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**Article**

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## Sustainability of Current Account Deficit in Turkey

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ARTICLE INFO	ABSTRACT
Article History	<b>Purpose:</b> This study aims to examine the sustainability of the current account deficit in Turkey for the quarterly data between 2003 and 2018. Besides, some policy implications are made to ensure the sustainability of the current account deficit in Turkey's economy.
Received 08 June 2020; Accepted 13 August 2020	<b>Design/methodology/approach:</b> The dynamics related to the sustainability of the current account deficit is analysed within the framework of the "intertemporal budget constraint approach" developed by Husted (1992). The long-term dynamics are empirically investigated using the Johansen cointegration test. Econometric analysis is also expanded within the framework of the Vector Error Model to reveal the short-term dynamics.
<i>JEL Classifications</i> F32, F10, C22	<b>Findings:</b> The results of Johansen cointegration analysis suggest that current account income and expenses are integrated with the cointegrating coefficient less than 1, implying that Turkey has a weak form of current account deficit sustainability. Findings of the Vector Error Correction model confirm the results of long-run analysis and indicates that the deviations from the long-term equilibrium are corrected at a rate of 78% every quarter term.
<b>Keywords:</b> Current Account Deficit, Export-Import Nexus, Time Series Analysis	<b>Research limitations/implications:</b> The "intertemporal budget constraint approach" developed by Husted (1992) focuses on the equilibrium between current account income and expenses to analyse the sustainability of the foreign balance. However, the sustainability of the foreign deficit is also closely related to what kind of capital inflows is used to finance the foreign deficit. Therefore, the implications made regarding the sustainability of the current account deficit in Turkey based on the Husted model should be accepted with some reservations.
	<b>Originality/value:</b> Since external imbalances are a key challenge for most of the developing countries to provide full integration into the world economy, many empirical studies are examining the current account sustainability. The majority of these studies focus on the long-run dynamics of the current account imbalances. Unlike most of the previous studies, this paper also focuses on the short-run dynamics of the current account balance. Thus, the difference of this study from other studies stems from the examination of the dynamics of current account sustainability not only in the long term but also in the short term.

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### 1. Introduction

Developing countries cannot sustain a satisfactory growth rate for a long time as they experience important problems in their economic structures that negatively affect their production processes. Thus, it is observed that the growth processes in developing countries are interrupted from time to time by crises. One of the most important problems preventing the achievement of sustainable growth rates arises from the imbalances in the current account. Accordingly, the risks resulting from the growth of current account deficits cause economic development processes to be cut by the crises. Thus, deficits in the current account prevent developing countries from achieving sustainable growth rates. Therefore, it is vital for policymakers in developing countries to observe and effectively analyse the dynamics that guide the current account (Senadza and Aloryito, 2016; 55-56).

Being open to international trade allows a country's total consumption to be higher than its production. Of course, if the country does not have sufficient production capacity, the number of goods and services available cannot meet the total consumption. However, some part of the goods and services needed can be provided by importing them from

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abroad. In this case, because of the increasing import demand of the country, trade deficits occur in the current account balance. At this point, foreign funds should be withdrawn from abroad to finance the current account deficit. In other words, deficits caused by the increase in imports in the current account can be financed by capital inflows in the financing account, that is, foreign borrowing. That means the current account deficit leads to significant increases in the country's external debt burden. Therefore, the increase in the current account deficit causes various risks to emerging due to the increase in the external debt burden. So much so that these risks can reach a level that will cause foreign capital inflows to stop and exit after a while. From this point on, the developing country cannot finance its current account deficit and faces an economic crisis.

As can be understood from the explanations above, having a sustainable current account deficit for the developing countries is one of the basic conditions for ensuring macroeconomic stability. Hence, this study aims to analyse the sustainability of the current account deficit in Turkey for the period between 2003 and 2018. The dynamics related to the sustainability of the current account deficit is analysed within the framework of the "intertemporal budget constraint approach" developed by Husted (1992). Johansen cointegration test and Error Correction Model as the econometric methods are used. In the first part of the study, the theoretical framework of the research has been determined. In the second part, empirical studies conducted on the subject in the literature are reviewed. In the third section, information about the data set, method, and econometric results are given. In the last part, some policy implications are made to ensure the sustainability of the current account deficit in Turkey's economy.

