

## THE IMPACT OF ADDITIONAL CUSTOMS DUTY DECISION OF THE USA ON STEEL EXPORT OF TÜRKİYE

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### Abstract

Steel products have an important spot among the export commodities of Türkiye to the United States of America (USA). The export of steel goods to the USA has been steadily rising over the years, along with other export commodities to the USA. Nevertheless, the imposition of a 25% supplementary customs tariff in 2018, motivated by political considerations, posed significant challenges for enterprises operating in the steel export industry. This study investigates how the USA's higher customs charge continues to affect Turkish steel in the industry. It analyzes monthly data from 2018 to 2023. Enders and Lee (2012) developed the Fourier ADF (FADF) unit root test to analyze the stationarity qualities of the examined series. If the series exhibits stationarity, the supplementary customs duty decision will have a transitory impact. Nevertheless, if the series possesses a unit root, the impact of the supplementary customs duty determination will be enduring. Based on the observed data, it can be concluded that the series does not exhibit any unit roots. Simply put, the FADF test rejects its primary hypothesis, indicating the presence of stationarity.

**Keywords:** International Economics, Hysteresis, Steel Export, Fourier Stationarity Test

**JEL Codes:** F10, F14

## ABD'NİN EK GÜMRÜK VERGİSİ KARARININ TÜRKİYE'NİN ÇELİK İHRACATINA ETKİSİ

### Öz

Çelik ürünleri Türkiye'nin Amerika Birleşik Devletleri'ne (ABD) yapmış olduğu ihracat kalemleri arasında önemli bir yer tutmaktadır. Türkiye'nin ABD'ye yapmış olduğu ihracatın yanı sıra çelik ürünleri ihracatı da yıllar itibarıyla artış göstermektedir. Fakat 2018 yılında siyasi nedenlerle uygulamaya konulan %25 ilave gümrük vergisi çelik ihracatı yapan sektördeki firmaları zor durumda bırakmıştır. Bu çalışma, ABD tarafından Türk çeliğine konan ilave gümrük vergisinin etkisinin sektör içinde hala devam edip etmediğini aylık verilerle 2018-2023 yılları arasında araştırmaktadır. İncelenen serilerin durağanlık özellikleri Enders ve Lee (2012) tarafından önerilen Fourier ADF (FADF) kırılmalı birim kök testi ile analiz edilmiştir. Eğer seri durağanlık özelliği gösteriyorsa ilave gümrük vergisi kararının etkisi geçici olacaktır. Ancak seri birim kök içeriyorsa, ilave gümrük vergisi kararının etkisi kalıcı etki gösterecektir. Elde edilen sonuçlara göre, seri birim kök içermemektedir. Diğer bir ifadeye, FADF testinin temel hipotezi reddedilmektedir ve durağanlık göstermektedir.

**Anahtar Kelimeler:** Uluslararası İktisat, Histeri, Çelik İhracatı, Fourier Durağanlık Testi

**JEL Kodları:** F10, F14

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## INTRODUCTION

Trade between Trkiye and the United States (USA) has been conducted on a bilateral basis since the time of the Ottoman Empire. The signing of the joint trade agreement in 1830 marked the beginning of business relations between the Ottoman Empire and the USA. In April 1930, the Republic of Trkiye and the USA, both established after the collapse of the Ottoman Empire, reestablished their bilateral relations with the signing of their first commercial agreement. The level of bilateral commerce between the USA and Trkiye has varied since the early years of the Republic. However, in the 2000s, Trkiye's economic expansion and free trade agreements led to a significant rise in trade volume. The bilateral relations between the two sides were primarily influenced by military agreements, the political influence of the USA, and Trkiye's unwavering commitment to maintaining its alliance with the USA regardless of the expenses involved.

