

**FOREIGN EXCHANGE REGIMES, THE REAL EXCHANGE
RATE AND CURRENT ACCOUNT SUSTAINABILITY:
THE CASE OF TURKEY**

Sübidey Togan and Hasan Ersel*

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* Sübidey Togan is from Bilkent University, Ankara and Hasan Ersel from Sabanci University in Istanbul. We thank Juergen von Hagen, Jizhong Zhou, seminar participants at the Center for European Integration Studies (ZEI) in Bonn, Fadle M. Naqib and participants at the 11th Annual Conference of Economic Research Forum for Arab Countries, Iran and Turkey held in Beirut during December 14-16, 2004 for their comments. Sübidey Togan thanks ZEI for its hospitality and the Alexander von Humboldt Foundation for financial support while this paper was written.

Send correspondence to: Sübidey Togan, Bilkent University, Department of Economics, Ankara, Turkey, Fax: 90-312-290 1794, E-Mail: togan@bilkent.edu.tr

Abstract

During the last two and half decades Turkey has suffered from three foreign exchange crises resulting in considerable loss of income. The paper argues that the country in order to avoid the foreign exchange crisis has to stay away from having too big current account deficits. Noting that under perfect capital mobility there will always be the unavoidable risk of speculative attacks on the currency unless the country resolves its fiscal problems, attains price stability, and achieves a sound banking sector, the paper stresses importance of current account sustainability and highlights shortcomings of current policies pursued by Turkey.

1. Introduction

During the last two and half decades Turkey has experienced three balance of payments crises.¹ These crises highlighted the danger of having excessive current account deficits, which are associated with a high probability of a balance of payments crisis. Naturally, the question arises; are these deficits sustainable?

The purpose of this paper is to discuss the sustainability of current account deficits in Turkey. The paper is structured as follows. While section 1 considers briefly the macroeconomic developments during the last two decades emphasizing the characteristics of the foreign exchange regime, section 2 discusses issues related with current account sustainability and the determination of the equilibrium real exchange rates (RER). Section 3 concludes.

2. Foreign Exchange Regime

Until the end of the 1970s, Turkey followed a fixed and multiple exchange rate policy while experiencing relatively high inflation rates. The policy led to a loss of competitiveness and eventually to the foreign exchange crisis of the late 1970s. Turkey's GNP shrank by 0.5 percent in 1979 and by 2.8 percent in 1980. With the stabilization measures of 1980, Turkey devalued its lira by 33 percent and eliminated the multiple exchange rate system. After May 1981, the exchange rate was adjusted daily against major currencies to maintain the competitiveness of Turkish exports. Multiple currency practices were phased out during the first two years of the stabilization program, and the government pursued a policy of depreciating the Real Exchange Rate—on average by about 6 percent annually over the period 1980–88.

In January 1984 domestic commercial banks were allowed to engage in foreign exchange operations within certain limits, and restrictions on foreign travel and investment from abroad were eased and simplified. The determination of the exchange rate was further liberalized by permitting banks to set their own rates within a specified band around the Central Bank rate. In August 1988 major reform was introduced and a system of market-setting of foreign exchange rates was adopted. In 1989 foreign exchange operations and international capital movements were liberalized entirely.²

A drawback of the RER depreciation policy pursued during the 1980s was the decline in real wages, measured in terms of foreign currency. By the second half of the 1980s, popular support for the government had begun to fall off. In the local elections of March 1989, the governing political party suffered heavy losses. To increase political support, the government conceded substantial pay increases during collective bargaining in the public sector. Pressure then built up in the private sector to arrive at similarly high wage settlements, real wages began to increase and the RER started to appreciate.³

¹ These are the crises of late 1970's, 1994 and 2001.

² Turkey opened the capital account in 1989 before it had taken measures to upgrade banking and financial market supervision and regulation, adopt international auditing and accounting standards, strengthen corporate governance and shareholder rights, and modernize bankruptcy and insolvency procedures.

³ To clarify the relation between RER and real wages, let $p^* E/p$ be the RER where p^* denotes the GDP deflator in the foreign country, E the exchange rate and p the GDP deflator in the home country, and $p y = w L + r K$ the nominal GDP where y stands for real GDP, w the nominal wage rate, L total employment, r the return on capital and K the stock of capital. Expressing the capital income in the above equation as $rK = \lambda (wL)$, where λ

According to the government, the appreciation of the RER experienced after 1989 stemmed from market forces. During the 1990s, Turkey's public finances had deteriorated considerably.⁴ The large public sector deficits were financed by borrowing from the market at very high real interest rates.⁵ Significant capital flowed into the country because it was offering not only high real interest rates but also the prospect of steady real appreciation of the exchange rate. Thus the government's implicit commitment to the RER appreciation insured the private sector, domestic and foreign, against currency risk. It encouraged capital inflows from abroad and lending to the public sector, giving rise to the phenomenon of large, arbitrage-related, short-term capital inflows.

The policy pursued during the first half of the 1990s was not sustainable. In 1993 the current account deficit to GNP ratio had reached 3.5 percent. In 1994 the country faced balance of payments crises. With the introduction of stabilization measures the trend in RER was reversed. RER depreciated by 64 percent during January 1994 and April 1994. GNP shrank by 6.1 percent in 1994. But because of the relatively weak coalition governments, the country had to reverse its economic policies. RER started to appreciate again after April 1994.

Between 1995 and 1997 the economy went through a boom period of above-trend growth. But, in 1998 the economy was badly hit by the Russian crisis. In August 1999 the Marmara area of Turkey was hit by a severe earthquake and this was followed by a further large shock in the Bolu area in November, 1999. As a result of these shocks real GNP shrank by 6.1 percent in 1999. At the end of 1999 Turkey embarked upon an ambitious stabilization program. Central to the program has been the policy of using a pre-determined exchange rate path as a nominal anchor for reducing inflationary expectations. During the course of 2000 the RER appreciated considerably which aggravated further the current account deficits, leading to concerns about the sustainability of the exchange rate regime. The current account deficit to GNP ratio reached 4.9 percent in 2000. This episode ended with a severe currency crisis in February 2001. There was a serious run on the Turkish Lira, interest rates skyrocketed and foreign exchange reserves started to decline rapidly. The government decided to abandon the crawling peg regime. The currency was floated. As a result, the RER depreciated sharply. On May 15, 2001 the IMF increased its assistance under a new stand-by

stands for the profit margin, the RER can be written as
$$\frac{Ep^*}{p} = \frac{\left(\frac{y}{L}\right)Ew^*(1+\lambda^*)}{\left(\frac{y^*}{L^*}\right)(1+\lambda)w}$$
, where (y/L) denotes labor

productivity in the home country, (y*/L*) labor productivity in the foreign country, λ* the profit rate in the foreign country and w* the wage rate in the foreign country. Thus, for given values of productivities and profit rates in the two countries depreciation of the RER leads to a decrease in wages measured in foreign currency (w/E).

