

Sustainability Analysis of Current Account in the European Union Countries: FADF and FKSS Unit Root Tests

Araştırma Makalesi /Research Article

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ABSTRACT: This paper investigates the sustainability of the current account in 27 European Union countries over the period 2005Q1-2020Q3. First, series which is considered as the ratio of the current account to gross domestic product, was applied to the traditional unit root test ADF and the nonlinear unit root test KSS. According to the ADF test, the current account was stationary in 9 countries and according to the KSS test, current account was stationary in 5 countries. Later, nonlinear FADF and FKSS unit root tests based on Fourier were applied. According to the unit root tests results, series were found stationary in 10 countries for FADF and 3 countries for FKSS. ADF and KSS test results are valid for countries whose trigonometric terms are insignificant. According to these results, it can be said that Fourier terms should be considered in unit root tests on the current account.

Keywords: European Union, Current Account Deficit, FADF-FKSS Unit Root Tests

JEL Codes: E69, F32, F41, H62, H63

Avrupa Birliği Ülkelerinde Cari İşlemler Hesabının Sürdürülebilirlik Analizi: FADF ve FKSS Birim Kök Testleri

ÖZ: Bu çalışmada 27 Avrupa Birliği Ülkesinin 2005Q1-2020Q3 periyodu için cari işlemler hesabının sürdürülebilirliğinin incelenmesi amaçlanmıştır. Cari işlemler hesabının gayri safi yurtiçi hasılaya oranı olarak ele alınan seriye ilk olarak geleneksel birim kök testlerinden ADF ve doğrusal olmayan birim kök testlerinden KSS testi uygulanmıştır. ADF testine göre 9, KSS testine göre ise 5 ülkede cari işlemler hesabının durağan olduğu gözlemlenmiştir. Daha sonra fourier temelli doğrusal olmayan FADF ve FKSS birim kök testlerine yer verilmiştir. Test sonuçlarına göre FADF için 10, FKSS için 3 ülkede durağanlığa rastlanmıştır. Trigonometrik terimleri anlamsız bulunan ülkeler için ADF ve KSS testi sonuçları geçerlidir. Bu sonuçlara göre, cari işlemler hesabı üzerine yapılan birim kök sınamalarında fourier terimlerinin dikkate alınması gerektiği söylenebilir.

Anahtar Kelimeler: Avrupa Birliği, Cari İşlemler Açığı, FADF-FKSS Birim Kök Testleri

JEL Kodları: E69, F32, F41, H62, H63

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1. Introduction

An effective and well-functioning market is required for the sustainable economic growth target that is attempted to be achieved in every country. An effective market can be achieved by macroeconomic stability, where internal and external balance is formed simultaneously. The internal balance is expressed by variables such as inflation, unemployment, real gross domestic product (GDP) level, public budget balance, and domestic debt level, while the external balance is usually indicated by the current account balance, which is the most important sub-item of the balance of payments. The current account consists of foreign trade, investment revenue, and current transfers. Since export is added and import is subtracted in calculation of national income by expenditure method and foreign trade transactions are also included, the current account establishes a direct link between a country's foreign economic transactions and its national income. Therefore, changes in the current account have significant effects on the level of production and employment. In addition, when a country has a current account deficit, the current account is also an indicator of the level of external debt, since the portion of imports that exceeds exports can only be financed by borrowing from foreigners (Krugman et al., 2017: 321). For this reason, it is accepted that the high current account deficit, which shows continuity, makes countries fragile against external shocks and causes economic crises. In short, the sustainability of the current account deficit is of great importance in maintaining economic stability.

Countries have become economically more dependent on each other, with the liberalization of trade and capital movements on the axis of neoliberal policies that have begun to be implemented since the 1980s. Due to these developments, the vast majority of developing countries faced with the current account deficit, which is considered a leading indicator of economic crisis and macroeconomic policies, has gained great importance in the current account balance of the countries. Due to external imbalances that arose with the 2008 global financial crisis, current account disorders have also become a major problem for developed countries, and the sustainability of the current account has been one of the priority issues. This resulting process has led to an investigation of the factors that lead to current account imbalances, and many theoretical and empirical studies on what and how to achieve a sustainable current account deficit level that will not cause crises.

