Fazil Kayikçi

SOLVENCY OF CURRENT ACCOUNT DEFICITS IN TURKEY

Long-run relationship between the export and the import ratios to the GDP for Turkey with quarterly data between 1992 and 2009 is searched by different cointegration tests. There are detected structural breaks in the second quarter of 1998 for the imports and in the first quarter of 2001 for the exports. Even though exports and imports have a long-run relationship and move together with structural breaks, the exports seem to compensate 69% of the imports until the break in the third quarter of 2000 whereas it only compensates 54.4% after 2000. This means that the path of unsustainable foreign trade became more dangerous after 2000.

Keywords: *current account; balance of payments; solvency; cointegration.*

Jel Codes: C12, C22, F32.

Фазіль Каїкчі

ДЕРЖАВНА СПРОМОЖНІСТЬ ТА ДЕФІЦИТ ПОТОЧНОГО РАХУНКУ: НА ПРИКЛАДІ ТУРЕЧЧИНИ

У статті за допомогою різних тестів на коінтеграцію досліджено співвідношення експорту та імпорту Туреччини для часового відрізку з 1992 по 2009 роки. Структурні розриви виявлено: для імпорту – у другому кварталі 1998 р., для експорту – у першому кварталі 2001 р., продемонстровано, що експорт покриває 69% імпорту до розриву у третьому кварталі 2000 р., а після нього – лише 54,4%. Це значить, що після 2000 р. Туреччина стала наближатися до торгового дисбалансу.

Ключові слова: *поточний рахунок; баланс рахунків; платоспроможність; коінтеграція.*

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Фазиль Кайикчи

ГОСУДАРСТВЕННАЯ СОСТОЯТЕЛЬНОСТЬ И ДЕФИЦИТ ТЕКУЩЕГО СЧЕТА: НА ПРИМЕРЕ ТУРЦИИ

В статье при помощи разных тестов на коинтеграцию исследовано соотношение экспорта и импорта Турции для временного периода с 1992 по 2009 год. Структурные разрывы выявлены: для импорта – во втором квартале 1998 г., для экспорта – в первом квартале 2001 года. Показано, что экспорт покрывает 69% импорта до разрыва в третьем квартале 2000 г., а после него – только 54,4%. Это значит, что после 2000 г. Турция стала приближаться к торговому дисбалансу.

Ключевые слова: *текущий счет; баланс счетов; платежеспособность; коинтеграция.*

1. Introduction. Several developing countries have experienced substantial and persistent current account deficits in the recent years; this has raised the issue of sustainability and increased the volume of studies on the measures of sustainable current account deficits. Researches are concentrated on the issue whether deficits result in a balance of payments crisis or not.

A country will be able to sustain its current account deficit as long as it can find external borrowings. Although this can be feasible in the short run, the ability of a country to service its debt by referring to further borrowing is likely to be questioned

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once the deficit becomes persistent. As Hakkio (1995) states, temporary current account deficits present fewer problems as imbalances represent natural outcome of reallocating capital to a country that the factor of production tends to receive the highest possible returns. However, large and persistent current account deficits tend to cause more serious problems for a country and may require a policy response. "They are causes for both domestic and international concern because of undesirable consequences of a forced adjustment in the economic policies if such deficits are expected to continue." (Baharumshah, Lau and Fountas, 2003, p.466). As Wu (2000) claims, sustaining an increasing current account deficit implies measures such as increasing domestic interest rates relative to foreign to attract more foreign capital for financing the deficit. This imposes an excessive burden on future generations as the accumulation of larger debt will imply increasing interest payments and thus lower standards of living. Hence, instead of emphasizing the current account deficits of a country at any particular point of time, the economists are more concerned with its sustainability.

