THE EFFECTS OF BUDGET DEFICIT REDUCTION ON EXCHANGE RATE: EVIDENCE FROM TURKEY

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THE EFFECTS OF BUDGET DEFICIT REDUCTION ON EXCHANGE RATE:
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—ABSTRACT—

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Key words: Budget deficits, Exchange rates, Cointegration analysis

This study investigates the effect of budget deficit reduction on exchange rate between US dollar and Turkish lira (TL). Our article aims to illustrate that the evidence on the relationship between budget deficits and exchange rates is not clear-cut and to explain why the theoretical approaches that underlie the relationship are ambiguous while there is general agreement that cutting budget deficits and debt will lower interest rates. The relationship between deficit reduction and exchange rates has caused a debate among the most famous monetary policy makers and researchers. [Melvin (1989), Mishkin (1992), Greenspan (1995), Thiessen (1995), Krugman (1995), Feldstein (1995)] In addition, budget deficit can be counted as one of the most common and major problem that influences the macroeconomic stability in developing economies. In this sense, cointegration method and causality tests were used in order to find out the possible effects of budget deficit reduction on exchange rates during the period of 1960-2003 in Turkey.

JEL Classification: H62, F31

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1. INTRODUCTION

The exchange rate is a key relative price in international finance. The determinants of this erratic
behaviour of real and nominal exchange rate in the long and short run has become one of the major
tasks of economists. At the same time government budget deficit, like the exchange rate, has generated
never ending debate among not only the policy makers but also academics as well. Last decade in
Turkey politicians from different ideologies even argue the necessity of balanced budget. Besides this
utopic approaches, it is almost accepted by everyone that deficit reduction is critical to the future of
Turkish economy. This paper tries to examine the effect of budget deficit reduction on exchange rate
between US Dollar and Turkish Lira.

In 1980’s and 1990’s budget deficit to GNP ratio was approximately –3 to –4 %. But in 2004 this ratio
has increased to –11.5% in Turkey. This significant increase in budget deficits might influence several
major macroeconomic indicators in Turkish economy. From this point of view, the effects of budget
deficits should be clarified in order to raise appropriate policy recommendations. It is generally
accepted that cutting budget deficit will result in a decrease in interest rates but its real effects on
exchange rate is not clear cut. Some argued the exchange rate would be strengthened by deficit
reduction, while others argued it would be weakened. Unfortunately evidence is available in the
literature for both type of arguments. In USA and Germany, increasing budget deficit lead to the
appreciation of the domestic currencies whereas in Italy, Finland and Sweden increasing budget deficit
lead to depreciation of the domestic currencies. The bottom line in the relationship between budget
deficit and exchange rate depends on the macroeconomic variables of the country, especially inflation
and debt records of the countries are closely linked to this ambiguous relationship.

2. THEORETICAL FRAMEWORK

It is not surprising that the empirical relationship between deficit reduction and exchange rate is
unclear because the theoretical relationship is ambiguous (Hakkio,1996:22). When economists and
policymakers decry deficits they cite diverse reasons. Thus, despite almost unanimous concern over
deficits, there is considerable controversy about what effects deficits have on the economy (Ball and
Mankiw,1995:95). Deficit reduction has different effects on the exchange rate, with some effects
leading to a stronger exchange rate and other effects leading to a weaker exchange rate. Budget deficit
reduction may effect interest rates and exchange rates both directly and indirectly. Direct effects
decrease the exchange rates, while indirect effects increase the exchange rates.
Deficit reduction can give rise to a weaker exchange rate. Deficit reduction directly influences interest rates and exchange rates because it decreases the demand for loanable funds. When the government prepares a budget that has a large deficit, it generally demands funds from financial markets so as to pay for the excess of spending over revenues. If the government decreases budget deficits, therefore, it needs to borrow less, leading to the demand for loanable funds and interest rates to diminish. With the decline of domestic interest rates, exchange rates will decrease accordingly. If domestic assets pay lower yields, investors would incline to sell lower yielding domestic securities and buy higher yielding foreign securities. When an investor tends to buy a foreign security in lieu of a domestic one, he does not really exchange a domestic security for a foreign security. In this case, the investor sells domestic security for domestic currency, buys foreign currency by using domestic currency and lastly uses the foreign currency to buy the foreign security. Consequently, a fall in domestic interest rates diminishes the demand for the national currency giving rise to the depreciation of the exchange rate.

