

# The Effects of Global Economic Policy Uncertainties on Manufacturing Industry Exports: The Case of Türkiye

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## Abstract

In this paper, the relationship between Türkiye's manufacturing industry exports and global economic policy uncertainty (GEPU) is examined using monthly data from 2013:01 to 2023:12. Estimations performed using the ARDL approach indicate that GEPU does not significantly affect manufacturing industry exports in Türkiye. This finding suggests that Turkish manufacturing industry exporters maintain stable and long-term trade relations. Consistent with expectations, foreign demand positively influences exports, while the appreciation of the Turkish Lira has a negative impact. To enhance manufacturing industry exports, it is recommended to strengthen commercial and diplomatic ties, enhance international cooperation, mitigate exchange rate risks through expanded hedging mechanisms, and invest in human capital and technology.

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## 1. Introduction

In recent years, global political and economic turbulence has significantly increased uncertainty in trade and economic policies (Al-Thaqeb & Algharabali, 2019). The global financial crisis that occurred in 2008 (Fortin et al., 2023), the Arab Spring, which profoundly affected the Middle East, including Türkiye, as well as the rest of the world (Chau et al., 2014), the protectionist measures implemented by U.S. President Donald Trump (Jawadi & Ftiti, 2017), the United Kingdom's Brexit decision (Bissoondeeala et al., 2023), Russia's invasion of Ukraine (Assaf, 2023), migration crises (Donadelli et al., 2019), and the radical policies enacted by central banks (Mumtaz & Ruch, 2023) are among the prominent factors contributing to this uncertainty. This situation is also evident at the micro level in Türkiye. In particular, the migration crisis faced by Türkiye in recent years, trade restrictions imposed by Russia, economic crises, and the

policies implemented by the Central Bank are the main sources of uncertainty (Sahinöz & Cosar, 2018). Uncertainty can lead to various adverse outcomes in the economy, ranging from short-term financial fluctuations to long-term structural problems. Consumers, the most fundamental economic units, tend to cut spending and increase savings under uncertainty. This situation impacts economic growth in the short-term directly (Dimitris et al., 2020). Moreover, uncertainty has the potential to increase risk premiums in financial markets, thereby reducing asset prices and wealth (Brogaard & Detzel, 2015). Declining asset prices not only complicate access to credit but also increase financing costs, negatively affecting investments (Gilchrist et al., 2014). The effects of uncertainty on fundamental economic variables, such as consumption, investment, and income, have negative implications for economic growth, development, and income distribution in

both the short and long-term (Şahinöz & Cosar, 2018). One of the areas most affected by uncertainty is foreign trade. In today's foreign trade policies, not only traditional variables such as exchange rates and income but also political and economic uncertainties play an active role in shaping trade dynamics (Handley, 2014). As a consequence of uncertainty, firms that are not sure about their future revenues and profits often choose to postpone fix and irreversible investments (Bernanke, 1983). During such periods, entrepreneurs adopt a "wait-and-see" strategy and delay investments (Dixit, 1989; Julio & Yook, 2016), while consumers defer purchases of relatively expensive durable goods (Bertola *et al.*, 2005). The negative effects of uncertainty on fundamental macroeconomic variables such as investment, consumption, income, and financing directly influence international trade flows. Handley and Limão (2015) claims that exporters, who initially face high fixed costs for activities such as market research and feasibility investments, are the first to abandon new investment decisions in uncertain situation. The impact of uncertainty on Türkiye's exports is particularly significant since the country's economic growth dynamics consist of export oriented growth. (Dura *et al.*, 2017). However, 85% of Türkiye's imports consist of intermediate and capital goods approximately. On the other hand this structure poses a disadvantage for Türkiye, it also holds potential advantages. For instance, although Türkiye's exports increased from \$152 billion in 2013 to \$232 billion in 2023, the share of manufacturing industry exports remained unchanged at 94% during this period. Furthermore, the share of manufacturing industry production in GDP has been approximately 20%. Despite its significant share in total production and exports, the response of manufacturing exports to economic policy uncertainty remains a critical question for Türkiye. This paper sheds light on the relationship between global economic policy uncertainty and Türkiye's manufacturing exports, providing valuable insights and recommendations for policymakers.

