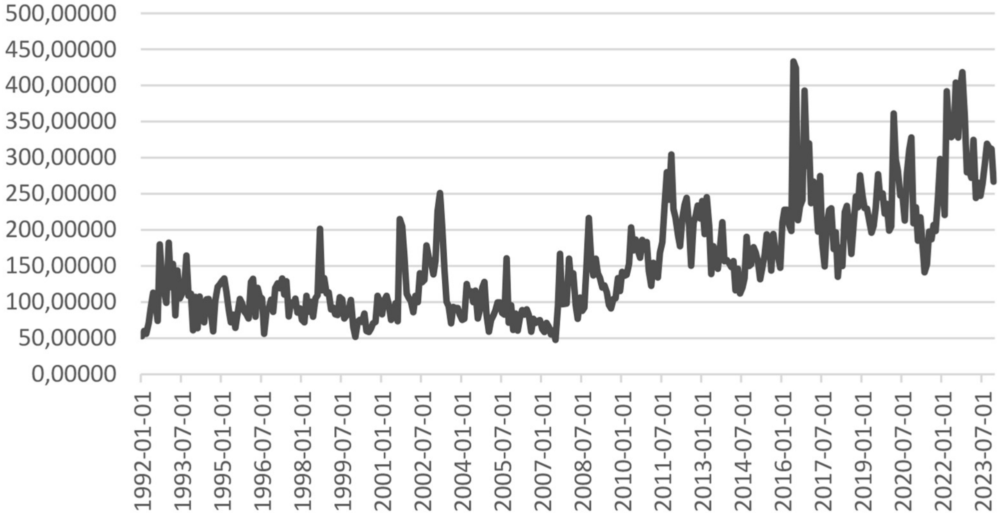
Since introducing the news-based policy uncertainty measure by Baker et al (2016), the Policy Uncertainty Group and others have constructed different index measures for various countries and regions worldwide. In this paper, we consider the European Policy Uncertainty (EPU) measure, which has experienced the largest jump, as a result of the Russian-Ukraine war, and assess its impact on the export earnings of 44 European countries. Using monthly data and linear as well as nonlinear ARDL approaches, we find that in almost all countries, the uncertainty measure has short-run asymmetric effects on their export earnings. Short-run effects, however, last into the long run only in 16 countries. Given substitution effects, increased uncertainty in Europe has boosted the export earnings of these 16 countries. These 16 are Albania, Armenia, Croatia, Cyprus, Greece, Iceland, Moldova, Montenegro, Netherlands, Russia, Slovenia, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

JEL Classifications: F14, F19, F37
Keywords: European Policy Uncertainty, 44 European Countries, Export Earnings, Inpayments, Asymmetric Analysis.

1. Introduction

In the last three decades, we have witnessed three major events that have affected all countries in the world, although European countries have perhaps been affected more than others. These events (i.e., the financial crisis of 2008, COVID-19 pandemic, Russia-Ukraine war) have introduced uncertainty to world trade. Of course, uncertainty could be a result of other factors or events, such as fiscal or monetary policy, exchange rate policy, and others. Nevertheless, the three aforementioned events have contributed the most. Baker *et al* (2016) introduced a method of constructing a measure of uncertainty that includes a flavour of any uncertain event, such as those mentioned earlier. Today, the Policy Uncertainty Group uses Baker *et al*'s (2016) method and constructs this measure for many countries individually and for a group of countries as a whole. This news-based index is now available for Europe as European Policy Uncertainty (EPU). To learn about its path over our study period, we plot it in Figure 1.

Figure 1: European Policy Uncertainty Index



Early studies that assessed trade flows' response to uncertainty relied only upon exchange rate uncertainty measured by its volatility. Bahmani-Oskooee and Hegerty (2007) review the literature, which is mixed but large. Unlike previous literature, our present goal is to use the most comprehensive measure of uncertainty depicted in Figure 1 and investigate its impact on the exports of European countries.[3] This comprehensive measure not only captures exchange rate uncertainty, but also all uncertain events such as uncertainty related to tax policy, monetary policy, financial crisis, COVID-19, Russia-Ukraine war, and that of the possibility of a US- Europe trade war.

Assessing the impact of Economic Policy Uncertainty measures on trade flows is a new area in the literature and includes a limited number of studies. The list consists of Armelius *et al* (2014) and Han *et al* (2016), who used panel data to show that US policy uncertainty adversely affects the trade flows of countries in the panel. Tam (2018) also used a panel model but added a Chinese measure of policy uncertainty to show that both the US and the Chinese measures affect trade flows. Following Tam's (2018) approach, Bahmani-Oskooee and Baek (2021) included the US and Korean policy uncertainty measures in their time-series model. They investigated the impact of both measures on 61 industries that trade between Korea and the US. While they found some short-run effects on commodity trade flows, no long-run effects were discovered. However, Bahmani-Oskooee and Xu (2022) discovered short-run and long-run effects when they included uncertainty measures of the US and China in their time-series model.[4]

All studies mentioned above assume that the impact of policy uncertainty on trade flows is symmetric. However, Foerster (2014), who considered the impact of any uncertainty on economic activity, argued that the effects could be asymmetric. He argued that although decreases in uncertainty promote economic activity and increases in uncertainty hurt it, the magnitude of the effects could differ in sign and size. By relying on Foerster's (2014) argument, Bahmani-Oskooee and Mohammadian (2024) investigated the asymmetric effects of Global Policy Uncertainty on the aggregate trade flows of G7 countries. Since asymmetric analysis requires the use of nonlinear models, as opposed to linear models used in symmetric analysis, Bahmani-Oskooee and Mohammadian (2024) demonstrated that introducing nonlinear adjustment of policy uncertainty measures unmasks significant outcomes masked by linear adjustment of uncertainty measures.

