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Original Contribution

IS THE CURRENT ACCOUNT DEFICIT "TOO LARGE" SOME FURTHER EVIDENCE

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Abstract:
If the total domestic expenditures are higher than the domestic production in an economy, this deficit will be covered from the outside and the current account will have a deficit accordingly. This study analyzes with formal tests whether or not Turkey's current account deficit is too large, which has always been a controversial issue since the 1980 structural change and transformation program. According to the conducted analysis, it is observed that the current account deficit has continually increased especially after 2001 economic crisis although current account deficit is not too large. As a consequence, a structural change is required in the foreign trade policy of Turkey in order for Turkey's economy not to come across crises again.

Keywords: current account deficit, intertemporal foreign budget constraint, foreign trade policy
JEL Classification; F32, F41, F47

INTRODUCTION

In an open economy, current account balance defines the difference between a country's total annual production and total expenditures. The current account will have a deficit in an open economy where the total expenditures are higher than the total production. Current account deficit's being in a sustainable level holds a great importance in terms of minimizing the negative effects of the foreign based shocks on the country's economy. While the current deficit is the result of the private and public deficits, it is basically determined by the consolidated budget deficit. In view of that, the budget deficits which are not financed with taxes and other public incomes are generally financed with foreign sources although they can be met with domestic and foreign finance sources considering that domestic borrowing will create a significant crowding out effect owing to insufficient domestic sources [1].

Due to the changes made in the foreign trade policy after 1988; foreign exchange adjustments which have been performed in order to preserve the value of Turkish lira against foreign currencies; and foreign financing model which has been based on high interest rate and low foreign exchange after 2001 crisis, export's rate of increase has slowed down and import has skyrocketed. As a result of these conditions, the ratio of foreign trade deficit to GNP has significantly deteriorated owing to the adjustments performed especially in foreign exchange.
The primary indicator of a looming crisis in a country is the current account deficit. If the actual or projected current account deficits are large or the countries that make heavy foreign debt repayments cannot give sufficiently large surpluses, this is a call for devaluation (crisis). If a country's current balance deficit is too high, this deficit is generally financed with portfolio investment (borrowing). These investments can lead the country to devaluation since they can be withdrawn very quickly [2]. If the ratio of current account deficit to the GNP rises to 4%, this condition is defined as the indicator of an economic crisis [3].

This study determines whether or not the current account balance is sustainable, which has continually increased after 1980 in which liberal policies were implemented and which has caused the country's economy to face

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crisis in 1994 and 2001. This study differs from [4] in some aspects. First of all, current account includes in the analysis the post-2001 period in which the difference between income and expense items has progressively increased. Secondly, it differs in terms of tested hypotheses and conducted econometric techniques. The study is composed of five sections. Intertemporal foreign budget identity and constraint in open economy is discussed in the second section following the introduction of the study which has been planned as having five sections. Econometric methodology will be given in the third section. Analysis and findings are given in the fourth section, and obtained findings are discussed in the fifth section.

INTERTEMPORAL FOREIGN BUDGET IDENTITY AND CONSTRAINT IN OPEN ECONOMY

In this section, intertemporal foreign budget identity will be defined mathematically for any given country, and then, deriving the reimbursement condition for current account deficit will be discussed mathematically. The basic accounting identity for an open economy during t period can be written as follows ignoring the international foreign exchange reserves (Sawada 1994)[1]: This identity which was suggested by Sawada [5] is, in its present form, quite similar to the basic equations used in the analyses of the studies which guide the literature Hamilton and Flavin [6], Wickens and Uctum [7], Wilcox [8], Trehan and Walsh [9], Hakkio and Rush[10], Tanner and Liu [11], Shaghil and Rogers [12], Cuddington [13], Bohn [14].