In this respect, some sustainability criteria are developed and used as indicators of crises. Current account deficit as a ratio to GDP is a simple and commonly used method, which provides an opinion on the sustainability of current account deficits. However, an evaluation based on this ratio may not always provide sufficient information on the sustainability of current account deficits of a country since it ignores specific characteristics of different economies. Different current account deficit to GDP ratios can be accepted as sustainable for different countries according to the financial and macroeconomic fundamentals of those countries. Thus, more comprehensive concepts have been proposed in the recent economic literature to evaluate whether the persistent current account deficits impose serious problems. These concepts are: solvency of foreign debt, excessiveness of the current account deficit and its sustainability.

In the next section, literature on sustainability of current account deficits is presented briefly. The third section consists of the data description and methodology, which is constructed from the solvency concept. The fourth section includes the empirical results. In the last section, evaluation of the sustainability of current account position of Turkey will be presented according to the empirical results.

2. Brief Literature Review. The pattern of current account imbalances has received considerable attention in the economic literature. However, growth of current account deficits and financial crisis in the last decades makes policymakers and economists pay more attention and work more frequently on the issue. One part of the literature considers the intertemporal approach to the current account according to which forward-looking dynamic saving and investment decisions determine the current account deficits such as Obstfeld and Rogoff (1994), Ghosh and Ostry (1995), Matsubayashi (2005), Campa and Gavilan (2006), Ogus and Sohrabji (2006). A related literature investigates the Feldstein-Horioka puzzle of persistent saving and investment correlation such as Kollias, Mylonidis and Paleologou (2006). The intertemporal approach has been used to evaluate the impact on the current account of fiscal policy in Leiderman and Razin (1991), the real exchange rate in Dornbusch and Fischer (1980), terms of trade fluctuations in Mansoorian (1998), capital controls in Mendoza (1991), and global productivity shocks in Glick and Rogoff (1995).

Sustainability of current account deficit is one of the popular subjects among the researchers since most of the countries persistently had deficits for the last years. Thus, different methodologies and related empirical works have emerged to determine the sustainability of current account deficits. The common feature in the existing literature is searching for stationary current accounts using unit root tests such as Wu (2000) for Organization of Economic Cooperation Countries (OECD). Another approach is to examine the cointegration between exports and imports such as Husted (1992), Leachman and Francis (2000) and Wu, Chenn and Lee (2001) for G7. There are also some studies that apply both methodologies such as Baharumshah et al. (2003) and Ongan (2008). Some researchers apply these methodologies by using intertemporal solvency approach such as Kalyoncu (2007), Matsubayashi (2005), Campa and Gavilan (2006), or by using Markov switching process such as Raybaudi, Sola and Spagnolo (2004). Some researchers try to find indicators of sustainability without implying empirical work such as Milesi-Ferretti and Razin (1996), Ogus and Sohrabji (2008). Unsustainability of current account deficits which results in policy and regime shift or balance of payment crisis are also popular subjects in the literature as in Krugman (1979), Milesi-Ferretti and Razin (1998).

3. Data and Methodology

3.1. Data. Data are obtained from the Central Bank of the Republic of Turkey and Turkish Statistical Institute. Turkish Lira values for all the variables are used. Variables in which the values are obtained as US Dollar are transformed to Turkish Lira by using the monthly averages of the exchange rate of the Central Bank of the Republic of Turkey (these which are Exports and Imports). The frequency of the data is quarterly, between 1992:1 and 2009:4. Since the Gross Domestic Product is obtained only for each quarter in the period, other high frequency variables are transformed to the quarterly data. EXP represents the ratio of exports to GDP, IMP stands for the ratio of imports to GDP where imports are the sum of import, net interest payments and net transfer payments. There are some summary statistics on the variables in Table 1.