## 2. Theoretical Framework

The current account deficit mainly stems from the fact that more imports are made in foreign trade than exports. The reason for such a deficit is the deficiencies in the production capacity due to structural problems in the economy. In this way, countries that have various structural problems in the production process may consume more than they produce by giving a current deficit. Since the current account deficits are generally financed by debt-generating capital movements, the foreign debt stock also increases during the current account deficit in these countries. For this reason, in the long run, it is not possible to consume more than it produces. Thus, developing countries must eliminate the deficiencies in production capacity by solving their structural problems in the long term, even if they have current account deficits in the short term. That means the sustainability of deficits in the current account depends on resolving structural problems in production capacity. Foreign funds used to finance current deficits can be paid back if only these funds are used to increase the country's production capacity and foreign exchange revenues. Therefore, there is a significant relationship between the sustainability of the current account deficit and the development of production capacity in the export sector in the long-run. In other words, the sustainability of the current account deficit is possible if foreign debt can be paid back by gaining export revenues (Milesi-Ferretti and Razin, 1996: 2).

Developing countries do not have financial funds enough to finance their investments due to insufficient capital accumulation for historical reasons. Besides, developing countries do not have the technological infrastructure to produce intermediate and capital goods used in the production process (Yalçınkaya & Temelli, 2014: 205, Insel & Kayıkcı, 2012: 46). Thus, the production structures of developing countries are insufficient. For this reason, they can solve the difficulties in the production process only by importing intermediate and capital goods from abroad. In this case, even if they give a current account deficit in the short term, they have the chance to improve the country's production structure and increase their export capacity by gaining international competitive advantage. For this, the current account deficit must be given by importing capital and intermediate goods, which enables the country to increase its export-based production capacity in the long term. In this context, the main criterion regarding the sustainability of the current account deficit depends on the condition that foreign resources obtained from abroad used in export-based production and hence paid back through export income.

In parallel with the above-mentioned views, Husted (1992) developed the "intertemporal budget constraint approach" and thus modeled the sustainability condition of the current account deficit in the context of developments in the country's ability to pay the debt over time. Thus, the sustainability of the current account deficit is determined depending on the capacity of the economy fulfilling its external financial liabilities. Accordingly, the main criterion regarding the sustainability of the current account deficit has been handled within the framework of the long-term relationship between import expenditures and export revenues. In this way, it is checked whether there is long-term equality between the foreign exchange expenses of the country and foreign exchange revenues. It is concluded that the current account deficit cannot be sustained if foreign exchange revenues through export cannot meet a significant portion of the foreign exchange expenditures incurred by import.

The criterion proposed by Husted (1992) regarding the sustainability of the current account deficit can be determined by testing the cointegrated relationship between imports and exports as an econometric method. Here, the relationship between export revenues and import expenses is analysed using various cointegration tests. When there is a cointegrated relationship between the two variables, it can be determined that the intertemporal budget constraint is met, thus the current account deficit is sustainable (Wu et al. 2001: 220-222). However, if there is no cointegrated relationship between export revenues and import expenditures, it is concluded that the current account deficit is unsustainable since the intertemporal budget constraint cannot be met and this country will not repay its debt. In short, this model shows that the sustainability of the current account deficit for a long time depends on increasing foreign currency revenues.

The model developed by Husted (1992) can be explained with the help of Equality-1 shown below. Here,  $C_0$  represents current consumption,  $Y_0$  production,  $B_0$  external borrowing,  $I_0$  investment,  $r_0$  world interest rate,  $(1 + r_0)B_{-1}$  represents the debt burden of the previous period.

$$C_0 = Y_0 + B_0 - I_0 - (1 + r_0) B_{-1} \quad (1)$$

After some assumptions, the above budget constraint equality is turned into a model that allows analysing the sustainability constraint of the current account, shown in Equation 2 below. Here, the revenues of exports of goods and services obtained in a certain period with EX are shown. The IM symbolizes the sum of import expenditures and net interest and transfer expenses.

$$EX = \alpha + \beta IM + \varepsilon \quad (2)$$

Within the framework of the equation stated above, the sustainability of the current account deficit is analysed within the framework of the condition that the co-integration relationship exists between the EX and IM series and that the co-integration coefficient is equal to one. Accordingly, firstly, the existence of the co-integration relationship between EX and IM series should be tested. Then, the sustainability of the current account deficit may be interpreted in terms of the value of cointegration coefficient. Sustainability of current account deficit is evaluated in the strong form when the co-integration coefficient is equal to one and in the weak form when it is between zero and one (Husted, 1992: 161; Quintos, 1995: 409-411, Baharumshah et al. 2003: 473).

