Is Current Account of Turkey Sustainable ? Evidence from Nonlinear Unit Root Tests

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In this paper, current account sustainability of Turkey is analyzed in a nonlinear framework. Various nonlinear unit root tests have been used to test for structural break, sign and size nonlinearity. We have tested structural break and size nonlinearity separately and structural break-sign and size-sign nonlinearities simultaneously. Only considering the size nonlinearity, we have found that the current account of Turkey is sustainable. Thus, the size nonlinearity, in other words the speed of reversion to equilibrium, is essential for the current account sustainability of Turkey. We have also found that the speed of adjustment towards equilibrium is symmetric, while considering size and sign nonlinearities simultaneously.

Keywords: Current account, sustainability, unit root, nonlinearity
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1. Introduction

The current account represents the economic performance of a country. In this respect current account is an important indicator for investors and policymakers. Especially big and continuously current account deficits lead to warning signals for a country. In the long period, current account deficits tend to accumulate debt condition of a country and then increase interest payments of next generations by increasing domestic interest rates according to foreign interest rates (Baharumshah et al., 2003). When current account deficits occur in the long periods, it can lead the debt and exchange rate crises to decline in economic activities such as investment, consumption and output (Christopoulos and León-Ledesma, 2010).

Chronologically, Turkey experienced three balance of payments crises in the late 1970's, 1994 and 2001 respectively. Common characteristic of these crises was the occurrence of too large current account deficits before the crisis. During the periods prior to the crises, current account deficits were generally financed by short-term foreign borrowing (Togan and Ersel, 2004). Apak et al. (2008) points out that the current account deficit could be compensated, but the leading problem was sustainability of the current account deficit. Because in February 2001 the current account deficit reached 5% of GDP in Turkish economy at that time economic crisis occurred. But in the recent years ratio of current account deficit to GDP has presented higher levels than 5% level. However, economic crisis has not occurred yet. Consequently, sustainability of current account is more important than its size. If the current account deficits are not sustainable in the long-run, then currency crisis may occur. Milesi-Ferretti and Razin (1996) relate the definition of sustainability with solvency conditions of a country. When the present discounted value of future trade surpluses is equal to current external indebtedness, then the economy is solvent. Finally, country's current account deficit is sustainable if the continuity of the present macroeconomic policy does not disrupt the solvency constraint in the future periods (Insel and Kayikci, 2012).

Since linear unit root tests have a low power against nonlinear stationary processes, in this paper, current account sustainability of Turkey is analyzed in a nonlinear framework by following and extending the testing approach used by Chen (2014). The author summarizes nonlinearity in three types in the context of current account sustainability. Chen (2014) denotes the three types as nonlinearity stems from structural break (structural break nonlinearity), sign and size nonlinearity. If the ratio of the current account to GDP stems from the first type of nonlinearity then, there exists a time-varying equilibrium for the ratio of the current account to GDP. Second and third types of nonlinearity contain nonlinear mean-reverting process and differ from each other based on the adjustment process. The reaction of the current account-GDP ratio depends upon the sign of the disequilibrium for sign nonlinearity (i.e. asymmetric adjustment). On the other hand, for size nonlinearity (i.e. asymmetric speed of adjustment) the reaction of the current account-GDP ratio depends upon the deviation of the current account-GDP ratio from its fundamental equilibrium (Chen and Xie, 2015).

We have found that the size nonlinearity is essential for the current account sustainability of Turkey. In the size nonlinearity conditions, when current account deficit becomes bigger than the threshold value of the ratio of current account deficit to GDP, then this situation alerts for the market participants and policy makers as an economic crisis signal (Kim et al., 2009). For example, if the markets determine that the current account deficits are unsustainable then, they can drop new investments; also policy makers implement anti-trade policies (Bergsten, 2002). Christopoulos and León-Ledesma (2010) assert that if stationary circumstance is not observed for current account permanently in the future, then country's current account does not exhibit mean reversion. When non-stationary circumstance occurs, then external remediation might appear in the form of an exchange rate and/or investment adjustment by markets. Akdoğan (2014) analyzes nonlinear adjustment behavior of danger zone economies. He finds out that mean reversion occurs when countries' current account deficit to GDP ratio exceed 4.8% level. Akçoraoğlu and Ağaslan (2009) point out that current account deficit to GDP ratio never exceeds the level of 5% before the 2004 period. After 2004, Turkish national currency overvalued and large current account deficits occurred. These deficits are generally financed by short-term international financial inflows, external borrowing of the firms and privatization revenues. In this way current account of Turkey will be sustainable.