## 2. Literature Review

In current foreign trade literature, uncertainty has emerged as a critical variable. Numerous studies have focused on global trade (Aslan & Acikgoz, 2023; Matzner *et al.*, 2023; Lal *et al.*, 2023; Baley *et al.*, 2020), while others have specifically examined its implications for Türkiye (Kilic & Balli, 2024; Köse & Aslan, 2023; Alacahan and Akarsu, 2017). Country-specific studies indicate that rising economic uncertainties negatively impact export performance and key macroeconomic variables. For instance, Han *et al.* (2016) demonstrated that increasing economic uncertainty adversely affects China's exports and macroeconomic indicators. In the case of South Africa, Hlatshwayo and Saxegaard (2016)

determined that the negative impact of economic policy uncertainty on exports outweighs the positive effects provided by exchange rate advantages. Similarly, Hassan *et al.* (2018) concluded that economic policy uncertainties in the United States negatively influence its trade flows. However, the impact of increased economic policy uncertainty among the United States' major trading partners on United States foreign trade is relatively limited. In another study concluding that economic policy uncertainty negatively affects United States foreign trade, Krol (2018) argued that imports are more sensible to uncertainty than exports. Analyzing the relationship between global trade and economic policy uncertainty, Tam (2018) showed that economic policy uncertainties in China and the U.S. adversely affect not only these countries' foreign trade but also global trade. Constantinescu *et al.* (2020) found that a 1% increase in economic policy uncertainty reduces the growth of global goods and services trade by 0.02% and a 1% decline in global trade growth. Aslan and Acikgoz (2021) investigated the effects of global economic policy uncertainty on the export performance of developing countries, highlighting that foreign demand is the primary determinant of exports and that uncertainties adversely affect export activity. Yagis (2024) focused on the impact of economic policy uncertainty on foreign trade in G-7 countries and found a negative relationship between economic policy uncertainty and volume of trade, with declining trade volume further negatively affecting economic growth. Exploring sectoral effects of economic policy uncertainty, Sharma and Paramati (2021) found that raw material trade is the most sensitive to uncertainty in the case of India. Li and Li (2021) demonstrated that increased economic policy uncertainty directly effects China's grain imports negatively. Examining the trade of high value-added manufacturing products, Zhao (2022) found that increased uncertainty adversely affects trade in high value-added manufacturing goods in both exporting and importing countries. The primary cause of the negative effect in the exporting country is sunk costs, while in the importing country; it is the decline in market demand. Aslan and Açıkgoz (2023) examined relationship between the exports of developing countries and global economic policy uncertainty. They noted that entrepreneurs expected to make larger investments in the production of high technology products are more sensitive to increased uncertainty and may delay their investment decisions. The existing literature includes numerous studies on relationship between uncertainty and trade flows. However, research on the micro-level and sector-specific effects of uncertainty remains limited. Variables such as trade elasticities, value-added shares, input-output linkages, production costs, and demand structure increased sectoral

heterogeneity (Giri *et al.*, 2021). This study fills a significant gap in the literature by examining the response of Türkiye's manufacturing sector exports—an area of critical importance for the country—to economic policy uncertainty.

### 3. Empirical Framework

#### 3.1 Methodology

In this study, the impact of global economic policy uncertainty (GEPU) on exports was investigated by extending the classical export demand model, and Equation (1) was formulated.

$$LX_t = \beta_0 + \beta_1 Y_t + \beta_2 REER_t + \beta_3 EPU_t + \varepsilon_t \quad (1)$$

In Equation (1),  $X_t$  represents Türkiye's real exports in the manufacturing industry,  $Y_t$  denotes the industrial production index of trading partners countries,  $REER_t$  refers to Türkiye's CPI-based real effective exchange rate, and  $GEPU_t$  signifies global economic policy uncertainty developed by Baker *et al.* (2016).