Table 1. **Descriptive Statistics for the Variables**

	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obs.
EXP	0.191	0.195	0.328	0.063	0.063	-0.061	2.185	2.035	72
IMP	0.261	0.260	0.444	0.116	0.080	0.088	2.073	2.666	72
EXPORT	13067	8590	38990	3303	9406	1.099	3.145	14.35	72
IMPORT	-17969	-11652	-4637	-55171	12912	-1.211	3.484	18.06	72
INTEREST	-919	-890	-476	-1989	324	-0.906	3.658	11.01	72
TRANSFER	780	781	1641	197	368	0.234	2.056	3.281	72

3.2. Methodology. Husted (1992) develops the theoretical framework to test for sustainability of current account based on the long-run relationship between exports and imports by adopting Hakkio and Rush's (1991) procedure for fiscal sustainability.

The model starts with a representative consumer who lives in a small open economy that produces and exports a single composite good and has no government. The agent is able to borrow and lend at international markets using one period financial instruments, faces a given world rate of interest, and is assumed to maximize lifetime utility subject to budget constraints. The agent's resources are composed of endowments

of output and redistributed profits from the firms. These resources are used for consumption and savings. The budget constraint of this individual in any period is given by:

$$C_t = Y_t + B_t - I_t - (1+r_t)B_{t-1} \tag{1}$$

where C_t is current consumption; Y_t is output; I_t is investment; r_t is the world interest rate; B_t is international borrowing, which could be positive or negative; and $(1+r)B_{t-1}$ is the initial debt of a representative household, corresponding to the country's external debt. Since equation must hold for every time period, by defining the trade balance as the difference between the exports and the imports:

$$TB_t = Y_t + C_t - I_t = X_t - M_t \tag{2}$$

All periods budget constraints can be added up to form the economy's intertemporal budget constraint:

$$B_{t+1} = -TB_{t+1} + (1+r_{t+1})B_t \tag{3}$$

$$B_{t+2} = -TB_{t+2} + (1+r_{t+2})B_{t+1} = -TB_{t+2} - (1+r_{t+2})TB_{t+1} + TB_{t+1} + (1+r_{t+2})(1+r_{t+1})B_t \tag{4}$$

$$B_{t+n} = -TB_{t+n} - (1+r_{t+n})TB_{t+n-1} - \ldots. - (1+r_{t+n})(1+r_{t+n-1})\ldots.(1+r_{t+2})TB_{t+1} + \\ + (1+r_{t+n})(1+r_{t+n-1})\ldots.(1+r_{t+1})B_t \tag{5}$$

Rearranging the last equation for B_t, we obtain the intertemporal budget constraint of the representative agent for n approaches to infinity. Such as:

$$B_t = \sum_{i=1}^{\infty} \mu_i TB_{t+i} + \lim_{n\to\infty} \mu_n B_{t+n} \tag{6}$$

where μ is the discount factor which is:

$$\mu_i = \prod_{s=1}^{i} \beta_s \quad \text{and} \quad \beta_s = \frac{1}{1+r_{t+s}}.$$

Equation (6) states that net international borrowing of the economy in period t is equal to the present value of all its future trade balances providing that the second term on the right hand side is zero. Assuming the world interest rate is stationary with unconditional mean r, equation (2) can be expressed as:

$$X_t - V_t = Y_t - C_t - I_t = -B_t + (1+r_t)B_{t-1} \tag{7}$$

$$M_t + (1+r_t)B_{t-1} = X_t + B_t \tag{8}$$

$$M_t + (r_t - r)B_{t-1} + (1+r)B_{t-1} = X_t + B_t \tag{9}$$

Rearranging this equation for B_t and defining the

$$Z_t = M_t + (r_t - r)B_{t-1} \tag{10}$$

it can be obtained that:

$$B_t = Z_t - X_t + (1+r)B_{t-1} \tag{11}$$

$$B_{t+1} = Z_{t+1} - X_{t+1} + (1+r)B_t = Z_{t+1} - X_{t+1} + (1+r)\left[Z_t - X_t + (1+r)B_{t-1}\right] \tag{12}$$

$$B_{t+n} = \sum_{j=0}^{n} (1+r)^{n-j}(Z_{t+j} - X_{t+j}) + (1+r)^{n+1} B_{t-1} \tag{13}$$