⁴ The average budget deficit measured by the public sector borrowing requirements-to-GNP ratio amounted to 10.9 percent during 1991-93, and to 10.4 percent during 1994-2003.

⁵ Real interest rate is defined as
$$r_t = \left[\frac{1 + \left(\frac{i_t}{100}\right)}{1 + \left(\frac{\pi_t}{100}\right)} \right] - 1 * 100$$
, where i_t denotes the annual rate of interest on

government bonds and treasury bills, attained as the weighted average rate in auctions during the month t weighted by total sales during the month, and π_t denotes the expected annual rate of inflation at time t over the period t to $t + 12$. In the calculations of the real interest rate, we set the expected annual rate of inflation at time t over the period t to $t + 12$ equal to the actual annual rate of inflation over the period t to $t + 12$. The average level of real interest rates over the period February 1994 to October 2003 amounted to 25.5 percent.

arrangement. This program aimed to strengthen the balance of public finances in a way that would prevent deterioration in the future. During the course of 2001 Turkey introduced a set of structural reforms. But the September 11 tragedy caused a threat to the reform progress. Turkey responded with a strengthened medium term program aimed at cleaning up the banking sector, consolidating fiscal adjustment and achieving disinflation. In February 2002 the IMF approved a three year stand-by credit for Turkey to support the government's economic program. The severity of the 2001 crisis surprised nearly all observers. GNP during 2001 contracted by 9.4 percent and the loss in employment was estimated at more than 1 million.⁶ Towards the end of 2001 RER started to appreciate again. It has appreciated during October 2001 and October 2004 by about 30 percent. With the appreciation of the RER considerable economic recovery was observed in 2002 and thereafter.

Figure 1 shows developments in the current-account-to-GDP over the period 1975-2003. Turkey faced currency crises during the late 1970s, 1994 and 2001. The figure indicates that the probability of a balance of payments crisis increases in Turkey as the current-account-deficit-to-GDP ratio increases above the critical level of 5 percent.⁷ Figure 2 shows the time path of the RER over the last two decades.⁸ The figure reveals four episodes of RER developments. After the foreign exchange crisis of late 1970s, the RER depreciated until 1988. The appreciation of the RER carried on from 1988 to 1994 when the country was faced with another currency crisis. In 1994 the RER depreciated sharply, but it started to appreciate again after April of that year. The appreciation of the RER carried on until February 2001, when the country was faced with yet another currency crisis. After the sharp depreciation of the RER from February 2001 to April 2001, it began to appreciate, in particular after October 2001. It appreciated substantially until March 2004, depreciated during the period March to May 2004, and thereafter it stayed relatively constant until October 2004.

⁶ The reason for the severity of the 2001 crisis compared to previous foreign exchange crisis is explained by the fact that by 2001 Turkey had a high level of 'liability dollarization', with high public and private foreign debt which was denominated in foreign currencies, and also a high share of foreign currency denominated bank deposits. As a result, the sharp depreciation caused a large increase in both the gross and the net indebtedness of the economy, which more than offset the positive effect of depreciation on the demand for exports.

⁷ We do not state that large current account deficits are the only cause of the currency crises. During the periods prior to the crises current account deficits were financed mainly by short-term foreign borrowing. There were also other weaknesses in the Turkish economy. The 1994 and 2001 crises occurred when the country was facing large fiscal deficits, huge public debts, problems in the banking sector and high inflation rates. The budget deficit measured by the public sector borrowing requirements-to-GNP ratio amounted to 10.9 percent during 1991-93 and to 10.4 during 1994-2003. The inflation rate during 1990-2000 fluctuated between 54.9 and 106.3 percent and the average inflation rate amounted to 75.2 percent. There were distortions created by the state banks, which had substantial share in the banking sector total assets. These banks faced un-recovered costs from duties carried on behalf of the government, and they covered their financing needs from markets by borrowing at high interest rates and short maturities. Currency and maturity mismatches on the balance sheets of the banks had left the public authorities little leeway for using either interest-rate or exchange rate adjustments to restore balance without undermining the stability of the banking sector. In addition Turkey lacked in the banking sector competent supervisory authorities and a regulatory framework. Thus Turkey before the 2001 crisis had neither resolved its fiscal problems, nor attained price stability and a sound banking sector. There were also major problems with governance in general.

⁸ When constructing real exchange rate indices one is faced with four decisions: choice of the price index, choice of the currency basket, choice of weights and choice of mathematical formula. In the formulation of the real exchange rate we use CPI as CPI data are available on a monthly basis for a large number of countries. Choice of currency basket is composed of countries which are major competitors of Turkey in world markets as well as major suppliers of imported commodities to Turkey. The countries considered consist of in West Europe of Belgium, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Switzerland and UK, in America of Brazil, Canada, Mexico and the US, in Central and Eastern European and Commonwealth of Independent States Countries of Czech Republic, Hungary, Poland, Russia, and in Asia of China, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand. For weights assigned to different countries and formula used for estimation of RER we use the approach developed by Zanello and Desruelle (1997).

To formally study the evolution of the foreign exchange rate regime we next turn to the IMF publication “Annual Report on Exchange Arrangements and Exchange Restrictions”. The IMF in those reports classified the exchange rate policies based on information provided by the member countries. During 1980-81 there were only two categories, ‘par’ (fixed) and ‘other’. Later the classification expanded to three. The three-bucket classification that prevailed through most of the 1980s and 1990s consisted of (i) pegged regimes, (ii) regimes with limited flexibility and (iii) more flexible arrangements. The first broad regime group consists of two sub-groups, i.e., single currency pegs and composite currency pegs. The second group has been used to classify the European countries (prior to the monetary union) with exchange rate arrangements vis-a-vis one another (i.e. the Snake, the Exchange Rate Mechanism, etc.) and the Gulf countries. The third bucket includes two sub-groups, i.e., managed floats, either according to a set of indicators or in a country-specific way, and independent floats.

In this classification the exchange rate arrangement refers to (i) fixed, (ii) to intermediate and (iii) to flexible regimes. However, the classification had two major shortcomings. First, it failed to capture differences between what the countries claimed to be doing and what they were doing in reality. Second, by lumping rigid forms of pegs together with softer pegs it failed to acknowledge the different degree of monetary autonomy afforded by each regime. To address these shortcomings IMF adopted in 1999 a new classification scheme based on still de facto policies. The new scheme allows for eight different categories ranging from the adoption of a foreign currency as legal tender to free floats. The eight regimes are: (I) dollarization and euroization, (II) currency board, (III) conventional fixed pegs, (IV) horizontal bands, (V) crawling pegs, (VI) crawling bands, (VII) managed float with no pre-announced path for the exchange rate and (VIII) independent float.⁹ This classification treats exchange arrangements I, II and III as fixed regimes, IV, V and VI as intermediate regimes and VII and VIII as flexible regimes. Table 1 shows the evolution of the Turkish exchange rate regime according to the Fund’s “Exchange Arrangements and Exchange Restrictions”. The table reveals that Turkey was labeled by the Fund during 1980-81 as an ‘exchange regime not maintained within narrow margin’. During most of the 1980s and 1990s it was classified under “more flexible arrangements” as other managed floating’. Later during 1996-97 it was classified as ‘managed floating’, during 1998-99 as ‘crawling peg’ and during 2000-03 as ‘independently floating’.