The bilateral trade volume between the USA and Trkiye has regular fluctuations. The political evolution of both nations directly influences the expansion or reduction of commerce. Donald J. Trump, the 45th President of the USA elected in 2017, played a more proactive role in the USA's ties with Trkiye compared to previous presidents. In March 2018, the USA imposed a 25% levy on steel imports from Trkiye, citing the need to protect national security. The Turkish authorities requested discussions with the USA over the application in question, alleging that the decision breached World Trade Organization (WTO) norms. Nevertheless, the ruling stayed unaltered. In response to this situation, Trkiye filed a complaint with the WTO against the USA. Despite finding the complaint justified, the US authorities ignored the decision. Even after additional modifications to the decision, the imposition of periodic taxes negatively impacted the Turkish steel sector's exports.

All of these enhancements form the core of the study. The main objective of the study is to assess the ongoing influence of the detailed customs tax application, as described above, on the export activities of Trkiye's steel exporting firms. This study's chosen research topic addresses a gap in the existing literature. The study conducted a literature analysis to examine the significant influence on bilateral commerce between the USA and Trkiye. Keynes defined the hysterical effect as the lingering influence of an economic disturbance on a quantity, preventing it from returning to its original equilibrium.

After the study was completed, evaluations were conducted to examine the scholarly outcomes. This framework aims to investigate whether the additional tariff on Trkiye's steel exports to the USA still affects the companies that export Turkish steel. The Fourier approach is capable of addressing this query.

The USA's imposition of increased customs taxes on the Turkish steel industry had a detrimental impact on the industry's exports. However, this effect was very minor and transitory, thanks to the sector's resilience. The conclusion section rejects the FADF test's fundamental hypothesis because the series demonstrates stationarity, indicating the presence of a unit root. Researchers might infer from this circumstance that the steel sector, in general, faced external constraints but managed to recover due to the positive political and diplomatic accomplishments of the two nations. The study's findings are utilized to propose industry policies.

## LITERATURE REVIEW

The literature frequently discusses the hysteresis of macroeconomic variables, such as economic growth, unemployment, shocks to the economy, etc. It is uncommon to find studies in the literature examining the effects of additional customs duties imposed on imports on exports. This component of the study will incorporate the literature on hysterical research. A literature review is necessary to gain a deeper knowledge of the study, and Table 1 provides the relevant literature review for the study.

**Table 1:** Literature review

Author/ Year	Country/ Periods	Methods	Results
Baldwin & Krugman (1989)	-	Macroeconomic Model	The exchange rate in the market, among other factors, is the sunk cost involved in entering the market and makes it challenging to quite due to shocks.
Baldwin (1990)	-	Cournot Duopoly Model	According to the result obtained, even in cases when the foreign industry faced a cost disadvantage, an exchange rate shock could lead to foreign producers dominating the market.
Giovannetti & Samiei (1995)	The USA, Germany & Japan 1975-1993	The Benchmark Model	.In their empirical study, Giovannetti and Samiei examine the significance of hysteresis in international commerce by analyzing industrial exports from the United States, Germany, and Japan. Their findings provide compelling evidence that hysteresis exists only in the context of Japanese exports.
Ansic & Pugh (1999)	1980-1993	Krugman's Model	One significant factor influencing trade activity is sunk costs. Due to sunk costs of entrance, businesses tend to "wait and see" while engaging in international trade in an environment where exchange rates are unpredictable.

