PAPER DETAILS

TITLE: THE EFFECT OF MONETARY POLICY INSTRUMENTS ON CURRENT ACCOUNT DEFICIT IN TURKEY: ARDL BOUNDS TESTING APPROACH

AUTHORS: Gizem BAS,Mehmet KARA

PAGES: 1-10

ORIGINAL PDF URL: https://dergipark.org.tr/tr/download/article-file/1095161

TÜRKİYE'DE PARA POLİTİKASI ARAÇLARININ CARİ AÇIK ÜZERİNE ETKİSİ: ARDL SINIR TESTİ YAKLAŞIMI

***Gizem BAŞ*[1]**
***Mehmet KARA*[2]**

Geliş/Received: 09.05.2020

Kabul/Accepted: 06.08.2020

Öz

2007/08 yılında meydana gelen finansal kriz sonrasında, FED, ECB ve BOJ gibi büyük merkez bankaları, aşırı genişletici para politikaları uygulamaya başlamıştır. Bu durum, Türkiye gibi pek çok gelişmekte olan ülkenin ekonomik hedeflerini ve makroekonomik göstergelerini olumsuz etkilemiştir. Finansal piyasalarda meydana gelen bu gelişme üzerine, Türkiye Cumhuriyet Merkez Bankası (TCMB), 2010 yılının Nisan ayından itibaren yeni bir para politikası stratejisi geliştirmiştir. Bu çalışmanın amacı, Türkiye ekonomisinde *niteliksel* (O/N faiz oranı) ve *niceliksel* (M3 para arzı) para politikası araçlarının cari açık üzerindeki etkisini analiz etmektir. Çalışma, 2005:IV-2018:II dönemini kapsamaktadır. Değişkenler olarak Gecelik Faiz (O/N) oranı, M3 para arzı ve cari açık kullanılmıştır. Analiz yöntemi olarak, ARDL modeli kapsamında kısıtlanmamış hata düzeltme modeli (UECM) ve sınır testi yaklaşımı uygulanmıştır. ARDL analiz yöntemi kapsamında ilk olarak sınır testi uygulanmış değişkenler arasında eşbütünleşme ilişkisi tespit edilmiştir. Ayrıca, uzun ve kısa dönem için, para arzı (M3) ile cari açık arasında hem istatistikî olarak hem de ekonomik olarak anlamlı bir ilişki olduğu görülmüştür.

Anahtar Kelimeler: Para Politikası Araçları, Cari Açık, Türkiye, ARDL Analizi

THE EFFECT OF MONETARY POLICY INSTRUMENTS ON CURRENT ACCOUNT DEFICIT IN TURKEY: ARDL BOUNDS TESTING APPROACH

Abstract

After the financial crisis occurred in 2007/08, the major central banks such as FED, ECB and BOJ, started to implement excessive expansionary monetary policies. This has negatively affected macroeconomic indicators and economic targets of many developing countries such as Turkey. Associated with developments occurred in financial markets, the Central Bank of the Republic of Turkey (CBRT) has developed a new monetary policy strategy since April of 2010. The aim of this study is in Turkish economy, to analyze the effect of *qualitative* (O/N interest rate) and *quantitative* (M3 money supply) *monetary policy tools* on the current account deficit. The time period of the study includes 2005: IV-2018: II. Overnight interest (O/N) rate, M3 money supply and current account deficit are employed. With ARDL analysis method, unrestricted error correction model (UECM) and boundary test approach are applied. Within the scope of ARDL method, firstly, bound test is performed, and the cointegration relationship is determined between the variables. Furthermore, it is found that there is a statistically and economically significant relationship between money supply (M3) and the current account deficit for the both long and short term.