On the other hand Babula and Otker-Robe (2002) distinguish between 13 regimes. These regimes are: (1) formal dollarization and euroization, (2) currency union, (3) currency board arrangements, (4) conventional fixed pegs vis-a-vis single currency, (5) conventional fixed pegs vis-a-vis a basket of currencies, (6) horizontal bands, (7) forward-looking crawling pegs, (8) backward-looking crawling pegs, (9) forward-looking crawling bands, (10) backward-looking crawling bands, (11) tightly managed floats, (12) other managed floats with no predetermined exchange rate path, and (13) independently floating.¹⁰ The classification of

⁹ Under “conventional fixed pegs” the currency is pegged to another currency or currency basket within a band of at most +/- 1 percent. While “horizontal bands” refer to pegs with bands larger than +/- 1 percent, “crawling pegs” refer to pegs with central parity periodically adjusted in fixed amounts at a pre-announced rate or in response to changes in selected quantitative indicators. “Crawling bands” refers to crawling pegs combined with bands larger than +/- 1 percent. While “managed float with no pre-announced path for the exchange rate” refers to a regime with active interventions without pre-commitment to a pre-announced target or path for the exchange rate, the “independent float” regime refers to market determined exchange rate with monetary policy independent of exchange rate policy.

¹⁰ The crawl is viewed as “backward looking” when the crawl aims to passively accommodate, for example, past inflation differentials under a real exchange rate rule, and as “forward looking” when the exchange rate is adjusted at a pre-announced fixed rate and/or set below projected inflation differentials, typically when the exchange rate is envisaged to have an anchor role. Under “tightly managed floats” interventions take the form of

Babula and Otker-Robe treats exchange arrangements 1, 2 and 3 as hard peg regimes, 4-11 as intermediate regimes and 12 and 13 as floating regimes. Finally, we consider the classification of Reinhart and Rogoff (2002), who distinguish between 15 regimes, which are: (a) no separate legal tender, (b) pre announced peg or currency board arrangement, (c) pre announced horizontal band that is narrower than or equal to +/- 2 percent, (d) de facto peg, (e) pre announced crawling peg, (f) pre announced crawling band that is narrower than or equal to +/- 2 percent, (g) de facto crawling peg, (h) de facto crawling band that is narrower than or equal to +/- 2 percent, (i) pre announced crawling band that is wider than or equal to +/- 2 percent, (j) de facto crawling band that is narrower than or equal to +/- 5 percent, (k) moving band that is narrower than or equal to +/- 2 percent, (l) managed floating, (m) freely floating, (n) freely falling, and (o) hyperfloats.

Table 2 reports in column 1 the exchange regime according to the classification of Babula and Otker-Robe. The table shows that Turkey during the 1990s under high capital mobility has abandoned the intermediate regimes of “forward looking crawling bands” and “forward looking crawling pegs” and moved towards a regime of free floats. The exchange regime according to the classification of Reinhart and Rogoff is reported in column 2 of table 2. This classification reveals that Turkey during 1980-82 had multiple exchange rates and also had active parallel (black) rates. Furthermore, the annual inflation rate in Turkey was running above 40 percent during 1980 and during 1984-2001, a situation which has been classified by Reinhart and Rogoff as ‘freely falling’.

During 2000 Turkey had used a pre-determined exchange rate path as a nominal anchor for reducing inflationary expectations, when the annual inflation rate was running above 40 percent. This episode is indicated as ‘independently floating’ in the new IMF classification, a ‘forward looking crawling peg’ by Babula and Otker-Robe and as ‘crawling band around Euro/freely falling’ by Reinhart and Rogoff.

The above considerations reveal that the classifications of IMF, Babula and Otker-Robe, and Reinhart and Rogoff have certain drawbacks. They do not reveal the essential characteristics of the exchange regime followed by Turkey. Following Zhou (2002) we therefore supplement the information provided in table 1 and columns 1 and 2 of table 2 with the following additional measures: (i) “volatility of exchange rates” defined as the average of absolute monthly percentage changes in the nominal exchange rate during a year, (ii) “volatility of exchange rate changes” defined as the standard deviation of the monthly percentage changes in the nominal exchange rate during a year, and (iii) “volatility of reserves” defined as the average of absolute monthly changes in the non-gold reserves, normalized by the reserve money in the previous month. We expect fixed regimes to have low values for “volatility of exchange rates”, low values for “volatility of exchange rate changes” and high values for “volatility of reserves”. On the other hand flexible regimes should combine high values for “volatility of exchange rates” and “volatility of exchange rate changes” with low values for “volatility of reserves”.

The estimated values of volatility of exchange rates, volatility of exchange rate changes and volatility of reserves for Turkey reported in columns 4-6 in Table 2 for 1980-2003 reveal that the volatility of exchange rates and volatility of exchange rate changes during 1981-1990 and during 2000 have been rather low. During the period 1980-1988 when Turkey tried to achieve annual RER devaluation of about 6 percent, the volatility of reserves was rather low.

very tight monitoring that generally results in a stable exchange rate without having a clear exchange rate path, so as to permit the authorities an extra degree of flexibility in deciding the tactics to achieve a desired path. Under “other managed floats with no predetermined exchange rate path” the exchange rate is influenced in a more ad hoc fashion.

On the other hand, during 2000 when Turkey followed a semi currency-board arrangement the volatility of reserves was been relatively high.

The volatility of reserves started to increase after the liberalization of international capital movements in 1989. As the exchange rate became more and more market determined the volatility of exchange rates and volatility of reserves increased considerably during the periods 1991-1993 and also during 1995-2001. During the crises periods of 1994 and 2001 the values of all the three measures increased enormously. During the period 2002-2003 the country experienced relatively high values of volatility of exchange rates and volatility of reserves.

The above considerations reveal the difficulties in classifying the exchange rate regimes as fixed, intermediate and flexible regimes. The data show that policy makers have tried to use the exchange rate as a policy variable during the two periods of 1980-1988 and 2000. But during 1989-1999 and 2001-2003 the exchange rate was largely endogenously determined together with the other variables in the system.

3. Current Account Sustainability and The Equilibrium Real Exchange Rate

The basic presumption of our approach is that the current account is sustainable. If not, the country could face an exchange rate collapse or an external debt default, which, in turn, would imply a reduction in real income and employment, deviating from the long-run growth path. Starting from the notion that under current account sustainability the country must satisfy its lifetime budget constraints, we contend that the current policies are sustainable if continuation of the current government policy stance and private sector behavior into the future does not entail a drastic policy shift or lead to a currency or balance of payments crisis.