### 3. Review of Literature

It is seen that many different methods are used in studies on the sustainability of the current account deficit in the literature. However, we can group the methods used in these studies under two groups. Accordingly, a group of economists go beyond the items in the current account and examine the sustainability conditions of the deficits from the different aspects. In this context, indicators such as economic growth rate, investment saving rate, the ratio of external debts to national income, and the ratio of reserves to debt stock are included in the analysis. Besides, some structural features that determine the import dependency of exports in the production process are used in the sustainability analysis of the current account deficit. On the other hand, the economists in the second group investigate the sustainability of current deficits directly based on the items in the current account (Duman, 2018: 127; Ayla and Küçükkale, 2018: 56). Within the framework of the “intertemporal budget constraint approach”, sustainability is examined focusing on the existence of a long-term relationship between export revenues and import expenses. In our study, this approach developed by Husted (1992) regarding the sustainability of the current account deficit was used. Therefore, studies analysing the existence of the co-integration relationship between export and import variables will be reviewed in the literature section.

Regarding studies analysing individual country experiences, Heidari et al (2012) analyzed the sustainability of the current account in the Iranian economy in the framework of the long-run relationship between exports and imports. By employing the bounds testing approach to data over the sample period 1960–2007, the study reveals that there is a long-run equilibrium relationship between imports and exports over the sample period. This finding suggests that current account deficits in Iran are sustainable. Destainings et al. (2013) examined the sustainability of the current account deficits in Kenya employing the Johansen cointegration test for the data between 1970 and 2012. Empirical findings assert that exports and imports are cointegrated. However, since the cointegration coefficient is not equal to one, the paper concludes that the current account deficit of Kenya is not sustainable in the long-run. Therefore, policy measures to correct unsustainable external imbalances are urgently needed. Asmarani (2015) tests whether the current account deficit is persistent and sustainable in Indonesia using the Autoregressive Distributed Lag (ARDL) approach for the period of 2011–2014. Empirical results show that Indonesia has an unsustainable condition in the current account deficit. Thus, findings call the government to optimize the policy on supporting the export performance. Shuaibu and Oyinlola (2017) examined the sustainability of the current account in Nigeria using time-series analysis including the causality tests of the Toda-Yamamoto modified Wald, Engle-Granger, and Gregory Hansen. Findings suggest that there is current account sustainability in Nigeria, which means that exports could finance imports.

In the literature, some studies have examined the sustainability of the current account deficit based on multi-country experiences. For example, Holmes (2006) used the intertemporal budget constraint model for the sustainability of the current account deficit in Latin American countries. Using the annual data between 1979 and 2001, panel unit root and co-integration techniques are used in the study. According to the findings, the current account deficits of 14 countries, except Brazil and Colombia, from 16 Latin American countries were sustainable. Konya (2009) conducted a study on the sustainability of the current account in three Central European countries, the Czech Republic, Hungary, and Slovenia, during the 1990–2005 timeframe. Cointegration tests showed that the Czech Republic and Slovenia are not in violation of their intertemporal budget constraint and their trade imbalances are sustainable. However, the cointegration relationship between exports and imports is not so strong in Hungary. Sissoko and Jozefowicz (2016) examined the current account sustainability of five countries in Southeast Asian country including Indonesia, Malaysia, The Philippines, Singapore, and Thailand. The paper uses cointegration econometric methodology to test for a relation between exports and imports of the current account based on the data between 1960 and 2014. Empirical results show that Malaysia and Thailand have sustainable current account balances while the current account positions for Singapore, Indonesia, and the Philippines are problematic. Thus, exchange rate adjustments and macroeconomic policy reforms may be necessary to reduce vulnerabilities in external positions for these countries. Finally, Öztürk ve Çoltu (2018) examined the sustainability of the current deficit in fifteen selected OECD countries between 1995 and 2015 by Pesaran CADF unit root and Westerlund ve Edgerton panel cointegration analysis. Empirical findings revealed that the ratio of countries' exports to imports in the long term is sustainable in the long term for the 15 countries examined. Considering the short-term parameters, it is concluded that the import coverage ratio for all countries is sustainable in a weak form.