In the model, the industrial production index is used as an indicator of foreign demand. An increase in this value implies that countries are experiencing economic growth and rising incomes, which is assumed to lead to an increase in import demand. In this context,  $\beta_1$  is expected to be positive.  $REER_t$  is generally used as a measure of competitiveness in international markets. An increase in  $REER_t$  indicates that the local currency, in this case, the Turkish lira (TRY), has gained value in real terms. This implies that as  $REER_t$  rises, the TRY appreciates, making Turkish goods more expensive in international markets. This would reduce the competitiveness of Turkish goods, leading to a negative expectation for  $\beta_2$ . During periods of increased uncertainty, exporters raise their risk perceptions due to unpredictability in future demand, exchange rates, and trade policies. This can negatively affect investment and production decisions, potentially reducing exports. Additionally, when GEPU is high, global demand may contract, and trade partners' import demands may decline. Therefore, GEPU can be considered a limiting factor for exports. Consequently, the coefficient of  $\beta_3$ , is expected to be negative

#### 3.2 Data

The study was conducted using monthly data covering the period from 2013:01 to 2023:12. For Türkiye's manufacturing industry exports, data were obtained from the TURKSTAT database, utilizing the seasonally and calendar-adjusted volume index of exports classified by economic activities (ISIC Rev. 4) in the manufacturing sector. The foreign

demand indicator was represented by the seasonally and calendar-adjusted industrial production index of OECD countries, retrieved from the OECD database. Additionally, the seasonally and calendar-adjusted industrial production index of EU countries was obtained from the Eurostat database and used in an alternative model for robustness checks. The real exchange rate was obtained as the CPI-based real effective exchange rate from the Central Bank of the Republic of Türkiye (CBRT) EVDS database. An increase in the real exchange rate indicates that the local currency, the Turkish lira, has appreciated. For economic policy uncertainty, the Global Economic Policy Uncertainty (GEPU) index developed by Baker *et al.* (2016) was utilized. The GEPU index is a composite measure that aggregates economic policy uncertainties from leading global economies. Economic Policy Uncertainty (EPU) is constructed for 28 countries, and global economic policy uncertainty is derived based on the data from these countries. Developed in 2016 by Baker, Bloom, and Davis, this index measures global uncertainty trends by analyzing news data from multiple countries. GEPU tends to rise significantly during global financial crises, trade wars, and pandemics, serving as an indicator of risk for the world economy.

#### 3.3 Empirical Findings

In the study, descriptive statistics for the variables are presented in Table 1 prior to the model estimations. The table includes the following information about the variables: mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the number of observations used in the models.

**Table 1.** Descriptive Statistics

	LX	LY (OECD)	LY (EU)	LREER	LGPEU
Mean	4.781	4.625	4.571	4.348	5.244
Median	4.766	4.637	4.590	4.341	5.309
Maximum	5.086	4.668	4.658	4.733	6.068
Minimum	4.270	4.419	4.277	3.863	4.462
Std. Dev.	0.186	0.037	0.052	0.253	0.372
Skewness	-	-2.105	-	-0.107	-0.184
Kurtosis	1.858	11.131	9.523	1.559	2.049
Observations	141	141	141	141	141

It is crucial to verify the stationarity of variables before selecting the model estimation method. Stationarity tests in time series analysis help determine whether a variable's mean, variance, and covariance remain stable over time. Variables that are not stationary tend to change randomly over time, which can result in spurious regression issues when included

in analyses. In such scenarios, even if the coefficients of the model appear significant, the findings may not accurately represent reality. As a result, estimating models without performing stationarity tests can lead to unreliable and invalid conclusions. In this context, the stationarity of the variables was analyzed using the ADF (1979, 1981) and PP (1988) tests. These tests are widely employed to assess whether time series data are stationary, though they differ in their treatment of error terms. The ADF test incorporates lagged differences to address autocorrelation and assumes that the error terms exhibit constant variance (homoskedasticity). On the other hand, the PP test uses a nonparametric approach to directly account for autocorrelation and heteroskedasticity.

**Table 2.** Unit Root Test Results

Variables	ADF		PP	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
LX	-1.832	-6.430***	-2.460	-6.518***
LY (OECD)	-3.028*	-3.645*	-2.976**	-3.577**
LY (EU)	-2.853*	-3.453*	-3.202**	-3.991**
LREER	-1.340	-2.097	-1.275	-2.230
LGEPU	-2.240	-4.584***	-2.594	-4.488***
ΔLX	-10.122***	-10.088***	-24.420***	-24.296***
ΔLREER	-9.871***	-9.886***	-8.427***	-8.528***
ΔLGEPU	-9.846***	-9.813***	-21.410***	-22.020***

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1.