Deficit reduction may also indirectly lead to an increase in demand for loanable funds by private investors. The increase in demand for funds may originate from one of three effects; a) lower expected inflation rate, b) lower foreign exchange risk premium, and finally c) higher expected rate of return on domestic assets.

Firstly, budget deficit reduction may lead to a decrease in expected inflation. When the government decreases budget deficits, its need for printing money or monetizing the deficit will diminish, leading to a fall in expected rate of inflation. Since nominal interest rate includes expected inflation as definition, when long-term expected inflation falls, nominal interest rates will decrease correspondingly. A fall in long-term inflation expectations leads to a decrease in nominal long-term interest rates, whereas it leads to an increase in real interest rates. As the real interest rates increase, investors will find domestic securities more appealing, leading to a rise in the demand for national currency. In other words, when expected inflation falls appreciation of the exchange rate takes place ultimately.

Secondly, reduction of budget deficits may give rise to a fall in the riskiness of domestic securities in comparison with foreign securities. When budget deficits decrease, government borrowings decrease, leading to a fall in the stock of domestic government securities, which in turn gives rise to the foreign exchange risk premium to decrease. When the foreign exchange risk premium falls, demand for domestic securities tend to increase and the appreciation of the exchange rate occurs. Beside these facts, when the government reduces budget deficits, risk of default decreases and foreign exchange risk premium falls.

Thirdly, deficit reduction may affect the expected rate of return on domestic securities. Government can decrease budget deficits either by cutting spendings or by increasing taxes. These two ways of cutting budget deficits may have individual effects over the expected rate of return of domestic assets. When the government cuts spendings, it also directs resources toward private sector. The use of resources by private sector leads to a rise in private investments, which in turn causes an increase in economic growth. As a result of this situation, the expected rate of return of domestic assets might also increase, hence leading to a higher demand for domestic assets and domestic currency, resulting in the appreciation of the exchange rate in the end.

Deficit reduction might also lead the government to lower the tax rates. With the decrease of marginal tax rates, the after tax rate of return on domestic securities would rise, causing an increase for the demand of domestically issued securities and domestic currency accordingly.

There are some important studies in empirical literature some of which are mentioned in our article. Chinn (1997,a) documents the evidence in support of fiscal and monetary models of exchange rates for the Canadian dollar, Deutschemark, Yen, and Pound over the 1974-1993 period. He estimated the cointegrating relationships between the real exchange rate and (i) fiscal impulses, and (ii) productivity and government spending. Long-run relations were examined, and little evidence was found for cointegration in the models he specified. In his study, it has been claimed that the finding of no
Cointegration might imply that cointegration methodology would not necessarily be appropriate. Chinn (1997,b) investigated the evidence for a fiscal model of the dollar/yen real exchange rate over the period 1974-1995. He estimated cointegrating relationships between the real exchange rate and productivity, government spending, and the real price of oil using the Johansen (1988) and Stock-Watson (1993) procedures. Chinn and Johnston (1997), investigated the long-run relationship between the real exchange rate, traded and nontraded productivity levels, and government spending for 14 OECD countries, using recently developed panel cointegration tests. According to their findings, it is extremely difficult to find a cointegrating relationship between the real exchange rate, sectoral productivity levels, and government spending in the period of 1970-1991 for an individual exchange rate. They find that government spending and productivity trends help in the analysis of real exchange rates; their finding is confirmed by Canzoneri et al. (1999), and by De Gregorio and Wolf (1994). Balvers and Bergstrand (2002), solve for the theoretical relationships among the real exchange rate, relative private consumption, relative government consumption, and tradables and nontradables production in a two-country general equilibrium model and then estimate the model’s structural equations. Using the techniques in Levin and Lin (1992), they conducted similar tests of stationarity for the selected variables for 37-year period 1953 to 1990, pooling data across ten selected country pairs (relative to the US). According to their results, government expenditures influence real exchange rates approximately equally via the resource-withdrawal and consumption-tilting channels.