Key words: Monetary Policy Instruments, Current Account Deficit, Turkey, ARDL Analysis

[1] Res. Asst., Hatay Mustafa Kemal University, FEAS, Economic Department, gizemercelik@mku.edu.tr

[2] Prof. Dr., Hatay Mustafa Kemal University, FEAS, Economic Department, mehmetkara@mku.edu.tr

1. Introduction

After the 2008 global financial crisis, rise in global risk appetite and the excessive expansionary monetary policies, implemented by the major central banks such as FED, ECB and BOJ in order to overcome the crisis, caused intensive capital inflows to the countries with relatively high interest rates such as Turkey. This intensive fund inflow led interest rates to decrease and to appreciate Turkish Liras. These developments, on the other hand, stimulated consumption and investment demand, increased the credit usage of both companies and households, and caused the economy to grow depending on domestic demand. Nevertheless, the weak foreign demand, growth based on domestic demand and the strengthening of the Turkish lira negatively affected the foreign trade balance, causing an increase in the current account deficit (CBRT, 2010: 9).

In 2003, while the ratio of the current account deficit to GDP was 2.5%, this ratio increased to 6% in 2006 and it decreased to the level of 2.3% in the period of 2006-2009. However, in the period of 2010-2018, the ratio of current account deficit to GDP was approximately 5.35%.The current account deficit was started to be considered as an important risk factor for financial stability since the current account deficit is above the rate that is accepted as sustainable or reasonable (4% - 5%) and also increases continuously. In this context, the CBRT started to apply unconventional monetary policies in order to reduce macroeconomic instability caused by this new circumstance emerging in international financial markets and to ensure financial stability (Cicioğlu et al., 2013: 14-15).

In this research paper, the interest rate (O/N) is used as a *qualitative monetary policy tool*, while M3 money supply is used as a *quantitative monetary policy tool*. The main objective of this study is to examine the effects of *qualitative and quantitative monetary policy instruments* on the current account deficit using the quarterly data for the 2005: IV-2018: II period by applying the ARDL Boundary Test Approach.

2. Overview of The Current Account in Turkey

The current account deficit arises due to the foreign exchange expenditures that are related to the import / export of goods and services and unilateral transfers in the current account of the balance payments exceed the foreign exchange revenues obtained from these transactions.

The current account balance is crucial within the various external balance definitions since it is closely related to the country's real national production level (GDP), overall employment volume, unemployment and foreign indebtment. The current account deficit or surplus can also be considered as an indicator of the success or failure of the economic policies implemented by governments. Thus, the external balance definition that is most emphasized is generally the current account balance (Seyidoğlu, 2017: 368).

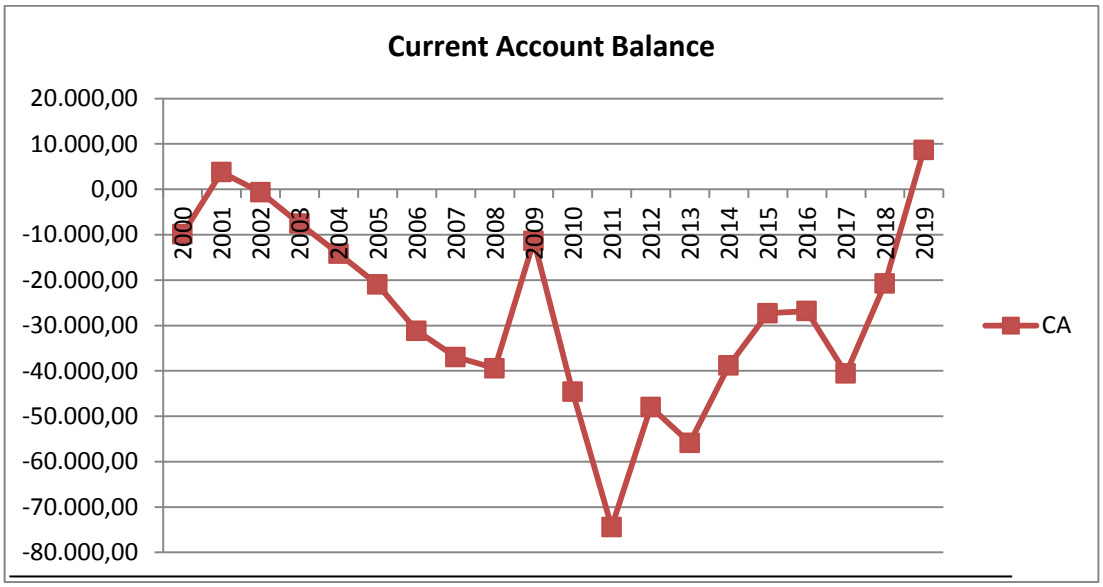
If the current account deficit of the country is sustainable, the current account deficit does not cause any problems in the country's economy. However, emerging economies such as Turkey is experiencing serious difficulties in sustaining the current account deficit. Turkey has abandoned import substitution policy carried out in 1960-1980 period, and has started to adopt open market economy by January 24th 1980 Decisions. With the liberalization of capital movements towards the end of the 1980s, fundamental changes occurred in Turkey’s economic structure. Turkish Liras became convertible, and Customs Union Agreement signed with the European Union. More importantly, Customs Union Agreement has increased foreign trade volume of Turkey by diversifying product and market. In addition, the ratio of especially medium technology intensive goods export has increased relatively over time.