Our primary goal in this paper is to answer a crucial research question: whose European exports are most affected by European Policy Uncertainty? The answer to this question can improve our understanding of the dynamics of international trade in the face of uncertainty, and provide valuable insights for economists, researchers, and policymakers.

Section 2 introduces our comprehensive linear and nonlinear export models, while Section 3 presents our empirical results. Finally, Section 4 summarises our findings and the importance of our work. Data sources and variable definitions are provided in the Appendix.

2. Models and Methods

Two strands of literature outline the determinants of a country's exports. In one strand, the dependent variable is real exports, with which researchers try to estimate the Marshall-Lerner condition.[5] In the other strand, the dependent variable is nominal exports. In this strand, researchers determine if a currency depreciation increases export earnings or inpayments. Haynes *et al* (1986), Bergstrand (1987), Cushman (1987), and Bahmani-Oskooee and Ratha (2008) are some examples of research belonging to this strand. These studies assume that the effects of exchange rate changes on a country's inpayments and outpayments are symmetric. However, Bahmani-Oskooee and Fariditavana (2019) demonstrated that the impact could be asymmetric, as we argued in the Introduction. Thus, we follow Bahmani-Oskooee and Fariditavana (2019) and adopt the following inpayments or export earning function for a European country where the European Policy Uncertainty measure is added as another determinant of inpayments, as follows:

$$LnX_t = \alpha_o + \alpha_1 LnYW_t + \alpha_2 LnREX_t + \alpha_3 LnEPU_t + \varepsilon_t \tag{1}$$

Equation (1) can be considered the world's demand for a country's exports. It is assumed that world income (YW), the real effective exchange rate (REX), and European Policy Uncertainty (EPU) are the three main determinants of a country's exports. In this formulation, we define X as export earnings, and since an increase in world income increases the demand for exports, we expect an estimate of α_1 to be positive. By way of construction, a decline in the real effective exchange rate reflects a depreciation, and if a depreciation is to increase a country's export earnings, an estimate of α_2 is expected to be negative. Of course, this assumes that world demand is price elastic. Where it is inelastic, an estimate of α_2 could be positive. Finally, if an increase in EPU is to hurt a country's export earnings, an estimate of α_3 should be negative. However, as Bahmani-Oskooee and Mohammadian (2024) argued, this estimate could also be positive if an importing country reduces its imports from one euro member and increases its imports from another member (i.e., there is a substitution effect).

The coefficient estimates belonging to the above model are long-run estimates. To learn about the short-run effects of each independent variable, equation (1) must be converted to an error-correction model represented by equation (2) as follows:

$$\Delta LnX_t = b_1 + \sum_{j=1}^{n1} b_{2j}\Delta LnX_{t-j} + \sum_{j=0}^{n2} b_{3j}\Delta LnYW_{t-j} + \sum_{j=0}^{n3} b_{4j}\Delta LnREX_{t-j} + \sum_{j=0}^{n4} b_{5j}\Delta LnEPU_{t-j} + \theta_1 LnX_{t-1} + \theta_2 LnYW_{t-1} + \theta_3 LnREX_{t-1} + \theta_4 LnEPU_{t-1} + \omega_t \tag{2}$$

Specification (2) is an Autoregressive Distributed Lag model (ARDL) as defined by Pesaran *et al* (2001), who include the linear combination of lagged level variables as a proxy for the lagged error term from equation (1). Once (2) is estimated by the OLS method, the coefficient estimates assigned to the first-differenced variables reveal short-run effects, and the estimates of θ_2–θ_4 normalised by $-\theta_1$ reveal the long-run effects. However, we must establish cointegration so that the long-run effects are not spurious. Pesaran *et al* (2001) recommend the F-test for the joint significance of the lagged level variables or the t-test for the significance of θ_1.[6] Since neither test has a standard distribution, they tabulate new critical values.[7]

One main assumption in models such as (1) or (2) is that the effects of each independent variable are symmetric. However, as discussed before, this need not be the case. Concentrating on the variable of interest (i.e., *Ln EPU*) to assess the possibility of its asymmetric effects, we follow Shin *et al* (2014) and first form $\Delta LnEPU$, which includes positive and negative changes in uncertainty. Then, using the partial sum approach, we decompose the $\Delta LnEPU$ series into two new time-series variables as follows:

$POS_t = \sum_{j=1}^{t} max(\Delta\, ln\, EPU_j\, , 0)$, and $NEG_t = \sum_{j=1}^{t} min(\Delta\, ln\, EPU_j\, , 0)$

Here, the POS_t variable (a partial sum of positive changes) reflects only increases in EPU. Similarly, the NEG_t variable (a partial sum of negative changes) reflects only decreases in EPU.

The next step is to replace the *LnEPU* variable in (2) with the two partial sum variables. The new specification is as follows:

$$\Delta LnX_t = c_1 + \sum_{j=1}^{n1} c_{2j}\Delta LnX_{t-j} + \sum_{j=0}^{n2} c_{3j}\Delta LnYW_{t-j} + \sum_{j=0}^{n3} c_{4j}\Delta LnREX_{t-j} + \sum_{j=0}^{n4} c_{5j}\Delta POS_{t-j} + \sum_{j=0}^{n5} c_{6j}\Delta NEG_{t-j} + \lambda_1 LnX_{t-1} + \lambda_2 LnYW_{t-1} + \lambda_3 LnREX_{t-1} + \lambda_4 POS_{t-1} + \lambda_5 NEG_{t-1} + \tau_t \quad (3)$$

Since constructing the two atrial sum variables introduces nonlinearity into the model, models like (3) are generally known as Nonlinear ARDL Models, as opposed to model (2) which is the Linear ARDL model. Shin *et al* (2014) demonstrate that both models can be estimated using the OLS method, and the same diagnostics tests can be applied to both models. They even go one step further and argue that in applying the F test for cointegration, the two partial sum variables in (3) should be considered as a single variable and the critical values of the F test should be kept at the same high level for both the linear and nonlinear models – a very conservative approach (Shin *et al* 2014 p 291).