Here we emphasize the points stressed earlier by considering the balance of payments relation, which can be written as

$$TB_t^S - i^*D_{t-1} + FDI_t + D_t - D_{t-1} - \Delta R_t = 0$$

where TB_t^S denotes the non-interest current account, i^* the foreign rate of interest, D the stock of foreign debt, FDI the net foreign direct investment, R the foreign exchange reserves of the country and ΔR_t the change in reserves. Also, $(TB_t^S - i^*D_{t-1}) = Current\ Account_t$ and $(FDI_t + D_t - D_{t-1}) = Capital\ Account_t$. All variables are measured in terms of foreign currency. If $d_t = \frac{E_t D_t}{p_t y_t}$ is the foreign-debt-to-GDP ratio, $tb_t = \frac{E_t TB_t^S}{p_t y_t}$ the non-interest-

current-account-to-GDP ratio, $fdi_t = \frac{FDI_t E_t}{p_t y_t}$ the FDI-to-GDP ratio and $\Delta r_t = \frac{(\Delta R_t) E_t}{p_t y_t}$ the change-in-reserves-to-GDP ratio, the equation determining the time path of d_t can be written as

$$d_t = -tb_t + \frac{(1+r^*)(1+\eta)}{(1+g)} d_{t-1} - fdi_t + \Delta r_t$$

where r^* denotes the foreign real rate of interest and η the rate of depreciation of the RER. The equation reveals that the external-debt-to-GDP ratio decreases with increases in the non-interest-current-account-to-GDP ratio tb , the FDI-to-GDP ratio fdi and the growth rate of GDP g . By contrast, the debt-to-GDP ratio increases with increases in the foreign real interest rate r^* , rate of depreciation of the RER η and changes in the reserves-to-GDP ratio Δr .

Following the approach of von Hagen and Harden (1994), we solve this expression forward for n periods and obtain

$$d_t = E_t \delta_{t,n} d_{t+n} + E_t \sum_{i=1}^n \delta_{t,i} A_{t+i}$$

where

$$\delta_{t,k} = \prod_{i=1}^k \frac{1+g_i}{(1+r_i^*)(1+\eta_i)}$$

and

$$A_t = tb_t + fdi_t - \Delta r_t .$$

Here, $\delta_{t,k}$ can be interpreted as the “k-periods ahead” discount factor used to calculate the present value of assets and liabilities in period $t+k$ for period t . $E_t x_{t+k}$ denotes the period t expectation of the variable x in period $t+k$. The equation shows that current-debt-to-GDP ratio equals the expected discounted present value of foreign debt outstanding in period $t+n$ relative to GDP, plus the sum of all discounted A_t 's between period t and period $t+n$. Theoretically, the inter-temporal budget constraint requires that $\lim_{n \rightarrow \infty} E_t \delta_{t,n} d_{t+n} \leq 0$ as n becomes very large, so that foreign debt remains bounded relative to GDP. If the inter-temporal budget constraint were violated, private investors would realize that the government's liabilities would eventually exceed its revenue-raising capabilities. As a result, the price of the debt of the country would fall to zero and the country would see itself barred from international capital markets.

To translate the inter-temporal budget constraint into a practically more relevant requirement, we consider the above relation for a limited period of time n^* and add the condition that the discounted-debt-to-GDP ratio at the end of period $t+n^*$ should not exceed the debt-to-GDP ratio at time t . We use actual data on d_t , tb_t and fdi_t for any year during the time period 1984–2003. For each year t of the time period, we estimate the expected discounted present value at time t of foreign debt outstanding in period $t+n^*$ relative to GDP, plus the sum of all discounted A_t 's between period t and period $t+n^*$. As for the government policy stance and the private sector behavior over the period t to $t+n^*$, we assume that the values of tb_{t+i} and fdi_{t+i} for $i=1, \dots, n^*$ will remain unchanged at their initial values of tb_t and fdi_t . Thus we assume that the government, private sector and rest of the world will not change the policies they pursue in period t over the time period $t+1$ and $t+n^*$.

A look at Turkey's annual GDP growth rate over the period 1980–2003 reveals that the average growth rate of GDP amounted to 4.1 percent during 1980–1989 and to 3.7 percent during 1990–2003. Thus for the growth rate of GDP over the time period t to $t+n^*$ we take the figure of 4 percent. By contrast, the foreign real interest rate is to equal 8 percent. Finally, we assume in the following calculations that $\Delta r=0$ for each year of the period t to $t+n^*$ and that over the same time period η equals zero.

Following the approach of von Hagen and Harden (1994), the current account is not sustainable if

$$S(n^*) = d_t - E_t \delta_{t,n} d_{t+n} = E_t \sum_{i=1}^n \delta_{t,i} A_{t+i} < 0 .$$

This is a rather mild sustainability condition. Here d_t denotes the actual debt-to-GDP ratio in period t and $A_{t+i} = (tb_t + fdi_t)$ for $i=1, \dots, n^*$. The result of calculations for $n^*=10$, $n^*=20$ and $n^*=25$ are shown in table 3.

The table reveals that during 1993 the current account was unsustainable in the sense that the actual debt-to-GDP ratio in 1994 fell short of the expected discounted present value of foreign debt outstanding in period 2004 relative to GDP by 14.03 percent when $n^* = 10$ and by 27.26 percent when $n^* = 25$. This finding indicates that the current account needed adjustment in the NICA-to-GDP and FDI-to-GDP ratios. During 1994, Turkey increased the NICA-to-GDP ratio considerably, but there was not much change in the FDI-to-GDP ratio. The table indicates that the policy was successful; the sustainability measure was positive thereafter. The warning signals for the 2001 currency crisis were evident in the negative figures of the sustainability measure for the year 2000. The situation improved after the crisis, when the sustainability measure increased and became positive at the end of 2001. Although the current account was sustainable in 2001 and 2002, the system became unsustainable again in 2003.

A look at the sustainability measure for 2003 with $n^* = 25$ reveals that the actual-debt-to-GDP ratio in 2003 fell short of the expected discounted present value of foreign debt outstanding in period 2028 by 17.07 percent. The system is not sustainable. The sustainability of the current account requires that the value of the sustainability measure be increased so that it becomes positive. This goal can be achieved either through an increase in the NICA-to-GDP ratio tb_t or through an increase in the FDI-to-GDP ratio fdi_t during each year of the period 2004–29 or through a combination of increases in both the NICA-to-GDP and FDI-to-GDP ratios during the same time period. During 2003, the actual value of $A_t = (tb_t + fdi_t)$ was –1.08 percent. For Turkey to achieve the minimal condition for external sustainability, the value of A_t during each time period of the interval 2004–2029 would have to be 0 percent. Thus, Turkey has to increase the sum of its non-interest-current-account-to-GDP ratio and its FDI-to-GDP ratio during each period of the interval 2004–29 by at least 1.08 percent. Supposing that fdi_t during the time period 2004–29 remains constant at its 2003 level of 0.03 percent we next turn to the study the determinants of non-interest-current-account-to-GDP ratio.¹¹

Using quarterly data from 1988 (first quarter) to 2003 (second quarter) we note from considerations in section 1 that one of the main determinants of this ratio is the RER. A second factor that strongly affects the NICA-to-GDP ratio is the aggregate demand for domestic goods and services, consisting of total consumption plus investment demand in the home country as well as the rest of the world. As the aggregate domestic demand for goods and services in the home country increases, it triggers imports and, other things being equal, the NICA-to-GDP ratio is expected to decline. Similarly, as aggregate domestic demand for goods and services increases in the rest of the world, it triggers imports of the foreign country, and, other things being equal, the NICA-to-GDP ratio in the home country is expected to increase.

