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Current Account and Financial Account Cyclicity: Evidence from Turkey

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ABSTRACT

This study analyzes fluctuations in the current account, financial account and their main components in Turkey between 1984 and 2007. Two Stage Least Squares method is used and the empirical model is built up on the base of the study of Clausen and Kandil (2005). Real output growth, price inflation, real effective exchange rates, oil prices, global output growth and European output growth are used as explanatory variables. The estimation results indicate that the empirical model is sufficient to explain cyclical in the current account balance, in its components and in the financial account balance. However, the model is not sufficient to estimate the changes in financial inflows and outflows. The findings from the estimations report that real output growth, real effective exchange rate and price inflation are the most important factors to explain the cyclical fluctuations.

Keywords: Current Account, Financial Account, Two Stage Least Squares, Non-stationarity

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1. INTRODUCTION

The aim of this thesis is to investigate the cyclical fluctuations in the current and financial account of the balance of payments and their major components for Turkey between the periods 1984 and 2007 using the framework provided by Clausen and Kandil (2005). The analysis is mainly focused on the cyclicity of the current account balance. Fluctuations in the current and financial account are estimated with a set of domestic and global explanatory variables; real output growth, oil price, real effective exchange rate, inflation, global growth and growth in the some major trading partners by using the Two Stage Least Squares method. The main conclusions from this analysis is that the cyclical fluctuations in the domestic and foreign explanatory variables are explaining the variability in the current account balance, its components and financial account balance better than the financial inflows and outflows. This is consistent with the study of Clausen and Kandil (2005). The real effective exchange rate and real output growth are the most important factors explaining the cyclicity of the balance of payments components.

The study is organized as follows: the next section gives information about the current account in Turkey. The third section provides a brief literature about the relation of current account balance with macroeconomic factors. In the fourth section cyclical effects on the balance of payments are modelled. Section five gives information about the data sources and description. Nonstationary and cointegration tests are presented in the section six. In section seven reduced form equations are estimated and cyclicity in the current account, financial account and their components are interpreted. Section 8 reviews the main results of the study.

2. AN OVERVIEW OF THE CURRENT ACCOUNT IN TURKEY

2.1 Definition of the Balance of Payments

The balance of payments record the international transactions between any country and other countries in the form of double entry book keeping that summarizes all the international

transactions of the country in a certain period of time. International transactions of the country with the rest of the world are separated into three main groups¹:

1. Current Account
2. Capital Account and Financial Account
 - 2.1 Capital Account
 - 2.2 Financial Account
3. Net Errors and Omissions

According to the balance of payments accounting identity, the sum of these three groups equal to zero. A country's current account balance is the change in the value of its net claims on the rest of the world in a given period. The current account balance is in surplus if it is positive and in deficit if it is negative. A current account surplus says that economy is lending to the rest of the world and deficit indicates that economy is borrowing from the rest of the world.² Exports and imports of the goods and services are the main components of the current account. Current account deficits affect and are affected by the several macroeconomic factors such as GDP, inflation, exchange rates... On the other hand, the financial account, which was formerly called capital account, contains all changes in the country's foreign financial assets and liabilities. The capital account includes all unilateral transfers and is usually a very small portion of the balance of payments. The financial account records the financial transaction between residents and non-residents and includes the direct investment, portfolio investment, financial derivatives, other investment and reserve assets. Reserve assets are used by the country's monetary authority to control its payments and regulate the imbalances in the payments by intervening foreign exchange market.³ However, in the floating exchange rate regime, central banks do not intervene the foreign exchange market and an imbalance in the current account is counterbalanced by the same amount imbalance in the financial account.

¹ Definition and the classification of the balance of payments are taken from the Central Bank of Turkey which follows the IMF classification.

² See Obstfeld and Rogoff (1996)

³ See Gandolfo (2004)

2.2 The Current Account Balance in Turkey

The Turkish economy has seen three economic crises in 1994, 1999 and 2001. Prior to each crisis, the current account balance has reached the lowest values.⁴ Until 1988, the current account balance followed a more stable pattern. However, policy changes in the international trade in 1988 and adjustments in the Turkish Lira in order to keep the value against foreign currencies caused a dramatic decrease in the growth rate of exports and a boom in the imports.⁵ The current account balance indicates that except after crisis periods, Turkey is having current account deficits which make it net borrowers from the world. Moreover, after the AK-Party (Justice and Development Party) government in 2003, Central Bank focuses on their policies on the price stability in order to have single-figure inflation rate. However, strong national currency policy has deepened the current account deficits. Appreciation of the Turkish Lira has decreased the competitiveness in the international trade that imports have increased much more than the exports which widened the trade deficit. As a result, higher trade deficits have increased the current account deficit. Between 2003 and 2007 the current account deficit has gone up from 7.5 billion US dollars to 37 billion US dollars.

Due to high rates of deficit, sustainability of the current account becomes a matter of concern. As the rate of the economic growth is declining, a decrease in the investment will lead to lower financial inflows. Moreover, since the value of the exports do not offset the imports, in the long-run sustainability of the current account deficit will become a crucial issue.⁶ Kalyoncu (2005) claims that in order to sustain higher deficit, interest rates need to increase to attract capital inflows which are decreasing the life standards of the next generations.

Between the periods 1974 and 1987 current account deficit was 2.6% of the GDP on average and having high fluctuations. However, from 1987 to 2002 current account has followed more balanced pattern and the deficit ratio on average decreased to 0.3% of the GDP. Since 2002, the deficit ratio has reached to 4.5% of the GDP which is far beyond the last 30 years average, 1.9%. (See Figure 1) High growth rates in the GDP have increased the investments. Since the savings

⁴ See Figure 1 and Figure 5

⁵ See Azgun (2006)

⁶ See Peker (2009)

of the country is not enough to finance the investments, the current account is having deficits. These deficits are financed by the foreign inflows. However, before 2005, foreign borrowing constituted the major part of financing. Figure 2 shows the total value of the portfolio investments of the foreigners where portfolio investments cover the holdings of the stocks, government bonds and other financial assets.