Once (3) is estimated, the short-run asymmetric effects of European Policy Uncertainty will be established if, at any given lag, j, $\hat{c}_{5j} \neq \hat{c}_{6j}$. However, short-run cumulative asymmetric effects will be established if the null hypothesis of $\sum \hat{c}_{5j} = \sum \hat{c}_{6j}$ is rejected by the Wald test. Additionally, if the Wald test rejects the null of $\hat{\lambda}_4/-\hat{\lambda}_1 = \hat{\lambda}_5/-\hat{\lambda}_1$, long-run effects will be asymmetric.[8]

3. Estimation Results

In this section, the linear model (2) and the nonlinear model (3) are estimated for each European country in our sample using monthly data from 1992M1–2023M9. As seen from the tables, there are 44 countries for which monthly data for all relevant variables were available.[9] Since data are monthly over a reasonable period for each country, we imposed a maximum of 12 lags on each first-differenced variable in both models. We used Akaike's Information Criterion (AIC) to select optimum lags and start with the estimates of the linear model first. Given the volume of results, we only report short-run coefficient estimates for our variable of concern (i.e., European Policy Uncertainty) in Table 1, and long-run coefficient estimates for all variables in Table 2.

From the short-run estimates in Table 1, we find at least one significant coefficient estimate in all 44 countries except Bosnia, Estonia, Finland, Gibraltar, Iceland, Montenegro, North Macedonia, Portugal, Romania, and Serbia. Thus, in most countries, EPU has significant short-run effects on their export earnings. However, do these short-run effects last into the long run? The answer is revealed in Table 2, where we report long-run estimates

Table 1: Short-Run Coefficient Estimates of the Linear ARDL Model (2)

Countries	*Lags on ΔLnEPU*											
	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Albania	–0.02	0.13**										
Armenia	0.23**											
Austria	0.02	–0.02	–0.03	–0.04*	0.02	–0.02	0.07**					
Azerbaijan	0.07	0.01	–0.17	–0.24**	0.32**	0.04	–0.07	0.12	–0.32**	0.15		
Belarus	0.06	0.01	–0.04	–0.09*	0.03	–0.03	0.12**	0.001	0.06	–0.001	–0.12**	
Belgium	0.05**	–0.06**										
Bosnia	0.05	–0.05										
Bulgaria	0.001	0.01	–0.06**	–0.001	0.02	–0.01	0.06**					
Croatia	0.05	0.05	–0.11**	0.004	–0.04	0.01	0.14**	–0.10**				
Cyprus	0.08**											
Czech	0.07**	–0.06**										
Denmark	0.05**	–0.03	–0.02	–0.02	0.02	–0.01	0.03	0.01	0.03	–0.01	–0.03*	
Estonia	0.02											
Finland	0.03	–0.03										
France	0.02	–0.01	–0.02	–0.01	0.01	–0.02	0.06**	–0.02	0.01	–0.05**		
Germany	0.03**	–0.02	–0.03**									
Gibraltar	–0.18	0.33										
Greece	0.09**	–0.05	0.01	0.01	–0.08**	0.01	0.15**	–0.11**	0.08**	0.03	–0.08**	
Hungary	0.07**	–0.05*	–0.02	–0.05*	0.01	0.001	0.05**					
Iceland	0.04											
Ireland	0.03	–0.03**										
Italy	0.04	0.01	–0.09**	0.01	0.02	–0.08**	0.12**					
Latvia	0.004	0.04**	–0.03*									

Lithuania	0.02	–0.03	–0.03	–0.02	0.01	0.04*	0.06**	–0.04*			
Luxembourg	0.07**	–0.08**	0.01	–0.06*	0.06*	–0.03	0.07**	0.02	–0.03	–0.05	
Malta	0.07**	–0.02	–0.05								
Moldova	0.17**	0.01	–0.10	0.04	0.17**						
Montenegro	0.07										
Netherlands	0.05**	–0.01	–0.01	–0.03*	0.04**						
North Macedonia	0.01										
Norway	0.03	0.01	–0.04**								
Poland	0.02	–0.01	–0.04**	–0.03	0.06**						
Portugal	0.04										
Romania	0.02	–0.03									
Russia	0.001	0.03	–0.04	0.04	–0.07**	0.04	0.04*				
San Marino	0.19**	–0.07	–0.10								
Serbia	0.02										
Slovak	0.001**	–0.003	–0.002	–0.004	0.002	–0.004	0.002	0.002	0.004	–0.002	–0.004*
Slovenia	0.11**	–0.04	–0.07**	–0.02	0.02	0.01	0.06**	0.01	0.04	–0.06**	
Spain	0.11**	–0.03	–0.04	0.02	0.01	–0.03	0.09**				
Sweden	0.06**	–0.04**									
Switzerland	0.07**	–0.01	–0.05*	–0.01	0.02	–0.01	0.05**				
Ukraine	0.02	–0.02	–0.03	–0.01	–0.01	0.04	0.07**	–0.04	–0.04	0.06**	
United Kingdom	0.04**	0.001	–0.04*	–0.01	0.001	–0.02	0.06**				

Notes: * and ** indicate significance at 10% and 5% levels, respectively.