Regarding work done on the sustainability of the current account deficit in Turkey, it is generally determined that a wide variety of cointegration tests is used. In this way, the majority of studies into different periods have demonstrated that the sustainability of the current account deficit is a weak form in Turkey. For example, Yanar and Yücel (2005), has examined the sustainability of Turkey's current account deficit using the intertemporal budget constraint point of view. The study analysed the relationship between annual export income and import expenses for the period 1964–2003 employing the Engle-Granger two-stage cointegration test. According to empirical findings, there is no long-term relationship between imports and export in the period studied. Kalyoncu (2005) examined the sustainability of Turkey's current account deficit, using the approach intertemporal budget constraint for the period between 1987 and 2002. In this framework, long-term interaction between exports and imports, net transfer payments, and net interest payments have been estimated by the Johansen cointegration test. Findings revealed the existence of a long-term balance between the current account income and expenses series. Besides, the cointegration coefficient value was found to be very close to, which indicates that the current account deficits are sustainable in the long term. In another study, Korkmaz (2007) carried out examining the sustainability of Turkey's current account deficit. In this study, the sustainability of the current account deficit was analysed for the period 2001–2005 based on the inter-period budget constraint principle. The findings show that the current account deficit in Turkey's economy is sustainable in a weak form. This result means that the export revenues covered only a certain part of the import expenses in the period examined. Berke (2009) analysed whether the current account deficit is sustainable for Turkey between 1989 and 2006. The results of the classical Engle-Granger cointegration test showed that the current deficits are unsustainable. On the other hand, the findings obtained from the piecewise cointegration method determined that the export and import series returned to their averages in the long run. Peker (2009) analysed the sustainability of the current account deficit using the Johansen cointegration test for monthly data from 1992 to 2007. Although there is a long-term relationship between the export and import series, the co-integration coefficient was calculated as 0.89. Accordingly, it does not meet all of its foreign exchange earnings from foreign exchange expenditures in Turkey. That means the cointegration coefficient value is smaller than 1, which indicates that the current account deficit in Turkey has a weak sustainable form.

As apparent from the studies described above, the sustainability of the current account deficit generally is founded to be at a weak form in Turkey. Similar conclusions are also indicated in researches conducted over the past decade. For example, Ümit (2011) examined the sustainability of the current account deficit using monthly data from 1992 to 2010 and revealed the low level of sustainable current account deficit. However, the import coefficient obtained from the cointegration equation has a value of less than one. In this case, to maintain Turkey's current account deficit a stronger form, priority should be given to policies to increase foreign exchange earnings. Using the inter-period budget constraint model, Ceylan and Çevis (2012) analysed the validity of the current account model before and after 2001, when the inflation-targeting regime was introduced. Accordingly, the relationships between the export revenues and import expenses of the 1987–2001 and 2002–2012 sub-periods were analysed by unit root tests based on the non-linear time series method. Findings obtained in the study determined that cointegration was valid between export revenues and import expenses in the pre-inflation-targeting regime from 1987 to 2000. However, there was no cointegration relationship between current account income and expense in the period of 2002–2012. Thus, the current account deficit in Turkey has proved to have an unsustainable form for the period after the inflation-targeting regime. Altunöz (2014) tested whether the current account deficit was sustainable using the Johansen cointegration test for the period 1994–2013. Findings revealed that there is a long-term relationship between the series. However, the long-term coefficients of the cointegration equation showed that the current account deficit is sustainable in a weak form.

More recently, Koç and Bakırtaş (2016) analysed the sustainability of the current account deficit using the Engle-Granger, Johansen, and ARDL - Boundary Test methods, using quarterly data from 1992 to 2015. Empirical findings have shown that the current account deficit is sustainable in a weak form, although it confirms the cointegration relationship between export revenues and import expenses. Accordingly, it has been emphasized that we should focus on longer-term reformist policies that would transform the economic structure rather than short-term policies. Turan and Barak (2016) investigated whether the current account deficit is sustainable in Turkey between the years 1987–2014. Engle-Granger Cointegration test was used as the econometric method. According to the results obtained, it has been observed that there is a long-term relationship between export and import variables to demonstrate the sustainability of the current account deficit. Besides, in the findings related to the Granger causality test, it was determined that export was the cause of imports. On the other hand, it has been proposed to increase the exchange rate by reducing interest rates. Because the high exchange rate will serve to close the current account deficit by causing the prices of goods in the country to decrease and hence increase export. Finally, Yalçınkaya et al. (2018) level of sustainability of the current account deficit in Turkey's economy, using quarterly data between 1984 and 2017, were analysed. Generalized Method of Moments was applied as an empirical method. The results of the study showed that the current account deficit was strong in the period 1984–2001 and weakly in the periods 1984–2017. It was also pointed out that policy measures to decrease import expenses and increase export revenues should be developed and implemented to increase the sustainability of the current account deficit.