Figure 1

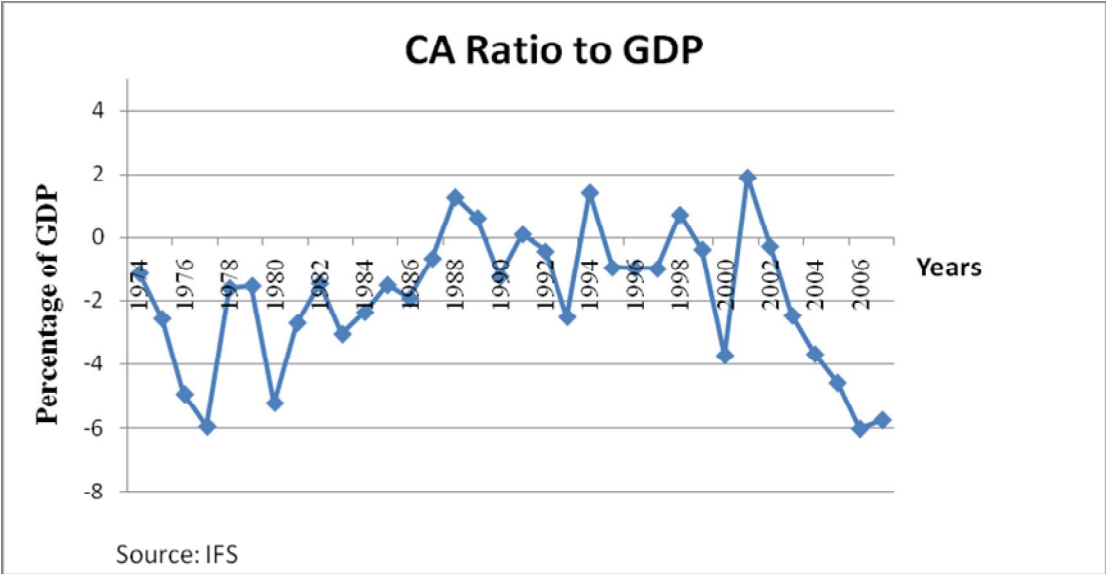
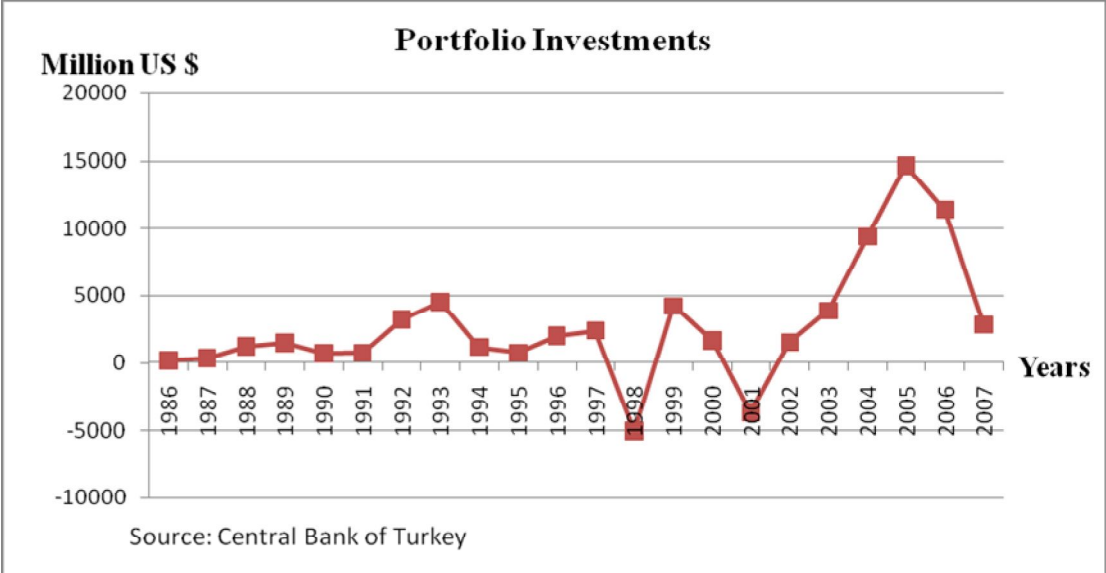
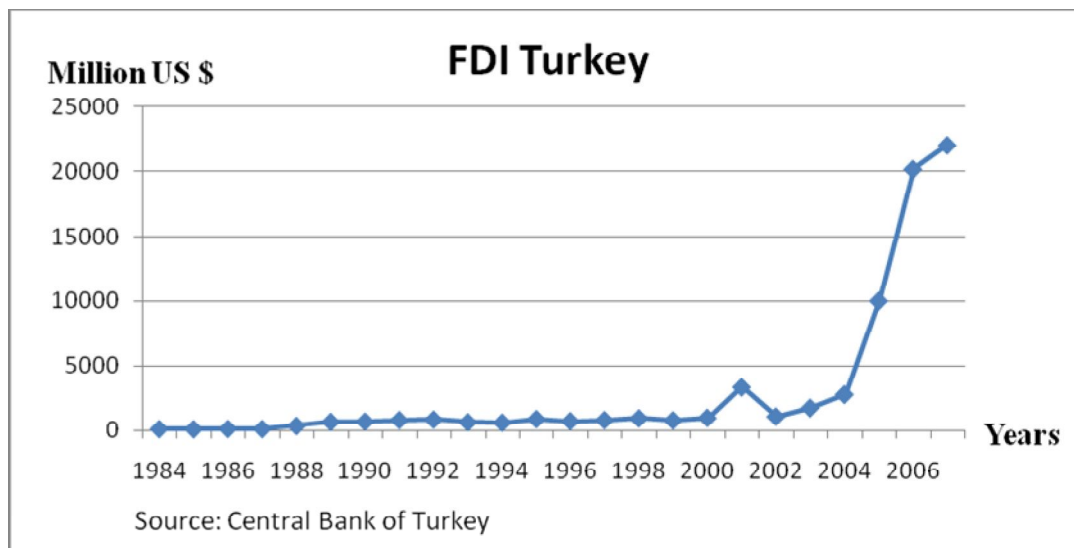


Figure 2



After 2002, a rapid increase in foreign direct investment has occurred. Thus, these investments play an important role on financing the current account deficit. Moreover, starting negotiations to join the European Union has given confidence to foreigners since it has strengthened the expectations for a more rapid and consistent implementation of the rules and regulations that ensure a level playing field for all companies.⁷ However; these investments are made by buying the available companies rather than starting from scratch. Privatization and investments in finance sectors are the most important factors to attract the foreign investments.

Figure 3



3. LITERATURE REVIEW

In this section, we discuss recent studies about the cyclicity of current account and financial account balance with macroeconomic factors.

Greene and Kandil (2002) analyze the sensitivity of the balance of payments components of the USA by using macroeconomic explanatory variables such as real GDP growth, inflation rate, the real exchange rate, energy prices, global growth and growth in major trading partners by using reduced form equations. The results indicate that there is long-run relationship between the

⁷ Yilmaz and Izmen (2009)

current and financial account, and explanatory variables according to cointegration test results. They find out that in the long run the current account has a significant and negative relationship with real GDP growth, energy prices and the real effective exchange rate, whereas real GDP growth and REER has significant and positive effects on the financial account. In addition, these macroeconomic factors have stronger effects on current account than the financial account.

Aristovnik (2006) investigates the main determinants of the current account in order to estimate potential unsustainability of the current account deficit in the transition economies in Europe and former Soviet Union countries between 1992 and 2003. His findings suggest that economic growth has a negative effect on the current account balance and rise in the real income increases investments more than the savings that cause a decrease in the current account balance. A one-percentage increase in the GDP growth decreases the current account balance 0.54 percentage. Furthermore, appreciation of the real exchange rate and worsening of the terms of trade leads to decline in the current account balance. Appreciation of the national currency by 10 percent leads to current account decrease 0.9 percentage.

Calderon, *et al.* (2000) examine the empirical relationship between current account deficits and main economic variables in 44 developing countries for the period 1966-1995 using reduced form equations (Generalized Methods of Moments). They divide the effects of the changes in explanatory variables as *within country* and *cross-country effects*. The main results from the study are that an increase in the domestic growth rate, exports, appreciation of the national currency, and reductions in the international interest rates generate increase in the current account deficit. However, the rise in the growth rate of the industrial countries and saving rates within country lead to reduction in the current account deficit.

Rahman (2008) investigates the current account developments in the 10 new EU member countries between 1992 and 2006 by using panel data from 59 countries.⁸ Output growth, EU accession, competitiveness in the manufacturing sector and private sector credit to GDP are found deviations from the estimated norms. In addition, the current account balance is adversely related with foreign direct investment. Increased FDI often is a sign of improvement in the

⁸ The 10 new EU countries are Czech Republic, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

developing economy that the current account deficit capacity of a country is restricted by the FDI inflows. Moreover, higher FDI also triggers the imports which in turns decrease the current account balance. The estimation results show that a one-percentage point of increase FDI to GDP ratio decreases the CA balance by 0.61 percentage point. The author concludes that due to lack of capital stocks in the manufacturing sector, the increase in the foreign direct investment increases the imports of raw materials which in turns decrease the current account balance.