Examining the unit root test results in Table 2, it was found that LY (OECD) and LY (EU) are stationary at the 10% significance level. The LX, LGEPU, and LREER variables, on the other hand, are concluded to be stationary at their first differences. Since the variables were found to be both I(0) and I(1), the ARDL model was employed to explore the relationships between them. The ARDL model is widely favored for investigating long-term relationships due to its numerous advantages. Unlike traditional cointegration approaches, such as the Johansen cointegration test and the Engle-Granger method, the ARDL model offers greater flexibility and robustness. One key advantage is that while the Johansen (1991) method requires all variables to be I(1), the ARDL model accommodates both I(0) and I(1) variables. This adaptability makes it particularly useful in datasets with variables exhibiting diverse unit root characteristics. Furthermore, although the Johansen method tends to perform better with larger samples, the ARDL model produces reliable results even in small samples. The Engle-Granger (1987) method may produce biased outcomes in the presence of endogeneity problems. In contrast, the ARDL model, with its single-equation estimation approach, offers greater resilience

to endogeneity issues. Moreover, it enables the simultaneous examination of short-term and long-term dynamics. These advantages make the ARDL model a highly effective tool for both academic research and practical applications. In the initial stage of ARDL model estimation, it is necessary to test for the existence of a long-term relationship among the variables. For this purpose, the bounds testing approach developed by Pesaran *et al.* (2011) was utilized. The bounds test is a method used within the ARDL framework to assess whether there is a long-term cointegration relationship between variables. The test evaluates the F-statistic from the estimated model against predefined critical thresholds. If the F-statistic surpasses the upper bound, a cointegration relationship is confirmed. Conversely, if it is below the lower bound, no cointegration is present. When the F-statistic falls between these two bounds, the outcome is ambiguous, necessitating additional analysis.

**Table 3.** ARDL Bounds Test for Cointegration Results

Models	Model 1		Model 2	
ARDL Model	ARDL (4,5,1,0)		ARDL (5,4,0,0)	
F Statistics	4.61**		4.23**	
Significance level	I(0)	I(1)	I(0)	I(1)
1%	2.01	3.1	2.01	3.1
2.50%	2.45	3.63	2.45	3.63
5%	2.87	4.16	2.87	4.16
10%	3.42	4.84	3.42	4.84

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1.

When examining the ARDL bounds test results in Table 3, the F-statistic values were found to be 4.61 and 4.22 in two different models where manufacturing exports serve as the dependent variable, and foreign demand, real exchange rate, and GEPU are the independent variables. In both models, since the F-statistic exceeds the 5% critical value, the presence of cointegration among the variables is confirmed.

$$\Delta y_t = \alpha(y_{t-1} - \beta x_{t,t-1}) + \sum_{j=1}^{p-1} \phi \Delta y_{t-j} + \sum_{j=0}^{q-1} \delta \Delta x_{t-j} \quad (2)$$

Equation 2 shows the ARDL error correction model to be estimated when the bounds test indicates the presence of a long-term relationship among the variables. Here,  $\alpha$  represents the coefficient of the error correction term, indicating the speed of adjustment to the long-term equilibrium, while  $\beta$  represents the coefficients of the independent variables in the long run. Additionally, the short-term dynamics are captured by the lagged differences of the dependent variable ( $\Delta y$ ) and independent variables ( $\Delta x$ ), which reflect the immediate effects of changes in these variables on the dependent variable.

ARDL model estimation results have been obtained, and before analyzing the model's estimation outcomes, it is

necessary to perform diagnostic tests. In this context, the model specifications presented in Appendix, Table 1, and Figures 1-2 have been examined. It was found that in both models, the errors are normally distributed, there is no autocorrelation, and the variance of the errors is homoscedastic. Additionally, the CUSUM and CUSUMQ tests indicate that the models are stable. As a result, the model outcomes can be interpreted and analyzed accordingly.