To explain the developments in the NICA, the following equation is estimated:

$$(NICA/GDP) = \beta_0 + \beta_1 \text{dlog}(ADD) + \beta_2 \text{dlog}(ADDF) + \beta_3 RER + \beta_4 DQ3 + \beta_5 DI999 + \beta_6 D93ST + \beta_7 D2000$$

where $\text{dlog}(ADD)$ denotes the annual growth rate of real aggregate domestic demand in the home country; $\text{dlog}(ADDF)$ the annual growth rate of real aggregate domestic demand in the rest of the world; RER the real exchange rate; $DQ3$ the third-quarter seasonal dummy; $DI999$ the recession and earthquake dummy for the year 1999, taking the value of 1 for the second, third, and fourth quarters of 1999 and 0 otherwise; $D93ST$ the structural break dummy in 1993, taking the value of 1 after 1993 and 0 otherwise; and $D2000$ the exchange

¹¹ During 2003, inward and outward FDI flows amounted to 0.23899 percent and 0.20990 percent of GDP, respectively. Thus the net FDI inflow was 0.0290946 percent of GDP.

rate-based stabilization measures, taking the value of 1 for all quarters of 2000 and 0 otherwise. The *D93ST* dummy refers to the structural break in Turkey's balance of payments that took place after the liberalization of the capital account in 1990. Because economic agents respond with lag to such decisions, a series of tests were conducted to identify the structural break resulting from this decision. All of the variables used in the estimation were checked for unit roots, and it was learned that the series are all stationary. Because of the simultaneity problems faced in the model, we use instrumental variable techniques to estimate the parameters.¹² The results of the estimation are presented in table 4.

The coefficients of the variables are all statistically significant, and all have the expected signs. An increase in the growth rate of aggregate domestic demand in the home country reduces the NICA-to-GDP ratio; an increase in the growth rate of aggregate domestic demand in the rest of the world increases that ratio. The ratio increases as the RER depreciates. The coefficient of the structural change dummy is negative, which indicates that liberalization of the capital account had a negative impact on the NICA-to-GDP ratio, as expected.

The above considerations reveal that the NICA-to-GDP ratio can be increased by decreasing aggregate demand for domestic goods and services and/or by depreciating the RER. Decreasing the aggregate demand for goods and services requires that the country aims for more ambitious fiscal objectives than the constant primary surplus of 6.5 percent of GDP. But this will be very painful after so many failed stabilization attempts. The alternative is to depreciate the RER and keep the RER at its "long-run equilibrium level" over time.¹³ To determine the extent of depreciation in the RER, we consider the regression equation reported in table 4. From that table, it follows that the RER has to depreciate from the level it attained in September 2003 by about 34.98 percent and maintained at about that level over time.

An alternative specification of the sustainability condition requires that the ratio of the stock of foreign liabilities to GDP stay constant over time at its initial value in time period 2003. In that case, the equation determining the time path of the debt-to-GDP ratio d can be solved for the equilibrium value of the sum of tb and fdi , under the assumption that $\Delta r=0$, as

$$(tb + fdi) = - \left[\frac{(g - r^* - \eta - r^* \eta)}{(1 + g)} \right] d .$$

Assuming that η equals 0 and setting the values of $g = 0.04$, $r^* = 0.08$ and $d = 0.612$ of the year 2003, the equilibrium value of $(tb + fdi)$ is determined to be 2.354 percent. Because in 2003 the actual value of $(tb_t + fdi_t)$ equaled -1.08 percent, Turkey must increase the sum of its

¹² To deal with the simultaneity problem in a simple way, a four-quarter lagged value of RER is used as the instrumental variable.

¹³ The literature basically includes two approaches to determining the long-run equilibrium value of the RER. According to Williamson (1994) and Wren-Lewis and Driver (2000), the fundamental equilibrium exchange rate (FEER) is the real exchange rate that would exist when the economy is at full employment (internal balance) and in current account equilibrium (external balance). Thus the FEER is the RER that will bring the current account into equality with the "sustainable" capital account, where home and foreign aggregate outputs are set at their full employment values. By contrast, the model of a behavioral equilibrium exchange rate (BEER) by Clark and MacDonald (1998) analyzes the actual behavior of the RER using econometric techniques, where the reduced form equation is estimated with assumed longer-term fundamentals and short-term variables using co-integration analysis. MacDonald and Stein (1999) and Hinkle and Montiel (1999) consider productivity and net foreign assets as fundamental variables. Other variables identified in the literature include real interest differentials, measures of openness of trade and the exchange system and size of fiscal balance. Finally, Stein and Allen (1995) distinguish between medium- and long-term factors influencing the RER. The approach developed in this chapter can be considered an extension of the FEER approach. The latter approach requires that the NICA-to-GDP ratio be sustainable.

non-interest-current-account-to-GDP and FDI-to-GDP ratios over time by 3.4 percent. Suppose again that fdi_t over time stays constant at its 2003 level of 0.03 percent. Then the increase in tb_t , and thus in A_t over time, can be achieved by depreciating the RER by about 100 percent and maintaining it at about that level over time.

Finally, following the suggestion of Reinhart, Rogoff and Savastano (2003), we consider cases in which the country tries to decrease its ratio of stock of foreign liabilities to GDP from its initial value of 0.612 to 0.5 and 0.4 over a period of 10 years. In those cases, Turkey has to increase the sum of its non-interest-current-account-to-GDP ratio and its FDI-to-GDP ratio over time by 4.3 and 5.2 percent, respectively. This change, under the assumption that fdi_t over time stays constant at its 2003 level, requires that the RER be depreciated by more than 100 percent.