Oğus and Sohrabji (2008) assess the sustainability of Turkey's present current account deficit with structural and macroeconomic indicators between the periods 1991 and 2006. They claim that the fiscal position and exchange rate policy have been important factors in the earlier crisis. Decrease in the fiscal deficit to GNP and interest payments to GNP ratio have increased the fiscal position since 2002. Strong fiscal policies enable a country to pay and make foreigners willing to lend which makes the current account sustainable. Improvements in the internal policies such as switching to floating exchange from fixed exchange rate policy, inflation targeting sustain higher current account deficits for longer periods of time. But, since the Turkish economy is influenced by global changes, it may not be possible to sustain higher current account deficits. To illustrate, the oil prices have been increasing since 2002 which raises the value of imports. If a decline in the exports occurs due to demand shortage because of the potential global crisis, it will be more problematic to sustain the deficits in the current account. In addition, Brook (2006) suggests that the rise in the price of energy imports in Turkey causes a decline in the current account balance in the recent years. It is cited that increase in the net import energy bill in 2005 has raised the current account deficit approximately 1.5% of GDP relative to 2004 level.

4. MODELLING CYCLICAL EFFECTS ON BALANCE OF PAYMENTS

This paper focuses on the fluctuations in the current account. The accounting identity indicates that current account is equal to the negative of the sum of the capital and financial account when the net errors are equal to zero.⁹ In this study cyclicity of current and financial account are

⁹ Current Account + Capital and Financial Account = 0

associated with domestic and foreign macroeconomic variables. The current account, the financial account and their major components exports, imports, financial inflows and financial outflows are analyzed, where financial inflows cover foreign direct investment in the country and portfolio investment liabilities, and financial outflows include direct investment abroad and portfolio investment assets. Domestic macroeconomic variables consist of real output growth, price inflation, the real effective exchange rate, and oil price, whereas foreign factors cover real output growth of USA as a proxy for global growth and real output growth of Europe as a proxy for growth in the major trading partners. Real output growth is divided in two parts; expected and unexpected growth in the output that output shocks show the short-run effects of the real output.

The literature suggests that the components of balance of payments respond to the changes in the macroeconomic variables. The aim of this study is to relate the cyclicalities of the current account and financial account with domestic and global explanatory variables. Economic growth requires higher investment which is obtained from either decreasing the consumption by increasing the saving rates or financial inflows. We expect that economic growth has a negative effect on the current account due to imports of intermediate and raw material for the investment and positive effect on the financial balance because of the higher financial inflows.¹⁰

An increase in the real effective exchange rate means appreciation of the national currency which leads to a decrease in the competitiveness of the country. Therefore, it is expected that a rise in the REER will cause a decrease in exports and an increase of the imports which in turns decrease in the current account balance.

Since Turkey is an oil importer, the effect of the increase in the oil prices will probably raise the value of imports. On the other hand, as oil is a raw material in the manufacturing sector, exports also likely to increase. However, it is expected that the value of the increase in the imports are

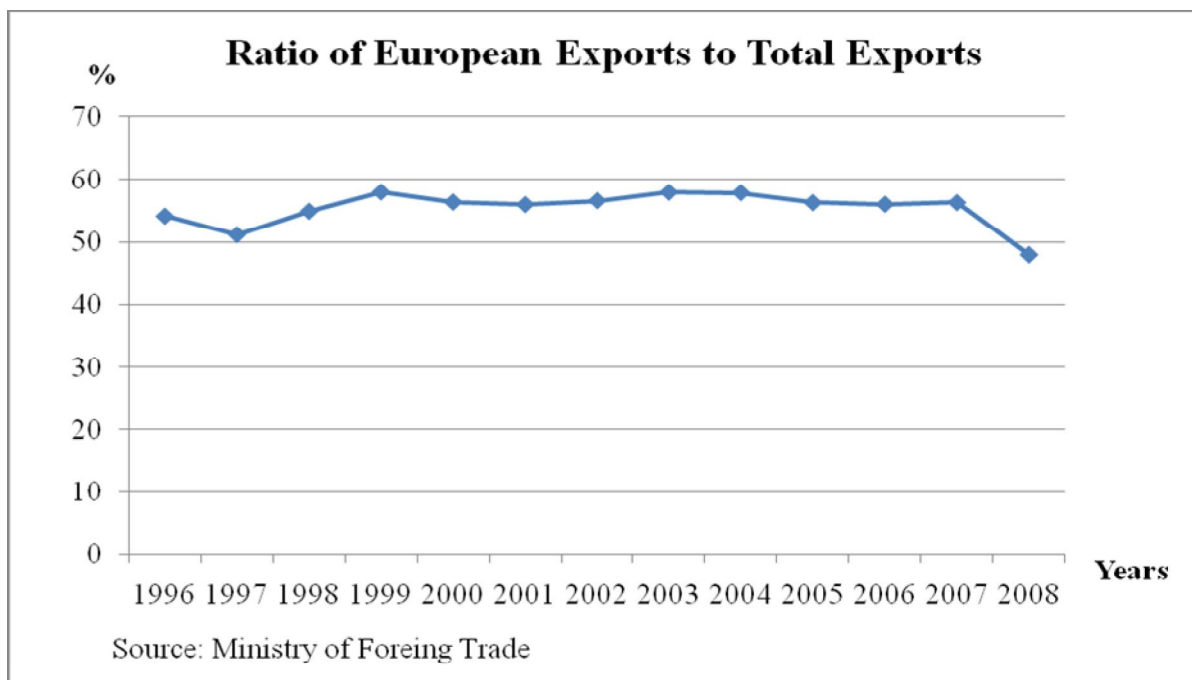
Current Account - Capital and Financial Account

¹⁰ For further discussion see Parikh and Stirbu (2004), and Guncavdi and Ulengin (2008)

higher than the exports that some of the imported oil is used in the domestic market. In aggregate, a decrease in the current account balance is expected due to higher oil prices.

We expect that increase in the real output of the Europe has possibility of the negative effect of the real output growth in the current and financial account. Since Europe is geographically close to Turkey, it becomes the major trading partner. An increase in the output of Europe leads to higher exports of Turkey due to higher investment and consumption demands, which will increase the current account balance. Figure 4 shows that the ratio of European exports to total exports varies between 50% and 60% of total exports. However, financial outflows will occur to Europe for investment opportunities that lead to deterioration of the financial account.

Figure 4



5. DATA DESCRIPTION AND SOURCES

VARIABLE	SYMBOL	DESCRIPTION	SOURCE
Real Effective Exchange Rate	Reer	Real effective exchange rate index, base year 2000=100	OECD
Price	Def	GDP Deflator	OECD
Oil Price	Oil	Oil price per barrel in US dollars	OECD
Real GDP	Yt	Turkey real GDP in US dollars, base year 2000	WDI
US Real GDP	Yus	United States real GDP in US dollars, base year 2000	WDI
Euro Real GDP	Yeu	Europe real GDP in US dollars, base year 2000	WDI
Government Spending	G	General government final consumption expenditure (current US dollars)	WDI
Money Supply	MS	Current US dollars	WDI
Current Account Balance	CA	Change in the Current Account (%)	IFS
Financial Account Balance	FA	Change in the Financial Account (%)	IFS
Exports	X	Volume of Exports of Goods and Services (in Millions of US dollars)	IFS
Imports	IM	Volume of Imports of Goods and Services (in Millions of US dollars)	IFS
Interest Rate	I	Short-term interest rates	TCMB
Inflows	Inf	Change in the Financial Inflows (%)	TCMB
Outflows	Out	Change in the Financial Outflows (%)	TCMB

OECD: Organization for Economic Co-Operation and Development

WDI: World Development Indicators (World Bank)

IFS: International Financial Statistics

TCMB: Central Bank of Republic of Turkey

- Financial inflows involve foreign direct investment in the country and portfolio investment liabilities. Financial outflows cover direct investment abroad and portfolio investment assets.