The main aim of this study is to examine the sustainability of the current account in 27 European Union (EU) countries using the method developed by Trehan and Walsh (1991). In this context, theoretical approaches to the sustainability of the current account deficit are explained in the following section of the study. In the second section, the relevant literature is summarized and in the third section, the method and findings of empirical analysis are presented. In the last section, the study concludes with a general assessment. Looking at studies conducted in EU

countries, it has been found that traditional methods of analysis are mostly used in this regard. Due to the use of new generation econometric techniques in the study, it is expected to contribute to the existing literature.

2. Sustainability of Current Account: Theoretical Approach

Among the theoretical approaches developed for explaining the current account balance within the balance of payments, there are traditional approaches such as elasticity approach, absorption approach, structuralist approach, and the Mundell-Fleming approach. But significant criticism has been made for these approaches, since the current balance is tried to be explained in the short term through the expectation of a stable exchange rate. In addition, an intertemporal approach is preferred to explain the sustainability of the current account deficit, especially as a result of the fact that macroeconomic variables exhibit a dynamic structure due to the increase in capital movements after the 1980s. This approach takes into account the macroeconomic determinants of relative prices and analyzes the impact of current and future prices on savings and investment decisions. In this aspect, it is accepted that it reveals a synthesis of absorption and elasticity approaches. It extends absorption approach, because it takes into account government decisions, expectations of future productivity growth, and real interest rates in determining the sustainability of the current account deficit (Obstfeld and Rogoff, 1995: 4).

The intertemporal approach can be described as simply determining consumption and savings preferences in accordance with the expectations of households in the following period and giving a current account deficit or surplus accordingly. Therefore, the current balance is seen as a tool for eliminating consumption fluctuations. This model is based on the intertemporal budget constraint. It is because in the model, it is assumed that rational consumers always want to consume more goods and services, but in reality, they can consume as much as their income allows, and therefore they face a budget constraint. Consumers need to save more today to be able to consume more in the future. However, if they expect to earn more income in the future, they will be able to save less today. Therefore, the trend in current savings of individuals in private and in general in a country can be a good indicator in terms of income expectations for future periods. In addition, if it is estimated that the level of production and national income will increase in subsequent periods, creating resources by borrowing from foreigners instead of reducing consumption in the current period is seen as a rational choice. It is because although the current account deficit is in question, it will not pose a risk to the country's economy (Babaoğlu, 2005: 8-9).

Although the concept of sustainability is expressed in terms of maintaining or sustaining a particular situation, when evaluated in terms of current account imbalances, it is more complex. According to Milesi-Ferrett and Razin (1996b), the current account imbalance reflects the interaction between public and private sector savings and investment decisions and lending decisions of foreign

investors. The authors fundamentally linked the sustainability of the current account deficit to ability of payment. According to them, the current account deficit is sustainable if the present value of a country's future foreign trade surplus is equal to the current foreign debt value of the country. Mann (2002) explained the sustainable current account balance as the fact that external imbalances remain at a level that does not adversely affect the economy. In addition, Roubini and Wachtel (1999) argued that it is sufficient to provide intertemporal budget constraints for the current account deficit to be sustainable.

Regarding the sustainability of the current account deficit, many criteria are used in the literature. Some of these criteria are investment/savings ratio, level of real exchange rate, external debt/GDP, export/GDP, size and composition of capital inflows, gross internal reserves/debt stock, and foreign exchange reserves. But the commonly used criterion is the 5% criterion. Accordingly, if the current account deficit is financed in particular by short-term borrowing and reflects excessive consumption spending's, the fact that the current account deficit exceeds 5% of the GDP indicates the existence of serious problems in the economy. This criterion, nevertheless, has been criticized for ignoring characteristics specific to countries, such as investment opportunities and savings capacity, as well as factors behind external imbalances. Furthermore, in some countries, current account deficits of well below 5% cannot be maintained, and in others, it is found that higher rates are sustainable, thus the use of a threshold is not enough. On this basis, it is argued that current account imbalances should be evaluated by structural factors such as exchange rate policy and external openness rate, savings and investment levels, and the health status of the financial system (Milesi-Ferrett and Razin, 1996b: 1; Milesi-Ferretti and Razin, 1996a: 65).