Consider now the issue of increasing the FDI-to-GDP ratio. Table 5, showing the FDI inflows over the period 1999-2003, reveals that Turkey was unable to attract large FDI inflows. The level of FDI inflow into Turkey is too low relative to FDI flows to developing countries with similar levels of GDP per capita. In particular, the FDI flows to Central and Eastern European countries are much larger than those to Turkey. However, in terms of population Turkey's is larger than that of Poland, the Czech Republic and Hungary combined. In terms of GDP, Turkey's economy is four times larger than that of the Czech Republic or Hungary, and one-quarter larger than that of Poland in 2000. In terms of gross fixed capital formation, Turkey's investments during 2000 were three to four times larger than those of the Czech Republic and Hungary and roughly a sixth larger than those of Poland. In terms of average annual inflows of FDI during the 1990s, Turkey attracted inflows valued at US\$800 million, which is roughly one-fifth of the \$4.1 billion in FDI inflows to Poland and significantly lower than the inflows to the Czech Republic and Hungary, each of which attracted about \$2.1 billion per year. Table 5 indicates that manufacturing and services have attracted almost all FDI inflows into Turkey. While the share of FDI of the manufacturing sector has decreased from 43.4 percent in 1999 to 20.4 percent in 2002 and increased to 61.9 percent in 2003, the share of services jumped from 55 percent in 1999 to 79 percent in 2002 and then decreased to 35.9 percent in 2003. The table shows that the EU is the largest investor in Turkey, accounting for 78 percent of total FDI inflows in 2003.

One of the main culprits behind the failure of Turkey to attract large FDI inflows was the uncertain macroeconomic environment, which, along with the uncertainties stemming from domestic politics and the ensuing high real interest rates, produced a very erratic growth performance. Infrastructure-related factors were at play as well. Although the quantity and quality of Turkey's broadly defined infrastructure, including its geographic and demographic endowments and its physical and financial infrastructure, help to position Turkey as a potentially powerful magnet for FDI inflows, these factors were ineffective in Turkey's effort to increase those flows. According to the Foreign Investment Advisory Service (2001a, 2001b), seven major problems impeded the operations of FDI enterprises up until the early 2000s: i) political instability, ii) government hassle, iii) a weak judicial system, iv) heavy taxation, v) corruption, vi) deficient infrastructure and vii) competition from the informal economy. On the other hand, according to Dutz and others (2005) the main bottlenecks seemed to have been insufficient respect for the rule of law and weak competition in local markets, reinforced by an uneven application of bureaucratic red tape. Finally, the Organization for Economic Co-operation and Development (2004) maintains that Turkey, in addition to the factors mentioned above, needs to improve political stability, and eliminate

unfair competition from the informal economy.¹⁴ Thus, Turkey, in order to attract higher levels of FDI flows in the future, has to improve its political stability and its macroeconomic environment, increase respect for the rule of law, re-evaluate the legal framework governing the privatization programmes, create a clear understanding with employee unions on the labor relations framework, increase competition in local markets, reduce the bureaucratic red tape, and take measures to reduce the informal sector in the economy.¹⁵

Once Turkey is able to attract higher levels of FDI into the country, it does not need to depreciate its currency by as much as 35 percent or even more than 100 percent in order to attain sustainability in its current account. Table 6 shows the required rates of depreciation of the RER for different values of the FDI-to-GDP ratio, starting from the initial situation in 2003. With increases in the FDI-to-GDP ratios, the depreciation rate of the RER required to attain sustainability in the current account decreases. When the FDI-to-GDP ratio increases to 2.5 percent of GDP, then the system becomes sustainable under the approach of von Hagen and Harden (1994). The debt-to-GDP ratio will remain constant over time if the RER is depreciated by about 31 percent, and the debt-to-GDP ratio will fall to 0.4 over a period of 10 years if the RER is depreciated by about 62.5 percent.

4. Conclusion

During the last two and half decades Turkey has suffered from three foreign exchange crisis resulting in considerable loss of income and in the creation of substantial social and political stresses within the country. The paper argues that Turkey, in order to avoid the occurrence of foreign exchange crises, must ensure that over time the sum of NICA to GDP and FDI to GDP ratios be at least be as large as the sustainable value of the sum of NICA to GDP and FDI to GDP ratios. In order to attain sustainability in its current account the country should pursue policies that will improve the business climate in the country so that FDI inflows into the country will increase over time and also keep the RER close to its long run equilibrium level.

Under perfect capital mobility there will always be the unavoidable risk of speculative attacks on the currency unless the country resolves its fiscal problems, attains price stability, and achieves a sound banking sector. A further requirement for avoiding the occurrence of currency crises is the condition that the RER should not deviate considerably from its long run equilibrium value.

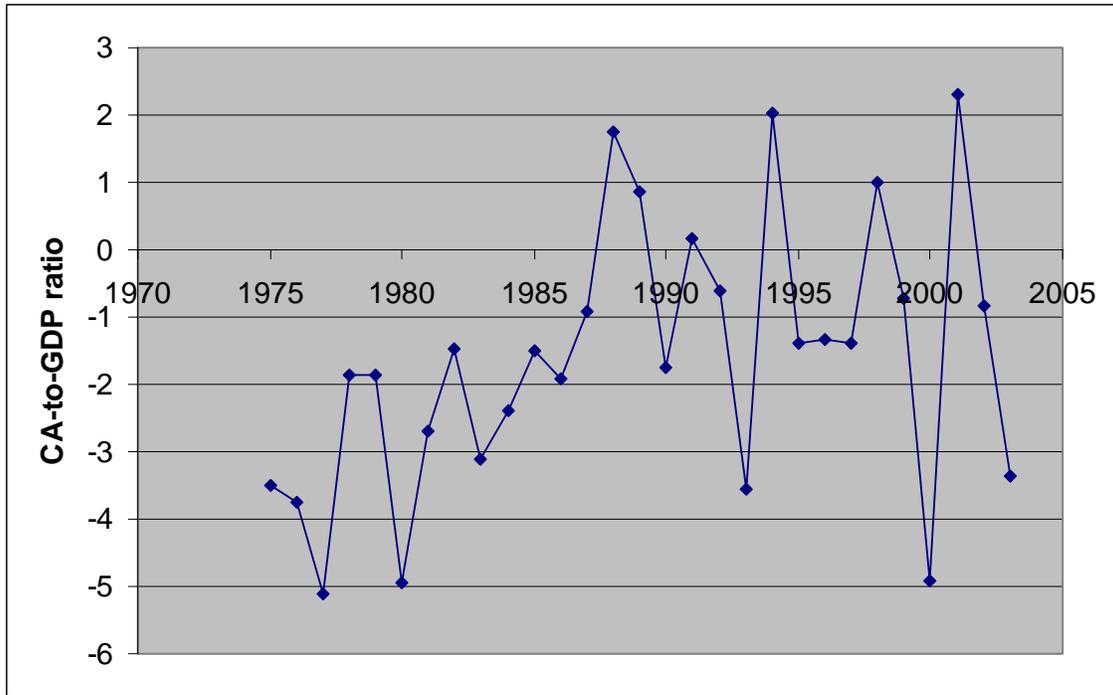
¹⁴ Foreign owned firms usually comply strictly with the formal regulatory and tax rules, possibly more completely than most domestic firms, in order to avoid any friction with the government authorities. They therefore do not enjoy the flexibility of incomplete enforcement.