when n approaches to infinity, we can obtain B_{t-1} as:

$$B_{t-1} = \sum_{j=0}^{\infty}\left(\frac{1}{1+r}\right)^{j+1}(X_{t+j} - Z_{t+j}) + \lim_{n\to\infty}\left(\frac{1}{1+r}\right)^{n+1} B_{t+n} \tag{14}$$

then, defining $\mu = \frac{1}{1+r}$;

$$B_{t-1} = \sum_{j=0}^{\infty}\mu^{j+1}(X_{t+j} - Z_{t+j}) + \lim_{n\to\infty}\mu^{n+1}B_{t+n} = \mu(X_t - Z_t) + \mu\sum_{j=1}^{\infty}\mu^{j}(\Delta X_{t+j} - \Delta Z_{t+j}) + \tag{15}$$

$$+\mu\sum_{j=1}^{\infty}\mu^{j+1}(X_{t+j} - Z_{t+j}) + \ldots\ldots + \lim_{n\to\infty}\mu^{n+1}B_{t+n} = \mu(X_t - Z_t) + \mu\sum_{j=1}^{\infty}\mu^{j}(\Delta X_{t+j} - \Delta Z_{t+j}) +$$

$$+\mu B_{t-1} + (1-\mu)\lim_{n\to\infty}\mu^{n+1}B_{t+n}$$

adding B_t terms in the left hand side we can obtain:

$$\frac{1-\mu}{\mu}B_{t-1} = X_t - Z_t + \sum_{j=1}^{\infty}(\mu)^{j}(\Delta X_{t+j} - \Delta Z_{t+j}) + \frac{1-\mu}{\mu}\lim_{n\to\infty}(\mu)^{n+1}B_{t+n} \tag{16}$$

which equals to:

$$Z_t + r_t B_{t-1} = X_t + \sum_{j=1}^{\infty}(\mu)^{j}(\Delta X_{t+j} - \Delta Z_{t+j}) + r\lim_{n\to\infty}(\mu)^{n+1}B_{t+n} \tag{17}$$

Subtracting X_t from both sides of the equation and multiplying by (-1), left hand side of the equation becomes the current account of an economy. Furthermore, by assuming the limit term that appears in equation is zero, X_t and Z_t follow random walk with drift and adding the residual term, the following regression model can be obtained:

$$X_t = \alpha + \beta MM_t + \varepsilon_t \tag{18}$$

where $MM_t = M_t + r_t B_{t-1}$ (19)

measures imports of goods and services plus net interest payments plus net unilateral transfers. The necessary condition (weak form) for an economy to satisfy its intertemporal budget constraint is the existence of a stationary error structure, that is, ε_t in equation should be an *I(0)* process. On the other hand, a failure to detect co-movements between exports (inflows) and imports (outflows) would indicate an economy fails to satisfy its budget constraint, and therefore, is expected to default due to its debt (Hakkio and Rush, 1991). Such a finding provides evidence against the sustainability of the current account balance. Then, this criterion can be used to search for sustainability of the current account deficit.

The necessary and sufficient condition (strong form) for the intertemporal budget constraint model is the existence of a vector (α, β) such that ε_t is a stationary process and (α, β) = (0,1). In other words, if exports and imports are cointegrated with cointegrating vector b = (1,-1), then the economy is said to satisfy its strong form of the intertemporal budget constraint in the long run. Such a relationship would imply that two series would never drift too far apart. The equation above provides a useful framework for testing sustainability of the current account deficits.

4. Empirical Results. In the empirical work first variables have been checked for stationarity by using Augmented Dickey-Fuller, Phillips-Perron, Dickey-Fuller

Generalized Least Square and Kwiatkowski-Phillips-Schmidt-Shin unit root tests. According to the test results both EXP and IMP are found trend-stationary. They could become stationary after making them detrended with HP filter. The test results are summarized in Table 2.