Figure 5. Balance of Payments Components

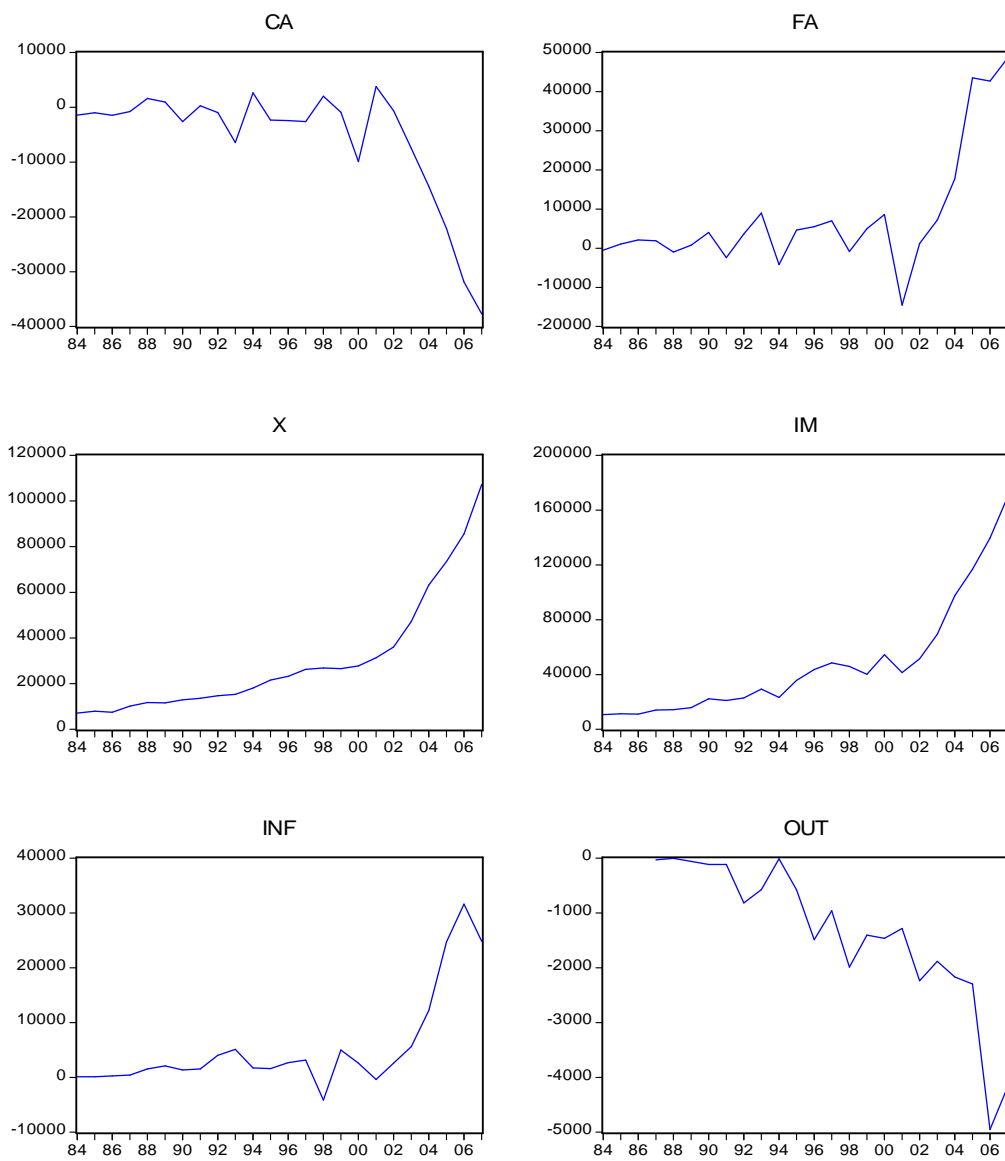
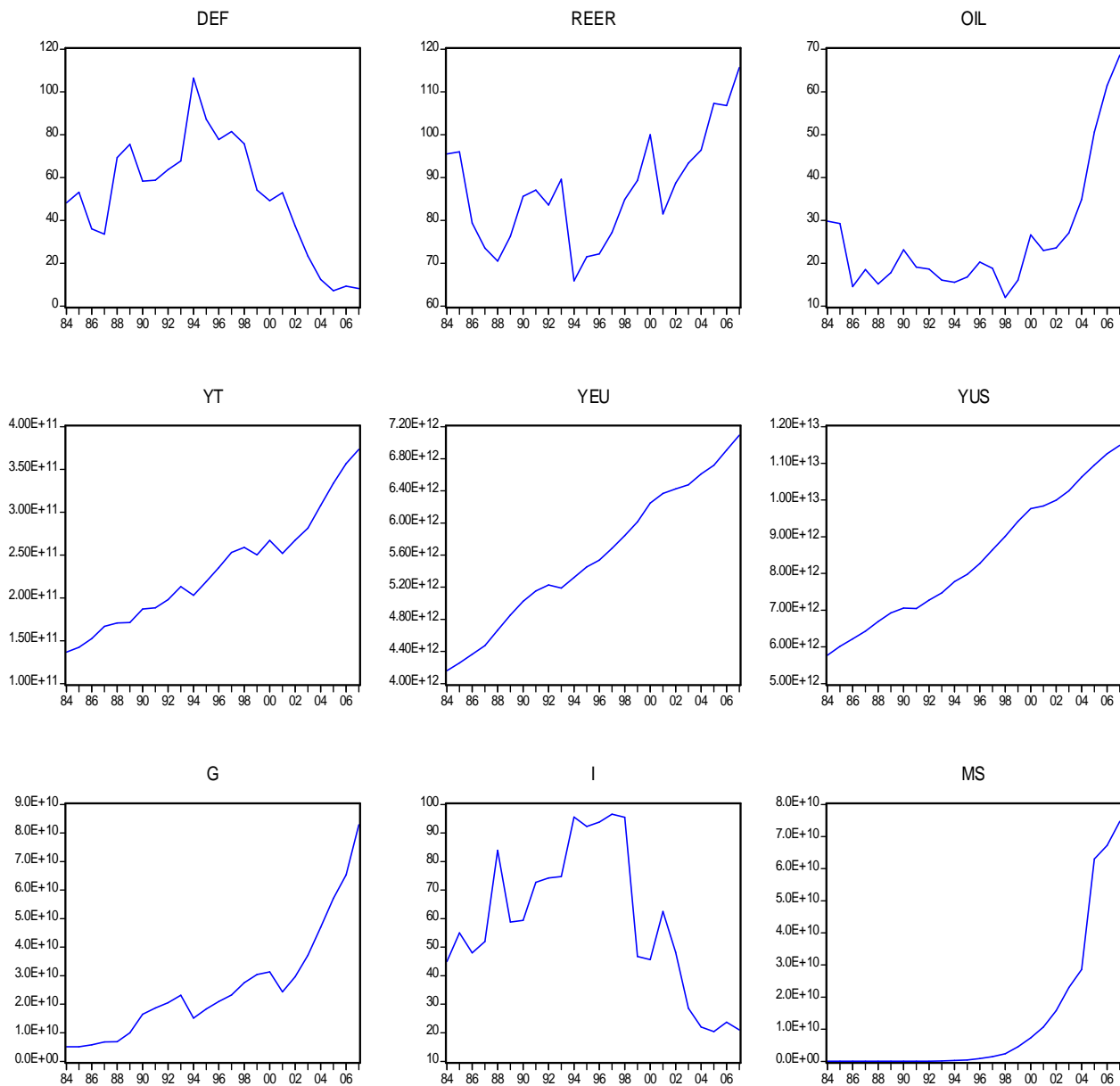


Figure 6. Explanatory and Instrumental Variables



6. NON-STATIONARITY AND COINTEGRATION ANALYSIS

In this analysis a group of explanatory variables, dependent variables and instrumental variables are used. The explanatory variables consist of real GDP, the GDP deflator, the real effective exchange rate, oil prices, real GDP of Europe, real GDP of USA. The dependent variables consist of the current account balance, the financial account balance, exports, imports, financial inflows and financial outflows. Instrumental variables include government spending, interest rates and money supply.