#### 4. Data, Methodology and Empirical Results

In this section, the sustainability of the current account deficit in Turkey will be empirically analysed according to the principles of the intertemporal budget constraint developed by Husted (1992). In this framework, the relationship between current account income and expenses will be tested in the short and long run separately. The current account income series (EX) consists of the gains from the exports of goods and services. The current account expense series (IM) consists of goods and services import expenses and net interest and transfer payment expenses. All quarterly

data between 2003 and 2018 are obtained from the International Monetary Fund (IMF) data system. Within the framework of econometric analysis, firstly, some unit root tests are applied to time series. Unit root analysis of variables was performed using HEGY (Hylleberg, Engle, Granger and Yoo) and Zivot-Andrews tests developed by Hylleberg et al. (1990) Zivot and Andrews (1992), respectively. Later, long-term relationships between variables were investigated within the framework of the cointegration test developed by Johansen (1991 and 1995). Finally, with the help of the Error Correction Model, the coefficients of short-term relationships are estimated.

#### 4.1 Unit Root Tests

In order to detect the presence of seasonal unit roots on the variables, we conducted the popular approach developed by Hylleberg, Engle, Granger and Yoo (1990) called HEGY unit root testing procedure. Hylleberg et al. (1990) investigate the existence of seasonal and non-seasonal unit roots in a time series using three null hypotheses and alternatives, which are presented below:

$$H_0: \pi_1 = 0, H_1: \pi_1 < 0; \quad H_0: \pi_2 = 0, H_1: \pi_2 < 0; \quad H_0: \pi_3 = \pi_4 = 0, H_1: \pi_3 = 0 \text{ and/or } \pi_4 = 0$$

Failure to reject the first hypothesis tested with the t-test indicates the presence of a non-seasonal unit root at zero frequency. Failure to reject the second hypothesis, which was also tested with the t-test, indicates the existence of a seasonal unit root at a six-month frequency. Finally, the failure to reject the third hypothesis tested with the help of the F-test also indicates the presence of the seasonal unit root at the annual frequency.

The results of the HEGY unit root test results in Table 1 show that EX and IM series only have a zero-frequency unit root. In other words, export and import series have only non-seasonal unit-roots. Thus, the existence of seasonal unit root was denied for the variables in the model. That means they did not contain seasonal components, which displayed stochastic appearance.

**Table 1. Results of the HEGY Unit Root Test**

Variable	$t(\pi_1)$	$t(\pi_2)$	$F(\pi_3, \pi_4)$	Decision
EX	-1,23	-4,32*	-4,10**	I (1, 0, 0)
IM	-1,87	-2,13**	-3,85**	I (1, 0, 0)

Note: \*, \*\* indicates the significance level at 1% and 5%, respectively. The critical values for t and F test sourced by Hylleberg et al. (1990).

In time series applications, if a standard unit root test is applied in case of a break in the series used, unreliable test results can be obtained. In order to obtain more realistic results from unit root tests, Zivot and Andrews (1992) developed unit root test that take into account the breaks in the time series. In this study, the unit root test, which takes into account the structural break, is also included in the study. Tablo-2 shows the results of Zivot and Andrews Unit Root Test. As can be seen in Table 2, both EX and IM variables are stationary at the first differences according to the results of unit root tests performed in different structural breaks and quarters. In other words, the results of Zivot-Andrews unit root test, which takes into account the structural breaks, indicate that EX and IM are stationary at I(1). In this way, since the variables are equally stable, it is possible to apply the Johansen Cointegration Test in the analysis of the cointegration relationship between them.

**Table 2. Results of Zivot-Andrews Unit Root Test**

			Breakpoint	t-statistics	Decision
EX	Level	Intercept	2008 Q3	-2.0762	I(1)
		Intercept+trend	2016 Q1	-3.7281	
	1.differenece	Intercept	2014 Q2	-8.2615*	
		Intercept+trend	2014 Q2	-9.2171*	
IM	Level	Intercept	2008 Q4	-3.7615	I(1)
		Intercept+trend	2012 Q1	-4.9817	
	1.differenece	Intercept	2009 Q1	-10.8271*	
		Intercept+trend	2009 Q1	-10.7615*	

Note: \* indicates that the variables are stationary at 1% significance level. Lag lengths of Zivot-Andrews structural break unit root test (max lag = 10) were automatically selected according to the SIC.