In the empirical analysis based on the intertemporal approach, current account sustainability is investigated by unit root tests and co-integration tests based on the theoretical model developed by Husted (1992) usually within the framework of the theoretical model developed by Trehan and Walsh (1991). According to the method put forward by Trehan and Walsh (1991) and used in this study, the stationarity of the current account is competent requirement for the continuation of intertemporal budget constraints. In this method, unit root tests are applied on the current account series to determine whether the current account is sustainable. The following process is performed by using simple budget relationships to show the analytical basis of intertemporal budget constraint. Budget constraints faced by the government in t period in an open economy:

$$C_t + I_t + G_t + B_t = Y_t + (1 + i_t)B_{t-1} \quad (1)$$

Here C_t , I_t , G_t , B_t , Y_t and i_t refer to consumption, investment, government spending, net foreign assets, GDP and World interest rate.

$$B_t = Y_t - C_t - I_t - G_t + (1 + i_t)B_{t-1} \quad (2)$$

$$B_t = NX_t + (1 + i_t)B_{t-1} \quad (3)$$

Here NX_t is net exports, which also include net external factor revenues. Assuming that the interest rate is variable, the new equation that occurs if Equation (3) is repeated (iterating) forward:

$$B_t = \sum_j^{\infty} = 1 \left(\frac{1}{1+r} \right)^j E_t (NX_{t+j} | \Omega_{t-1}) + \lim_{T \rightarrow \infty} \left(1 + \frac{1}{r} \right)^T E_t (B_{t+T} | \Omega_{t-1}) \quad (4)$$

Here Ω_{t-1} , $(t-1)$ refers to the set of information that is instantly obtainable. Equation (4) states that international investors can lend to an economy when the current value of the future distribution of net exports is equal to the present value of net external assets. Therefore, the sustainability hypothesis or, in other words, the long-term budget cut can be shown as follows:

$$\lim_{T \rightarrow \infty} \left(1 + \frac{1}{r} \right)^T E_t (B_{t+T} | \Omega_{t-1}) = 0 \quad (5)$$

This transversality condition implies that the current value of the expected debt stock must be equal to zero when t goes to Infinity. It is called the no-ponzi game condition. Since the current account is $CA_t = B_t - B_{t-1}$ according to Trehan and Walsh (1991), the sufficient condition for the validity of Equation (5) is that the current account follows a stationary process. If the growth rate in an economy is positive, the sustainability of the current balance is ensured by the constant rate of $y_t = CA_t/Y$. This implies that the current account deficit is sustainable if it does not increase faster than production at expected values. In this case, according to the sustainability hypothesis, the debt/GDP ratio is steady over the long term. On the other hand, it is said that the current account for the observed period does not correspond to the intertemporal budget limit if $y_t = CA/Yt$ is not stable (Christopoulos and Leon-Ledesma, 2010: 4).

3. Literature Review

From the past to the present, the current account has been a carefully monitored macroeconomic indicator, especially in countries with current account deficits. Literature research has generally focused on issues such as the size of current account deficits, their movements in the face of crises, and their determinants. But from the point of view of the current account, sustainability research also occupies an important place in the literature. The literature on the sustainability of the current account tends to expand using unit root tests. For this reason, studies based on unit root tests are included in general when summarizing literature research. Among the common features of research in the literature, it seems that mainly nonlinear and Fourier-based analysis is used, especially in recent studies. It can be said that the selected tests are diverse, in some of the studies the results are interpreted by comparing them with traditional tests, and the issue is of interest not only for developing economies but also for developed countries. Another feature of the studies in which the variable is used in the analyses is generally considered as the ratio of the current account to the GDP. Examples from the literature can be listed as:

Dulger and Ozdemir (2005) found that current accounts in France, Italy and Canada are sustainable in the long term and not sustainable in Germany, United Kingdom, United States and Japan by testing fractional unit root in G-7 countries during the period 1974-2001. Kalyoncu (2006) examined the sustainability of current account deficits with ADF and IPS unit roots tests in 22 OECD countries in the period of 1960-2002. According to ADF unit root test results, the current account of most OECD countries has a unit root, while current deficits are sustainable according to IPS results. Lau et al., (2006) concluded that current account deficits were sustainable with ADF, KPSS, DFGLS, Breitung (2000) and Harris and Tzavalis (1999) tests in 5 Asian countries in the period of 1976-2001.