3. EMPIRICAL RESULTS

General government financial balance as a percent of GDP (BD) and the real exchange rates (REALEXC) were used as the independent and dependent variables respectively. The annual data were collected from State Planning Organization’s (Turkey), State Institute of Statistics’ (Turkey) and International Financial Statistics’ web sites.

Cointegration analysis has been made in order to determine the long-run relationship between the budget deficits and TL/US Dollar exchange rate in Turkey during the period of 1960-2003. If such a relation exists then a decrease in budget deficits may bring about several effects through direct or/and indirect channels upon the real exchange rates.

In testing cointegration, we should first make sure that both series are integrated of the same order [I(1)]. We apply ADF, PP and KPSS unit root tests to investigate the stationarity of the individual time series. Table 1 reports the results of these unit root tests on the first differences as well as on the levels of the series. The results are consistent with real exchange rates and budget deficits are integrated of order one, I(1).
Table-1: Unit Root Test Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without trend</td>
<td>With trend</td>
<td>Without trend</td>
</tr>
<tr>
<td></td>
<td>1st Difference</td>
<td>-6,701(0)**</td>
<td>-6,740(0)**</td>
</tr>
<tr>
<td></td>
<td>1st Difference</td>
<td>-5,985(1)**</td>
<td>-6,495(1)**</td>
</tr>
</tbody>
</table>

Notes:
1) Numbers in parentheses denote the number of lags in the augmented term of ADF regression and are determined by using model selection criterions (Akaike’s Information, Schwarz Bayesian and Hannan Quinn).
2) Numbers in brackets denote the truncation lag for the PP (Phillips-Perron) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests (suggested by Barlett Kernel and Newey West).
3) ** and *** indicate the rejection of the null hypothesis of nonstationarity at 5 % and 1% levels respectively.
4) ♣♣ denotes the rejection of the null of stationarity in KPSS test.

Having established that two series under examination are I(1) processes, Engle and Granger two-stage procedure (1987) is postulated. The results of the Engle and Granger procedure are reported in Table 2.

Table-2: Engle-Granger Two Stage Procedure

<table>
<thead>
<tr>
<th>First Stage: Static Long-Run Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
</tr>
<tr>
<td>REALEXC = 523093,7 + 275,482 BD + u</td>
</tr>
<tr>
<td>R²=0.46</td>
</tr>
<tr>
<td>CRDW=1.42</td>
</tr>
<tr>
<td>Residual Based ADF statistics: -1.980 [2]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Stage: Error Correction Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
</tr>
<tr>
<td>DREALC = -1410,6 + 193,97 DBD – 0,15u(-1) + ε</td>
</tr>
<tr>
<td>t-statistics</td>
</tr>
<tr>
<td>(-0,09) (2,36)** (-1,58)*</td>
</tr>
<tr>
<td>R²=0.25</td>
</tr>
<tr>
<td>DW=2.03</td>
</tr>
</tbody>
</table>

Notes:
The number in brackets indicates the lag order in the ADF test and determined by using Akaike Information, Schwartz Bayesian and Hannan Quinn criterions.
Error correction model meets all the assumptions of normality.