2. Literature Review

Açıkgöz and Akçağlayan (2014) have examined sustainability of current account deficit in Turkey in long-run relationship between export and import during the period of 1992:1-2011:3. They have used Engle and Granger cointegration and ARDL bound testing approach. They conclude that there is a long-run relationship between export and import. Besides, current account deficit sustainability has a weak form.

Akçoraoğlu and Ağaslan (2009) have investigated the sustainability of external position of Turkey during the period of 1987:1-2008:2. They have used Johansen cointegration analysis and Granger causality test. According to the analyze results, current account deficit of Turkey was unsustainable in that period. Additionally current account deficit was comparatively higher than the optimal current account balance levels in the period of 2004:1-2008:2.

Apak et al. (2008) point out that current account deficit has a dilemma for Turkish economy. Because high interest rate effect on the capital inflows and value of the national currency has increased. These conditions have caused trade imbalances and then current account deficit has occurred again. Consequently, if the Turkish economy finances the deficits with capital flows, balance of the current account cannot be obtained.

Insel and Kayikci (2012) infer that the exports and imports conditions of Turkish economy are interdependent on one another. Generally, Turkey exports final consumption goods and conversely Turkey imports intermediate goods. This structure of foreign trade leads to trade imbalances. To overcome this problem, production system needs to be regenerated. Insel and Kayikci (2012) also point out that after the 2008 global economic crisis two negative developments occurred in the context of sustainability of current account deficits in Turkey. One of them is that short-term debt of the private sector has instantly increased and the other is that share of foreign direct investment in financing current account deficit is at lower levels than the previous years.

Cecen and Xiao (2014) assert that the current account deficits in Turkey are not sustainable. They explain this unsustainable condition is caused by unstable macroeconomic policies of Turkish government. They also add that unsustainable current account does not imply insolvency or upcoming financial crisis.

Ümit (2011) has investigated the sustainability of the Turkish current account deficit in the period of 1992:1-2010:2. He has used unit root tests and cointegration test in terms of long-run relation between imports and exports. According to the analysis results, current account deficit of Turkey is weakly sustainable. Similarly, Murat et al. (2014) has examined current account deficit of Turkey during the period of 2003:1-2013:2. They have estimated the model in the respect of long-term relationship between export and import by using unit root test and cointegration test. They find that current account deficit of Turkey is weakly sustainable.

Ekinci and Kahyaoğlu (2015) have analyzed the sustainability of current account deficit in Turkey in the scope of international interest rate. They have used logistic smooth transition autoregressive model over the period of 1992:1-2011:12. They find that increases in international interest rates move current account deficit of Turkey from an unsustainable regime to a sustainable regime. Nevertheless, this direction effect of interest rates on current account deficit is weak.

Göçer (2013) has analyzed the sustainability of Turkey's current account deficit in the period of 1996:1-2012:1 by using cointegration analysis and vector error correction model. According to the analyze results Turkey's current account deficit is weakly sustainable.

Mercan and Göçer (2012) have investigated the sustainability of Turkey's current account deficit over the period of 1992-2012 by using two different approaches. One of them is intertemporal external balance constraint and the other is cointegration approach. Results show that sustainability of current account balance has a weak form.