¹⁵ In Turkey foreign-owned firms had long been subject to special authorizations and sectoral limitations. In 2001 the Turkish government requested the Foreign Investment Advisory Service of the World Bank to conduct a study on the business environment affecting foreign direct investment (FDI) firms in Turkey. On the basis of this work, a new Law on FDI and important amendments in various laws (Commercial Law and in the laws concerning the Employment of Foreigners, the Registry of Title Deeds and Public Procurement) were adopted by the Parliament in 2003. The new legislation removed the screening and pre-approval procedures for FDI projects, re-designed the company registration process on an equal footing for domestic and foreign firms, facilitated the hiring of foreign employees, included FDI firms in the definition of “domestic tenderer” in public procurement, and authorized foreign persons and companies to acquire real estate in Turkey. Thus the new law guarantees national treatment and investor rights. According to the law a company can be 100 percent foreign owned in almost all sectors of the economy. Acquisitions of more than 30 hectares by foreigners are subject to permission from the Council of Ministers, and establishments in the financial, petroleum and mining sectors require special permission, according to appropriate laws.

References

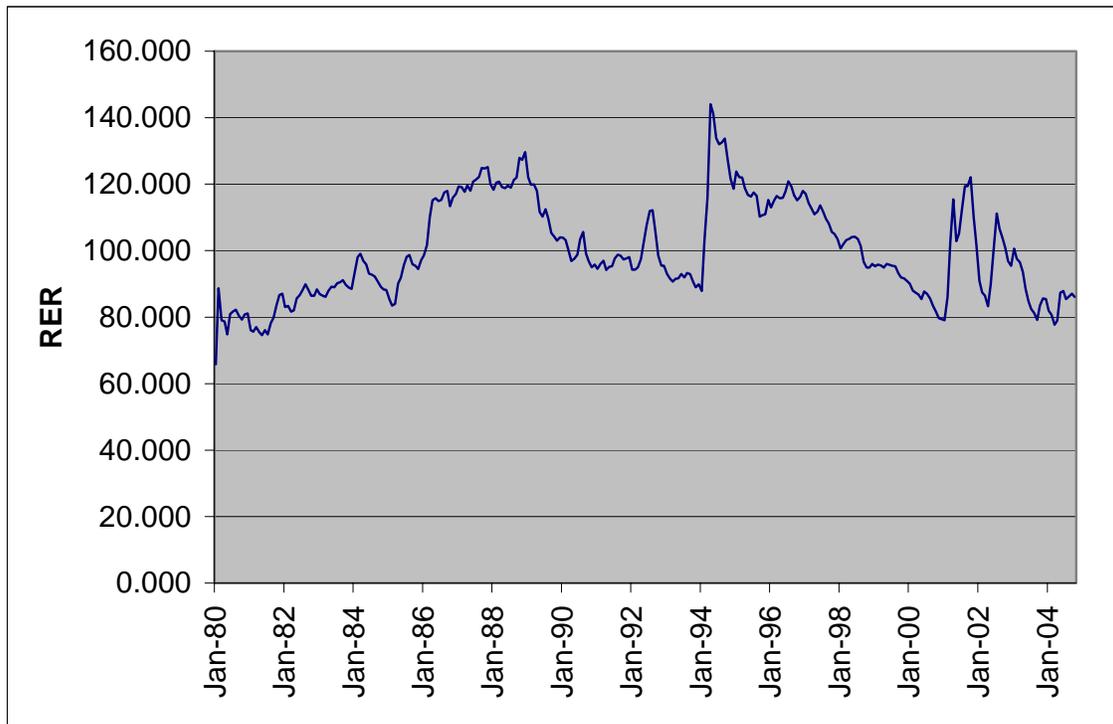
- Babula, A. and Otker-Robe, I., 2002. "The Evolution of Exchange Rate Regimes Since 1990: Evidence from De Facto Policies", IMF Working Paper WP/02/155, Washington D.C.: IMF.
- Clark, P. and MacDonald, R., 1998. "Exchange Rates and Economic Fundamentals: A Methodological Comparison of BEERs and FEERs", IMF Working Paper 98/67 Washington: IMF.
- Dutz, M., Us, M. and Yilmaz, K., 2005. "Foreign Direct Investment Challenges: Competition, the Rule of Law and EU Accession", in *Turkey: Economic Reform and Accession to the European Union*, ed. by B. Hoekman and Togan, S., The World Bank (forthcoming).
- Foreign Investment Advisory Service (2001a). *Turkey: A Diagnostic Study of the Foreign Direct Investment Environment*, World Bank and the Treasury of Turkey, Ankara
- Foreign Investment Advisory Service (2001b). *Turkey: Administrative Barriers to Investment*, World Bank and the Treasury of Turkey, Ankara
- Hinkle, L. and Montiel, P., 1999. *Exchange Rate Misalignments: Concepts and Measurements for Developing Countries*, Washington D.C.: World Bank
- International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions*, various issues, Washington D.C.: IMF.
- MacDonald, R. and Stein, J., 1999. *Equilibrium Exchange Rates*, Boston, Massachusetts: Kluwer Academics
- Organization for Economic Co-operation and Development, 2004. *OECD Economic Surveys: Turkey*. Paris: OECD.
- Reinhart, C. and Rogoff, K. 2002. "The Modern History of Exchange Rate Arrangements: A Reinterpretation", National Bureau Economic Research Working Paper 8963, Cambridge: NBER.
- Reinhart, C., Rogoff, K. and Savastano, M., 2003. "Debt Intolerance", *Brookings Papers on Economic Activity*, 1-74.
- Stein, J. and Allen, P., 1995. *Fundamental Determinants of Exchange Rates*, Oxford: Clarendon Press
- Von Hagen, J. and Harden I. J., 1994. "National Budget Process and Fiscal Performance" *European Economy. Reports and Studies 3*. Towards Greater Fiscal Discipline. 311-393.
- Williamson, J., 1994. *Estimating Equilibrium Exchange Rates*, Institute for International Economics, Washington D.C.
- Wren-Lewis, S. and Driver, R., 1998. *Real Exchange Rates for the Year 2000*, Institute for International Economics, Washington D.C.
- Zanella, A. and Desruelle, D., 1997. "A Primer on the IMF's Information Notice System", IMF Working Paper WA/97/71. Washington D.C.: IMF.
- Zhou, J., 2002. *Empirical Studies on Exchange Rate Policies in Transition Economies*, Ph.D. thesis. University of Bonn.