Although all these improvements in the economy, the balance of trade has constantly had a deficit and it also caused the current deficit to increase in time. In other words, since import volume was higher than export volume, it has led trade deficit, and has become the main reason for the current account deficit. The current account deficit was sustainable until 2000s but it started to increase because of the appreciation of national currency. And, this appreciation is resulted from the inflation targeting strategy implemented in the scope of the Transition to the Strong Economy Program

associated with adopting floating exchange rate regime in 2001. Since the appreciation of the national currency has made the import goods cheaper in terms of the national currency, particularly the increase in the use of imported intermediate goods in the real sector and the target of high growth rates since 2003, the deficits have started to increase rapidly.

The appreciation of the national currency has led the import goods became cheaper in terms of the national currency, and in the production process, particularly the increase in the use of imported intermediate goods in real sector and targeting high growth rates since 2003 caused that the deficits started to increase rapidly. The rising current account deficit was financed with high real interest rate and external borrowing (Gençoğlu and Ünlü, 2019: 630-632).

Graph 1: Turkey's Current Account Balance (2000-2019) (Million $)



Source: This graph is based on our calculations from CBRT Statistical Data.

The current account deficit problem is deepening in Turkey until 2008 but it declined sharply after 2008 due to global crisis. In addition to the new regulations and rules introduced to regulate the markets, expansionary monetary and fiscal policies continued to be implemented in order to achieve the aim of rapid economic growth.

In spite of the fact that Turkey tried to develop strategies to reduce the current account deficit, especially foreign capital inflows seeking to take advantage of relatively high interest rates charged by emerging economies such as Turkey, has led national currency to appreciate; hence, the current account deficit has raised.

Turkey has implemented expansionary fiscal and monetary policies for economic growing (GDP) rapidly since 2000; on the other hand, had has to paid relatively high interest rate in order to be able to finance increasing current account deficit; therefore, it is quite significant to investigate the relationship between monetary policy and the current account deficit.

3. Literature Review

If the empirical literature about the current account deficit in Turkey is evaluated, it is concluded that the majority of the studies explains the current account deficit problem considering economic growth (GDP), real effective exchange rate and energy prices or sustainability of the current account deficit. Therefore, it can be considered that the studies investigating the association between monetary policy instruments and current account deficit are limited. In Table 1 below, the empirical studies that examine the effect of monetary policy instruments on the current account deficit are given chronologically.