3. Current Account Sustainability

In this study, sustainability of current account balance has been examined by using Trehan and Walsh (1991) and Hakkio and Rush (1991) approach to the intertemporal budget constraint. According to this approach, current account balance can be sustainable if the long-term budget constraint is ensured by any important feedback on domestic savings and investments and any important variation on budget deficits. According to Trehan and Walsh (1991) stationary current account is sufficient to ensure the intertemporal budget constraint. In a stochastic model, which has zero growth, budget constraint is;

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

In (1) C_t, I_t, B_t, Y_t and r_t are consumption, investment, government expenditure, net foreign assets, income and the world interest rate respectively. Net debt stock can be negative or positive. Rearranging (1) in the context of debt stock;

$$B_t = (1 + r_t)B_{t-1} + NX_t \qquad (2)$$

Where NX_t is net exports. Iterating (2) forward, assuming interest rate $R_t = 1 + r_t$ with expected value $E(R_{t+j}|I_{t-1}) = R$ for all t and $i \geq 1$ and φ_{t-1} be the information set available in (t-1), we get,

$$B_{t-1} = -\sum_{j=0}^{\infty} E\left(\prod_{i=0}^{j}\left(\frac{1}{1+r_{t+i}}\right) NX_{t+j}|\varphi_{t-1}\right) + \lim_{j\to\infty} E\left(\prod_{i=0}^{j}\left(\frac{1}{1+r_{t+i}}\right) B_{t+j}|\varphi_{t-1}\right). \quad (3)$$

(3) infer that international investors can be lent to an economy if they expect that the current value of the future stream of net exports surpluses equals the current stock of foreign debt. Therefore, we define long-run budget constraint. Finally, the last term in (3) must equal zero:

$$\lim_{j\to\infty} E\left(\prod_{i=0}^{j}\left(\frac{1}{1+r_{t+i}}\right) B_{t+j}|\varphi_{t-1}\right) = 0 \quad (4)$$

(3) and (4) indicate that the present value of economy's net resource transfers to foreigners must equal the value of the economy's initial debt to them. Trehan and Walsh (1991) assert that current account $CA_t = B_t - B_{t-1}$, a sufficient condition for (4) to hold is that the current account is stationary. When the growth rate of an economy is positive, current account sustainability can be obtained if the ratio $y_t = CA_t/Y_t$ is stationary. This condition implies that current account sustainability is possible with permanently current account deficits as long as they do not grow faster than output in terms of expected value. In this respect, the sustainability hypothesis indicates that the debt to GDP ratio is constant in the long-run. For the finite sample, non-stationary process is the best approximation to the data generation process of the current account. Because, in this context current account adjustment will take place in the future period (Christopoulos and León-Ledesma, 2010).

4. Econometric Methodology

Leybourne, Newbold and Vougas (1998) (LNV henceforth) propose a unit root test for testing the unit root null hypothesis against the alternative of stationary around a smooth transition in linear trend. The authors consider the following three logistic smooth transition regression models:

Model A $\quad y_t = \alpha_1 + \alpha_2 S_t(\gamma,\tau) + v_t \quad$ (5)

Model B $\quad y_t = \alpha_1 + \beta_1 t + \alpha_2 S_t(\gamma,\tau) + v_t \quad$ (6)

Model C $\quad y_t = \alpha_1 + \beta_1 t + \alpha_2 S_t(\gamma,\tau) + \beta_2 t S_t(\gamma,\tau) + v_t \quad$ (7)

where v_t is a zero-mean I(0) process and $S_t(\gamma,\tau)$ is the logistic smooth transition function. $S_t(\gamma,\tau)$ controls the transition between regimes and can be defined as below:

$$S_t(\gamma,\tau) = [1 + \exp\{-\gamma(t - \tau T)\}]^{-1} \quad (8)$$

where T is the sample size and the parameter τ and γ determine the timing of the transition midpoint and the speed of transition respectively. Using Model A, B and C the following unit root hypotheses can be tested;

H_0: $y_t = \mu_t$, $\mu_t = \mu_{t-1} + \varepsilon_t, \mu_0 = \psi$

H_1: Model A, Model B or Model C

H_0: $y_t = \mu_t$, $\mu_t = \kappa + \mu_{t-1} + \varepsilon_t, \mu_0 = \psi$

H_1: Model B or Model C

where ε_t is assumed to be I(0) process with zero mean.

