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Determinants of Foreign Trade Deficits in the Turkish Economy

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ABSTRACT

The purpose of this study is to analyse the relations between the basic macro economic variables that determine the budget deficits and current accounts deficits and to determine the dynamics of the relation between these two deficits via vector-autoregression. The Vector Autoregression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system. The period of 1989Q1-2009Q3 was analysed by using the var model with quarterly data. According to the results of the variance decomposition, which is expressed in terms of arithmetical averages for all of these periods, while the shocks of public and private consumption expenditures explain approximately 30% of the estimation error variance of goods and services balance, exchange rate shocks explain 21% and interest rates explain approximately 10% of the estimation error variance of the foreign trade balance.

Key words: Fiscal policy, current account deficit, vector-autoreggession model, bugget deficit

INTRODUCTION

Approaches that describe the relation between the public deficit and current accounts deficits in literature: (1) Conventional approaches: Keynesyen income-expenditure approach and feldstein chain approach and (2) It could be expressed as the Ricardian equivalence hypothesis. While conventional approaches anticipate a relation from the public deficit towards current accounts deficit between the public deficit and current accounts deficit which are constituted as a result of the fiscal policy being applied, Ricardian equivalence hypothesis expresses that public deficits do not cause foreign trade deficits (Barro, 1989). Darrat (1988), Zietz and Pemberton (1990), Bachman (1992), Pahlavani and Saleh (2009), Khalid and Guan (1999), Vamvoukas (1999), Akbostancı and Tunç (2002), Rosensweig and Tallman (1993) and Bahmani-Oskooee (1992, 1995) attained findings which support the hypothesis that budget deficits cause current accounts deficits within the frame of conventional approaches. Enders and Lee (1990), on the other hand, attained findings that support the Ricardian equivalence hypothesis.

Together with the structural change and conversion program of 1980, the Turkish Economy adopted a growth strategy directed at export. As a result of putting the politics in question into practice, the Turkish economy began to have foreign trade deficits. The restrictions to capital movements were removed in 1989 for financing foreign trade deficits which became chronicle. Finance policy of external deficit based on Low Exchange Rate-High Interest caused the economic crisis of 1994 and 2001 and led the way for trade deficits to gain structural characters. The purpose

of this study is to determine the dynamics of the relation between the fiscal deficit and foreign trade deficits which are constituted as a result of the fiscal policies being applied, with the help of the basic macro economic variables and to reveal the determinants of foreign trade deficits in the Turkish economy.

ECONOMIC MODEL

The model which describes the relation between budget deficits and current accounts deficit has fairly been aggregated. The model in question is explained through using a single property that could be subject to private or public consumption (Enders and Lee, 1990). In an economy, an individual makes the advantage maximum with the following advantage function.

$$E_0 \sum_{t=0}^{\infty} \beta \left[c_t^{1-\delta} - g_t^{\delta} \right]^{\rho} / \rho \tag{1}$$

where, c_t is the real private consumption, g_t is the real public consumption, $0<\beta<1$, $0<\delta<1$, $\rho<1$; $E_t x_{t+j}$ is the mathematical expectation of x_{t+j} conditioned on the set at t and the information set at t contains all variables subscripted t and earlier. ρ in Eq. 1 measures the level of abstaining from risk. β measures the discount rate. δ, on the other hand, is the share of parameter that measures the level of the real government expenditure which contributes to the advantage of the representative individual in question.

Within the scope of the Ricardian hypothesis, government debt is expressed only as a value. Every government can export reduced debt certificates for a period. The government undertakes a unit of output with debt certificates. By this way, in a position where risk is not in question, the real return of the two securities (debt certificate and output) shall be the same. Budget constraint which is encountered by the representative individual during the t period is expressed as follows:

$$B_t / (1+i_t) + F_t / \left[(1+i_t^*) e_t \right] + p_t c_t + p_t \tau_t \leq p_t y_t + B_{t-1} + F_{t-1} / er_t \tag{2}$$

where, B_t expresses the national monetary value of one-period debt certificates which are purchased during the t period and kept until the t+1 period, i_t expresses the nominal interest rate, er_t expresses the exchange of the national currency in foreign currency, p_t expresses the prices of goods in national currency, y_t expresses the real output and τ_t expresses the total real conclusive tax incomes.