Table 2. **Unit Root Test Statistics for Variables**

	ADF		PP		DF GLS		KPSS	
	Trend and Intercept	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept
EXP	-4.39***	-1.30	-4.83***	-1.63	-4.35***	-0.13	0.05	1.03000
IMP	-3.76**	-1.29	-5.32***	-1.71	-3.80***	-0.11	0.08	1.06000
	None	Intercept	None	Intercept	-	Intercept	None	Intercept
DT(EXP)	-4.02***	-4.02***	-5.24***	-5.20***	-	-3.16***	0.05	0.05
DT(IMP)	-4.70***	-4.76***	-5.83***	-5.78***	-	-4.75***	0.06	0.06

* – ** and *** denote rejection of the null hypothesis of unit root at 10% , 5% and 1% levels respectively.
0 – 00 and 000 denotes the rejection of the null hypothesis of stationary at 10% , 5% and 1% levels respectively. DT denotes detrended.

Then, optimal lag length is decided according to the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwartz Information Criterion (SC), Hannan-Quinn Information Criterion (HQ). All criteria except SC select 5 as an optimal lag. In Table 3 lag length selection criteria and their calculated values are presented:

Table 3. **VAR Lag Length Selection Criteria**

Lag	LR	FPE	AIC	SC	HQ
0	NA	3.76e-07	-9.119	-9.051	-9.092
1	24.10	2.87e-07	-9.389	-9.186*	-9.309
2	11.36	2.68e-07	-9.456	-9.119	-9.324
3	15.95	2.30e-07	-9.611	-9.139	-9.425
4	10.68	2.15e-07	-9.680	-9.073	-9.441
5	12.18*	1.94e-07*	-9.785*	-9.043	-9.493*
6	1.326	2.15e-07	-9.686	-8.809	-9.341
7	6.648	2.14e-07	-9.697	-8.685	-9.298
8	3.424	2.28e-07	-9.645	-8.498	-9.193

* indicates lag order selected by that criterion

Then, cointegration relation between exports and imports was searched by the cointegration test with 5 lag of each variables (Tables 4 and 5).

Table 4. **Johansen Cointegration Test**

No. of CE vectors	Eigen value	Trace Statistic	0.05 Critical Value	Probability
None	0.1406	10.446	15.394	0.247
At most 1	0.0067	0.4460	3.8414	0.504
No. of CE vectors	Eigen value	Max Eigen Statistic	0.05 Critical Value	Probability
None	0.1406	10.0003	14.264	0.211
At most 1	0.0067	0.4460	3.8414	0.504

Estimated equation for ( ) by Dynamic OLS is:

$$EXP_t = 0{,}001 + 0{,}729 IMP_t \qquad (20)$$
$$(0{,}009) \quad (0{,}034)$$

Table 5. **Engle and Granger Cointegration Test**

	ADF		PP		DF GLS
	None	Intercept	None	Intercept	Intercept
RESIDUALS	-4.17***	-4.14***	-4.25***	-4.22***	-4.03***

*, ** and *** denote rejection of the null hypothesis of the unit root at 10%, 5% and 1% levels respectively. Residuals obtained from Cointegration Equation (20).

Wald Test result for the hypothesis of $\alpha = 0$ and $\beta = 1$ is $F = 350.66$ and $prob. = 0$.

Conventional unit root tests presented above do not consider the structural breaks. However, there are strong arguments and discussions in the literature that there may be a change in the mean and/or trend of the series that affects the order of integration in the presence of structural changes. Perron (1989) argues that conventional unit root tests are biased towards accepting the null hypothesis in the presence of structural breaks which means accepting that series have a unit root although they are stationary. As this work contains the years between 1992 and 2009 which are known as the period of crises and fundamental structural changes, unit root and cointegration tests that take structural breaks into consideration should be used. For this reason, Zivot-Andrews (1992) unit root test with Gregory-Hansen (1996) cointegration tests are performed to determine the stationarity of the series and cointegration relationship between them respectively.