Table 2: Long-Run Coefficient Estimates of the Linear ARDL Model (2)

	Long-Run Coefficient Estimates[a]				*Diagnostics*				
Countries	*Constant*	*Ln* WY_t	*Ln* REX_t	$LnEPU_t$	F^b	$\hat{\theta}_1$(t-test)[c]	LM^d	$CM(CM^2)$	*Adj.* R^2
Albania##	–31.07**	5.20**	2.09**	0.38**	4.36**	–0.27**	1.21	US(US)	0.93
Armenia###	–34.69**	5.16**	2.36*	0.97**	17.75**	–0.23**	1.70	US(US)	0.91
Austria	–14.69**	3.45**	1.75**	0.03	1.63	–0.14**	2.04	US(S)	0.52
Azerbaijan	–32.53**	6.14**	2.48**	–0.27	12.12**	–0.33**	0.64	US(US)	0.93
Belarus##;###	–24.90**	4.68**	2.35**	–0.01	10.07**	–0.25**	1.25	US(S)	0.96
Belgium	–18.77**	4.05**	2.53	–0.19	1.31	–0.05**	2.69	S(S)	0.97
Bosnia	–77.01**	13.26**	4.81**	0.07	4.38**	–0.07**	1.19	S(US)	0.99
Bulgaria	–38.46**	6.19**	3.31	0.54	2.62	–0.04**	0.33	S(US)	0.99
Croatia	–33.29**	5.93**	2.83**	0.04	2.59	–0.09**	1.50	S(S)	0.95
Cyprus	–62.88**	4.34**	9.23**	1.17**	3.25	–0.07**	0.63	S(US)	0.89
Czech	–40.33**	6.96**	3.58**	0.31	2.28	–0.04**	2.49	S(US)	0.99
Denmark##	–14.43**	3.28**	1.77**	0.06	2.30	–0.11**	0.65	S(S)	0.96
Estonia##;###	–28.29**	4.95**	2.48**	0.16	11.69**	–0.16**	0.19	US(S)	0.99
Finland###	–14.09**	2.94**	2.01**	0.01	2.45	–0.17**	1.79	S(US)	0.95
France#	–5.17**	2.26**	1.25**	–0.08	3.48	–0.31**	1.41	US(S)	0.95
Germany##	–10.02**	3.20**	1.59**	–0.13	2.79	–0.14**	0.38	S(S)	0.98
Gibraltar	–7.01	–2.64	4.14	0.65	2.43	–0.22**	0.37	US(US)	0.31
Greece#	–27.41**	4.11**	3.10**	0.43**	5.16**	–0.16**	0.57	S(S)	0.95
Hungary	–28.75**	6.61**	1.59	0.04	2.84	–0.08**	0.87	US(US)	0.99
Iceland##;###	–19.85**	3.29**	2.08**	0.22**	3.33	–0.19**	0.08	S(US)	0.89
Ireland#	–6.48**	3.19**	0.31	–0.04	11.57**	–0.17**	2.11	S(US)	0.98
Italy#;##	–16.75**	3.27**	2.49**	0.19	1.97	–0.18**	0.39	S(S)	0.92
Latvia##	–33.88**	5.42**	3.14**	0.19	4.22**	–0.07**	1.28	S(S)	0.99
Lithuania##	–29.39**	5.51**	2.33**	0.11	4.74**	–0.09**	0.66	S(S)	0.99

Luxembourg	–19.70**	2.77**	3.30**	–0.17	3.55	–0.12**	0.29	S(S)	0.90
Malta	–16.33**	2.74**	2.05	–0.01	1.32	–0.10**	0.002	S(US)	0.82
Moldova	–29.03**	2.74**	3.43**	1.14**	13.58**	–0.25**	0.22	S(US)	0.88
Montenegro	–17.85**	3.27**	1.28	0.11	6.87**	–0.66**	0.82	US(US)	0.22
Netherlands	–28.07**	4.88**	3.18**	0.39**	2.83	–0.06**	0.67	S(US)	0.99
North Macedonia	–45.56**	6.51**	4.38	0.34	1.47	–0.06**	1.09	S(US)	0.94
Norway	–26.25**	4.74**	3.02**	–0.02	2.30	–0.06**	0.58	S(US)	0.97
Poland	–42.16**	7.69**	3.61	0.08	2.49	–0.02	2.22	US(US)	0.99
Portugalee	–13.68**	2.96**	1.66**	0.14*	2.78	–0.28**	0.09	S(S)	0.95
Romania	–41.84*	7.77**	3.67	–0.31	2.69	–0.02**	0.13	S(US)	0.99
Russia	–35.86**	4.99**	4.51**	0.50**	5.85**	–0.08**	0.63	US(S)	0.98
San Marino#;##	–26.69**	4.12**	2.13**	0.08	3.86*	–0.26**	0.04	US(US)	0.67
Serbia#	–7.27	3.02**	0.01	0.09	11.01**	–0.24**	0.54	US(S)	0.95
Slovak	–0.46	0.37**	0.19**	0.01	2.34	–0.11**	0.54	S(S)	0.97
Slovenia#	–32.65**	4.69**	3.50**	0.59**	2.05	–0.09**	0.06	S(US)	0.98
Spain##	–18.34**	3.84**	1.92**	0.39**	8.44**	–0.30**	0.41	US(US)	0.96
Sweden	–18.76**	3.14**	2.78**	0.21**	2.37	–0.11**	0.42	S(S)	0.96
Switzerland	–13.78**	3.02**	1.58**	0.48**	3.68	–0.12**	0.19	S(S)	0.98
Ukraine##;###	–27.24**	4.24**	3.04**	0.43**	6.83**	–0.10**	0.09	S(US)	0.97
United Kingdom	–9.02**	2.37**	1.68**	0.18**	3.00	–0.15**	0.01	S(US)	0.94