Martinez-Zarzoso (2001)	Spain 1970-1993	The seemingly unrelated regression model (SURE)	The trade hysteresis hypothesis is valid in just three cases: 1. Production of accounting and office computing equipment. 2. Drug and medication manufacturing machinery. 3. Production of telecom, television, and radio apparatus.
Campa (2004)	Spain 1990-1997	Bellman's Equation	Despite its existence, hysteresis has a negligible quantitative impact on how responsively total trade volumes are to changes in exchange rates.
Konings & Vanderbussche (2005)	The EU 1992-2000	Panel Data Analysis	This study provides empirical evidence that domestic companies' markups significantly increase during antidumping protection against dumped imports.
Yıldırım (2011)	Türkiye 1923-2010	Bai-Perron (1996) Multiple Structural Breaks Test.	The unit root test concludes that Türkiye's hysteresis hypothesis is valid for the specified period.
Chandra & Long (2013)	China 2000-2006	Panel Data Analysis	The researchers discovered compelling evidence indicating that the imposition of the US anti-dumping duty resulted in a significant decline of over 12 (or five) percent in the labor productivity (or total factor productivity) of the Chinese enterprises that were targeted.
Lu, Tao & Zhang (2013)	China & The US 2000 – 2006	Difference-in-Differences (DID) Estimation	Antidumping investigations result in a considerable reduction in the overall export quantity at the HS-6-digit product level. This fall in trade is mostly caused by a notable decline in the number of exporters, but there is only a slight decrease in the export quantity per remaining exporter.
Li, Yan & Sun (2014)	China 2006-2012	Panel Data Analysis	The result that writers obtained is a substantial decrease in aberrant returns following the announcements of antidumping and countervailing investigations.
Belke, Göcke & Werner (2014)	Germany 1991-2012	Time Series	The conclusion from the paper is adjustment costs in economics can lead to hysterical behavior.
Chandra (2016)	China 2002-2008	Panel Data Analysis	The imposition of trade obstacles by the USA on China resulted in a surge in the expansion of Chinese exports to other nations.
Odero (2018)	Namibia 2001-2015	A Polynomial Distributed-Lag Modelling (PDL)	Raising tax rates in an attempt to increase revenue may have the opposite impact because economic agents will have less money available to them to spend on goods and services.



İnal (2021)	Türkiye 1980-2018	The Frequency Domain New Generation Wavelet-Based Fourier ADF (FWADF)	Research findings indicate that the shocks experienced by financial growth in Türkiye are of a transient nature, while the shocks encountered by financial institutions might have a lasting impact. At this juncture, it becomes evident that formulating future forecasts for financial institutions using previous values would be inappropriate.
Li et al. (2022)	China 2008-2017	Panel Data Analysis	Antidumping(AD) measures have a substantial impact on the profitability, market value, and export volume of the exporters they target. Exporters endeavor to enhance their domestic sales and earnings by diminishing profit margins and period expenditures, as their primary course of action.

The majority of earlier research has focused on the hysteresis of various macroeconomic factors. Literature focuses on macroeconomic variables like economic growth, financial development, and unemployment. The finding is that, depending on economic variables, shocks that are administered generally have varying consequences. The results of this study are consistent with those of previous studies in the literature, as the parts that follow will demonstrate.

## DATA AND METHODOLOGY

This study attempted to determine whether Türkiye continues to feel the impact of the increased customs tax imposed by the USA using monthly data that taken from Turkish Statistical Institution – (TUIK) and period covered in Jan 2018 to August 2023 (TUIK, 2023). Shocks applied to macroeconomic variables can have either transient or lasting consequences, according to a review of the literature. The Fourier ADF unit root test will use to determine whether the shock's impact on the macroeconomic variable is short-term or long-term. An FADF unit root test was developed by Enders and Lee (2012) to ascertain the quantity and structure of the progressive breaks and their deterministic elements. The frequency component of the Fourier type function is utilized in this unit root test to assess stationarity with the ADF unit root test. In many instances, FADF unit root test findings exhibit more consistency and strength when compared to other Fourier unit root tests (e.g., FGLS). In cases where the beginning values of the series are substantial and there is nonlinearity present, it is advisable to use the FADF unit root test, as it is more reliable and robust. An inherent benefit of the Fourier ADF test is the absence of the necessity to pre-determine the positions, quantities, and structure of the breaks in the series. Therefore, Fourier ADF unit root test was considered more appropriate for this study. The next section contains details about how to apply unit root test. Table 2 shows a brief synopsis of criteria of variable that used for research.