Leybourne et al. (1998) calculate a test statistic via a two-step procedure. In the first step, the deterministic component of the models is estimated by nonlinear least squares (NLS). Then at the second step the following regression

$$\Delta\hat{v}_t = \hat{\rho}\hat{v}_{t-1} + \sum_{i=1}^{k} \hat{\delta}_i \Delta\hat{v}_{t-i} + \hat{\eta}_t \quad (9)$$

is estimated by using first steps residuals to compute an ADF test statistic whose value is denoted as s_α, $s_{\alpha(\beta)}$ and $s_{\alpha\beta}$ if the $\hat{v}_t$ is obtained from Model A, B and C, respectively.

Sollis (2004) has developed unit root tests that under the alternative hypothesis allow for stationary asymmetric adjustment around a smooth transition between deterministic linear trends by combining the smooth transition methodology of Leybourne et al. (1998) with the threshold autoregressive (TAR) methodology of Enders and Granger (1998).
While I_t is the Heaviside indicator function,

$$I_t = \begin{cases} 0, & \hat{v}_{t-1} < 0 \\ 1, & \hat{v}_{t-1} \geq 0 \end{cases} \qquad (10)$$

Sollis (2004) considers the following TAR model:

$$\Delta\hat{v}_t = I_t \hat{p}_1 \hat{v}_{t-1} + (1 - I_t)\hat{p}_2 \hat{v}_{t-1} + \sum_{i=1}^{k} \hat{\delta}_i \Delta\hat{v}_{t-i} + \hat{\eta}_t \qquad (11)$$

Where $\hat{v}_t$ are the residuals come from (5), (6) or (7). $\hat{v}_t$ and therefore y_t contains a unit root only if $H_0: p_1 = p_2 = 0$ in (11) is not rejected. This hypothesis should be tested by using an F-statistic. Alternatively the more significant t-statistic of $H_0: p_1 = 0$ or $H_0: p_2 = 0$ can be used for testing whether y_t contains a unit root. Sollis (2004) denotes the F statistics as F_α, $F_{\alpha(\beta)}$ and $F_{\alpha\beta}$ and t statistics as ts_α, $ts_{\alpha(\beta)}$ and $ts_{\alpha\beta}$. If unit root null hypothesis is rejected, it is possible to test whether the adjustment is symmetric (i.e., $p_1 = p_2 < 0$) or asymmetric (i.e., $p_1 < 0,\ p_2 < 0,\ p_1 \neq p_2$) using a standard F-distribution. If the former holds then y_t is a stationary smooth transition TAR (ST-TAR) process with symmetric adjustment, or if the latter holds then y_t is a stationary ST-TAR process displaying asymmetric adjustment.
Cook and Vougas (2009) have extended ST-TAR unit root test of Sollis (2004) to develop a smooth transition momentum-threshold autoregressive (ST–MTAR) unit root test, which is based a MTAR adjustment that has a power advantage relative to TAR adjustment. The authors consider the model specification provided by Vougas (2005) in addition to Models A to C:

Model D $\quad y_t = \alpha_1 + \beta_2 t S_t(\gamma, \tau) + v_t \qquad (12)$

Cook and Vougas (2009) combine (5), (6), (7) and (12) with (11) and the following Heaviside indicator function:

$$I_t = \begin{cases} 0, & \Delta\hat{v}_{t-1} < 0 \\ 1, & \Delta\hat{v}_{t-1} \geq 0 \end{cases} \tag{13}$$

Based on the used model specification the resulting F and t-statistics are referred as F_{α}^{*}, ts_{α}^{*} (Model A), $F_{\alpha(\beta)}^{*}$, $ts_{\alpha(\beta)}^{*}$ (Model B), $F_{\alpha\beta}^{*}$, $ts_{\alpha\beta}^{*}$ (Model C) and F_{β}^{*}, ts_{β}^{*} (Model D).