Notes:
a. * and ** indicate significance at 10% levels and 5% levels, respectively.
b. At the 5% (10%) significance level when there are three exogenous variables (k=3), the upper bound critical value of the F test is 4.35(3.77). The comparable figures when k = 4 are –4.01(–3.52), respectively. These come from Pesaran *et al* (2001. Table CI-Case III, p 300).
c. The upper bound critical value of the t-test for the significance of $\hat{\theta}_0$ at the 5%(10%) significance level is –3.78(–3.46) when k=3. The comparable figures when k = 4 are –3.99(–3.66), respectively. These come from Pesaran *et al* (2001. Table CII-Case III, p 303).
d. LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom (first order). Its critical value at a 5%(10%) significance level is 3.84(2.71)
e. Wald tests are distributed as χ^2 with one degree of freedom. Critical values are 2.71 and 3.84 at the 10% and 5% levels, respectively.
f. Dummy: Covid-#; Global financial crisis-##; Russian-Ukraine War-###

Table 3: Short-Run Coefficient Estimates of ΔPOS and ΔNEG in the Nonlinear Model (3)

	# Lags on ΔPOS												
Countries	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Albania	0.07												
Armenia	0.47**												
Austria	0.002	0.02	–0.08	–0.15*	–0.01	–0.001	0.22**	0.02	0.11	–0.02	–0.03	–0.11*	
Azerbaijan	0.07												
Belarus	0.20	–0.04	–0.11	–0.35*	0.21	–0.20	0.41**						
Belgium	0.26**	–0.24**											
Bosnia	0.07	–0.29*	–0.07	0.11	–0.08	0.36**							
Bulgaria	0.04	–0.02	–0.08	–0.07	–0.11	0.06	0.33**	–0.16**					
Croatia	0.17	0.05	–0.22	0.15	–0.33**	–0.03	0.67**	–0.46**	0.20	–0.02	–0.27**		
Cyprus	0.16												
Czech	0.14*	–0.06	0.01	–0.13	–0.15	0.14	0.12						
Denmark	0.18**	–0.09	–0.08	–0.13*	0.02	–0.05	0.15**	0.02	0.16**	–0.02	–0.15**		
Estonia	0.29**	–0.22**											
Finland	0.12*	–0.05	–0.11	–0.06	–0.03	0.004	0.21**	–0.07	0.12	0.04	–0.20**		
France	0.02												
Germany	0.01	0.01	–0.08	–0.02	–0.19**	0.19**							
Gibraltar	–1.22*	1.59**											
Greece	0.15	0.03	0.17	–0.19	–0.39**	0.02	0.59**	–0.39**	0.28**	0.10	–0.24**		
Hungary	0.16*	–0.12	0.05	–0.20	–0.30**	0.29**	0.27**	–0.17	0.17	0.004	–0.17**		
Iceland	0.13*												
Ireland	0.09	–0.14*	0.01	–0.09	–0.03	0.03	0.13**						
Italy	0.02	0.15	–0.26	0.13	–0.22	–0.23*	0.48**						
Latvia	0.02	0.13	–0.20**	–0.02	–0.09	0.18**	0.15*	–0.19**	0.06	0.07	–0.19**	0.21**	–0.11

Lithuania	0.12	–0.12	–0.10	–0.09	–0.05	0.21**	0.19**	–0.19**			
Luxembourg	0.23**	0.04	–0.27**								
Malta	0.02										
Moldova	0.46**	–0.05	–0.58**	0.34	0.59**	–0.41*					
Montenegro	-0.35	1.57**	–0.85	0.88	–1.29*	–0.96	1.49**	–0.77	0.39	1.81**	–0.98**
Netherlands	0.18**	–0.01	–0.02	–0.13**							
North Macedonia	–0.002										
Norway	0.12*	–0.001	–0.17**								
Poland	0.10	0.001	–0.12	–0.20**	0.02	0.21**					
Portugal	-0.12	0.34**	–0.19*								
Romania	-0.02										
Russia	0.10	0.09	–0.22**	0.23**	–0.31**	0.17	0.19**	–0.20**			
San Marino##	0.10										
Serbia	0.25**	–0.32**	–0.01	–0.09	–0.08	0.19	0.35**	–0.54**	0.48**	–0.17	
Slovak	0.02**	–0.01	–0.01	–0.01*	0.01	–0.01	0.01**				
Slovenia	0.26**	0.04	–0.27**	–0.13	–0.03	0.05	0.18	–0.04	0.19*	–0.27**	
Spain	0.11**										
Sweden	0.13*	–0.03	–0.11								
Switzerland	0.16**	0.08	–0.18	–0.08	–0.15	0.31**					
Ukraine	0.05	–0.13	–0.09	–0.03	–0.06	0.20	0.27**	–0.25**			
United Kingdom	0.03	–0.12	–0.01	–0.04	0.05	0.19**	–0.17**	0.19**	–0.15**		

Notes: * and ** indicate significance at 10% and 5% levels, respectively.