**Table 2:** A brief synopsis of criteria

Indicator	Code	Value or Percentage	Sources
Total Steel Export of Türkiye	EXP	US Dollars	Turkish Statistical Institution – (TUIK)

Enders and Lee (2012) devised a unit root test using the DF-based Fourier technique that accounts for various structural failures. Enders and Lee (2012) defined the data generation step as follows:

$$y_t = \alpha(t) + \rho y_{t-1} + \gamma t + \varepsilon_t \quad (1)$$

Here  $\varepsilon_t$  is a stationary error term,  $\alpha(t)$  is a time-dependent function of the definable term. Although the unit root fundamental hypothesis is wanted to be tested for  $\rho = 1$ , an error occurs in the modeling because the structure of  $\alpha(t)$  is unknown. Due to this error, Enders and Lee (2012) proposed the following Fourier modeling for the structure of  $\alpha(t)$  in their study:

$$\alpha(t) = \alpha_0 + \sum_{k=1}^n \alpha_k \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^n \beta_k \cos\left(\frac{2\pi kt}{T}\right), \quad n \leq \frac{T}{2} \quad (2)$$

$n$  denotes the quantity of frequencies. In addition,  $k$  stands for a specific frequency and  $T$  for the total number of observations. A linear process can be defined if  $\alpha_1 = \beta_1 = \dots = \alpha_n = \beta_n = 0$ . Traditional unit root tests are applied in this scenario. It is recommended to use at least one Fourier frequency in the event of a structural break or non-linear trend. In this instance, Enders and Lee (2012) recommended applying the following model:

$$\Delta y_t = \rho y_{t-1} + c_1 + c_2 t + c_3 \sin\left(\frac{2\pi kt}{T}\right) + c_4 \cos\left(\frac{2\pi kt}{T}\right) + e_t \quad (3)$$

All integer values of  $k$  that are in the range of one and five such as  $1 \leq k \leq 5$  and give Least Square Residuals (MinKKT) are tried to be estimated using the EKK method in the above equation. The  $k$  value of the model that gives the sum of least squares is selected. After that, need to look into the possibility of a non-linear structure. In order to test this, the F test is run using the coefficients from the previous equation and the fundamental hypothesis,  $c_3 = c_4 = 0$ . The basic hypothesis stating linearity cannot be rejected if the obtained values are less than the F-statistic critical value. Applying the ADF unit root test proposed by Enders and Lee (2012) is deemed to be more dependable in this scenario (Ender & Lee, 2012, p. 196-97).

## EMPIRICAL FINDING

This study attempted to investigate the hysteresis theory using data from Türkiye and the FADF unit root test. Monthly data is used for the analysis. Since the study's primary subject permits inspection

beginning at a specific time, there is a time constraint. The initial phase of the three-stage Fourier ADF structural unit root test involves determining the best frequency value and the suitable lag length. Table 3 displays the test result for the lag length that is suitable, which is computed using the sum of the residual squares derived from the Fourier ADF equation. This calculation is used to find the ideal frequency value and the Akaike Information Criterion (AIC). Table 3 shows that the smallest value for the sum of the residual squares occurs when  $k = 2$ . The lag length that minimizes the AIC information criteria and is determined to be 3 is considered the optimal lag length.

**Table 3:** Optimal frequency and appropriate delay length for steel export

Frequency (k)	MinKKT
1	1.212613
<b>2</b>	<b>1.042314</b>
3	1.112352
4	1.204532
5	1.125684
L	3
AIC	29.43055

**Note:** The k optimum frequency, MinKKT represents the sum of the Minimum Residual squares, and L the appropriate delay length. Akaike information criterion (AIC).

Table 4 reports the results of the unit root test. The unit root test findings indicate that the estimated statistical value (3.61), which is lower than the test's critical value (%)1, does not reject the  $H_0$  hypothesis. This scenario demonstrates that the series are non-stationary, indicating the existence of a unit root. This result confirms the validity of the phenomenon of exporting steel hysteresis.