$$Y_t + (NFL_t - NFL_{t-1}) + TR_t \equiv DA_t + rNFL_t \qquad (1)$$

Where Y_t is the gross domestic product; NFL is the net foreign liabilities; TR is the current account net transfer receipts; DA_t is the total expenditure of domestic residents on goods and services; r is the nominal interest rate. While the left-hand side of the equation (1) represents aggregate income of the economy at the end of the period, the right-hand side of the equation represents the total expenditures in the economy. Under the general assumptions of national accounting identity, foreign trade balance for any given country, NX , can be defined as follows:

$$NX_t = EX_t - IM_t + r_t NFL_{t-1} - (NFL_t - NFL_{t-1}) - TR_t \qquad (2)$$

Where EX and IM define the total exports and imports of goods and services during t period respectively. From equation (2), the dynamic foreign budget equation can be derived, which provides the evaluation of the foreign debt resulted from the current account deficit:

$$NFL_t - NFL_{t-1} = r_t NFL_{t-1} - NES_t \qquad (3)$$

International foreign exchanges are not included in the test suggested by Hakkio and Rush [10]. On the other hand, the identity given with the equation (1) suggested by [5] is controversial. Thus, international foreign exchanges are omitted from the equation (3) and they are defined as $NES_t = \mathrm{NX_t} + TR_t$. NES_t can be interpreted as the net external surplus, which can be used to meet foreign debt repayments. In order to obtain forward looking solution in terms of NFL_t, difference equation in the equation (3) is solved dynamically and the following definition is obtained:

$$NFL_t = \lim_{N\to\infty} \frac{NFL_N}{\prod_{j=1}^{N-t}(1+r_{t+j})} + \sum_{j=t+1}^{\infty} \frac{NES_j}{\prod_{i=1}^{j-t}(1+r_{t+i})}$$

Full prediction assumption is removed in t period. That is because economic units (debtors and creditors) cannot know the end-of-period value, but they know about start-of-period value. Accordingly; under the rational expectations hypothesis, conditional information expectations of economic units for t period, E_t, are added to the above equation and the following equation is obtained:

$$NFL_t = \mathrm{E_t} \lim_{N\to\infty} \frac{NFL_N}{\prod_{j=1}^{N-t}(1+r_{t+j})} + E_t \sum_{j=t+1}^{\infty} \frac{NES_j}{\prod_{i=1}^{j-t}(1+r_{t+i})}$$

Consequently, current account deficits, and accordingly, the condition of reimbursement ability for foreign debts are defined with the following equation:

[1] This identity which was suggested by Sawada (1994)
$Y_t + (NFL_t - NFL_{t-1}) + TR_t \equiv DA_t + rNFL_t + [FER_t - (1+i)FER_{t-1}]$
is controversial in the literature.

$$NFL_t = E_t \sum_{j=t+1}^{\infty} \frac{NES_N}{\prod_{t+1}^{j-t}(1+r_{t+i})} \qquad (4)$$

Equation (4) denotes that if the country has the ability to reimburse its foreign debt liabilities, the present value of the future foreign surpluses is equal to the current foreign debt stock as of the end of t period. This means that current account deficits can be sustainable. On the other hand, the equation in question is mathematically equal to the following condition.

$$E_t \lim_{N\to\infty} \frac{NFL_N}{\prod_{j=1}^{N-t}(1+r_{t+j})} = 0 \qquad (5)$$

If the equation (5) is obtained, the country has the ability to reimburse in terms of current account. This condition is defined as no Ponzi game condition in macroeconomics literature. In other words, the country has the ability to roll over the current account deficit. If the equation (5) has a value greater than zero, the country has lost the ability to roll over the current account deficit. The country will finance the deficit in question by implementing Ponzi plans.

ECONOMETRIC METHODOLOGY

The methodologies which were developed by Wilcox [8] and Hakkio nad Rush [10] will be used to determine whether or not the current account deficit is too large. While determining whether or not the current account deficit is too large, Wilcox [8] uses discount debt. In this methodology, perfect capital mobility is performed implicitly, and accordingly, world interest rate is used as a discount factor.