Table 1: Related Literature

Author(s)	**Period/Country**	**Method**	**Result**
Holtrop (1972)	1954-1969/ Netherlands	Regression Analysis	In the study, it is concluded that monetary policy is a significant effective tool to decrease the balance of payments deficits.
Calderon etc. (1999)	1966-1995/ 44 Developing Countries	Panel Data Analysis	It is found that there is an inverse relationship between real interest rates and current account deficit.
Lane (1999)	1974:I-1996:III/ USA	VAR Analysis	The study indicated that the effect of monetary policy shocks on the current account deficit is very important.
Oktar and Dalyancı (2011)	2003-2010/ Turkey	VAR Analysis and Granger Causality Analysis	Based on the analysis results obtained in the study, there is a long-term, opposite relationship between the CBRT policy rate and the current account balance. It is stated that monetary policy instruments are important for financial stability if the instruments are applied in order to decrease the current account balance.
Ener and Arıca (2012)	1980-2009/ 21 OECD Countries	Panel Regression Analysis	The findings of the analysis implied that interest rates and the current account deficit move in the same direction.
Taslı (2012)	2005:01-2010:08/ Turkey	Time Series Analysis	The increase in policy interest rates and implementation of contractionary monetary policy lead to the appreciation of the national currency and the increase in the current account deficit, particularly by increasing short-term foreign capital flows.
Danmola and Olateju (2013)	1970-2012/ Nigeria	Johansen Cointegration Test and Ordinary Least Squares	In this research paper, it is found that if money supply rises, the current account deficit also rises.
Steiner (2013)	1970-2009/ USA	Panel Data Analysis	It is determined that low interest rates affect current account transactions through savings and investments, and the decrease in interest rates increases domestic investments and reduces the current account deficit.
Göçer etc. (2013)	1992:I-2012:III/ Turkey	Carrion-i Silvestre Multi-Structural Breaks Unit Root Test and Maki Multi-Structural Breaks Cointegration Test	Analysis results indicate that the policy rate applied by the central bank reduces the credit volume and affects the current account deficit.

Evaluation of the empirical litrerature indicates that there is a strong relationship between monetary policy and current account deficit, and also monetary policy instruments have a significant effect on current account deficit.

4. Dataset, Model and Method

In this research, 2005: IV - 2018: II period is used. The variables and their explanations as follows: *CA* stands for current account deficit; *M3* refers M3 money supply, and *O/N* represents overnight interest rate of CBRT.

The mathematical model employed in the study is expressed as follows;

$$CA_t = \alpha_1 + \alpha_2 M3_t + \alpha_3 O/N_t + \mu_t \qquad (1)$$

In the study, ARDL (Autoregressive Distributed Lag) analysis method is applied in order to determine the existence of cointegration relationship between monetary policy instruments and current account deficit. ARDL analysis method has many advantages compared to the other cointegration tests in the literature. Most importantly, even though the variables become stationary at different levels, the cointegration relationship can be detected. It means that if the variables are I (0) or I (1) does not cause any problems for the application of the test. Another advantage is that the Unrestricted Error Correction Model (UECM), obtained within the scope of the analysis, provides more reliable results than other cointegration tests. UECM, also, gives information about variables for both short and long term (Narayan and Narayan, 2004).

In ARDL method, first of all, bound test is performed to detect the cointegration relationship.

Below, the equality of boundary test approach is represented;

$$\Delta Y_t = \alpha 0 + \sum_{i=0}^{m} \alpha_1 \Delta Y_{t-i} + \sum_{i=0}^{m} \alpha_2 \Delta X_{t-i} + \alpha 3 Y_{t-1} + \alpha 4 X_{t-1} \qquad (2)$$

α_0 coefficient means constant term; α_3 and α_4 refer long-term coefficients. Δ symbol in the model implies the first differences of the variables. Additionally, α_1 and α_2 present short-term relations.

In the boundary test approach, the first lag of the dependent and independent variables is tested with the F test. The null hypothesis of the F test is that there is no cointegration between the variables. On the other hand, the alternative hypothesis states that there is cointegration between the variables. The calculated F statistical value is compared with the lower and upper bounds. If F statistics is less than the lower critical value, H_0 hypothesis cannot be rejected, and no cointegration between the variables is detected. On the contrary, if F statistics takes a greater valued than upper limit, the null hypothesis is rejected. Thus, it is concluded that the variables are cointegrated. However, if F statistical value is between the lower and upper critical values, any interpretation cannot be made about the existence of the cointegration relationship; F statistics is in uncertain district (Akel and Gazel, 2014: 31). In this case, it is necessary to examine the other cointegration tests for the analysis of the long-term relationship between the series of variables.