Shyh-Wei Chen (2010) examined sustainability of the current account deficit with quarterly data for the period of 1960-2018 in United States of America (USA), France, the United Kingdom and Canada by means of ADF, Bierens (1997) nonlinear unit root tests and according to the ADF test results the conclusion of unsustainability was reached in 4 countries while according to NADF test results it was concluded that series is stationary, i.e., a sustainable current account deficit was identified. Christopoulos and León-Ledesma (2010) studied the sustainability of the US current account deficit for the periods 1960-2004 and 2004-2008 using ADF, Ng-Perron and Kılıç (2003) nonlinear unit Root Test. In terms of classical unit root tests, the findings are unit root, while in terms of nonlinear tests, the unit is rootless.

Cunado et al., (2010) examined the sustainability of the current account deficit in European countries for 1960-2005. According to the results of the Ng-Perron test, it was concluded that the current account deficit was sustainable in Belgium, Ireland, Italy, Spain and Switzerland. Holmes et al., (2010) examined whether the current account deficit was sustainable for 13 European countries with quarterly data covering the period of 1975-2005 using IPS ADF, KPSS, Bootstrap Hadri unit root tests. According to the results of the Hadri test, the current account deficit for European countries was sustainable.

Shyh-Wei Chen (2011) tested the sustainability of the current account deficit of 10 OECD countries using nonlinear unit root tests using unit root process with regime switching for different ranges. He concluded that current account deficits were not sustainable for Australia, Finland, Czech Republic, New Zealand, Hungary, Portugal and Spain. Ceylan and Çeviş (2012) conducted sustainability research for sub-periods including 1987:1-2001:4 and later periods 2002:1-2012:1 before the inflation targeting regime in Turkey. KSS, Leybourne, Newbold and Vougas (LNV) Aestar Exponential Smooth Transition (AESTAR) Autoregressive Nonlinear Unit Root tests were used in the study. The results showed that current account deficits were sustainable in the period of 1987:1-2001:4, while they were unsustainable in the period of 2002:1-2012:1.

Cuestas (2013) conducted an analysis in transition economies in Europe for the period of 1999-2011 by using some panel unit root tests (Levin, Lin and Chu, IPS,

ADF, etc.) and nonlinear panel unit root tests were KSS and Sollis (2009) est. As a result of the empirical findings of the study, it was concluded that the current balance can be maintained in different tests and confidence intervals in Czech Republic, Estonia, Lithuania and Latvia. In a study conducted by Bozoklu and Yılcı (2014) for Brazil, Czech Republic, Hungary, Colombia, Indonesia, Russia, Peru, and South Africa with 1996-2009 quarter-term data, IPS and nonlinear Ucar and Omay (2009) Panel KSS method were used. Linear panel unit root test findings showed that the current account of Indonesia and Russia was stationary. The nonlinear panel unit root test showed that Indonesia's current account balance was stationary.

Donoso and Martin (2014) used the Park and Shintani (2005) nonlinear unit root test, one of the nonlinear unit root tests, in their study of Latin American countries for the period of 1970-2010. They concluded that current account deficits in Brazil, Chile, Argentina, Paraguay, Colombia, Guatemala, El Salvador and Ecuador were unsustainable. They concluded that deficits were sustainable for the Dominican Republic, Peru, Honduras, Uruguay, Mexico, Panama, and Venezuela. Lanzafame (2014) examined the sustainability of the current balance in 27 developed countries for the period of 1980-2008 by using powerful panel unit root (PUR) and panel KSS tests. The study concluded that the current account deficit for 7 countries was sustainable. They found that current account deficits of other 20 countries examined in the study were unsustainable.

Shyh-Wei Chen and Xie (2015) examined the sustainability of the current account balance for 9 countries in their study covering different periods between 1970 and 2012. In the study, linear and nonlinear unit roots such as LNV-ADF, LNV-Sollis were used together. As a result of unit root tests, current account deficits in Australia, Finland, Belgium, Norway, Ireland, Czech Republic, New Zealand and Portugal were found to be sustainable. In Spain, however, the current account deficit was not sustainable. Taştan and Arıç (2015) addressed Turkey's quarterly current account balance for the period of 1998-2014 through LNV, Sollis (2004), Cook and Vougas (2009), KSS and Kruse unit root tests and reached the sustainability conclusion in general.