Basic accounting identity which defines the evaluation of current account can be rewritten as follows in the basis of Equation (4) and Equation (5).

$$NFL_t = (1+r_t)NFL_{t-1} - NES_t \qquad (6)$$

Where NFL_t is the market value of foreign liabilities in current dollar terms, r_t is the real interest rate and NES_t is the non-foreign exchange current account deficit or surplus.

If Q_t = 0, 1, 2, 3,…, is defined as the discount factor for t periods,

$$Q_t = \prod_{j=0}^{t-1}(1+r_j)^{-1} \;;\; Q_0 = 1 \qquad (7)$$

r_t variable can be interpreted as the periodical return of the foreign debt stock [8]. Perfect capital mobility, and accordingly, periodical return of the foreign debt and the interest on the foreign debt are equal for the same period. The following equation is obtained by multiplying the each variable in the equation (6) for t=0, 1, 2, 3,…, t periods with the discount factor:

$$NFL_t Q_t = Q_{t-1} NFL_{t-1} - Q_t NES_t \qquad (8)$$

Equation (8) which is defined in the present value term can be written in a simpler way as follows by being discounted with the interest rate.

$$NFL_t^D = NFL_{t-1}^D - NES_t^D \qquad (9)$$

While the term on the left-hand side of the equation (9) defines the present value of the net foreign liabilities, the last term on the right-hand side of the equation defines the discount value of the current account surpluses. The equation in question also defines that the change in the value of the discount debt will be equal to the discount value of non-interest current account deficit. If the equation (9) is rearranged by substituting forward-looking, the following equation is obtained:

$$NFL_t^D = E\sum_{j=1}^{N} NES_{t+j}^D + NFL_{t+N}^D \qquad (10)$$

If the expected value of the second term of equation (10) approaches zero in the limit, the current value of the debt in question becomes equal to the expected future non-interest current account surpluses. If it is accepted that NFL_N^D will be equal to zero in limit, the following equation is obtained:

$$NFL_t^D = \mathrm{E}\sum_{\mathrm{j}=1}^{\mathrm{N}} \mathrm{NES}_{\mathrm{t+j}}^{\mathrm{D}} \qquad (11)$$

Equation (11) is the intertemporal foreign borrowing or deficit which determines whether or not the current account deficit is large. Obtaining the mentioned foreign budget and/or borrowing constraint is dependent on the condition that the second term in the equation (10) which defines the expected value of the discount debt converges zero in the limit. Wilcox (1989) defines whether or not the current account deficit is too large by taking the equation (11) as basis. That is to say, let it

be defined as $\lim_{N\to\infty} \mathrm{E}_t NFL^D_{t+N} = A_t$ .If $\lim_{N\to\infty} E_{t+1} NFL^D_{t+n} = \lim_{\mathrm{N}\to\infty} E_t NFL^D_{t+N}$, it must be $A_t = \mathrm{A}_{t+1}$. In this case, the behavior of A_t variable is determined by the behavior of NFL^D_t variable. If NFL^D_t variable is stationary, A_t variable is expected to be constant (converge zero in infinity). If NFL^D_t variable is non-stationary, then A_t variable will be contingent. In view of that, NFL^D_t variable's being stationary is a necessary condition in order to obtain intertemporal foreign budget constraint in terms of current account deficit.