Table 4: Short-Run Coefficient Estimates of ΔNEG in the Nonlinear Model (3)

	# *Lags on ΔNEG*											
Countries	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Albania	0.01											
Armenia	0.40**											
Austria	0.10	–0.15*										
Azerbaijan	0.24	0.47	–0.70	–1.04**	1.11**	–0.23	–0.26	1.02**	–1.32**	0.82**		
Belarus	0.14											
Belgium	0.16*	–0.14										
Bosnia	0.10											
Bulgaria	–0.001	0.06	–0.27**	0.11	0.25**	–0.16*						
Croatia	0.16	0.09	–0.40**									
Cyprus	0.15											
Czech	0.17*	–0.21*	0.02	–0.04	0.30**	–0.19**						
Denmark	–0.002											
Estonia	–0.13	0.18**										
Finland	–0.01											
France	0.15**	–0.12										
Germany	0.05	–0.12	0.005	–0.08	0.23**	–0.14**						
Gibraltar	0.37											
Greece	0.34**	–0.36**	–0.20	0.34**								
Hungary	0.21**	–0.15	–0.19	0.07	0.34**	–0.30**						
Iceland	0.12											
Ireland	–0.004											
Italy	0.20	–0.11	–0.16	–0.15	0.31**							
Latvia	0.06											

Lithuania	–0.05						
Luxembourg	0.13	–0.46**	0.27*	–0.18	0.25**		
Malta	0.36**						
Moldova	0.32**						
Montenegro	1.06**						
Netherlands	0.18**	–0.17**					
North Macedonia	–0.03						
Norway	–0.05						
Poland	0.01	–0.09	–0.08	0.08	0.25**	–0.16**	
Portugal	0.36**	–0.33**					
Romania	0.10	–0.13					
Russia	–0.03						
San Marino	0.83**	–0.72**					
Serbia	0.02						
Slovak	0.001						
Slovenia	0.23**	–0.29					
Spain	0.32**	–0.23**					
Sweden	0.14*	–0.16*					
Switzerland	0.15	–0.15	–0.04	0.07	0.31**	–0.37**	0.16*
Ukraine	–0.03						
United Kingdom	0.04						

Notes: * and ** indicate significance at 10% and 5% levels, respectively.

Table 5: Long-Run Coefficient Estimates of the Nonlinear Model (3)

	Long-Run Coefficient Estimates[a]					*Diagnostics*					
Countries	*Constant*	*Ln* YW_t	*Ln* REX_t	POS_t	NEG_t	F[b]	$\hat{\lambda}_1$(t-test)[c]	*LM*[d]	*Adj.* R^2	*Wald-S*[e]	*Wald-*L_o
Albania##	–14.23**	2.17**	1.54**	0.16	0.02	4.16**	–0.41**	0.67	0.93	0.35	24.01**
Armenia##;###	12.44	0.76	2.35*	1.78**	1.53**	15.79**	–0.26	1.45	0.92	2.50	18.33**
Austria	–9.60**	2.41**	1.64**	–0.29	–0.35	1.46	–0.14**	0.25	0.98	0.04	12.07**
Azerbaijan	–45.09**	8.71**	2.55**	0.25	0.37	8.61**	–0.29**	0.45	0.93	0.19	20.42**
Belarus##;###	–30.58**	5.94**	2.43**	0.43	0.49	10.14**	–0.28**	0.18	0.96	0.12	11.11**
Belgium	–11.08**	2.49**	2.08**	0.16	0.12	2.58	–0.16**	4.73**	0.96	1.18	14.56**
Bosnia	–85.44**	14.31**	5.91**	1.36	1.45	5.43**	–0.07**	1.03	0.99	3.89**	1.90
Bulgaria	–15.87	2.11	2.69**	0.05	–0.10	1.81	–0.06**	0.003	0.99	0.53	18.30
Croatia	–6.64*	0.57	2.00**	–0.30	–0.47*	4.87**	–0.31**	1.16	0.96	8.38**	115.09**
Cyprus	–41.27	1.77	7.96**	1.90	1.81	2.77	–0.08**	0.69	0.88	0.12	9.29**
Czech	–32.94**	5.75**	3.37**	0.86	0.83	1.95	–0.07**	1.02	0.99	1.14	0.01
Denmark	–10.25**	2.57**	1.55**	0.01	–0.02	1.62	–0.12	0.92	0.97	0.14	8.32**
Estonia##;###	–19.51**	2.09**	3.28**	0.55	0.42	7.45**	–0.13**	1.37	0.99	5.17**	13.51**
Finland	–12.54**	2.59**	1.97**	–0.06	–0.08	2.24	–0.15**	1.43	0.95	3.53*	5.11**
France	–8.68**	2.98**	1.28**	0.06	0.09	4.34**	–0.38**	0.88	0.95	1.70	1.43
Germany	–6.69*	2.48**	1.45**	–0.51	–0.54	2.79	–0.13**	2.19	0.99	2.48	2.64
Gibraltar	–6.41	–2.41	4.41	1.63	1.64	2.27	–0.22**	0.04	0.32	1.27	0.03
Greece	–17.49**	2.63**	2.67**	0.73*	0.67	4.24**	–0.18**	0.56	0.96	2.33	726.04**
Hungary	–23.06**	5.51**	1.45	–0.39	–0.43	1.63	–0.08**	0.74	0.99	0.06	3.12*
Iceland#;##;###	–15.67**	2.61**	1.96**	0.57*	0.54	3.11	–0.22**	0.23	0.89	0.04	7.16**
Ireland	–5.94*	2.96**	0.38	–0.01	–0.02	8.06**	–0.19**	2.07	0.98	1.26	5.24**
Italy#	–13.81**	2.85**	2.43**	0.40	0.39	2.11	–0.22**	1.65	0.92	2.44	18.39**
Latvia	–37.19**	5.04*	4.31**	0.73	0.64	1.86	–0.05	0.41	0.99	0.11	10.33**
Lithuania	–20.59**	3.83**	2.08**	–0.50	–0.59	2.37	–0.08**	0.001	0.99	0.02	8.95**