Assuming that there are no transportation expenditures and other foreign trade restrictions, arbitrage and consequently the equation of $p_t = p_t^*/er_t$ is provided for a single homogeneous property. Here, p_t^* shows the prices of goods in foreign currency. Considering r_t is for the real interest rate, b_t is for national debt certificates and f_t is for foreign conversions, the following descriptive equations are attained:

$$1+r_t \equiv p_t(1+i_t)/p_{t+1} = p_t^*(1+i_t^*)p_{t+1}^*; \ b_t \equiv B_t / p_{t+1}; \ ve \ f_t = F_t / p_{t+1}^* \tag{3}$$

The descriptive equations in Eq. 3 are substituted within the Eq. 2 and if Eq. 2 is rearranged by being divided with p_t, the following Eq. 4 is attained:

$$(b_t + f_t)/(1+r_t) + c_t + \tau_t \leq y_t + b_{t-1} + f_{t-1} \tag{4}$$

When the budget constraint which is given with Eq. 4 is a data, the individual, who wants to optimise their advantage in every t period, shall choose c_t and (b_t+f_t) in order to execute the advantage maximization in Eq. 1. The model takes the neutrality of foreign exchange as base. By this way, the model in question enables the real variables to be dissolved independently from prices and foreign exchange.

During the maximization period, series of the future tax payments and problem of the government debt are associated. The relation between the future tax payments and the government debt is given with the Eq. 5 below:

$$g_t - \tau_t = (b_t + b_t^*)//(1+r_t) - b_{t-1} - b_{t-1}^* \tag{5}$$

The first rank conditions for an inner solution are given with Eq. 6 and 7 below:

$$(1-\delta)[c_t^{1-\delta}g_t^\delta]^{\rho-1}c_t^{1-\delta}g_t^\delta = \lambda_t \tag{6}$$

$$\lambda_t = \beta E_t \lambda_{t+1}(1+r_t) \tag{7}$$

where, λ_t is the langrage multiplier.

In order to prove the hypothesis of the Ricardian equivalence, the government budget constraint given with Eq. 5 is substituted into the budget constraint of the individual in question which is given with Eq. 4 and if it is rearranged, Eq. 8 is attained:

$$\sum_{t=0}^{\infty}[c_t + g_t - y_t]\prod_{j=0}^{t}d_{j-1} = f_{-1} - b_{-1}^* \tag{8}$$

Equation 8 could be expressed as the touchstone of the Ricardian equivalence hypothesis for the open economy. Discount value of the national consumption flows must be financed from the income stream plus the government net claims on foreigeners $(f_{-1}\text{-}b^*_{-1})$ less the discounted value of the government spreading.

Where:

$$\prod_{j=0}^{t}d_{j-1} \equiv d_{-1}d_0d_1...d_{t-1};\ d_{-1} \equiv 1\ ;d_j \equiv 1/(1+r_j)\quad j\geq 0 \tag{9}$$

Taxes do not appear on the lifelong budget constraint of the representative individual in question. Taxes and debts do not affect the economic behaviour of the individual. The only reason of exporting debt certificate instead of taxes is that debt issue affects the real economic behaviour by means of real interest. In determining the real interest rate, optimization behaviour in foreign habitants has importance.

It is assumed that foreign habitants have the same consumption shape with the national habitants. In that case, optimization plans of foreigners shall satisfy the combined lifelong budget constraints of the foreign government and private sector:

$$\sum_{t=0}^{\infty}\left[c_t^* + g_t^* - y_t^*\right]\prod_{j=0}^{t}d_{j-1} = f_{-1} - b_{-1}^* \tag{10}$$

where, * shows the foreign partner of the country variable.

Thereby, while real interest rates and public expenditure stream of foreign governments are given, substitution of taxes for the foreign debt shall change the possibilities of consumption. Real interest rates are determined in accordance with the condition in which the world output is equal to the world demand. The equation which shows that world output is equal to the world demand is as follows:

$$y_t + y_t^* = c_t(\ ) + c_t^*(\ ) + g_t + g_t^* \tag{11}$$

where, the symbols $c_t()$ and $c_t^*()$ show the functions of consumption demand. The series of $\{y_t\}$, $\{y_t^*\}$, $\{g_t\}$ and $\{g_t^*\}$ and demand functions $c_t()$ and $c_t^*()$ are determined depending upon the expectations which are rationally constituted by the related agents, the pre-existing national rights on foreigners $(f_{t-1}$-$b_{t-1}^*)$ and the series of real discount factor $(1+r_t)$. Equation 11 determines the time way of the real interest rates independently from the time way of government deficits or surpluses. The hypothesis in question is known as the twin deficits and they are not in distant relationship with one another. Considering the net export of any country to be nx, the real market equilibrium in the country in question could be written as follows:

$$nx_t = y_t - c_t(\ ) - g_t \tag{12}$$

where, y_t and g_t are data, budget deficits do not cause current accounts deficits on an occasion when the rate of consumption $c_t()$ debt does not change. However, a temporary increase in government expenditures may cause current accounts deficit. While, public expenditures (g_{t+j})-except of t period- are stable, the reduced value of tax currents shall remain the same if public expenditures g_t increase during the t period. Since the increase in tax liabilities would decrease the available income, consumption shall cause a decrease in every period. Decrease in every period within consumption shall be equal to a value less than the increase in public expenditures. Totally, current expenditures and consequently current accounts deficit shall increase.

ECONOMETRIC METHODS AND DATA

The relation between fiscal policy variables and current accounts deficit is determined by Vector Autoregression (VAR) technique. One of the advantages of VAR technique is that it enables the examination of relations between the variables without requiring any constraint about externality. Vector Autoregression (VAR) is commonly used for the purpose of analysing the dynamic effect of casual demolishers on the system of variables and for the estimation systems of correlated time series. Mathematical presentation of a VAR model is as follows:

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + Bx_t + \varepsilon_t \tag{13}$$

where, y_t is the k internal variables vector. x_t is the k external variables vector. $A_1,\dots, A_p$ and B is the matrix of coefficients to be estimated. ε_t (shock) is the innovations. Innovations are

contemporaneously correlated, however they are not correlated with their own retarded values and with all variables on the right side of the equation.

A shock to any i. variable does not directly affect only the i. variable, but it also may be transferred to all other internal variables due to the dynamic (retardation) structure of VAR. An impuls- response function analyses the effect of a time shock of innovations to one on the current and future values of internal variables. While impuls- response functions reveal the effect of a shock given to an internal variable on other variables in VAR, variance decomposition distinguishes the change in an internal variable from the compound shocks in VAR. By this way, variance decomposition provides information about the relative importance of each casual innovation in affecting the variables within VAR. At the same time, variance decomposition shows the proportion of estimation error variance of a variable being attributed to each variable in the system (Onis and Ozmucur, 1990). There is not a single way in VAR model to arrange the variables. In any VAR analysis, set of variables being included in the system and retardation lengths are arbitrary to a certain extent. In order to explain the relation between the budget deficits and current accounts deficit, real private consumption expenditures, real public consumption expenditures, real public debt stock, net export, exchange rates, variables of real interest rates are used to test the prediction of the economic model. The period of 1989Q1-2009Q3 is analysed with quarterly data. Interest rates are three-month term treasury bills interest rates. Treasury bills interest rates are expressed in real terms by using GSMH deflator. In terms of exchange rate, the rate of exchange at the last day of each three month is taken as base. All variables except of interest rates and exchange rates are expressed in per capita terms. Real private consumption expenditures are expressed with rc; real private public expenditure is expressed with rg; net export is expressed with nx; real public debt stock is expressed with rb; exchange rates are expressed with er and real interest rate is expressed with ri notations.

ANALYSIS AND FINDINGS

In VAR model, the variables are arranged as rc, eg, rb, nx, er, ri. In VAR model, Var equations do not make a sense in terms of showing the relations between the variables. In the model in question, the relations between the variables are expressed with impuls-response functions and variance decomposition. Within the scope of the VAR system, the results of variance decomposition being expressed as arithmetical averages for the whole period are given in Table 1.

Majority of estimation error variance in a variable is explained with the previous values of that variable. This situation is well understood from the diagonal values in Table 1. Public expenditure shocks explain (11.66%) of goods and services balance, 45.98% of the private consumption and 0.91% of the public debts. An increase in public debt stock explains 1.25% of the estimation error

Table 1: Variance decomposition

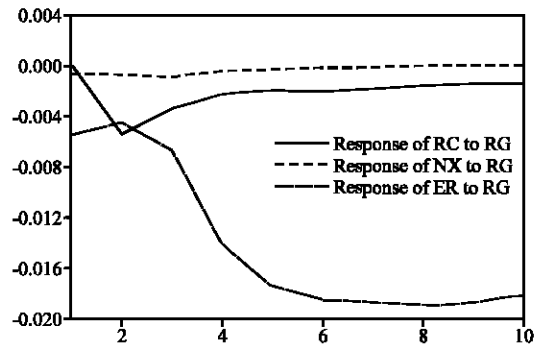| Shocks	Estimation error variance					
	rc	rg	rb	nx	er	ri
rc	68.55	8.35	0.94	15.43	5.02	1.71
rg	45.98	34.20	0.91	11.66	5.56	1.69
rb	8.01	12.24	76.78	1.25	1.08	0.64
nx	8.68	2.24	4.08	71.71	12.18	1.12
er	2.64	1.29	0.22	21.02	74.75	0.09
ri	14.83	1.16	5.72	8.83	10.93	58.53