**Table 4.** FADF structural unit root test result

Variable	Statistic	Decision
EXP	-3.614956	<b><math>H_0</math>: Not Rejected</b>
<b>Critical Values</b>		
1%	5%	10%
-3.97	-3.27	-2.91

The study assesses the statistical relevance of the trigonometric terms in relation to steel export hysteresis. The Wald test is employed for this objective, utilizing the F statistic values. Table 5 displays the



Wald test outcomes. Therefore, we can reject the null hypothesis ( $H_0$ ), stating that the trigonometric components are not significant, because the computed F statistics value (3.28) falls below the critical value (6.35) from the table. Therefore, we can conclude that the Fourier ADF unit root test is not appropriate, and we should utilize the ADF unit root test instead.

**Table 5.** Wald test result

Fourier ADF	F Statistic	
	3.286604	
Critical Values		
1%	5%	10%
10.35	7.58	6.35

After employed the ADF unit root test to examine the data, concluding that the trigonometric terms do not have a significant influence. Table 6 presents the results of the ADF unit root test.

**Table 6.** ADF unit root test

ADF
-4.3447*** (0.0015)

**Note:** \*\*\*, and \*\* indicate the significance levels of %1, and %5 correspondingly. The value included in the parentheses represents the p-value.

The ADF unit root test results in Table 6 reject the null hypothesis, suggesting the presence of a unit root for steel export imports. This indicates that the steel export variable is stationary. Consequently, it can be concluded that shocks have only a temporary effect on the steel export variable.

## CONCLUSION

Under the pretext of preserving national security, USA President Donald J. Trump levied a 25% tariff on steel imports from Türkiye in March 2018. Türkiye requested appropriate consultations from the USA over the aforementioned application, but it did not obtain a favorable response. Türkiye complained to the WTO against the USA and asked that the verdict be overturned, claiming that the USA authorities' decision violated WTO regulations. However, on August 10, 2018, the USA declared that it would not acknowledge Türkiye's concerns and had raised the customs tariffs on steel imports from the country. These advancements served as the foundation for this investigation. Using monthly data covering the years 2018–2023, the





detrimental effects of the extra customs duty on the Turkish steel sector were investigated. The FADF unit root test used as the analytical technique.

The increased customs tariff placed on Türkiye by the USA has been shown to have an effect on the Turkish steel industry through the application of the unit root test. The FADF unit root test's primary hypothesis was disproved by the findings. The series is therefore stationary and contains a unit root. Based on this circumstance, it has been noted that the USA' decision to impose an additional customs tax on the Turkish steel industry had a negative impact on the industry's exports as of the time the tax was applied, and that Türkiye's steel exports to the USA decreased. Furthermore, this decline is significant in relation to the international trade imbalance within the relevant industry. The supplementary tariff levied on steel exports might progressively exacerbate the international trade imbalance. The sector's ability to generate revenue has declined, resulting in financial losses for industry exporters. They have encountered difficulties in dispatching their merchandise. In addition, this scenario has placed firms involved in steel exports and indirect exports in a challenging position. To prevent a decline in their sales profits, organizations have compelled themselves to allocate their resources towards less productive sectors. The sector occasionally lost power as a result of this decrease, and exporters in the sector suffered financial losses. Furthermore, the USA's extra customs tariff forced Turkish steel industry exporters to look for other markets, which resulted in resource waste for the business. The cost escalations resulting from the requirement for fresh market research may also prevent the sector from making new investments. All these and comparable elements can have a direct impact on sectors such as unemployment, economic growth, international trade, etc. and can be regarded as macroeconomic variables. Unemployment figures were not affected much due to the short-term nature of the taxation by the US. Nevertheless, it could be considered as a factor that could arise due to additional taxation. However, because of the sector's strength, it was determined that this influence was just transitory.

Researchers can learn from this situation that, generally speaking, the steel sector suffered from outside pressures but managed to rebound because of the two countries' beneficial political and diplomatic achievements.

#### **AUTHOR STATEMENT / YAZAR BEYANI**

Researcher declared that all contributions to the article were his own. Researcher have not declared any conflict of interest.

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