Kapetanios et. al. (2003) (KSS henceforth) suggest a unit root test, which is based on an exponential smooth transition autoregressive (ESTAR) process. The KSS unit root test tests the null hypothesis of unit root against the alternative of nonlinear but globally stationary ESTAR process. Kapetanios et. al. (2003) employ the following auxiliary model:

$$\Delta y_t = \delta y_{t-1}^3 + \sum_{i=1}^{k} \rho_i \Delta y_{t-i} + \eta_t \tag{14}$$

The unit root null hypothesis of $H_0: \delta = 0$ is tested against $H_1: \delta < 0$ in (14) using the t-statistic (t_{NL}). KSS unit root test can be applied to raw data, demeaned or detrended data to deal with zero mean, non-zero mean or a deterministic trend, respectively.

Kruse (2011) has extended KSS unit root test by allowing for a nonzero location parameter c in the exponential transition function. Kruse (2011) uses the following auxiliary regression:

$$\Delta y_t = \delta_1 y_{t-1}^3 + \delta_2 y_{t-1}^2 + \sum_{i=1}^{k} \rho_i \Delta y_{t-i} + \eta_t \tag{15}$$

In (15) $H_0: \delta_1 = \delta_2 = 0$ is tested against $H_1: \delta_1 < 0, \delta_2 \neq 0$. Since one parameter in alternative hypothesis is one-sided while the other one is two-sided, Kruse (2011) uses the modified Wald test statistic (τ) of Abadir and Distaso (2007) instead of a standard Wald test statistic. τ

can be used to test the null hypothesis of unit root against globally stationary ESTAR,

Sollis (2009) suggests another extension for KSS unit root test, which assumes symmetry under the alternative. Sollis (2009) uses an asymmetric ESTAR (AESTAR) model that deals with both symmetry and asymmetry under the alternative hypothesis. AESTAR model includes both an exponential function and a logistic function. In the following model, $H_0: \phi_1 = \phi_2 = 0$ can be tested via an F-test in order to test the null hypothesis of unit root against the alternative hypothesis of globally stationary symmetric or asymmetric ESTAR nonlinearity.

$$\Delta y_t = \phi_1 y_{t-1}^3 + \phi_2 y_{t-1}^4 + \sum_{i=1}^{k} \delta_i \Delta y_{t-i} + \eta_t \qquad (16)$$

If $H_0: \phi_1 = \phi_2 = 0$ is rejected then $H_0: \phi_2 = 0$ is tested against $H_1: \phi_2 \neq 0$ with an F-test in order to test the null hypothesis of symmetric ESTAR nonlinearity against asymmetric ESTAR nonlinearity. Sollis' unit root test can also be applied to raw data, demeaned or detrended data like KSS unit root test.

5. Data and Results

The data of this study has consisted of quarterly current account balance of Turkey as percentages of GDP. The data, which cover the 1998:1-2014:2 periods, has been obtained from the web site of the Organization for Economic Co-operation and Development (OECD).

Linear unit root tests may be misleading in the presence of nonlinearity. Therefore, we have examined current account sustainability of Turkey in a nonlinear framework. We have taken the cases of a gradual structural break in the deterministic trend, sign nonlinearity and size nonlinearity. First we have applied LNV unit root test on Turkey' ratio of the current account to GDP for the possibility of a gradual structural break in the deterministic trend. We have computed test statistics for all model specifications A to C. The optimal lag orders of the models are selected by the Bayesian information criterion (BIC). Table 1 presents the results. Comparing test statistics with the critical values obtained for the sample size of fifty, we conclude that the null of a unit root cannot be rejected even at the 10 percent significance level for all model specifications. Thus, the current account-GDP ratio of Turkey is non-stationary and unsustainable, when considering only structural break nonlinearity.