Luxembourg	–26.47**	4.02**	3.35**	0.04	0.09	3.86*	–0.09**	0.19	0.90	9.28**	0.79
Malta	–18.42	3.12*	2.16*	0.22	0.25	1.56	–0.11**	0.31	0.82	5.41**	1.08
Moldova	–10.03	0.08	2.79**	1.32**	1.20**	9.36**	–0.26	0.04	0.88	0.33	18.98**
Montenegro	–22.69**	5.04**	1.00	1.14**	1.31**	8.05**	–0.81**	2.33	0.33	0.54	0.56
Netherlands	–13.46**	3.11**	1.98**	0.19	0.12	2.57	–0.09**	1.18	0.99	1.55	23.67**
North Macedonia	–4.66	0.36	1.49	–0.01	–0.19	2.65	–0.17**	0.40	0.94	0.52	38.19**
Norway	–16.33	2.79	2.59**	–0.74	–0.83	2.57	–0.06**	0.41	0.97	3.63*	5.92**
Poland	–18.53**	3.04**	2.73**	0.13	–0.03	1.64	–0.07**	1.77	0.99	0.04	15.02**
Portugal	–9.58**	2.24**	1.57**	0.11	0.08	2.56	–0.32**	0.01	0.95	2.59	54.41**
Romania##	–18.68	3.09	2.57	–0.46	–0.62	2.72	–0.05**	0.25	0.99	0.01	10.23**
Russia	–18.05	1.83	3.99**	–0.34	–0.49	2.50	–0.07**	0.15	0.98	1.71	11.49**
San Marino#;##	–26.95**	4.26**	2.18**	0.32	0.35	5.73**	–0.31**	0.11	0.67	2.16	1.31
Serbia#;###	–11.10**	2.21**	1.37**	0.24	0.09	4.06**	–0.28**	0.49	0.95	1621.01**	25.11**
Slovak	–0.03	0.28**	0.20**	0.01	0.01	1.63	–0.13**	1.63	0.97	0.44	3.83*
Slovenia	–6.32	0.78	1.89**	–0.17	–0.34	2.98	–0.19**	0.46	0.98	4.15**	76.06**
Spain##	–9.97**	2.88**	1.36**	0.18*	0.16	11.45**	–0.59**	0.07	0.96	0.08	24.91**
Sweden	–11.38**	2.31**	2.16**	–0.05	–0.07	2.24	–0.15**	0.62	0.96	0.99	17.65**
Switzerland	–14.73	3.45**	1.79**	1.23**	1.25*	2.62	–0.11**	0.25	0.98	0.01	17.65**
Ukraine##;###	–15.11	2.7	2.29	–0.41	–0.46	2.76	–0.07**	0.97	0.97	0.06	2.52
United Kingdom	–7.03	2.29**	1.47**	0.33	0.33	2.24	–0.13**	0.01	0.94	8.25**	1.89

Notes:
a. * and ** indicate significance at 10% levels and 5% levels, respectively.
b. At the 5% (10%) significance level when there are three exogenous variables (k=3), the upper bound critical value of the F test is 4.35(3.77). The comparable figures when k = 4 are –4.01(–3.52), respectively. These come from Pesaran *et al* (2001. Table CI-Case III, p 300).
c. The upper bound critical value of the t-test for significance of $\hat{\theta}_0$ at the 5%(10%) significance level is –3.78(–3.46) when k=3. The comparable figures when k=4 are –3.99(–3.66), respectively. These come from Pesaran *et al* (2001. Table CII-Case III, p 303).
d. LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom (first order). Its critical value at a 5%(10%) significance level is 3.84(2.71)
e. Wald tests are distributed as χ^2 with one degree of freedom. Critical values are 2.71 and 3.84 at the 10% and 5% levels, respectively.
f. Dummy: Global Financial Crisis #; Covid # #; Russian-Ukraine war ###.

and diagnostic statistics. As can be seen in Table 2, the European Policy Uncertainty variable carries a significant, positive, and meaningful coefficient in 14 countries.[10] These are Albania, Armenia, Cyprus, Greece, Iceland, Moldova, Netherlands, Russia, Slovenia, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom. Thus, increased European uncertainty benefits these countries by increasing their export earnings. The results also reveal that the main factor contributing to the export earnings of every European country is the level of economic activity in OECD countries, since world income measured by OECD income carries a significantly positive and meaningful coefficient in almost all countries. Thus, maintaining economic growth in Europe benefits all countries.[11] Now, how do the results change if we move to the estimates from nonlinear models? These estimates are reported in Tables 3-5.

The short-run estimates in Tables 3 and 4 show that either ΔPOS or ΔNEG carries at least one significant lag coefficient in all countries except Albania, Cyprus, and Romania. Thus, in the 41 remaining countries, European Policy Uncertainty has significant short-run effects on export earnings. Additionally, since at a given lag i, the estimate attached to ΔPOS_{t-i} is different than the one attached to ΔNEG_{t-i}, short-run effects are asymmetric. But, do these short-run asymmetric effects last into the long run?

The answer is provided in Table 5, where either the POS or the NEG variable carries a meaningful coefficient in the case of Armenia, Croatia, Greece, Iceland, Moldova, Montenegro, Spain, and Switzerland. The long-run effects are also asymmetric, supported by the Wald test reported as Wald-L in Table 5. Following Bahmani-Oskooee and Harvey (2022 p 859), if we consider the linear and nonlinear approaches as complements, the nonlinear approach adds Croatia and Montenegro to the list of 14 countries from the linear approach to arrive at a total of 16 countries that are affected by European Policy Uncertainty in the long run.[12] Since in almost all countries, the EPU variable in the linear models and the POS and NEG variables in the nonlinear models carry positive coefficients, increased uncertainty in Europe boosts, and decreased uncertainty hurts, the export earnings of these 16 countries.[13, 14]

4. Summary and Conclusion

Since the introduction of the news-based measure of policy uncertainty by Baker *et al* (2016), the Policy Uncertainty Group has constructed different index measures for various countries and regions worldwide. One such measure is the European Policy Uncertainty Index (EPU), which is sensitive to any uncertain event or policy in Europe. While some previous studies investigated the impact of Economic Policy Uncertainty on trade flows, in this study, we assess the short-run and long-run effects of EPU on export earnings in European countries. We are motivated by recent events in Europe, such as the Russia-Ukraine war, and we seek to answer the question of whose export earnings are boosted and whose are hurt by uncertainty in Europe.