#### 4.2 Johansen Cointegration Test

The long-term interaction between current account income (EX) and expenses (IM) is investigated using the Johansen cointegration test and the results are presented in Table-3. Both trace and maximum eigenvalue statistics in the second row of the table were higher than the critical values at a 5% significance level. Thus, the null hypothesis ( $\tau = 0$ ), which claims that there is no cointegration relationship between the series, is rejected and an alternative hypothesis ( $\tau = 1$ ) that assumes that there is a cointegrated relationship is accepted. Accordingly, the income and expense series of the current account are co-integrated. Therefore, our quarterly data from 2003 to 2018 appear to support the proposition that in Turkey there exists a stable long-run relationship between export and import plus net transfer payments and net interest payments.

**Table 3. Results of Johansen Cointegration Test**

Hypothesis	Trace Statistic	Critical Value (% 5)	Maximum Eigenvalue	Critical Value (% 5)
H0: $\tau = 0$ , H1: $\tau = 1$	25.3672	20.2618	22.4267	15.8921
H0: $\tau \leq 1$ , H1: $\tau = 2$	3.7612	9.1645	3.7612	9.1645

Note: Lag order is determined as 6 using SIC'a (Schwarz Information Criterion).

The results of the cointegration analysis show that the income and expense series of the current account are co-integrated in the long term. Thus, in the relevant period, the current account deficit in Turkey regardless of whether weak or strong can be said to be sustainable. To decide whether sustainability is weak or strong, it is necessary to look at the long-term coefficients of the cointegrating vector. For the current account deficit to be strongly sustainable, the estimated value of the cointegration vector coefficient must be equal to 1. The estimation results of the long-term cointegration equation are presented in Table-4. It is seen that the coefficient value of the current account expense (IM) is positive. However, the fact that the coefficient value (0.74) is less than 1 indicates the sustainability of the current deficit only in weak form. Therefore, empirical evidence reveals that the current account deficit can be sustained in the examined period in Turkey, but weak form.

**Table 4. Results of Long Run Estimation**

Variable	Coefficient	Probability
C	3.87**	0.0370
IM	0,74*	0.0014

Note. \* and \*\* show the critical values at the significance levels %1 and %5, respectively.

#### 4.3 Estimation of Error Correction Model

After determining the long-term relationship between the current account income and expenses, our analysis has been expanded within the framework of the Error Correction Model to reveal the short-term dynamics of the interactions among the variables. Accordingly, using the Error Correction Model, the deviations of the co-integrated series from the equilibrium relation are determined over time. The equation for the Error Correction Model used is expressed in Equation-3 below.

$$\Delta EX_t = \mu + \sum_{i=1}^n \theta_i IM_{t-1} + \sum_{i=0}^n \alpha_i \Delta EX_{t-1} + \gamma ECT_{t-1} + \varepsilon_t \quad (3)$$

Here, a coefficient of error correction term (ECT) is expected to be negative and statistically significant. This finding confirms that the variables will move towards the long-term equilibrium value. The magnitude of the ECT coefficient is an indicator of the speed of convergence towards the long-term equilibrium value. In other words, short-term deviations from the equilibrium state return to the long-term equilibrium at the speed determined by the magnitude of the coefficient of the ECT parameter. The estimation results of the Error Correction Model are presented in Table-5. Accordingly, the coefficient of ECT is found to be negative and statistically significant. Thus, it was determined that the EX and IM series converged towards equilibrium in the long term even if they moved away from the balance levels in the short term. The coefficient of ECT showing the convergence rate for each period is 78%. That means 0,78 of the difference between the observed value and equilibrium value in the model disappears every quarter term. In other words, when a deviation occurs in the long-term equilibrium, this deviation is corrected at a rate of 78% every quarter term. On the other hand, as expected, coefficients of the first, second, and third terms lagged variables of current account expense (IM) reveal that they have a positive effect on the current account income (EX). These findings also indicated that the long-run analysis obtained is reliable. Concerning with the diagnostic tests, R<sup>2</sup> value (0.78) determines that the model in Equation-3 is sufficiently large to explain the relationship under consideration. Besides, Breusch-Godfrey LM test results show that there is no autocorrelation in the model and the White test does not have a variance problem.