While intertemporal foreign budget constraint is written like in the equation (3) to evaluate whether or not the current account deficit is too large, Hakkio and Rush [10] suggest an alternative equation to the equation (3).[2] If $rNFL_{t-1}$ is subtracted from both sides of the equation (3), equation (12) s obtained.

$$E_t + (1+r)NFL_{t-1} = X_t + NFL_t \qquad (12)$$

In equation (12), $X_t = EX_t + TR_t$, $M_t = IM_t$ and $E_t = M_t + (r_t - r)NFL_{t-1}$

Equation (12) is valid for all periods.The following equation is obtained by taking the first difference of the equation (12):

$$\Delta NFL_t = (1+r)\Delta NFL_{t-1} + \Delta E_t - \Delta X_t$$

In this equation, Δ shows the first differences. Solving this equation forward and substituting them into the fundamental equation, $\Delta NFL_t = (1+r)NFL_{t-1} + M_t - X_t$, the following equation is obtained:

$$MM_t = X_t + \lim_{i\to\infty} \frac{\Delta NFL_{t+i}}{(1+r)^i} + \sum_{j=t+1}^{\infty} \frac{\Delta X_j - \Delta E_j}{(1+r)^{j-t}},$$

(13)

Where MM_t is defined as M_t plus $r_t NFL_{t-1}$

Now, assume that X and M are non-stationary and obey the I(1) process, so that ΔX_t and ΔM_t are stationary. In particular, assume that X and M follow random walk with drift:

$$X_t = a_1 + X_{t-1} + u_{1t} \qquad (14)$$

$$E_t = a_1 + E_{t-1} + u_{2t} \qquad (15)$$

In this case, equation (15) can be rewritten as

$$MM_t = X_t + \lim_{N\to\infty} \frac{\Delta NFL_{t-j}}{(1+r)^j} + \frac{(a_1 + a_2)}{r} \sum_{J=t+1}^{\infty} \frac{(u_{1t} - u_{2t})}{(1+r)^{j-t}} \qquad (16)$$

Equation (16) forms the basis of the hypothesis which is tested in tested. First, if we assume that the solvency condition is satisfied, the second term of the right-hand side in equation (16) will be zero. One can rewrite this equation (16) as a regression equation below:

$$X_t = a + bMM_t + u_t \qquad (17)$$

If X and MM are non-stationary, that is to say; if they are I(1), apart from the fact that empty hypothesis b coefficient which is to be tested is equal to zero, MM and X variables are cointegrated. As a matter of fact, MM and X variables' being in long-term balance is the first condition for obtaining the intertemporal foreign budget constraint. However, co-integration coefficient b parameter's taking a value between $0 < b < 1$ means that intertemporal foreign budget constraint cannot be obtained for the current account [10]. Therefore, When MM and X are non-stationary, that is to say, they are I(1), the existence of long-term balance relationship between these two variables means that current account deficit is not too large.

ANALYSIS AND EVIDENCE

Whether or not the current account deficit is too large for Turkey's economy has been analyzed for (1983-2008) period. Annual data have been used in the analysis. Data have been obtained from SPO (State Planning Organization), CBRT (Central Bank of the Republic of Turkey) and TSI (Turkish Statistical Institute).

Summary statistics related to unit roots tests have been given in Table 1 Table 2. In the first line of the mentioned tables, summary statistics related to hypothesis suggested by Wilcox (1989) have been given. Prime rate has been used for the discount factor. The discounted foreign debt in question has been found to be stationary in view of both tests (Dickey-Fuller and Phillips-Perron). Therewithal, Table 1 and Table 2 are summary

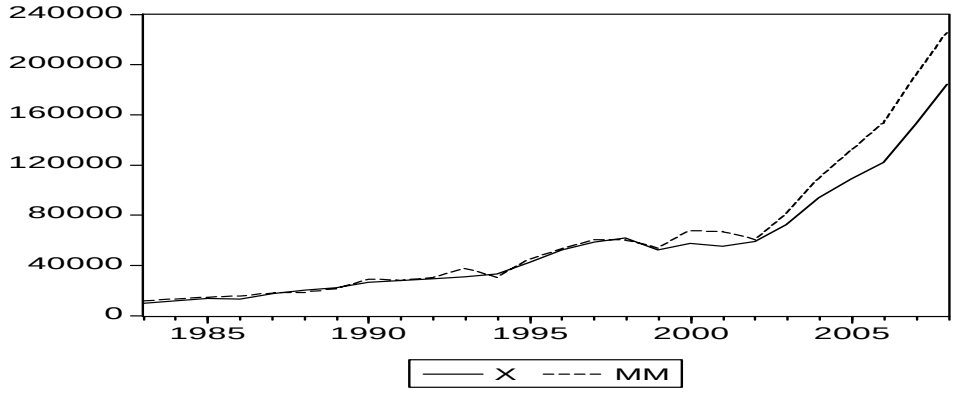
[2] It has been assumed that the interest rate is definitively equal to r.