6.1 Non-Stationarity Tests

All variables are tested for stationarity. The Dickey-Fuller Test (1979) is applied where the null hypothesis indicates that the series contains a unit root, while the alternative hypothesis says the series is stationary.¹¹ The Dickey Fuller tests are done on the basis of three forms:

1. Without constant and trend: $\Delta Y_t = \theta Y_{t-1} + u_t$
2. With constant, no trend: $\Delta Y_t = \alpha_0 + \theta Y_{t-1} + u_t$
3. With constant and trend: $\Delta Y_t = \alpha_0 + \alpha_1 t + \theta Y_{t-1} + u_t$

The tests are done with two models, intercept-no trend and intercept-trend. Results show that, except for the change in the financial account balance all the variables are found to be non-stationary.¹² The change in the current account, log values of the real GDP, the GDP deflator, the real effective exchange rate, imports, exports, government spending, financial inflows, financial outflows, oil price, real output of USA, interest rates, and money supply are found to be integrated order 1, I(1). In addition, log value of the real output of Europe is found integrated order 2, I(2).¹³

¹¹ If the Dickey-Fuller statistic is smaller than the critical value, the null hypothesis of unit root is rejected that the series have stationary process.

¹² Since Current Account \approx -Financial Account, it is expected that the financial account should be nonstationary. However, because in the data source reserve assets are not included into the financial account and shown as another component of the balance of payments, therefore current account balance is not equal to negative of the financial account balance. Moreover, high value of the net errors and omissions due to informal economy is another factor which makes financial account stationary.

¹³ See Table 2 in Appendix.

6.2 Cointegration Relation between the Current and Financial Accounts

Having done the stationarity tests, we look for cointegration among the non-stationary components of the balance of payments. Cointegration tests assess the long-run relationship between series of variables. If the linear combinations of the nonstationary variables are stationary, then these variables are said to be cointegrated (Banerjee, Dolado, Galbraith and Hendry, 1993). A multivariate test approach, Johansen Cointegration Test (1988) is used to test for cointegration. To implement this test all the variables have to be integrated order 1, $I(1)$. Given the Johansen test results, the null hypothesis implies that there are no cointegrating equations. Johansen approach has two different tests, the Trace test and the Maximum-Eigenvalue test. The null hypothesis of the trace test indicates that the number of the cointegrating vectors is less or equal to r , where the alternative asserts there are more than r cointegrating vectors. The null hypothesis of the Maximum-Eigenvalue test indicates that there are r cointegrating relations, while the alternative says $r+1$ cointegrating relations.

The results indicate that there is a stochastic trend between current account and its subcomponents-imports and exports. For the intercept without deterministic trend, Maximum Eigenvalue test indicates 1 cointegrating equation at the 5% significance level. For the rest of the test with linear and quadratic trends both the Trace and Maximum Eigenvalue tests indicate 1 cointegrating equations at the 5% significance level. Cointegration test results among CA, financial inflow and outflow indicates a stochastic trend. In the tests with intercept and restricted linear deterministic trend, and quadratic deterministic trend, the Trace and Max-Eigen test statistics shows long-run relationship between CA and components of FA.¹⁴ Overall, the results indicate that current account not only has long run relationships with its subcomponents but also with the financial account components.¹⁵

6.3 Cointegration among Dependent and Explanatory Variables

In this section we implement a residual based cointegration test, Engle and Granger (1987), to examine the long run relationship between the dependent and explanatory variables. To carry out

¹⁴ Since financial account is stationary, cointegration tests are not estimated among financial account, its subcomponents and current account components.

¹⁵ Johansen cointegration test results are given in Table 3 and Table 4 in the Appendix.

the test, each dependent variable is regressed with the domestic explanatory variables by using the OLS method.¹⁶

$$X_t = b_0 + b_1y_t + b_3Dp_t + b_4reer_t + b_5oil_t + e_t \quad (1)$$

where X represents the current account, exports, imports, financial account, financial inflows and outflows. The residual term from this OLS regression is taken and tested for stationarity by Augmented Dickey-Fuller test. We choose a test without intercept and trend. The time series are said to be cointegrated if the residual term is stationary. Then, there is at least one cointegrating vector which proves the long run relationship between dependent and explanatory variables. It is found from the test that the residual terms from the regression result of the current account, exports, imports, financial inflows and outflows are stationary so that a lagged value of the residual term is included to as an explanatory variable into our empirical model.¹⁷

7. EMPIRICAL METHODOLOGY

The initial aim of the empirical research is to analyze the cyclical fluctuations in the components of the balance of payments in Turkey in periods 1984-2007. Following previous theoretical empirical research of Clausen and Kandil (2005), we estimate a model which is expressed as:

$$DX_t = b_0 + b_1E_{t-1}Dy_t + b_2(Dy_t - E_{t-1}Dy_t) + b_3Dp_t + b_4Dreer_t + b_5Doil_t + b_6Dy_t^{MS} + b_7Dy_t^{FX} + b_8EC_{t-1} + v_t \quad (2)$$

The empirical model is expressed in first-difference form.¹⁸ X is the dependent variable, which denotes the percentage change in the current account balance, the log of exports, the log of imports, percentage change in the financial account balance, percentage change in the financial

¹⁶ All the variables are taken in levels.

¹⁷ Engle-Granger cointegration test results are presented in Table 5 in Appendix

¹⁸ The letter *D* denotes the first difference and small letters indicate the log values of the variables. Since the financial account is stationary, first difference is not taken. However, for the other dependent variables first difference is taken that transforms them stationary.

inflows and percentage change in the financial outflows.¹⁹ Domestic output is divided into two parts as expected and unexpected components, where $E_{t-1}Dy_t$ represents the first difference of the rational expectation of output given information available at time t-1, whereas $(Dy_t - E_{t-1}Dy_t)$ represents the shocks in the real output.²⁰

The domestic variables consist of log of the real output, y_t , log of the price inflation, p_t , log of the real effective exchange rate, $reer_t$, and log of the oil prices, oil_t . To capture global economic circumstances, we include the log of real output of the United States, y_t^{US} , into our model. In addition, the log of real output of Europe, y_t^{EU} , is added as a proxy for growth in major trading partners which includes the member of European Union countries. Given the evidence of cointegration, we include an error correction term, EC_{t-1} , which is the lagged value of the residual in the cointegration regression between nonstationary dependent variable and nonstationary domestic explanatory variables, into the empirical model to explain the fluctuations in the dependent variable.²¹

7.1 Estimation Method

Cyclical fluctuations in current account, exports, imports, financial account, financial inflows and outflow are estimated by Two Stage Least Squares (TSLS) method. TSLS method consist two regressions in the estimation. First, reduced form is estimated by OLS that predicted values are obtained from a regression of the endogenous regressors on the instrumental variables.²² In the second step the original equation is estimated by OLS. A list of instrumental variables are used in the estimation process which includes two lags of the first difference of the short-term interest rate, two lags of the first difference of the log value of real output, GDP deflator, oil price, real effective exchange rate, real output of US, real output of Europe, money supply and government spending. The results are presented in Table 1. The cyclical fluctuations in the

¹⁹ Because current account, financial account, financial inflows and financial outflows take negative values, these series cannot transformed into logs. Therefore, they were estimated as percentage changes.

²⁰ For detail information see Appendix.

²¹ If the series are not cointegrated, we do not need to include error correction term into our empirical model.

²² For detail information see Verbek (2004)

explanatory variables explain the changes in the current account balance, exports, imports and the financial account balance. However, the variability in the financial inflows and outflows is not adequately explained.