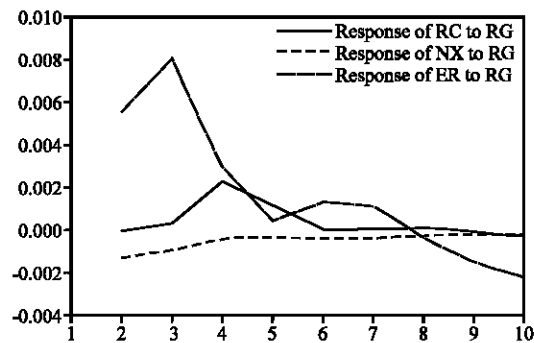Fig. 1: Impuls and response related to public consumption expenditures

Fig. 2: Impuls and response related to public debts

variance of the trade balance, 8.01% of the variance of the private consumption expenditures and 0.64% of the error estimation variance of the real interest rates. Among the variables which are included in the Var system, exchange rate shocks mostly affect the estimation error variance of goods and services balance. In this context, while private and public consumption shocks, respectively explain 15.43 and 11.16% of the estimation error variance of goods and services balance, real interest rates explain 8.43% of the estimation variance of goods and services balance.

The effects of various short and long term shocks to the system in question could be explained by using innovation-based impuls-response. Figure 1 shows how a typical positive increase in public expenditures affects the real private consumption, trade balance and time way of exchange rate. No simple relation is seen between the public expenditures (shocks) innovation and private consumption expenditures. That means that individuals do not make a change in their private consumptions in case of an increase in public expenditures. Public expenditure innovation causes the constant increase of current accounts deficits. From the Fig. 1, it is seen that the change in exchange rates is in an inverse relation with the net export in long term. While exchange rates are on long term balance values, the series of current accounts go down below the long term balance value and the deficit gradually grows.

The effects of debt innovation are seen in the Fig. 2. The increases in public debts firstly increase and then decrease the private consumption expenditures. This situation contradicts with the Ricardian equivalence hypothesis. On the other hand, it is seen that public debts have a constant and positive effect on the net export deficits. This reveals a contradictory situation with Ricardian hypothesis. Public debts, on the other hand, decrease the exchang rate in the long term.

CONCLUSIONS

Twin deficits hypothesis which could be expressed as public deficits cause current accounts deficits. According to the approach of Keynesyen-income expenditure, national income increases as a result of an open budget policy which could be applied as increasing the public expenditures and/or decreasing the tax incomes and the increasing national income causes the increase of import. The approach of Feldstein chain, on the other hand, is mostly explained within the frame of the relation between exchange, rate, hot money and interest. Public deficit causes the increase of the local interest rate and the increasing interests causes the entrance of capital into the country. Capital entrance causes the appreciation of the national currency and the growth of current accounts deficit.

According to Ricardian equivalence hypothesis, increasing the taxes without changing the total expenditure level does not affect current accounts deficit. At certain public and private expenditure levels, a tax increase shall decrease the budget deficit, but it shall not change the current accounts deficit. According to the hypothesis, there is no causality relationship between budget deficits and current accounts deficits. In case the budget deficit is met by loan, the taxes would need to be raised in order to serve the debt in question onwards. Rational individuals shall direct the increase in expendable incomes towards possession rather than consumption together with decreasing the taxes. Accordingly, since the income which increases with the expanding fiscal policy is not canalized into the consumption, budget deficits are not effective on current accounts deficits.

In this study, budget deficits and the effects of the financing of these deficits on current accounts and the variables determining the current accounts were analysed by using the VAR technique. It is understood that when public expenditures are financed by debt, this situation increases the consumption expenditures and the net export. This means that Ricardian equivalence hypothesis, which is expressed as the financing of budget deficit is not effective on consumption decisions, is not valid for the Turkish economy. On the other hand, while public expenditure shocks are effective on public debts and net export, it is not effective on the trade balance of public debts. While interest rates play an important role in determining the time way of exchange rates, exchange rates are effective on the net export.

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