We estimate the so-called cointegration regression by Ordinary Least Squares (OLS) and test for the stationarity of the residuals. If REALEXC and BD are I(1), in order to be REALEXC and BD are cointegrated, u should be I(0). We used the Augmented Dickey-Fuller (1979) test to determine whether the series and the residuals of cointegration regression are stationary or not. In determining the optimal lag structure in ADF testing procedure, in addition to t-ratios, we also rely on the model selection criterions of Akaike Information, Schwarz Bayesian and Hannan Quinn since the arbitrary choice of lag structure may easily result in wrong conclusions.

Since the residual-based ADF test statistic –1,980 is smaller than the corresponding critical value –1,941 at 5% statistical significance level, we can reject the null of no cointegration among the variables against the alternative. Engle and Granger cointegration test recommends a cointegrating vector between real exchange rates and budget deficits. Table 2 also shows that the error correction representation is well determined and there is a long run causal relationship between real exchange rates and budget deficits. According to the Granger Representation Theorem (Engle and Granger,1987) if two time series are cointegrated, then there exists an error correction mechanism and vice versa. According to the error correction mechanism results, coefficient of the variable u(-1) is...
statistically significant and negative in sign (-1<-0.15<0). For this reason, error correction mechanism has validity and offsets the deviations from the long-run equilibrium with 15% per year.

The two major shortcomings of the Engle-Granger method are; a) although the long-run static regression gives consistent estimates, they may not be fully efficient, b) due to nonnormality of the distribution of the estimators in the cointegrating vector, no sensible judgement can be made about the significance of the parameters. Engle and Yoo (1991) propose a three-step estimation technique to overcome two of the main disadvantages of the classical two-step Engle-Granger method. The third step corrects the parameter estimates of the first step so that standard tests, such as \( t \)-test, can be applied.

Table-3: Engle and Yoo Model Results

<table>
<thead>
<tr>
<th>Model</th>
<th>( \epsilon = \eta(-0.15 \times \text{BD}) + \nu )</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>12,541</td>
</tr>
<tr>
<td>Standard error ( \eta )</td>
<td>34,383</td>
</tr>
<tr>
<td>Corrected cointegrating vector (( \beta ))</td>
<td>288,023</td>
</tr>
<tr>
<td>( t )-statistics of ( \beta )</td>
<td>288,023 / 34,383 = 8,377</td>
</tr>
</tbody>
</table>

Results of the Engle-Yoo third step correction show that the corrected coefficient of cointegrating vector is very close to the uncorrected parameter of the static long run regression of Engle and Granger procedure. Corrected value of the coefficient has been found as 288,023 (275,482+12,541). Consequently, long run relationship between budget deficits and real exchange rates reveals that when the share of budget deficits in GDP increases by 1 percent, real exchange rates will increase by 288,023 points.

4. CONCLUSION

No issue in economic policy has generated more debate over the past decade than the effects of government budget deficits. Although the economics profession is more divided over the issue, many economists share the view that deficits are harmful, and perhaps even disastrous (Ball and Mankiw, 1995:95).

In our study, the effect of the budget deficits on real exchange rates was investigated. It is quite certain that budget deficits may influence many other macroeconomic variables such as long-term interest rates, inflation, national savings and government debts. In spite of this fact, when constructing the model we only included general government financial balance as a percent of GDP (BD) and the real exchange rates (REALXEC) as the independent and dependent variables respectively and did not include any other additional variables. Looking from that angle, our study can be seen as a preliminary analysis that investigates the causal relationship between so-called variables. The annual time series under investigation comprise the period of 1960-2003 in Turkish economy.

Long run relationship between budget deficits and real exchange rates reveals that when the share of budget deficits in GDP increases by 1 percent, real exchange rates will increase by 288,023 points. As a conclusion, balanced budget has a crucial role to maintain the stability of the exchange rates since there is a long-run economic relationship between REALXEC and BD. For this reason, governments should give greater emphasis upon budget discipline and apply tight fiscal policies. It should be also borne in mind that exchange rate which is closely related to government’s budget policies has significant influence on net exports in Turkish economy.
BIBLIOGRAPHY