Time of structural break is endogenously determined in Zivot-Andrews' unit root test. It has 3 different versions: break in the mean, break in the slope, break both in the mean and the slope. As a general to specific model selection; first the model that has break in the mean and the slope is estimated and checked the significance of the mean and slope dummies. If both of them are significant, this model is used. If only one of them is significant, then the model which uses that significant dummy is selected. If none of them is significant, then it is decided that there is no structural break in the series. In the empirical work for the EXP and IMP series, both the mean and the slope dummies are found to be significant and it is decided to use the general model below:

$$\Delta y_t = \alpha_1 + \alpha_2 DU_t(\lambda) + \beta_1 t + \beta_2 DT_t(\lambda) + \theta y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta y_{t-i} + \varepsilon_t \qquad (21)$$

where: $DU_t(\lambda) = \begin{cases} 1 \ if t \rangle Tb \\ 0 \ otherwise \end{cases}$

$$DT_t(\lambda) = \begin{cases} t - Tb \ if t \rangle Tb \\ 0 \ otherwise \end{cases}$$

In above test equation Tb refers to the year that possible structural break occurs and λ refers to the relative break time in the data period. This equation is estimated for all possible break years (excluding few years from the beginning and end of the sample) and the equation in which the θ coefficient has the highest t-statistic was selected as the break year. Since the results of Zivot-Andrews test are very sensitive to the number of lag, in every equation, the number of lag is determined separately according to the Akaike Information Criterion. Then, this t-statistic is used to determine if the series are stationary. The results are presented in Table 6.

Table 6. **Zivot-Andrews Unit Root Test Statistics for Variables**

	α_1	A_2	β_1	β_2	θ	t-stat (θ)	Break time	Lag
EXP	0.093	0.018	0.0009	0.0008	-0.752	-4.718	2001:1	8
IMP	0.139	-0.078	0.007	-0.001	-0.305	-4.418	1998:2	4

Critical values for unit root test are -5,57 (1%), -5,08 (5%) and -4,82 (10%) from Table 4 in Zivot-Andrews (1992).

According to the above results, it is concluded that Export/GDP ratio has a structural break in the first quarter of 2001 and Import/GDP ratio has a structural break in the second quarter of 1998. Since the t-statistics of the θ coefficients are lower than the critical values in absolute manner, the null hypothesis of unit root was accepted for both of them.

After ensuring that series have a unit root, Gregory-Hansen (1996) cointegration test is performed to search for a long term relationship between exports and imports. This test assumes that the parameters in the possible cointegration relation are not stable over time because of the structural breaks. The time of structural break is also endogenously determined in the test. The test was performed by estimating the below equation with OLS:

$$EXT_t = \alpha_1 + \alpha_2 \varnothing_{tb} + \beta_t IMP_t + \beta_2 IMP_t \varnothing_{tb} + \varepsilon_t \qquad (22)$$

where $\varnothing_{tb} = \begin{cases} 1 & if t \rangle tb \\ 0 & otherwise \end{cases}$

In above test equation, *tb* refers to the year when a possible structural break occurs. This equation is estimated for all possible break years and residuals are obtained for all equations. Break time (third quarter of 2000) is determined in which the ADF unit root test statistics for the residuals are the highest. The estimated Gregory-Hansen cointegration equation and unit root test statistics for the residuals are shown below:

$$EXP_t = 0{,}004 + 0{,}061\varnothing_{tb} + 0{,}690_t IMP_t - 0{,}146 IMP_t \varnothing_{tb}$$
$$(0{,}016) \quad (0{,}028) \quad (0{,}082) \quad (0{,}109) \qquad (23)$$

Table 7. **Gregory-Hansen Cointegration Test**

	ADF		PP		DF GLS
	None	Intercept	None	Intercept	None
RESIDUALS	-4.60***	-4.57**	-4.69***	-4.66***	-4.33***

*, ** and *** denote rejection of the null hypothesis of unit root at 10%, 5% and 1% levels respectively. Residuals obtained from Cointegration Equation (53).