On the basis of the boundary test results obtained, if there is a cointegration relationship between the variables of the series, ARDL model is established to analyze both long and short term relationships. And, the optimal lag length for the model is determined based on Hannan-Quinn (HQ), Akaike (AIC) and Schwarz (SC) information criteria. The optimal lag length for the model is the lowest value among these information criteria. However, if the autocorrelation problem exists, then, the second smallest valued is used. This process is repeated until the autocorrelation problem is resolved. Finally, CUSUM and CUSUMSQ tests are performed in order to test if the long term coefficients are stable.

5. Empirical Findings

In this section, empirical results of the study are explained and the relationships between the variables are analyzed econometrically.

5.1. Stationarity Test

In time series analysis, it is very important that the series do not have unit roots. Granger and Newbold (1974) stated that when working with non-stationary time series, a spurious regression problem can occur (Gujarati, 1999: 726). In this research paper, ADF (Augmented Dickey Fuller) unit

root test is applied to investigate the variables' order of stationarity. ADF results indicated that LNCA and LNM3 stationary at their level values but LN0/N become stationary when its first difference is taken.

Table 2: Stationarity Test Results

Variables employed in the study	Level	1st Difference	Decision
LNCA	-4.212 (0.008) [constant+trend]	---	I(0)
LNM3	-3.892 (0.019) [constant+trend]	---	I(0)
LNO/N	-2.299 (0.176) [constant]	-5.724 (0.000) [constant]	I(1)

The expressions in parentheses represent the probability values of the tests.

5.2. ARDL Analysis

In the research, bound test is applied in the scope of ARDL analysis. The unrestricted error correction model (UECM) established as follows;

$$\Delta CA_t = \alpha_0 + \alpha_{1t} + \Sigma^{m}_{i=1}\ \alpha_{2i}\ \Delta CA_{t-i} + \Sigma^{m}_{i=0}\ \alpha_{3i}\ \Delta M3_{t-i} + \Sigma^{m}_{i=0}\ \alpha_{4i}\ \Delta O/N_{t-i} + \alpha_5\ CA_{t-1} + \alpha_6\ M3_{t-1} + \alpha_7\ O/N_{t-1} + \mu_t \quad (3)$$

In the equation, α, Δ, μ symbols represent constant term, difference and error term, respectively.

In the context of ARDL cointegration approach, firstly bound test analysis is performed to determine the long-term relationship between the variables used in the study.

Table 3: Boundary Test Results

Independent variables	F value	%5 Critical values	
		Lower critical value	Upper critical value
2	6.55	3.79	4.85

Accordingly boundary test results in Table 3, it is found that there is a cointegration relationship between the variables since the F value is higher than the upper critical value.

5.3. ARDL Estimation Results

The ARDL model used in the analysis was established as follows;

$$CA_t = \alpha_0 + \alpha_{1t} + \sum^{m}_{i=1}\ \alpha_{2i}\ CA_{t-i} + \sum^{n}_{i=0}\ \alpha_{3i}\ M3_{t-i} + \sum^{l}_{i=0}\ \alpha_{4i}\ O/N_{t-i} + \mu t \quad (4)$$

The estimation results of the model are presented in Table 4.

Table 4: ARDL (1,0,0) Model's Estimation Results

Variables employed in the study	**Coefficients**	**t value**	**p value**
LNCA(-1)	0.424	3.232	0.002
LNM3	0.417	2.288	0.026
LNO/N	-0.209	-1.461	0.150
C	-2.445	-0.735	0.465
Diagnostic Values			
R^2	0.548		
Adjusted R^2	0.519		
X^2 *BG (Breusch-Godfrey)*	2.507 [0.077]		
HET Test	0.408 [0.729]		
X^2 *RAMSEY RESET*	1.109 [0.297]		

X^2 *BG, HET Test* and X^2 *RAMSEY RESET*; stands for autocorrelation, heteroscedasticity and suitability of the model respectively.

If the diagnostic test values are examined, it is concluded that there is no autocorrelation and heteroscedasticity problems and the model established is suitable.