Figure 1: Current Account-to-GDP Ratio, 1975-2003



Source: Central Bank of Turkey

Figure 2: Real Exchange Rate, 1980-2004



Source: The authors

TABLE 1: Evolution of Exchange Rate Regime According to the Fund's "Exchange Arrangements and Exchange Restrictions"

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<i>Period 1980-81</i>																								
Exchange Rate maintained within narrow margin																								
Exchange Rate not maintained within narrow margin	X	X																						
<i>Period 1982-95</i>																								
Pegged Regimes																								
Regimes with limited flexibility																								
single currency																								
cooperative arrangements																								
More flexible arrangements																								
adjusted according to a set of indicators																								
other managed floating			X	X	X	X	X	X	X	X	X	X	X	X	X	X								
independently floating																								
<i>Period 1996-97</i>																								
Pegged to																								
single currency																								
composite of currencies																								
Flexibility limited																								
More flexible arrangements																								
Managed floating																	X	X						
Independent floating																								
<i>Period 1998-2004</i>																								
Exchange arrangements with no separate legal tender																								
Currency board arrangement																								
Conventional pegged arrangements																								
Pegged exchange rate within horizontal bands																								
Crawling peg																			X	X				
Crawling band																								
Managed floating with no preannounced path for the E																								
Independently floating																					X	X	X	X

TABLE 2: Exchange Rate Regimes of Turkey

	Classification of Babula and Otker-Robe	Classification of Reinhart and Rogoff	Volatility of	Volatility of	Volatility of Reserves
			Exchange Rates Annual	Exchange Rate Changes	
1980		freely falling/de facto crawling band around US\$	9.167	18.019	1.972
1981		managed floating/parallel market	3.254	2.237	3.131
1982		managed floating/parallel market	2.995	1.865	2.446
1983		managed floating	3.245	1.379	1.801
1984		freely falling/managed floating	3.950	2.547	2.543
1985		freely falling/managed floating	2.360	1.769	1.550
1986		freely falling/managed floating	2.472	2.261	2.583
1987		freely falling/managed floating	2.391	1.154	1.825
1988		freely falling/managed floating	5.080	2.108	2.832
1989		freely falling/managed floating	2.149	1.186	4.079
1990	9	freely falling/managed floating	1.834	0.978	2.816
1991	9	freely falling/managed floating	4.854	2.929	4.688
1992	9	freely falling/managed floating	4.296	2.142	4.776
1993	9	freely falling/managed floating	4.433	1.579	3.553
1994	7	freely falling/managed floating	10.770	15.141	8.115
1995	9	freely falling/managed floating	3.579	2.515	14.266
1996	9	freely falling/managed floating	5.222	1.245	8.618
1997	9	freely falling/managed floating	5.538	0.944	8.913
1998	7	crawling band around DM/freely falling	3.659	1.812	12.500
1999	7	crawling band around Euro/freely falling	4.618	1.373	5.658
2000	7	crawling band around Euro/freely falling	2.323	1.102	8.480
2001	13	freely falling/freely floating	9.773	8.080	13.553
2002			3.247	3.310	7.190
2003			3.132	2.007	9.554
			4.347	3.320	5.727

Notes:

1. The thirteen regimes of Babula and Otker-Robe are: (1) formal dollarization and euroization, (2) currency union, (3) currency board arrangements, (4) conventional fixed pegs vis-a-vis single currency, (5) conventional fixed pegs vis-a-vis a basket of currencies, (6) horizontal bands, (7) forward looking crawling pegs, (8) backward looking crawling pegs, (9) forward looking crawling bands, (10) backward looking crawling bands, (11) tightly managed floats, (12) other managed floats with no predetermined exchange rate path, and (13) independently floating.

Source: Babula and Otker-Robe (2002), Reinhart and Rogoff (2002), and the author.

TABLE 3 Current Account Sustainability Measures
(Values of $S(n^*)$, percent)

	10 years	20 years	25 years
1984	1.55	2.61	3.00
1985	6.53	11.01	12.69
1986	4.85	8.18	9.43
1987	12.30	20.73	23.89
1988	39.31	66.27	76.38
1989	29.16	49.15	56.65
1990	2.20	3.71	4.28
1991	19.12	32.23	37.15
1992	11.54	19.46	22.43
1993	-14.03	-23.65	-27.26
1994	36.46	61.45	70.83
1995	3.00	5.06	5.83
1996	1.74	2.93	3.38
1997	3.06	5.16	5.95
1998	21.57	36.37	41.91
1999	9.89	16.67	19.21
2000	-25.41	-42.83	-49.36
2001	58.32	98.31	113.31
2002	12.70	21.40	24.67
2003	-8.79	-14.81	-17.07

Source: The authors

TABLE 4 Results for the Quarterly Instrumental Variable Regression of NICA/GDP

Variable	Coefficient	t-Statistic
C	-2.56863	-1.41186
d log (aggregate domestic demand, home country)	-29.89038	-12.12362
d log (aggregate domestic demand, foreign country)	38.84045	1.95129
Real exchange rate	0.03719	1.97118
DQ3	1.84541	4.52182
D1999	-3.82977	-4.34096
D93ST	-0.91545	-2.34142
D2000	-2.72463	-3.18816
R-squared	0.82106	
Adjusted R-squared	0.79787	
Durbin-Watson statistic	2.14602	

Source : The authors

TABLE 5: Foreign Direct Investment in Turkey (US\$ million)

	1999	2000	2001	2002	2003
<i>Sectoral Breakdown</i>					
Agriculture	0	9	0	0	0
Mining	13	3	3	2	12
Manufacturing	353	932	846	78	338
Services	447	763	2,439	510	196
<i>Country Breakdown</i>					
EU	386	1,172	2,613	455	426
Other OECD	258	210	280	60	117
Middle East	155	184	0	5	0
Others	14	141	395	70	3
<i>Total FDI</i>	813	1,707	3,288	590	546
Share of FDI in GNP (%)	0.44	0.85	2.28	0.32	0.22

Source: Central Bank of Turkey

TABLE 6 Sustainable Combinations of FDI/GDP, NICA/GDP and RER

FDI/GDP Percent	Following the Approach of von Hagen and Harden (1994)		Constant Debt/GDP ratio		Debt/GDP ratio equals 0.5 after 10 years		Debt/GDP ratio equals 0.4 after 10 years	
	Required Change in NICA/GDP	Required Rate of Depreciation of the RER	Required Change in NICA/GDP	Required Rate of Depreciation of the RER	Required Change in NICA/GDP	Required Rate of Depreciation of the RER	Required Change in NICA/GDP	Required Rate of Depreciation of the RER
0.02909	1.0	35.0	3.4	113.7	4.3	145.1	5.2	173.2
0.5	0.6	19.2	2.9	98.0	3.9	129.4	4.7	157.5
1	0.1	2.5	2.4	81.2	3.4	112.7	4.2	140.7
1.5	-0.4	-14.2	1.9	64.5	2.9	96.0	3.7	124.0
2	-0.9	-30.9	1.4	47.8	2.4	79.2	3.2	107.3
2.5	-1.4	-47.6	0.9	31.1	1.9	62.5	2.7	90.6

Note: FDI = foreign direct investment; GDP = gross domestic product; NICA = noninterest current account; RER, real exchange rate.

Source: The authors