7.2 Empirical Results

7.2.1 Determinants of the Current Account Fluctuations

As seen in the Table 1 in Appendix, all of the explanatory variables are affecting the current account balance significantly and 93% of the variability in the current account is explained by the explanatory variables. The current account has negative relationship with the domestic variables. Forecasted real GDP and real output shocks have negative effects on the current account which is consistent with the theory. Price inflation affects the current account balance negatively. In the 1980's and 1990's Turkey has a movement to higher inflation rate which decreases the saving rates in turns to lower current account balance.²³ Therefore, higher inflation rates cause decrease in the current account balance in Turkey. The real effective exchange rate has a negative effect on the current account such that an appreciation in the currency will increase imports and decrease exports which consequently decrease the current account balance. Oil prices have a negative effect on the current account balance. Global economic situations affect current account both negatively and positively. Real GDP in US decreases the current account balance, whereas rise in the real output of Europe increases the current account balance of Turkey.

Our results for the current account balance are also consistent with some researches. Kopurlu (2006) finds that a one dollar increase in the output causes a 0.146 dollars decrease in current account balance on the average and he concludes that increase in the output causes deterioration in the current account that decline in the current account is inevitable in the case of economic growth. Bayoumi and Gagnon (1992) cite that 1 percentage point increase in the inflation rate decreases the current account balance by 1 percent of GDP. Moreover, they assert that current account balances of the countries that have higher capital mobility are strongly affected by the changes in the inflation rate. Akcaci (2006) has estimated the current account balance real

²³ Bayoumi and Gagnon (1992) report that high inflation movements lead to decrease in current account balance.

exchange rate relationship, and a negative relationship is found between the current account and real exchange rate.²⁴ Aytemiz and Sengonul (2008) found that the rise in the import price of oil will deteriorate the current account. However, they cited that oil prices do not have recessionary impact on current account till 2003 due to low variations in the price. On the other hand, Clausen and Kandil (2005) could not find any evidence of the effect of the REER and price inflation on the current account balance.

7.2.2 Determinants of Exports

For exports expected GDP growth, output shocks, real effective exchange rates and oil prices have significant effects and the specified model explains 55% variability in the export growth. Expected GDP growth and output shocks have positive effects on exports. However, the real effective exchange rate affects the exports negatively. Since appreciation of the currency decreases the export competitiveness of the country which is consistent with the theory that decreases the growth of export.²⁵ On the other hand, export growth is negatively affected by the price inflation.

Similarly, Clausen and Kandil (2005) find that export growth in the industrial countries is significantly affected by the output growth, inflation, the REER and oil prices. Moreover, Gylfason (1999) estimates the export ratios to GDP with inflation, population and primary exports and the results shows that exports are adversely correlated with the inflation in all income groups.²⁶

²⁴ The series used in the regression consist the periods between 1991 and 2005.

²⁵ Hooper and Marquez (1993) report that exchange rate changes have significant and vital effects on the external balance movements. They cite that export price of the Japan falls because the price of the raw material decreases due to appreciation of the yen. Since Turkish Lira has appreciated between 2002 and 2006, it becomes relatively expensive to import raw materials and a decrease in the growth of the exports has occurred.

²⁶ Agricultural exports are not included in the estimation.

7.2.3 Determinants of Imports

Import growth is significantly affected by forecasted real output, output shocks and oil prices.²⁷ The remaining explanatory variables do not have significant effect on imports. However, the model specified explains %81 variability in the import growth. Real output growth and output shocks have positive effect on imports. Increase in the oil prices leads to rise in import growth which corresponds to dependency of energy imports. However, since increase in oil price does not have huge effects on imports, this can be interpreted as Turkey has not completed its industrial transition.²⁸

Similarly, Clausen and Kandil (2005) find high degree of Adjusted-R² except Australia. According to their results, domestic growth and price inflation are the most important factors affecting the import growth. However, for United Kingdom they find a negative Adjusted-R² value which indicates the explanatory variables do not explain the import growth in UK.

7.2.4 Determinants of the Financial Account Fluctuations

Oil price, real effective exchange rate, and GDP deflator have significant effects on the financial account balance that increase in these variables leads to rise in financial balance. However, neither domestic output changes nor global conditions have significant effect on the financial account. %91 changes in the financial account are explained by the specified model. Except real output growth and output shocks, the signs of the coefficients indicates that financial account progress adversely with current account which explains that changes in current account are adjusted by the financial account.

On the other hand, Clausen and Kandil could not find any impact of the inflation and the real effective exchange rate on the financial account balance for any country. Overall, the explanatory variables do not explain well the cyclicity of the financial account in their estimation.

²⁷ Oil prices are significant at the %10 significance level.

²⁸ Tonus (2007) claims that joining Customs Union has increased the volume of trade in Turkey, however this increase has not reflected any increase in the ratio of manufacturing industry in GDP that delays the industrialization of the economy.

7.2.5 Determinants of Financial Inflows

For financial inflows only real effective exchange rate and real output of US are significant. The model indicates that %25 of the fluctuations in the financial inflows is explained by the explanatory variables which show that both domestic variables are not adequate to explain the variation in the financial inflows. Our findings are also similar with the Clausen and Kandil (2005) that they only find significant results in Australia and Italy.

7.2.6 Determinants of Financial Outflows

None of the variables are significant for the financial outflows. Moreover, negative value of the Adjusted-R² indicates that cyclical fluctuations in the explanatory variables do not explain the fluctuations in the financial outflows. However, the result is consistent with Clausen and Kandil (2005) that they find the Adjusted-R² 0.07 for Sweden, 0.03 for France and 0.13 for Australia.

8. SUMMARY AND CONCLUSIONS

The aim of this thesis is to investigate the cyclical fluctuations in the current and financial account of the balance of payments and their major components for Turkey in the periods between 1984 and 2007. Domestic and global explanatory variables are used in the estimation. Real GDP growth, the inflation rate, the real effective exchange rate, oil prices, real output growth of USA and real output growth of Europe constitutes the domestic and global macroeconomic factors. I have followed the methodology of Clausen and Kandil (2005) in the estimation procedure.

The relationships between explanatory variables and components of balance of payments are investigated with empirical research. First, stationarity of the variables are tested. Financial account balance is found stationary; however the tests suggest that all the other variables are nonstationary. Second, cointegration between current account, and financial account and their components are tested.²⁹ Cointegration results imply that current account has a long run relationship with its components and financial account components. Third, we estimate

²⁹ Since financial account balance is stationary, it is not included to cointegration test.

cointegration between dependent and domestic explanatory variables. The results indicate that a long run relationship exists between current account, exports, imports, financial inflows and financial outflows and domestic explanatory variables.

After the stationarity and cointegration tests, a reduced form equation is estimated for current account and financial account balance, and their components. These dependent variables are estimated by the domestic and foreign fluctuations. Real output growth is divided into two variables as forecasted real output growth and output growth shocks to estimate its short and long run effects. The results show that current account balance is well explained by the model that real output growth, output shocks, inflation, real effective exchange rate, oil price and real output growth of US affect current account balance negatively, whereas rise in the real output growth of Europe increases the current account balance.

The results report that fluctuations in the export growth is significantly affected by the real output growth, output shocks, inflation and the real effective exchange rate where output growth and shocks cause an increase in exports, and increase in the inflation and the real effective exchange rate is followed by a decrease in exports. Similarly, rise in the real output growth and output shocks leads to increase in the imports, and unlike exports, rise in the price of oil raises the growth of imports.

Financial account balance is significantly affected by the inflation, oil price and real effective exchange rate that increase in these explanatory variables raises the financial account balance. Except the real output growth and output shocks, the signs of the variables indicate that financial account is acting adversely to current account.

The reduced form equation is not sufficient to explain variation in the financial inflows and financial outflows. Real effective exchange rate and real output growth of US are the only significant variables that explains the changes in the financial inflows. However, none of the variables are significant to estimate the fluctuations in the financial outflows.