statistics related to current account series. Current account series become stationary in their differences in view of both tests (Dickey-Fuller and Phillips-Perron).

Table 1: *ADF (Augmented Dickey-Fuller) Test Results*

Variable	ADF Test statistics	Critical Value (%5)	[Intercept; Trend;Lag]
NFL^D	-6.800328	-3.622033	[C ; T ;2]
X	2.640060	-1.955681	[- ; - ;0]
ΔX	-0.134208	-1.955681	[- ; - ;0]
$\Delta\Delta X$	-5.772659	-1.956406	[- ; - ;0]
M	7.508284	-1.955020	[- ; - ;0]
ΔMM	-2.941816	-3.612199	[C ; - ;0]
$\Delta\Delta MM$	-5.832981	-1.957204	[- ; - ;0]

According to MacKinnon, critical value is (%5) (lags have been determined in accordance with SIC)



Johansen co-integration test has been applied for the current account series which have been understood to have become stationary in their second differences as a result of the conducted unit root tests. Summary statistics related to the conducted co-integration test have been given in Table 3. It is observed from the table in question that the current account series (X and MM) are in a long-term balance relationship.

Table 2: *PP (Phillips-Perron) Test Results*

Variable	PP Test statistics	Critical Value (%5)	[Intercept; Trend;Lag]
NFL^D	-3.418483	-3.238054*	[C ; T ;1]
X	2.640060	-1.955681	[- ; - ;0]
ΔX	-0.134208	-1.955681	[- ; - ;0]
$\Delta\Delta X$	-5.772659	-1.956406	[- ; - ;0]
M	7.508284	-1.955020	[- ; - ;0]
ΔMM	-2.941816	-3.612199	[C ; - ;0]
$\Delta\Delta MM$	-5.832981	-1.957204	[- ; - ;0]

* Critical value according to %10 (lags have been in accordance with Barlett Kernel)

Table 3: *Johansen Co-integration Rank Test Results*

Variables	H_0	H_1	λ_{trace}	Critical Value (5%)
X and MM	$r = 0$	$r > 0$	16.49328	15.41

The test results have been obtained in %5 reliability range

CONCLUDING REMARKS

With the 1980 structural change and transformation program, foreign trade regime based on import substitution has been abandoned in Turkey's economy and export-oriented growth strategy has been adopted. In this scope, foreign exchange control has been discontinued and Turkish money has become convertible. As a result of the mentioned structural change and transformation program, significant increases have been obtained in export and import with the economic growth. Foreign trade deficits have increasingly grown. Restraints on the capital movements have been removed in 1989 in order to finance the foreign trade deficits. A financial model, which is based on low foreign exchange – high interest rate and hot money inflow, has been adopted in order to finance the foreign trade deficits. Such a financial model has increased the vulnerability of the economy against foreign-based shocks, and Turkey's economy has experienced the 1994 and 2001 economic crises.

As a result of the conducted analyses, such findings have been obtained, which show that the country has not lost its ability to reimburse foreign liabilities resulting from current account deficits. On the other hand, it has been observed that the current account deficit has continually increased especially after 2001 economic crisis as a result of the financial model which is based on low foreign exchange – high interest rate. If the mentioned financial model is not abandoned and a structural change is not implemented in the foreign trade policy, it is possible for Turkey's economy to experience crisis as a result of foreign-based shocks.

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