**Table 5. Estimation Results of Error Correction Model**

Variable	Coefficient	Probability
C	9.6782	0.0411**
$\Delta IM_{t-1}$	0.68	0.0000 *
$\Delta IM_{t-2}$	0.47	0.0113 **
$\Delta IM_{t-3}$	0.51	0.0217 **
$ECT_{t-1}$	-0.78	0.0002 *
Adj R2	0.82	
Breusch-Godfrey LM	2,0812	0,1891
White Test	0.531	0.1427

Note. \* and \*\* show the critical values at the significance levels %1, and %5, respectively.

## 5. Conclusion

Sustainability of the current account deficit is of great importance in terms of sustaining economic growth for developing countries. In this respect, the sustainability of the current account deficit is considered an important matter that should be managed for policymakers. Accordingly, this study aims to investigate the dynamics of the current account deficit in Turkey by using “the intertemporal budget constraint approach” developed by Husted (1992). For this aim, quarterly data between 2003 and 2018 were empirically examined within the framework of the Johansen cointegration test and Error Correction Model. Empirical findings have revealed that there is a cointegration relationship between current account incomes and expenses. However, since the cointegration coefficient is smaller than 1, the current account deficit is sustainable in a weak form which means that intertemporal budget constraint is partially provided. The result of the Error Correction Model shows that the deviations from the long-term equilibrium are corrected at a rate of 78% every quarter term.

Overall, according to the “intertemporal budget constraint approach” developed by Husted (1992), the current account deficit in Turkey is sustainable in the weak form for the period of 2003-2018. The policy implication of the finding of the violation of the powerful sustainability for current account balance implies that foreign deficit may trigger a financial crisis in the long run. Therefore, the policymakers in Turkey should implement some measures to increase current account income while decreasing expenses. Accordingly, priority is given to policies that reduce import expenses on the one hand and increase export revenues on the other. Production structures in developing countries like Turkey are mostly dependent on imports in the raw materials and intermediate goods, which often cause the current account deficit problem. In this context, the most effective solution is of course to apply some structural reforms that can save domestic production from import dependency. Thus, the import-dependent production structure in Turkey should be a delicate matter to provide the sustainability of the current account balance.

## References

- Altunöz U. (2014). Cari Açık Sorunun Temel Nedenleri ve Sürdürülebilirliği: Türkiye Örneği. *İstanbul Gelişim Üniversitesi Sosyal Bilimler Dergisi*, 1 (2), 115-132.
- Asmarani, T. E. (2015). Persistency and Sustainability of Indonesia's Current Account Deficit. *Bulletin of Monetary, Economics and Banking*, 17 (3), 325-348.
- Ayla, D. & Küçükkale, Y. (2018). Cari Açıkların Sürdürülebilirliği: Literatür Taraması, *Karadeniz Sosyal Bilimler Dergisi*, 10 (18), 55-80.
- Baharumshah, A. Z., Lau, E. & Fountas S (2003). On Sustainability of Current Account Deficits: Evidence from Four ASEAN Countries. *Journal of Asian Economics*, 14 (3), 465-487.
- Berke, B. (2009). Türkiye'de Cari Açığın Sürdürülebilirliği: Parçalı Eş bütünlüşme Analizi. *Akdeniz Üniversitesi İİBF Dergisi*, 9 (18), 117-145.
- Ceylan, R. & Çeviş, İ. (2012). Enflasyon Hedeflemesi Rejimi Öncesi ve Sonrasında Türkiye'de Cari Açıkların Sürdürülebilirliği. *E-Journal of New World Science Academy*, 7(4), 259-276.
- Destainings, N. N., Mohamed, S. M. & Gideon, M. (2013). Is Kenya's Current Account Sustainable? A Stationary and Cointegration Approach. *European Scientific Journal*, 9 (25), 171-190.
- Heidari, H., Katircioğlu, S. T. & Davoudi, N. (2012). Are Current Account Deficits Sustainable? New Evidence from Iran Using Bounds Testing approach to Level Relationships. *Economics: The Open-Access, Open Assessment E-journal*, 6 (29), 1-18.
- Holmes, M. J., Panagiotidis T. & Sharma A., (2011). The Sustainability of India's Current Account, *Applied Economics*, 43, 219-229.
- Husted, S. (1992). The Emerging U.S. Current Account Deficit in the 1980s: A Cointegration Analysis, *The Review of Economics & Statics*, 74 (1), 159-166.
- Hylleberg, S., Engle, R. F., Granger, C. W. J. & Yoo, B. S. (1990). Seasonal Integration and Cointegration. *Journal of Econometrics*, 44, 215-238.
- İnsel, A. & Kayıkçı, F. (2012). Evaluation of Sustainability of Current Account Deficits in Turkey. *Modern Economy*, 3, 43-50.
- Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*, 59, 1551-1580.
- Johansen, S. (1995). *Likelihood-based Inference in Cointegrated Vector Autoregressive Models*, Oxford: Oxford University Press.
- Kalyoncu, H. (2005). Sustainability of Current Account for Turkey: Intertemporal Solvency Approach. *Prague Economic Papers*, 1, 82-88.
- Koç, S. & Bakırtaş, İ. (2016). Türkiye'de Cari Açığın Sürdürülebilirliği: Kointegrasyon Testlerinden Bulgular. *Sosyal Bilimler Dergisi*, 49, 252-277.
- Kónya, L., 2009. The Sustainability of the Current Account in the Czech Republic, Hungary, and Slovenia. *Empirical Economics*, 36, 367-384.
- Milesi-Ferretti, M. & A. Razin (1996). Sustainability of Persistent Current Account Deficits. *NBER Working Paper*, No: 5467.
- Öztürk, S., & Çoltu, S. (2018). The Analysis of Sustainability of Current Account Deficit in Selected OECD Countries. *Bingöl University, Journal of Social Sciences Institute*, 8 (16), 37-48.
- Quintos, C. E. (1995). Sustainability of the Deficit Process with Structural Shifts, *Journal of Business and Economic Statistics*, 13, 409-417.
- Peker, O. (2009). Türkiye'deki Cari Açık Sürdürülebilir mi? Ekonometrik Bir Analiz. *Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 17(1), 164-174.