Kuo (2016) showed that the current account balance was sustainable through ADF and Quantile tests in Taiwan, Korea, Philippines, Thailand, Singapore and Japan with quarterly data for the 1976-2013 period. Ceylan, Uz, and Çeviş (2018) examined the sustainability of the current account deficit using KSS and AESTHEAR unit root tests in the fragile five for the period of 1990-2014. As a result of nonlinear unit root tests, they concluded that the current account deficit for Turkey, India and Indonesia was sustainable.

Demir (2019) pointed out that current account deficits were not sustainable in Turkey for the period of 1998: Q1- 2018: Q2 through ADF, PP, Ziwot-Andrews, Lee-Strazicich two breaks and Carrion-I-Silvestre multiple structural breaks unit root tests. Saraç and Sivri (2019) discussed the sustainability of the current

account deficit in Turkey for the period of 1992: 01-2017:12. ADF, PP, KPSS, Ng and Perron (2001), Lee and Strazicich's single and two-break unit root tests were used in that study. Traditional unit root tests and single-break unit root tests have generally referred to the unit root. In the model that allowed two breaks, the current account deficit was stationary.

Demircioğlu Karabıyık (2020) conducted sustainability analysis by using Multivariate ADF panel unit root test in Latin American countries for the period of 1996-2019. He determined that the current account balance was sustainable. Türkmen (2020) examined whether the ratio of the current account to the GDP was stationary using ADF, FADF, KPSS and FKPS unit root tests in Turkey for the period of 1974-2019. The results showed that the series was stationary in terms of FKPS unit root testing.

4. Econometric Methodology

The study used unit root tests developed by Christopoulos and León-Ledesma (2010), which considered structural breaks and nonlinear structures together. The advantage of these tests is that they take into account obvious structural breaks as well as smooth transition changes. In addition, these tests do not need to specify the number, form or duration of structural fractures. These unit root tests use trigonometric variables to capture large changes in the deterministic terms of the variable, taking into account the following model:

$$y_t = \delta_0 + \delta_1 \sin\left(\frac{2\pi kt}{T}\right) + \delta_2 \cos\left(\frac{2\pi kt}{T}\right) + v_t, \quad (6)$$

where k is the number of frequencies of the Fourier function, t is a trend term, T is the sample size and frequency number is an integer value between 1 and 5. In Fourier ADF and Fourier KSS tests used for linear and nonlinear series, respectively, the H_0 hypothesis states that the series contains a unit root.

$$H_0: v_t = \mu_t, \mu_t = \mu_{t-1} + h_t,$$

where h_t is assumed to be a stationary process with zero mean. The test statistics proposed by Christopoulos and Leon-Ledesma (2010) are calculated using a three-step procedure. The first step involves obtaining the optimal frequency value (k^*). For k values between 1 and 5, a nonlinear deterministic component is estimated in Model 1 using the least squares (OLS) method, and a value of k is selected, which makes the sum of residual squares a minimum. Then, the OLS remaining of the model is calculated

$$\hat{v}_t = y_t - \hat{\delta}_0 + \hat{\delta}_1 \sin\left(\frac{2\pi k^* t}{T}\right) + \hat{\delta}_2 \cos\left(\frac{2\pi k^* t}{T}\right). \quad (7)$$

In the second step, the unit root test is applied to the OLS remaining obtained from the first step. Three different models, linear and nonlinear, have been proposed for unit root testing.

$$\Delta v_t = \alpha_1 v_{t-1} + \sum_{j=1}^p \beta_j \Delta v_{t-j} + u_t, \quad (8)$$

$$\Delta v_t = \rho v_{t-1}(1 - \exp(-\theta \Delta v_{t-i}^2)) + \sum_{j=1}^p \alpha_j \Delta v_{t-j} + u_t, \quad (9)$$

$$\Delta v_t = \lambda_1 v_{t-1}^3 + \sum_{j=1}^p \beta_j \Delta v_{t-j} + u_t, \quad (10)$$

where $\theta > 0$ and u_t is the white noise error term. If the null hypothesis expressing the existence of a unit root is rejected in the second step, it is examined with the significance of trigonometric terms using the F test for Model 1 in the third step. At this stage $H_0: \delta_1 = \delta_2 = 0$ null hypothesis is tested against the alternative hypothesis $H_1: \delta_1 = \delta_2 \neq 0$. If the null hypothesis is rejected, it can be concluded that the variable is stationary around a breaking deterministic function. The significance of trigonometric terms is tested by critical values in the study of Becker, et al. (2006).