Wald Test result for the hypothesis of $\alpha 1 = 0$ and $\beta 1 = 1$ is $F = 120.2$ and $prob. = 0.$

5. Conclusion. Foreign trade is the most important item of the current account. From the point of view that sustainability of the current account reasonably depends on the foreign trade balance, cointegration relation between the export and the import ratios to the GDP for Turkey is searched by different empirical criteria to judge whether the exports and imports in Figure 1 are moving together and do not drift from each other much.

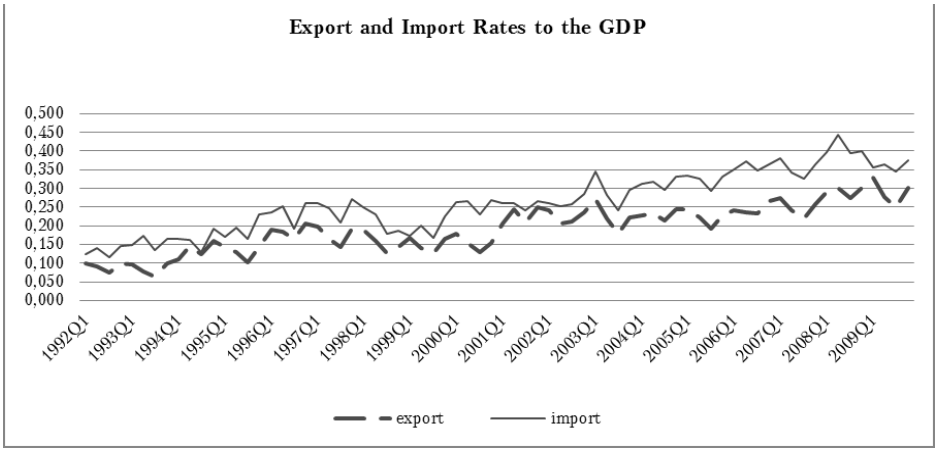

Figure 1. **Export and Import Rates**

When it is assumed that there are no structural breaks in the behavior of the foreign trade items for more than the last 20 years, it can be seen from the above results that the necessary condition (weak form) for the Turkish economy to satisfy its intertemporal budget constraint in foreign trade is satisfied by the existence of a stationary error structure, that is, ε_t in equation 18 (obtained from equation 20) is a stationary process. However, the necessary and sufficient condition (strong form) for the intertemporal budget constraint model is not satisfied since the hypothesis of the vector $(\alpha, \beta) = (0,1)$ for the equation 20 is rejected with a probability of zero. According to these results, it can be argued that the current account deficits of Turkey are only weakly sustainable. Even though exports and imports have a long run relationship and move together (this relationship is approved by only one of two cointegration tests above), exports seem to compensate only 72,9% of the imports which means that the foreign trade deficit of the country becomes larger and larger as time passes.

The period used to analyze the foreign trade of Turkey includes severe economic crisis occurred for trade partners and competitors. Households' and firms' perceptions and reactions to the crisis were shaped variously according to different economic policies implemented by governments. For that reason, it might be beneficial to analyze the subject by assuming that there are structural breaks in the export and import dynamics of the country. Investigation of structural breaks in the variables separately results in two different time points: second quarter of 1998 for imports and first quarter of 2001 for exports. Structural break and increase in the imports can be illustrated by the 1998 Asian-Russian crises and devaluations made by those countries after the crises which made their export cheaper. Also, the appreciated Turkish Lira because of the disinflation program in 1999 has caused the imports increase. Structural break and decrease in the exports can be illustrated by the financial crisis in 2001 besides the progressive competition in the export markets especially Chinese penetration in textiles and the EU regulations of export.