5.3.1. ARDL Model's Long-Term Estimation Results

Table 5 below presents ARDL (1,0,0) model's long-term estimated coefficients.

Table 5: ARDL (1,0,0) Model's Long-Term Estimation Results

Variables employed in the study	**Coefficients**	**t value**	**p value**
LNM3	0.726	2.747	0.008
LNO/N	-0.363	-1.443	0.155
C	-4.251	-0.753	0.455

The estimated values of the long-term relationship in Table 5 indicate that there is a statistically and economically significant relationship between M3 money supply and current account deficit. In other words, it is found that the expansion in M3 money supply causes the current account deficit to increase. The 1% increase in the money supply increases the current account deficit by approximately 0.73%.

5.3.2. ARDL Model's Short-Term Estimation Results

The equation of the Unrestricted Error Correction Model (UECM) constructed to estimate the short-term relationship between the variables analyzed in the study is as follows;

$$\Delta CA_t = \alpha_0 + \alpha_{1t} + \alpha_2 EC_{t-1} + \sum^{m}_{i=1} \alpha_{3i} \Delta CA_{t-i} + \sum^{m}_{i=0} \alpha_{4i} \Delta M3_{t-i} + \sum^{m}_{i=0} \alpha_{5i} \Delta O/N_{t-i} + \mu_t \quad (5)$$

The coefficient of the error term (EC_{t-1}) in the equation implies how much of the short-term imbalances rebalanced in the next period.

Based on the results of the analysis, it is determined that there is a statistically and economically significant association between M3 money supply and current account deficit in the short term. It is found that the 1% increase in M3 money supply leads the current account deficit to increase by approximately 0.40%.

Table 6: ARDL (1,0,0) Model's Short-Term Estimation Results

Variables employed in the study	Coefficients	t values	p values
D(LNM3)	0.417	2.288	0.026
D(LNO/N)	-0.209	-1.461	0.150
ECT(-1)	-0.575	-4.377	0.000

The error correction term coefficient is estimated as -0.575. ECT (-1) has a negative sign and statistically significant. Therefore, it can be stated that 57.50% of the imbalances occurring in the short term rebalanced in the next period.

5.3.3. CUSUM Graphs

In order to investigate the stability of the model used in the study, graphics of CUSUM tests are performed and the results are given in Figure 1.

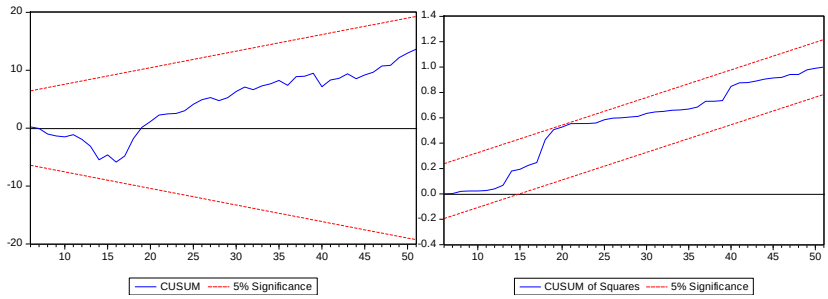


Figure 1: Graphics of CUSUM Tests

The CUSUM graphs in Figure 1 states that there is no structural break of the variables in the study and the long-term coefficients obtained within the scope of ARDL analysis are stable.

6. Conclusion

After the 2008 global financial crisis, rise in global risk appetite and the qualitative and quantitative expansionary monetary policies, implemented by the major central banks in order to overcome the crisis, caused intensive capital inflows to the countries with relatively high interest rates such as Turkey. This intensive fund inflow led Turkish Liras to appreciate and the current account deficit to further deteriorate.

Also, like many developing countries, Central Bank of the Republic of Turkey (CBRT) determined a new road map with the "Monetary Policy Exit Strategy" published in April 2010 and it started to employ an unconventional method for the implementation of monetary policy in order to reduce macroeconomic instability and to ensure financial stability.