4.1. Data and Econometric Analysis

In the study, econometric analyses used the ratio of the current account quarter to GDP, i.e. CA/GDP data obtained from the Eurostat database covering the period of 2005Q1-2020Q3 for 27 EU countries. The series used in the study were seasonally adjusted using the Census X-13 method.

Table 1: ADF and the KSS Unit Root Test Results

Countries	ADF	KSS	Countries	ADF	KSS
	t-Statistic	t-Statistic		t-Statistic	t-Statistic
AUS	-4.5263***(0)	-1.62926(12)	MAL	-2.1486(1)	-1.04776(12)
BEL	-6.1834***(0)	-1.13745(12)	NET	-2.6518*(2)	-1.47424(12)
BUL	-1.4334(0)	-1.24532(12)	POL	-0.1127(1)	-1.22564(12)
CRO	-1.9393(0)	-0.84365(12)	POR	-1.1987(3)	-1.57844(12)
CYP	-4.8054***(1)	-0.32946(12)	ROM	-1.7121(0)	-2.2098***(12)
CZE	-2.2659(4)	-1.22381(12)	SLK	-3.537**(2)	-3.3186*(12)
DEN	-1.4912(10)	-0.32226(12)	SLV	-1.2404(8)	-0.80399(12)
EST	-1.4781(0)	-1.52971(12)	SPA	-1.1328(4)	-2.42052***(12)
FIN	-1.4158(2)	-2.83526*(12)	SWE	-1.0494(2)	-1.90849(12)
FRA	-4.4899***(0)	0.92108(12)			
GER	-2.7006*(8)	-0.20611(12)			
GRE	-1.5242(0)	-1.87137(12)			
HUN	-1.9313(5)	-1.70232(12)			
IRE	-7.5797***(9)	-1.52918(12)			
ITA	-0.5813(4)	-1.46554(12)			
LAT	-1.3512(4)	-1.58295(12)			
LIT	-1.4559(0)	-1.68949(12)			
LUX	-9.0612***(0)	-2.51478**(12)			

Notes: *, **, *** indicates the significance level at the 1%, 5% and 10%, respectively. () shows the optimal lag length.

On the purpose of comparison, ADF and KSS unit root tests were first performed, which ignored multiple structural breaks in the data generation process. According to the ADF test results, the CA/GDP series for 9 EU countries (Austria, Belgium, South Cyprus, France, Germany, Ireland, Luxemburg, and Netherland, Slovakia) were found to be stationary. As a result of the KSS test, it was found that the CA/GDP series was stationary for 5 EU countries (Finland, Luxemburg, Romania, Slovakia, and Spain). As a result of two tests, it was determined that the CA/GDP series was stationary for only two EU countries, Slovakia and Luxemburg.

Table 2. Fourier ADF and Fourier KSS Unit Root Test Results

	\hat{k}	FADF	FKSS	$f(\hat{k})$	Optimal lag
AUS	1	-4.3032**	-3.82552***	8.49227*	1
BEL	5	-4.9224*	-4.4015*	1.709	1
BUL	1	-1.84434	-2.67598	52.04483	1
CRO	1	-3.92028**	-3.9648**	63.37696*	1
CYP	1	-4.58998*	-4.23834**	11.82218*	1
CZE	1	-4.61047*	-3.26982	16.91062*	1
DEN	1	-2.51665	-2.26389	57.46869	1
EST	1	-1.79998	-2.14848	21.5591	1
FIN	1	-3.837***	-3.25672	50.37527	1
FRA	5	-3.55326*	-0.9712	3.44379	1
GER	1	-3.54262***	-3.34545	32.22358*	1
GRE	1	-3.89744**	-2.82642	155.779*	1
HUN	1	-2.52241	-2.11981	80.17091	1
IRE	5	-5.11626*	-3.73005*	2.24063	1
ITA	1	-1.77438	-1.96455	142.5054	1
LAT	2	-1.68537	-1.51025	15.84052	1
LIT	1	-1.49029	-1.8278	12.59474	1
LUX	2	-6.74819*	-6.03939*	0.70531	1
MAL	1	-4.13161*	-1.9817	19.68154*	1
NET	1	-3.72452***	-0.91325	4.98769**	1
POL	1	-1.23472	0.48705	54.24932	1
POR	1	-1.88221	-2.55242	198.2565	1
ROM	1	-3.54128***	-2.95972	87.77185*	1
SLK	1	-3.43476	-2.33476	25.53248	1
SLV	1	-2.04694	-0.86767	98.0612	1
SPA	1	-1.86184	-2.39881	144.5415	1
SWE	1	-3.36866	2.73999	82.71773	1

Notes: *, **, *** indicates the significance level at the 1%, 5% and 10%, respectively. () shows the optimal lag length.