To answer the above question, following the literature, we first assume that the effects of EPU on export earnings are symmetric and employ the linear ARDL approach of Pesaran *et al* (2001). Due to evidence in the literature on the asymmetric effects of uncertainty on trade, we also apply the nonlinear ARDL approach of Shin *et al* (2014) to determine if any additional asymmetric effects could be discovered.

Our findings can best be summarised by saying that while the linear ARDL approach shows that the EPU has significant short-run effects on the export earnings of all 44 European countries in our sample, the nonlinear ARDL approach reveals that the short-run effects are asymmetric. As for the long-run effects, while the linear ARDL approach shows that export earnings of 14 out of 44 countries are boosted by increased uncertainty in Europe, the nonlinear approach adds two more countries to the list.

In sum, the export earnings of 16 countries are boosted by increased uncertainty. Given the uncertain future in Europe, some countries try to import more from European countries today to be safe in the future, resulting in increased export earnings by these 16 countries: Albania, Armenia, Croatia, Cyprus, Greece, Iceland, Moldova, Montenegro, Netherlands, Russia, Slovenia, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom. These findings have implications for strategies to boost production and plans to meet increased demand for trade in the future. Such strategies and plans become even more important given the possibility of a new tariff war between the current US administration and Europe.

Accepted for publication: 4 March 2025

Appendix: Variable Definition and Data Sources
Monthly data over 1987(M1)–2023(M9) are used for all countries to carry out the estimation. Exceptions are Armenia 1993(1)–2023(9), Azerbaijan 1992(1)–2023(9), Belarus 1992(1)–2023(9), Belgium 1997(1)–2023(9), Bosnia Herzegovina 1993(1)–2023(9), Croatia 1993(1)–2023(9), Czech Republic 1993(1)–2023(9), Estonia 1992(1)–2023(9), Gibraltar 2000(1)–2023(9), Latvia 1992(1)–2023(9), Lithuania 1992(1)–2023(9), Luxembourg 1997(1)–2023(9), Moldova 1992(2)–2023(9), Montenegro 2006(1)–2023(9), North Macedonia 1993(1)–2023(9), Russia 1992(1)–2023(9), San Marino 2000(1)–2023(9), Serbia 2006(1)–2023(9), Slovak 1993(1)–2023(9), and Ukraine 1992(1)–2023(9).

The data came from the following sources:

a) International Monetary Fund (IMF Data)
   i) International Financial Statistics
   ii) Direction Of Trade Statistics
b) Federal Reserve Bank of Dallas, Database of Global Economic Indicators, https://www.dallasfed.org/research/international/dgei/ip

c) European Policy Uncertainty: Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/EUEPUINDXM

Variables

X = For each country, this variable is defined as the country's export earnings in dollars from the rest of the world. The data comes from source a(ii)

YW = World Real Income is proxied by the Index of Industrial Production in OECD countries. This is the only monthly measure available from source b.

REX = Real Effective Rate. The data comes from source a(i). By way of construction, a decline in REX reflects a depreciation of domestic currency.

EPU = European Policy Uncertainty, source c.

Endnotes

Valuable comments from two anonymous reviewers are greatly appreciated without implicating them.

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3. While the Policy Uncertainty Group (https://www.policyuncertainty.com/) constructs the uncertainty measure for many countries, including each state in the US, the European measure that we use comes from Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org/series/EUEPUINDXM). For more see the Appendix.

4. Note that 87 industries that trade between China and the US were included in their study.

5. In this strand the real export demand model is estimated along the real import demand model to determine if export and import price or exchange rate elasticities add up to more than unity, satisfying the Marshall-Lerner condition. For a review article see Bahmani-Oskooee *et al* (2013).

6. Note that for long-run convergence, estimate of θ_1 must be negative, like the coefficient estimate assigned to the lagged error correction term in an Engle and Granger (1987) setting.

7. Pesaran *et al* (2001) also show that under this method variables could be combination of I(0) and I(1) and this is one of the main advantages of this method. Since most macro variables are either I(0) or I(1), there is no need for pre-unit root testing.

8. For some other application of these methods, see Aftab *et al* (2017), Arize *et al* (2017), and Baek (2020).

9. Exceptions are noted in the Appendix.

10. By meaningful we mean the estimate is supported by a significant F-test or t-test for cointegration also reported in Table 2.

11. Note that in addition to cointegration tests, we have also reported the Lagrange Multiplier statistics as LM to test serial correlation. Since it is insignificant in all cases, residuals in every model are autocorrelation-free. We have also reported the outcome of CUSUM and CUSUMSQ tests as CM and CM^2 to identify unstable estimates. As can be seen, the stability of the estimates is supported by at least one of these tests.

12. Other diagnostic statistics in Table 5 are as those in Table 2, supporting stable estimates and autocorrelation-free residuals in all nonlinear models.

13. The exception is Croatia where increased uncertainty has no long-run effects on its export earnings, but decreased uncertainty boosts them (Table 5).

14. In the absence of any other study that includes all 44 countries, we are unable to make a direct comparison. However, Bahmani-Oskooee and Mohammadian (2024), who assessed the impact of Global Policy Uncertainty on trade flows of the G7, found that while exports of Canada, Italy, and Japan will be hurt by increased global uncertainty, those of France will be boosted.

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