When the sustainability issue is considered, the results are quite similar to the stable case; the necessary condition for the economy to satisfy its intertemporal budget constraint in foreign trade is satisfied by the existence of a stationary error struc-

ture, that is ε_t in equation 22 (obtained from equation 23) is a stationary process. However, the necessary and sufficient condition for the intertemporal budget constraint model is not satisfied since the hypothesis of the vector $(\alpha_1, \beta_1) = (0,1)$ for the equation 22 is strongly rejected with a probability of zero. According to these results, it can be argued that the current account deficits of Turkey are only weakly sustainable. Moreover, the results of this case approve the above interpretations about the time and the reasons of structural breaks. Even though the exports and imports have a long run relationship and move together with structural breaks, exports seem to compensate 69% of the imports until the break in third quarter of 2000 whereas it compensates only 54,4% after 2000. This means that the path of unsustainable foreign trade became more dangerous after the third quarter of 2000.

Appendix:

Table 8. **Diagnostic Checks for the Foreign Trade Equation (20)**

TEST	Statistic	Probability
Breusch-Godfrey Serial Correlation LM Test	18.5	0.000
ARCH Test	2.492	0.119
White Heteroskedasticity Test	0.307	0.706
Jarque-Bera	3.663	0.160
Ramsey RESET Test	1.717	0.194
R-Squared	0.865	
Akaike	-4.646	

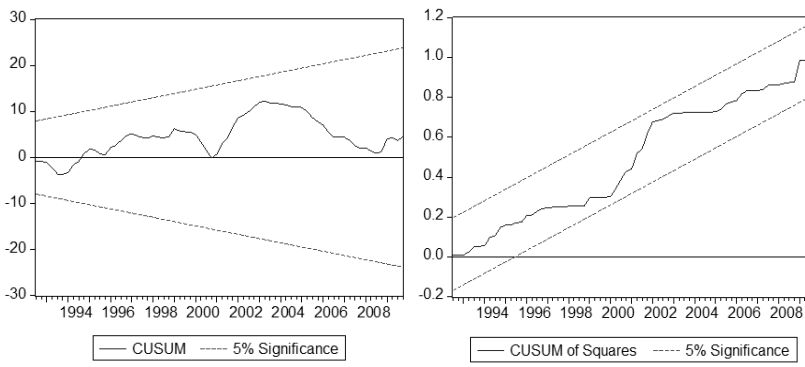

Figure 2. **Parameter Stability in Foreign Trade Equation**

Table 9. **Diagnostic Checks for the Foreign Trade Equation with a Break (23)**

TEST	Statistic	Probability
Breusch-Godfrey Serial Correlation LM Test	6.62	0.000
ARCH Test	0.114	0.976
White Heteroskedasticity Test	0.267	0.929
Jarque-Bera	3.056	0.216
Ramsey RESET Test	0.081	0.776
R-Squared	0.882	
Akaike	-4.726	

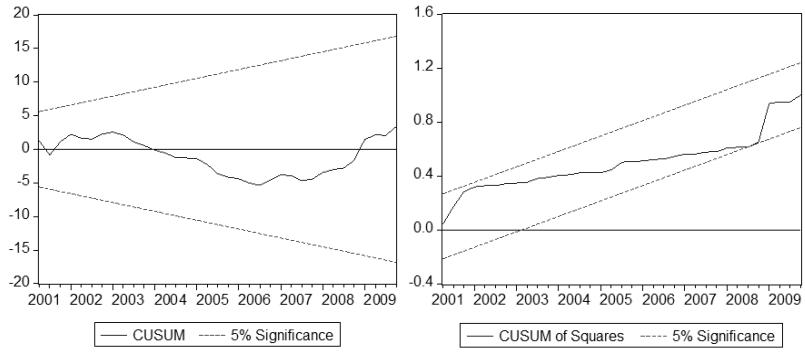

Figure 3. **Parameter Stability in Foreign Trade Equation with Structural Break**

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