According to the results of the FADF unit root test, in 14 EU countries (Austria, Belgium, Croatia South Cyprus, Czech Republic, Finland, France, Germany, Greece, Ireland, Luxemburg, Malta, Netherlands, Romania), it was determined that the CA/GDP series does not have a unit root, that is, it is stationary. But according to the F test statistic value calculated for 4 countries (Belgium, France, Ireland and Luxemburg), the trigonometric terms were found to be insignificant. In this case, the classic ADF unit root test results, which do not take into account the nonlinearity in the data generation process, were applied.

According to the results of the FKSS unit root test, which takes into account structural changes and nonlinearity, it was concluded that the CA/GDP series in 6 countries (Austria, Belgium, Croatia South Cyprus, Ireland, and Luxemburg) does not contain a unit root, that is, it is stationary. But according to the F test statistic calculated for Austria, Croatia and South Cyprus, the trigonometric terms were found to be significant, while for Belgium, Ireland and Luxemburg they were found to be insignificant. KSS test results are valid for countries whose trigonometric terms are insignificant.

5. Conclusion

For countries, the current account provides clues about much more than numerical statement. Economic functioning, production and consumption structure, relations with other countries, growth strategy and in short economic structure can be interpreted through the current account. The fact that the income received by countries as a result of current operations is less than the expenses, that is, the current account balance is negative, leads to the problem of the current account deficit. Parameters such as growth, exchange rate, international capital movements, and foreign trade are interrelated as well as crises in the formation of current account deficits. Current account deficits can lead to countries entering troubled processes in the long term. For this reason, the values that the current account deficit will receive are important, and reviews are made with the concept of sustainability in combating the problem of current account imbalance.

The study examined the sustainability of the current account based on unit root tests for 27 EU member states. According to the ADF test result, it was found that the CA/GDP series for 9 EU countries were stationary, and for 18 countries it contains a unit root. As a result of the KSS test, it was found that the CA/GDP series for 5 EU countries was stationary and contains a unit root for 22 countries. Fourier unit root tests are more consistent because they add trigonometric terms that take into account structural change to the model. As a result of both Fourier unit root tests, the CA/GDP series for Austria, Croatia and South Cyprus was found to be stationary; and it was found to contain a unit root for Bulgaria, Denmark, Estonia, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden. For Belgium, Ireland and Luxemburg, the trigonometric terms were not statistically significant. As a result, traditional ADF and KSS tests will be applicable to the sustainability analysis of the countries'

current account balance. According to the ADF and KSS on both unit root tests, the CA/GDP series for Luxemburg is stationary. According to the KSS test results for Belgium and Ireland, the series was found to be nonstationary and stationary according to the ADF test. The fact that the Fourier terms of only 4 countries among 27 countries are statistically insignificant reveals the importance of FADF and FKSS tests in investigating current account sustainability with unit root tests for EU countries.

Eurostat data shows that France is the country with the highest current account deficit among the European Union countries. After France, Romania is the country with the highest current account deficit. Not spending more on manufactured goods and services and not disrupting growth potential is one way to get rid of current account deficits. Growth policies that are export-oriented but not import-based should be implemented in accordance with the level of global competition. Cheap prices with domestic production will lead to increased demand for the domestic market, thus import will be reduced. For this purpose, country-level incentive programs should be designed. On the other hand, in some countries, it is known that additional taxes are imposed on luxury goods due to the effect of reducing imports, and credit opportunities are removed.

Reducing the current account deficit is important because in this way, countries may have an advantageous position in terms of risk premiums. It is believed that countries with a positive current account appearance have a high ability to pay debts. This, on the other hand, increases the opportunities for countries to find debt and to attract investment again on international platforms. Finally, what matters is whether the deficit can be funded. Permanent current account imbalances that cannot be funded create a fragility effect for countries and signal for a crisis.

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