In this research, the effect of *qualitative* (O/N) and *quantitative* (M3 money supply) *monetary policy tools* on current account deficit is analysed for the period of 2005: IV-2018: I in Turkey. Accordingly the boundary test results, it is detected the variables are cointegrated. In addition, it is found that there is an economically and statistically significant relationship between money supply (M3) and the current account deficit in both short and long-term. It means that an expansion in M3 money supply increases the current account deficit. In this context, it is concluded that the liquidity management (M3 money supply) of the CBRT is very important for the elimination of the current account deficit problem. However, an expected relationship between interest rates and the current account deficit is not valid for Turkey in this period.

REFERENCES

Cicioğlu, Ş., Ağuş, A. and Torun, P. (2013). "Para Politikası Araçlarının Cari Açık Üzerindeki Etkinliği: Türkiye Ekonomisi Üzerine Bir Uygulama". Global Journal of Economics and Business Studies, 2(4): 14-26.

Calderón, C., Alberto C. and Norman L. (1999). "Determinants of Current Account Deficıts in Developıng Countries", Contributions in Macroeconomics, 2(1): 1534-6005.

Danmola, R. A. and Adijat, O. O. (2013). "The Impact of Monetary Policy on Current Account Balance in Nigeria". IOSR Journal of Humanities and Social Science, 7(3): 67-72.

Ener, M. and Feyza A. (2012). "The Current Account-Interest Rate Relation: A Panel Data Study for OECD Countries". E3 Journal of Business Management and Economics, 3(2): 48-54.

Gençoğlu, P. and Ünlü, F. (2019). "Türkiye'de Cari Açığın Sürdürülebilirliği: Ekonometrik Analiz". Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 37(4): 627-650.

Göçer, İ., Mercan, M. and Peker, O. (2013). "Kredi Hacmi Artışının Cari Açığa Etkisi: Çoklu Yapısal Kırılmalı Eşbütünleşme Analizi". İstanbul Üniversitesi İktisat Fakültesi Ekonometri ve İstatistik Dergisi, 18(1): 1-17.

Granger, C.W.J. and Newbold, P. (1974). ''Spurious Regressions in Econometrics.'' Journal of Econometrics, 2(2):111-120.

Gujarati, D.N. (1999). *Temel Ekonometri*. Çev., Ü. Şenesen ve G.G.Şenesen. İstanbul: Literatür Yayınları.

Holtrop, M. W. (1972). "On the Effectiveness of Monetary Policy: The Experience of the Netherlands in the Years 1954-69". Journal of Money, Credit and Banking, 4(2): 283-311.

Lane, P. R. (1999). *Money Shocks and the Current Account.* Trinity College: Dublin and Cepr.

Narayan S. and Narayan P.K. (2004). ''Determinants of Demand of Fiji's Exports: An empirical Investigation". The Developing Economics, 17(1): 95-112.

Pesaran M.H., Shin, Y. and Smith, R.J. (2001). ''Bounds Testing Approaches to The Analysis of Level Relationships". Journal of Applied Econometrics, 16(3): 289–326.

Seyidoğlu, Halil (2017). *Uluslararası İktisat, Teori Politika ve Uygulama*. Geliştirilmiş 21. Baskı, Güzem Can Yayınları.

Steiner, A. (2013). "Current Account Balance and Dollar Standard: Exploring the Linkages". Journal of International Money and Finance, 41(2014): 65-94.

Oktar, S. and Dalyancı, L. (2011). "Türkiye Ekonomisinde Para Politikasının Cari İşlemler Dengesi Üzerindeki Etkisinin Ekonometrik Analizi". Marmara Üniversitesi İ.İ.B.F Dergisi, 30(1): 1-22.

Talaslı, İ. A. (2012). "Türkiye'de Bankacılık Sistemi Zorunlu Karşılık Yönetimi". Uzmanlık Yeterlilik Tezi, TCMB Piyasalar Genel Müdürlüğü: Isparta.

TCMB, (2010), "Finansal İstikrar Raporu". http://www.Tcmb.Gov.Tr/Yeni/Evds/Yayin/Finist/Fir_Tammetin11.Pdf. (Erişim Tarihi: 15.02.2020).