**Table 4.** ARDL Error Correction Model Estimation Results (Model 1)

Lon Run Equation				
Variable	Coefficient	Std. Error	t-Stat	p-value
LY (OECD)	1.386	0.110	12.585	0.000
LGEPU	0.077	0.051	1.514	0.133
LREER	-0.466	0.065	-7.180	0.000
Short Run Equation				
ECC	-0.293	0.067	-4.350	0.000
$\Delta LX(-1)$	-0.616	0.091	-6.739	0.000
$\Delta LX(-2)$	-0.360	0.103	-3.512	0.001
$\Delta LX(-3)$	-0.121	0.083	-1.462	0.147
$\Delta LY$	2.979	0.204	14.607	0.000
$\Delta LY(-1)$	0.999	0.331	3.017	0.003
$\Delta LY(-2)$	0.937	0.337	2.782	0.006
$\Delta LY(-3)$	-0.429	0.290	-1.483	0.141
$\Delta LY(-4)$	0.436	0.222	1.967	0.052
$\Delta LGEPU$	-0.005	0.019	-0.281	0.780

**Table 5.** ARDL Error Correction Model Estimation Results (Model 2)

Lon Run Equation				
Variable	Coefficient	Std. Error	t-Stat	p-value
LY (EU)	1.431	0.089	16.111	0.000
LGEPU	0.031	0.041	0.752	0.454
LREER	-0.441	0.053	-8.369	0.000
Short Run Equation				
ECC	-0.355	0.085	-4.165	0.000
$\Delta LX(-1)$	-0.491	0.102	-4.817	0.000
$\Delta LX(-2)$	-0.211	0.109	-1.932	0.056
$\Delta LX(-3)$	-0.001	0.100	-0.014	0.989
$\Delta LX(-4)$	0.141	0.063	2.226	0.028
$\Delta LY$	1.795	0.146	12.278	0.000
$\Delta LY(-1)$	0.727	0.225	3.231	0.002
$\Delta LY(-2)$	0.469	0.231	2.031	0.045
$\Delta LY(-3)$	-0.410	0.225	-1.824	0.071

The ARDL model results are summarized in Tables 4-5. The error correction term is statistically significant at the 1% significance level in both models. This result indicates that

approximately 0.29% of the short-term imbalances are corrected in the first model, while 0.36% are corrected in the second model during the first period. In the short-term, an increase in industrial production in OECD or EU countries has a strong and positive impact on exports. This highlights the significant influence of foreign demand in export performance. However, global economic uncertainty does not have a significant effect on Türkiye's manufacturing export performance in the short-term. In the long-term, OECD industrial production (LY) has a positive effect on manufacturing exports. A 1% increase in the OECD industrial production index leads to a 1.386% increase in Türkiye's manufacturing exports. A 1% increase in industrial production in EU countries, on the other hand, results in a 1.431% increase in Türkiye's manufacturing exports. This finding indicates that foreign demand, particularly the economic activity in developed countries, has a positive impact on Türkiye's exports to these countries. The real exchange rate (LREER) shows a negative and significant effect in the long-term. A 1% increase in the real exchange rate (i.e., an appreciation of the local currency) reduces exports by 0.466% in the first model and 0.441% in the second model. This suggests that the appreciation of the local currency negatively affects the competitiveness of Türkiye's manufacturing products. On the other hand, although economic uncertainty (LGEPU) has a positive coefficient in the long-term, it is not statistically significant, indicating that global economic uncertainty does not have a substantial impact on Türkiye's export performance in the long run. The absence of a statistically significant impact of economic uncertainty (GEPU) on Türkiye's manufacturing exports, both in the short and long-term, may suggest that Türkiye's current export structure is resilient to such uncertainties. Furthermore, the diversification of Türkiye's target markets could help mitigate the influence of regional economic fluctuations on overall exports. Consequently, Türkiye's export structure and strategy may have built a more resilient framework that dampens the effects of economic uncertainties and protects against such shocks. In the long-term, Türkiye's manufacturing exports are positively influenced by increases in industrial production among its trade partners. In this context, Türkiye can focus on products with high demand in global markets, particularly in OECD and EU countries, while diversifying its exports to these regions. Additionally, enhancing international trade agreements, improving logistics infrastructure, and boosting production capacity through technological advancements will help Türkiye take greater advantage of these demand shifts. Given the significant influence of the real exchange rate on long-term exports, it is clear that competitive exchange rate



policies and structural reforms to reduce costs will play a crucial role in this process.