To sum up, the cyclical fluctuations in the domestic and foreign explanatory variables explain current account balance, its components, and financial account balance well than the financial inflows and outflows that this is consistent with the study of Clausen and Kandil (2005). Real

effective exchange rate and real output growth are the most important factor explaining the balance of payments components over time.

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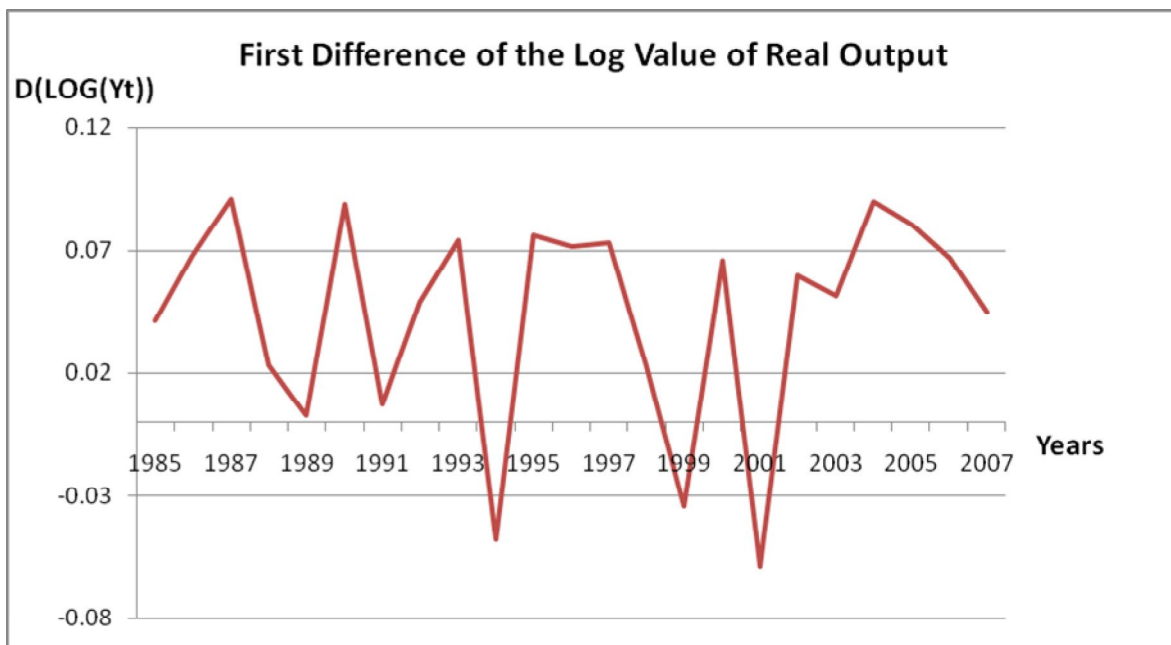
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APPENDIX

Estimation of Anticipated and Unanticipated GDP shocks

To estimate the reduced form equation in (2) with two stages least squares method, which is an instrumental variable estimation technique, we constitute a proxy for the forecasted real GDP growth to eliminate the endogeneity problem. Anticipated changes in real GDP are calculated by regressing the log value of the first difference of the real GDP on a constant, two lags of its own, two lags of first difference of the log value of the GDP deflator, two lags of the first difference of the log value of oil price, two lags of the first difference of the log value of the real effective exchange rate and two lags of the first difference of the log value of the government spending. A reduction in the model is made according to general to specific approach that the least significant variables are omitted. Since the Turkish GDP is fluctuating over the years, the model specified is not explaining the variation in the output adequately. Therefore, low degree of R^2 is obtained from the regression and shocks in the real GDP are calculated by subtracting the forecasted value from the actual value of the real GDP.



Forecasted Growth in Real GDP

Dependent Variable: D(LOG(YT))

Method: Least Squares

Date: 05/13/09 Time: 13:07

Sample (adjusted): 1987 2007

Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.029	0.015	1.891	0.081
D(LOG(YT(-1)))	-0.436	0.233	-1.869	0.084
D(LOG(YT(-2)))	0.377	0.278	1.360	0.197
D(LOG(DEF(-1)))	-0.060	0.029	-2.025	0.064
D(LOG(OIL(-1)))	0.059	0.035	1.693	0.114
D(LOG(EXC(-1)))	-0.373	0.118	-3.147	0.008
D(LOG(G(-1)))	0.197	0.080	2.455	0.029
D(LOG(G(-2)))	-0.108	0.063	-1.717	0.110
R-squared	0.599	Mean dependent var		0.043
Adjusted R-squared	0.383	S.D. dependent var		0.045
S.E. of regression	0.036	Akaike info criterion		-3.544
Sum squared resid	0.017	Schwarz criterion		-3.146
Log likelihood	45.213	F-statistic		2.774
Durbin-Watson stat	1.936	Prob(F-statistic)		0.053

Note: The second lag of the first difference of the GDP deflator, oil price and real effective exchange rate are eliminated since they are the least significant variables in the model. (General to Specific approach)

Table 1

Dependent Variable	Constant	EDY	Dys	Dp	Dreer	Doil	Dy ^{1st}	Dy ^{2nd}	EC	Adj-R ²
Debtal	-0.298	-11.539*	-13.862*	-4.666*	-10.944*	-4.206*	-31.426*	71.764*	-0.0004*	0.938
	-0.609	-3.034	-2.889	-5.686	-5.802	-4.426	-2.375	4.546	-6.5651	
Dexport	0.006	1.942*	2.227*	-0.261*	-0.996*	0.061	-1.604	2.431	-	0.551
	0.115	4.611	4.211	-3.130	-4.778	0.633	-0.990	1.334		
Dimport	-0.078	2.804*	2.747*	-0.110	0.266	0.213**	0.874	0.811	-0.00001**	0.810
	-0.770	3.800	2.910	-0.855	0.785	1.835	0.351	0.355	-1.6845	
Fbdl	1.256	-4.449	-8.536	3.523*	21.210*	6.600*	41.723	-24.893		0.906
	0.953	-0.500	-0.689	2.451	4.545	5.621	1.561	-0.991		
Dinflow	-1.317*	-14.745	4.471	-1.175	-9.759*	1.496	21.863*	23.189	-0.0001	0.254
	-1.848	-1.459	0.696	-0.798	-2.106	0.961	2.122	0.917	-0.8210	
Doutflow	1.004	-38.218	-50.502	-3.334	-41.026	5.720	0.081	37.438	0.0051	-0.077
	0.087	-0.251	-0.391	-0.212	-0.545	0.299	0.000	0.088	0.4202	

- The sign * indicates that the explanatory variable is significant at %5 significance level, whereas ** indicates that the variable is significant at %10 significance level.

Notes:

- The dependent variables are the first difference of the percentage change in the current account balance, the first difference of the log of the exports, the first difference of the log of the imports, the percentage change in the financial account balance, the first difference of the percentage change in the financial inflows and the first difference of the percentage change in the financial outflows.
- EDy is the first difference of the log of the expected value of the real output, where Dys is the first difference of the log of the real output shocks.
- Dp is the first difference of the log value of the GDP deflator.
- Dreer is the first difference of the log value of the real effective exchange rate.
- Doil is the first difference of the log value of the oil prices.
- Dyus is the first difference of the log value of the real output of US (a proxy for global growth).
- Dyeu is the first difference of the log value of the real output of Europe.