Table 1

Results of LNV unit root test

	s_{α}	$s_{\alpha(\beta)}$	$s_{\alpha\beta}$
t statistic	-3.229	-3.308	-3.270
10%	-4.009	-4.636	-4.990
5%	-4.363	-5.053	-5.395
1%	-5.095	-5.770	-6.135

The critical values are obtained from Leybourne et al. (1998).

Source: Own calculation

Then, we have used the ST-TAR and ST-MTAR unit root tests in order to test the structural break nonlinearity and sign nonlinearity simultaneously. The two tests differ from each other based on the adjustment mechanism. The former extend LNV unit root test with lagged values, whereas the latter extend LNV unit root test with lagged changes. We have used model A, B and C for ST-TAR unit root tests and additionally model D for ST-MTAR unit root tests. Computed t and F statistics for ST-TAR and ST-MTAR unit root tests are given in

Table 2 and Table 3, respectively. Both ST-TAR and ST-MTAR test results indicate that the null hypothesis of a unit root cannot be rejected at all significance levels. Yet taking sign nonlinearity into consideration, these results are similar to LNV unit root test and again, sustainability condition of the ratio of current account to GDP is not met. Since we cannot reject the unit root null hypothesis, we have not tested or reported the null hypothesis of symmetry. Besides, for all applied tests, we have used BIC for optimal lag selection and fifty as sample size for the critical values.

Table 2

Results of ST-TAR unit root test of Sollis

	ts_{α}	F_{α}	$ts_{\alpha(\beta)}$	$F_{\alpha(\beta)}$	$ts_{\alpha\beta}$	$F_{\alpha\beta}$
Test statistic	-1.849	5.267	-1.935	5.494	-1.872	5.414
10%	-3.326	8.581	-3.789	11.437	-4.045	13.203
5%	-3.625	9.971	-4.075	13.442	-4.365	15.151
1%	-4.207	13.76	-4.737	17.635	-4.967	19.740

The critical values are obtained from Sollis (2004).

Source: Own calculation

Table 3

Results of ST–MTAR unit root test of Cook and Vougas

	ts^*_{α}	F^*_{α}	$ts^*_{\alpha(\beta)}$	$F^*_{\alpha(\beta)}$	$ts^*_{\alpha\beta}$	$F^*_{\alpha\beta}$	ts^*_{β}	F^*_{β}
Test statistic	-1.635	5.302	-1.347	5.889	-1.316	6.066	-1.285	5.690
10%	-3.587	8.620	-4.075	11.553	-4.302	13.037	-3.465	7.948

5%	-3.901	10.063	-4.387	13.197	-4.630	14.937	-3.808	9.434
1%	-4.538	13.269	-5.062	16.792	-5.338	19.008	-4.436	12.924

The critical values are obtained from Cook and Vougas (2009).
Source: Own calculation

Finally, we have tested the size nonlinearity alone with ESTAR type unit root tests proposed by Kapetanios et al. (2003) and Kruse (2011). Moreover, we have tested simultaneously the sign and size nonlinearities with the AESTAR unit root test of Sollis (2009). We have applied the three nonlinear unit root tests whose optimal lag orders are selected by using BIC, to the raw, demeaned and detrended data of the current account-GDP ratio. Results are reported in Table 4 and Table 5. As seen in Table 4, except the raw data the null hypothesis of unit root can be rejected against the alternative of nonlinear but globally stationary ESTAR process. The null hypothesis is rejected at the 5% and 10% significance level or better based on t_{NL} and τ test statistics. As pointed in Cuestas (2013), since the current account-GDP ratio is analyzed against convergence to an equilibrium value, the demeaned data should be focused. Therefore, by taking size nonlinearity into account, it can be concluded that the current account-GDP ratio of Turkey is stationary and sustainable.