#### 4. Conclusion

This paper analyzes the effects of Global Economic Policy Uncertainty (GEPU) on the export performance of Türkiye's manufacturing industry. Monthly time series data from 2013:01 to 2023:12 is used, and estimations are performed using the ARDL model. Before implementing the ARDL model, the necessary conditions for its application were checked. Specifically, all variables in the model were found to be stationary at first difference according to the ADF unit root test results, and a cointegration relationship among the variables was confirmed based on the ARDL Bound Test results. The findings of the ARDL model indicate that an increase in the value of the local currency decreases export demand for the manufacturing industry. On the other hand, increasing foreign demand positively impacts exports. These results align with expectations. Furthermore, no statistically significant relationship was found between GEPU and manufacturing industry exports. Considering that the European Union is Türkiye's primary export market, this finding is reasonable. It is assessed that Turkish exporters maintain stable and long-term trade relations; therefore, even if the GEPU level rises, it does not negatively affect Türkiye's manufacturing industry exports. This study offers several policy recommendations. Strengthening commercial and diplomatic relations, as well as enhancing international cooperation, could contribute to increased exports. Additionally, reducing exchange rate risk and expanding hedging mechanisms are expected to boost Türkiye's manufacturing industry export volume. In the medium and long-term, investments in human capital and technology are likely to create new opportunities for Türkiye's manufacturing industry exports. This study focuses on the relationship between Türkiye's manufacturing industry exports and GEPU. However, further in-depth analyses could be conducted. For instance, studies could explore examples from other countries or perform sector-specific analyses. Micro-level analyses, such as firm-level studies, could also offer valuable perspectives. In summary, there are still avenues waiting to be explored in this area.

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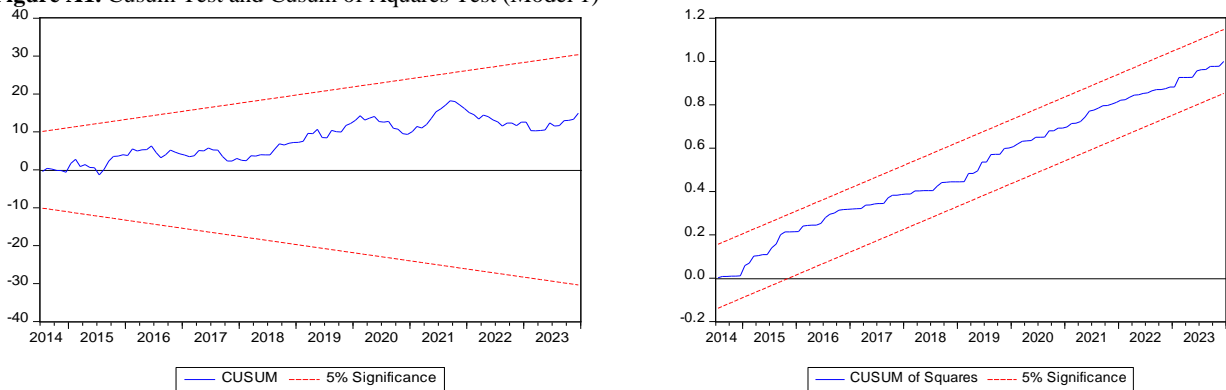
APPENDIX

**Table A1.** Diagnostic test results for the validity of the model

Model 1	Statistics
Jaeque-Berra Normality Test	0.071(0.965)
Breusch-Godfrey Serial Correlation LM Test	0.332(0.847)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	11.805(0.544)
Model 2	Statistics
Jaeque-Berra Normality Test	0.877(0.645)
Breusch-Godfrey Serial Correlation LM Test	0.990(0.609)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	8.849(0.716)

Note: P-values are given in parentheses.

**Figure A1.** Cusum Test and Cusum of Aquares Test (Model 1)



**Figure A2.** Cusum Test and Cusum of Aquares Test (Model 2)