Table 2

Unit Root Test Results

Series	Test	T-Value	P-Value	H ₀ = There is Unit Root A=Accept Null, R=Reject Null, at 5%	Series	Test	T-Value	P-Value	H ₀ = There is Unit Root A=Accept Null, R=Reject Null, at 5%	
Current Account	c	-2.199	0.212	A	Money Supply	c	-0.896	0.771	A	
	ct	-3.058	0.139	A		ct	-0.627	0.967	A	
	c,1	-5.251	0.000	R		c,1	-4.102	0.005	R	
	ct,1	-6.259	0.000	R		ct,1	-4.178	0.017	R	
Deflator	c	0.292	0.973	A	Oil Prices	c	0.958	0.994	A	
	ct	-0.851	0.945	A		ct	2.062	1.000	A	
	c,1	-3.656	0.013	R		c,1	-4.401	0.003	R	
	ct,1	-5.494	0.001	R		ct,1	-5.132	0.003	R	
Reer	c	-1.382	0.573	A	Exports	c	1.572	0.999	A	
	ct	-2.455	0.345	A		ct	-0.789	0.951	A	
	c,1	-5.153	0.000	R		c,1	-3.654	0.013	R	
	ct,1	-4.881	0.006	R		ct,1	-4.076	0.021	R	
Financial Account	c	-5.081	0.001	R	Outflows	c	1.271	0.998	A	
	ct	-4.847	0.006	R		ct	-2.855	0.194	A	
Imports	c	0.313	0.974	A		c,1	-6.815	0.000	R	
	ct	-2.388	0.375	A			ct,1	-7.395	0.000	R
	c,1	-6.087	0.000	R						
	ct,1	-6.163	0.000	R						

Table 2 continued

Series	Test	T-Value	P-Value	Ho= There is Unit Root A=Accept Null, R=Reject Null, at 5%	Series	Test	T-Value	P-Value	Ho= There is Unit Root A=Accept Null, R=Reject Null, at 5%
Government Spending	c	-0.414	0.891	A	Inflows	c	-0.267	0.916	A
	ct	-2.876	0.190	A		ct	-1.247	0.876	A
	c,1	-4.082	0.005	R		c,1	-3.920	0.007	R
	ct,1	-3.981	0.025	R		ct,1	-4.034	0.023	R
Interest Rate	c	-1.194	0.659	A	GDP Turkey	c	-0.228	0.922	A
	ct	-1.833	0.656	A		ct	-2.723	0.238	A
	c,1	-5.021	0.001	R		c,1	-5.435	0.000	R
	ct,1	-5.275	0.002	R		ct,1	-5.303	0.002	R
GDP Europe	c	-1.284	0.619	A	GDP USA	c	-0.577	0.858	A
	ct	-4.470	0.011	R		ct	-1.013	0.920	A
	c,1	-2.846	0.068	A		c,1	-4.190	0.004	R
	ct,1	-2.889	0.184	A		ct,1	-5.681	0.001	R
	c,2	-5.141	0.001	R					
	ct,2	-5.011	0.003	R					

c: constant

ct: constant, linear trend

Table 3

COINTEGRATION TEST RESULTS

Johansen Cointegration Test among Current Account, Export and Import

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None		Linear		Linear		Quadratic	
	No Intercept	Intercept	No Intercept	Intercept	No Intercept	Intercept	No Intercept	Intercept
Test Type	No Trend	No Trend	No Trend	No Trend	Trend	Trend	Trend	Trend
Trace	0	0	1	1	1	1	1	1
Max-Eig	0	1	1	1	1	1	1	1

*Critical values based on Mackinnon-Haug-Michelis (1999)

Test Type: Intercept (No Deterministic Trend)

Unrestricted Cointegration Rank Test (Trace)			
Hypothesized	Trace	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None	0.653547	33.1658	35.19275
At most 1	0.249802	9.845598	20.26184
At most 2	0.14795	3.522409	9.164546

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Test Type: Intercept (Linear Deterministic Trend)

Unrestricted Cointegration Rank Test (Trace)			
Hypothesized	Trace	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None	0.652347	31.32368	29.79707
At most 1	0.241708	8.0796	15.49471
At most 2	0.086588	1.992498	3.841466

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None	0.653547	23.3202	22.29962
At most 1	0.249802	6.32319	15.8921
At most 2	0.14795	3.522409	9.164546

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None	0.652347	23.24408	21.13162
At most 1	0.241708	6.087102	14.2646
At most 2	0.086588	1.992498	3.841466

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Table 3 continued

Test Type: Intercept (Linear Deterministic Trend Restricted)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.723769	46.52507	42.91525	0.0209
At most 1	0.473605	18.2217	25.87211	0.3292
At most 2	0.170188	4.104224	12.51798	0.727

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Test Type: Intercept (Quadratic Deterministic Trend)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.716309	41.86241	35.0109	0.008
At most 1	0.413309	14.14523	18.39771	0.1779
At most 2	0.103904	2.413565	3.841466	0.1203

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob. **
None *	0.723769	28.30336	25.82321	0.0231
At most 1	0.473605	14.11748	19.38704	0.2464
At most 2	0.170188	4.104224	12.51798	0.727

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob. **
None *	0.716309	27.71717	24.25202	0.0167
At most 1	0.413309	11.73167	17.14769	0.2579
At most 2	0.103904	2.413565	3.841466	0.1203

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Table 4

Cointegration Test among Current Account, Financial Inflow and Financial Outflow

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	0	0	0	1	1
Max-Eig	0	0	0	1	1

*Critical values based on Mackinnon-Haug-Michelis (1999)

Test Type: Intercept (Linear Deterministic Trend Restricted)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05	Prob. **
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.727304	45.23541	42.91525
At most 1	0.394727	16.64864	25.87211
At most 2	0.224836	5.602962	12.51798

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Test Type: Intercept (Quadratic Deterministic Trend)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05	Prob. **
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.720276	41.47092	35.0109
At most 1	0.377229	13.44396	18.39771
At most 2	0.128477	3.025297	3.841466

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05	Prob. **
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.727304	28.58677	25.82321
At most 1	0.394727	11.04568	19.38704
At most 2	0.224836	5.602962	12.51798

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05	Prob. **
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.720276	28.02696	24.25202
At most 1	0.377229	10.41866	17.14769
At most 2	0.128477	3.025297	3.841466

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Table 5
Cointegration among Dependent and Explanatory Variables
Engle-Granger Test Results

	t-stat	p-value	H₀: There is no cointegration	H₁: There is at least one cointegration	
Current Account	-4.134478	0.0002	R		
Exports	-5.686528	0.0000	R		A: Accept the null hypothesis
Imports	-3.889074	0.0005	R		R: Reject the null hypothesis
Financial Inflows	-3.693387	0.0008	R		
Financial Outflows	-6.176657	0.0000	R		

Current Account		Financial Inflows
Null Hypothesis: Current Account residual has a unit root		Null Hypothesis: Inflows residual has a unit root
Exogenous: None		Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)		Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

	t-Statistic	Prob.*		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.134478	0.0002	Augmented Dickey-Fuller test statistic	-3.69339	0.0008
Test critical values: 1% level	-2.669359		Test critical values: 1% level	-2.66936	
5% level	-1.956406		5% level	-1.95641	
10% level	-1.608495		10% level	-1.6085	

*MacKinnon (1996) one-sided p-values.

Export		Financial Outflows
Null Hypothesis: Exports residual has a unit root		Null Hypothesis: Outflows residual has a unit root
Exogenous: None		Exogenous: None
Lag Length: 1 (Automatic based on SIC, MAXLAG=5)		Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

	t-Statistic	Prob.*		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.686528	0.0000	Augmented Dickey-Fuller test statistic	-6.17666	0.000
Test critical values: 1% level	-2.67429		Test critical values: 1% level	-2.66936	
5% level	-1.957204		5% level	-1.95641	
10% level	-1.608175		10% level	-1.6085	

*MacKinnon (1996) one-sided p-values.

Import		
Null Hypothesis: Imports residual has a unit root		
Exogenous: None		
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)		

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.889074	0.0005
Test critical values: 1% level	-2.669359	
5% level	-1.956406	
10% level	-1.608495	

*MacKinnon (1996) one-sided p-values.