Table 4

Results of unit root tests of KSS and Kruse

	t_{NL}			τ		
	Raw data	Demeaned	Detrended	Raw data	Demeaned	Detrended
Test statistic	-1.023	-3.006**	-4.883***	3.797	9.025*	23.830***
10%	-1.920	-2.660	-3.130	7.850	8.600	11.100
5%	-2.220	-2.930	-3.400	9.530	10.170	12.820
1%	-2.820	-3.480	-3.930	13.150	13.750	17.100

(1) *, ** and *** show significance at 10%, 5% and 1% levels, respectively. (2) The critical values are obtained from Kapetanios et. al. (2003) and Kruse (2011)
Source: Own calculation

The results of the AESTAR unit tests support the findings of the size nonlinearity tests. Again, the null hypothesis of a unit root can be rejected at 10% significance level or better so it is concluded that the current account sustainability holds for Turkey. Furthermore, we have tested the null hypothesis of symmetric ESTAR nonlinearity against asymmetric ESTAR nonlinearity. We find symmetry hence the null hypothesis cannot be rejected.

While the results of various unit root test are evaluated as a whole, the sustainability hypothesis is valid for Turkey. This finding is only valid after considering the size nonlinearity, so the vital feature of the current account-GDP ratio of Turkey is the size nonlinearity, which is related with symmetric speed of adjustment towards equilibrium.

Table 5

Results of AESTAR unit root test of Sollis

	Raw data	Demeaned	Detrended
F statistic	1.022	4.882*	11.21***
10%	3.577	4.009	5.415
5%	4.464	4.886	6.546
1%	6.781	6.891	8.799
$\phi_2 = 0$	0.998	0.763	0.091
	(0.322)	(0.386)	(0.765)

(1) *, ** and *** show significance at 10%, 5% and 1% levels, respectively. (2) p-values are given in parentheses. (3) The critical values are obtained from Sollis (2009).

Source: Own calculation

6. Conclusions

The current account sustainability of Turkey is analyzed with various nonlinear unit root tests, in this article. We have tested structural break and size nonlinearity separately. Additionally, we have tested structural break-sign and size-sign nonlinearities simultaneously. On the one hand by taking structural break and structural break-sign nonlinearities into account, we cannot reject the null hypothesis of a unit root, but on the other hand we find the evidence in favor of the current account sustainability of Turkey by considering the size nonlinearity. Consequently, the size nonlinearity is essential for the current account sustainability of Turkey. We also find that the speed of adjustment towards equilibrium is symmetric, while considering size and sign nonlinearities simultaneously. Dalgin and Gupta (2012) find out that current account-GDP ratio of Turkey sustainable around -6% level. According to our findings, most important condition for current account sustainability is the speed of reversion to sustainability level. For instance in 2011 current account-GDP ratio of Turkey was -9.6%, which is the highest level for Turkey, but next year in 2012, this ratio declined sharply to -6.1% level.

Despite the fact that the sustainability hypothesis is valid for Turkey, over many years current account deficit is a problem for Turkish economy. During the 1990's, current account deficits of Turkey were partially small. On average the current account balance was a little smaller than -1% GDP, falling to -3.2% and -3.7% in the years before the 1994 and 2001 crises respectively. After 2002 steadily large current account deficits occured and in 2011 it reached near -10%, this level has never been seen before in Turkey (Zaidi, 2012). Özata (2014) claims this situation is a result of cheap foreign exchange and production system of Turkey, which is highly dependent on imported energy and intermediate goods. He points out that in order to overcome the current account deficit problem in Turkey, realistic exchange policy is necessary to shift the domestic demand from imported goods to domestic goods and for a sustainable production system. Additionally Zaidi (2012) infers that the fiscal policies can be used to control internal demand to stabilize the Turkey's current account balance. Togan and Ersel (2007) assert that contractionary economy policies can reduce the aggregate demand for goods and services. Their solution for sustainable current account balance is to depreciate the real exchange rate around its long-run equilibrium level. Akçay and Üçer (2008) point out that low real interest rates led to increasing of current account deficit of Turkey in the 2003-2006 period. Also Turkey has a weak control power over the exchange rate policy. Togan and Berument (2007) assert that there has been some essentials to generating current account deficit sustainability for Turkey; steady macroeconomic policies, reliable banking system, investment environment for foreign direct investments and productivity growth for external competitiveness.

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