- Sahbaz, A. (2011). Cari İşlem Açıklarının Sürdürülebilirliği: 2001-2011 Türkiye Örneği. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 20 (3), 417-432.
- Senadza, B. & Aloryito, G. K. (2016). The Twin Deficits Hypothesis: Evidence from Ghana. *International Journal of Business and Economic Sciences Applied Research (IJBESAR)*, 9 (3), 55-62.
- Shuaibu, M. & Oyinlola, M. A. (2017) An Empirical Analysis of Nigeria's Current Account Sustainability, *The Journal of Applied Economic Research*, 11 (1), 54-76.
- Sissoko, Yaya, & Jozefowicz J. J. (2016). An Investigation of Current account Sustainability in Five Asian Countries. *Microeconomics and Macroeconomics*, 4(1), 1-16.
- Turan, Z. & Barak, D. (2016). Türkiye'de Cari İşlemler Açığının Sürdürülebilirliği. *İşletme ve İktisat Çalışmaları Dergisi*, 4 (2). 70-80.
- Ümit, A. Ö. (2011). Türkiye'de Cari İşlemler Açığının Sürdürülebilirliğinin Zaman Serileri Analizi ile Değerlendirilmesi: 1992-2010 Dönemi. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 11(3), 135-148.
- Yalçinkaya, Ö. Daştan, M. & Karabulut, K. (2018). Türkiye Ekonomisinde Cari İşlemler Açığının Sürdürülebilirliği: Dönemsel ve Yapısal Kırılmalı Bir Zaman Serisi Analizi. *Journal of Life Economics*, 5 (4), 1-22.
- Yalçinkaya, Ö. & Temelli F. (2011). Ekonomik Büyüme ile Cari İşlemler Dengesi Arasındaki İlişki BRICS VE MINT (1992-2013). *Süleyman Demirel Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi*. 19, (4), 201-224.
- Yamak, R. & Korkmaz, A. (2007). Türk Cari İşlemler Açığı Sürdürülebilir mi? Ekonometrik Bir Yaklaşım. *Bankacılar Dergisi* (60), 17-32.
- Yanar, R. & Yücel, F. (2005). Türkiye'de Cari İşlem Açıkları Sürdürülebilir mi? Zaman Serileri Perspektifinden Bir Bakış, *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 4 (2), 483-492.
- Wu, J. L., Chen, S. L. & H.Y. Lee (2001) Are Current Account Deficits Sustainable. Evidence from Panel Cointegration, *Economic Letters*, 72, 219-224.
- Zivot, E. & Andrews, D.W.K. (1992). Further Evidence on the Great Crash, the Oil Price Shock, and the Unit Root Hypothesis. *Journal of Business and Economic Statistics*, 10 (3), 251-270.

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