METU Studies in Development, 25 (2) 1998, 275 - 296

Exchange rate regime and fiscal stability: An application to Turkey

Turan Erol
Department of Management, Başkent University, Bağlıca Kampüsü, 06530 Ankara, Turkey

Abstract

Devaluation may under some conditions inflict a capital tax on domestic bond holders and thus reduce the debt service burden. These conditions are the fully flexible domestic goods prices and the long-term maturity of government debt. A discrete devaluation will then lead to an instantaneous rise in the price level and promote fiscal stability by lowering the domestic debt stock in real terms. Otherwise, the desired reduction in domestic debt service requires an overshooting of the real exchange rate. The gradual appreciation phase following the overshooting thus generates an interest tax on the domestic currency debt.

However, the need for a sustained real devaluation to generate a trade surplus might push domestic prices above the long-run equilibrium value of the purchasing power parity, leaving little room for overshooting. This may imply an unpleasant tradeoff between external adjustment and fiscal stability. We put the issue in the context of the Turkish economy, and examine, both historically and ex ante, the implications of the exchange rate policy for fiscal stability. Although the exchange rate regime since 1980 may be characterized as a managed float, its impact on fiscal stability has been variant. A basic observation is this: A lower (higher) real domestic interest rate or interest differential is accompanied by a *steady* real exchange rate depreciation (appreciation). Moreover, fiscal stability seems not to have benefitted from the exchange rate overshooting. When examining the implications of alternative exchange rate regimes for fiscal stability, an interesting finding is that maintaining a fixed exchange rate is only a temporary means for achieving the goal of fiscal stability.

1. Introduction

This paper investigates the implications of alternative exchange rate regimes for fiscal stability in Turkey. The focus is on the interest part of the government budget or, more broadly on the debt service burden. Concerned with the exhausting French debt service burden in the 1920s, Keynes suggested a discrete devaluation to erode the real value of domestic currency debt. His two main presumptions were the full flexibility of prices and the long-term maturity of government debt. Under these assumptions, a discrete devaluation, by allowing a once-for-all increase in the price level, would reduce the debt service burden by lowering government debt stock in real terms[1].

The desired reduction in the domestic debt service burden following the depreciation is not straightforward due to the observed stickiness in domestic prices and the domination of short-term debt. The reduction in the domestic debt servicing is still possible if a real exchange rate overshooting is realized (Ize and Ortiz, 1987). The exchange rate overshooting, by inducing an expectation of future appreciation, can reduce the domestic interest rate[2] and, hence, the cost of servicing domestic debt.

Moreover, the need for a sustained real devaluation, the squeeze in net international financial funds, and disadvantageous domestic debt contracts are likely to limit the devaluation induced improvement in the interest budget in most problem debtor countries (Reisen, 1990). The sustained real devaluation needed to generate a trade surplus and to service foreign debt may lead to a deviation of domestic prices from their long run equilibrium level where purchasing power parity holds, leaving little room for overshooting. This would imply lower savings from interest costs on domestic currency debt due to exchange rate overshooting. A devaluation can therefore worsen government finance if the share of foreign debt and the initial budget deficit on tradables is higher than the savings from the interest costs.

Similarly, a real devaluation would create a negative price effect on the budget if the real interest on external debt and the tradable deficit exceed new net foreign funds (debt minus interest). Government domestic debt in most debt-ridden countries has an extremely short-term maturity and a floating interest rate, or is

[1] Hence the detrimental effects of the growing debt stock on income distribution via interest transfers to rentiers and on efficiency via crowding-out would be avoided.

[2] So that interest parity holds.

closely indexed to inflation or to the devaluation itself. Therefore, a strategy based on inflicting surprise capital losses on domestic bond holders through devaluation has become increasingly ineffective (Buiter, 1985). The presence of asset substitution, by reducing the taxable base (stock of domestic currency assets), also limits the scope of surprise capital gains.

The preceding discussion focused on the interest part of the government budget as being our prime interest. The impact of the exchange rate depreciation on the non-interest part is even more complicated[3]. It is determined by the shares of tradables and nontradables in budget revenues and expenditures, and by the price and output responses of each good to the depreciation. The more outward-oriented an economy the more likely the government will benefit from the devaluation in terms of net revenue including revenue from price changes. The output response determines the levels of real output and spending to be taxed.

The exchange rate depreciation in many highly indebted countries has to accommodate inflation or even generate a real depreciation to maintain the capacity to serve external debt. Therefore it is of vital interest to understand whether exchange rate depreciation contributes to external adjustment and fiscal stability simultaneously, without an unpleasant tradeoff between both targets. We put this issue within the context of the Turkish economy in the analysis that follows. The rest of the paper proceedes as follows. Section 2 examines the evolution of exchange rate policy and public finance in Turkey, and tries to establish some empirical regularities. Section 3 investigates the implications of alternative (fully indexed and fixed) exchange rate regimes for fiscal stability through simulation of a macromodel.

2. Exchange rate, interest rate, and public finance in Turkey

The early 1980s marked the shift from a fixed to a relatively flexible exchange rate regime in Turkey. The present exchange rate regime may be described as a managed float or better a passive crawling peg. Periodic devaluations in response to foreign exchange crises prior to 1980 were replaced with a more systematic policy. The priority has, in general, been to avoid the negative effect of domestic inflation on external competitiveness. Especially, between 1981 and 1984, the government was committed to a real depreciation policy executed through daily

[3] See Balassa (1987), Reisen (1988), and Seade (1988).

nominal depreciations. Between 1985 and 1988, this policy led to relatively a constant real exchange rate.

Since 1989, however, the policy has been relaxed and more real appreciations have been allowed to reduce the pressure on the government budget. Lower depreciations have alleviated this pressure by lowering the foreign debt service. The policy makers' concern has gradually shifted from external competitiveness to price, and especially to fiscal stability (Erol,.1996). The intensifying burden of interest payments has become a major policy concern. Interest payments are now the second largest item, after the personal expenditures in the current budget outlays.

Total interest payments in the consolidated budget, as presented in Table 1, increased about eight times over the last fifteen years; from 0.95% of GDP in 1981 to 7.30% in 1995. The high interest payments have turned the budgetary balance into a deficit, which could otherwise have been in balance or even in surplus. The figures for 1994 and 1995 deserve more emphasis. As a long-term solution to the confidence crisis, which first occurred in the foreign exchange market and then shook the entire financial markets in early 1994[4], an austerity program was implemented. The program involved cuts in both current (including wages) and investment expenditures (see OECD, 1996). As a result, unusual surpluses in the primary budget balance were realized (3.80 and 3.29% of GDP). However, the improvement in the non-interest budget was not adequate to offset the additional interest burden, which was also affected by the jump in the domestic interest rate following the confidence crisis[5].

---

[4] Which was repeated later in 1995 albeit milder.

[5] Note also from Table 1 how the budgetary balance in real terms (i.e. the operational balance) is achieved. The estimates of principal erosion of domestic public debt due to inflation and real interest taxes indicate that inflation is the key in obtaining the real budgetary balance as opposed to the soaring interest payments in nominal terms.

Table 1
Deficit, debt and related indicators of Turkish public finance (*), 1980-1995
(Percentage of GDP)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Budget balance	-4.0	-1.6	-1.6	-2.1	-3.5	-1.1	-1.1	-2.8	-3.1	-3.2	-2.9	-5.0	-4.0	-6.8	-3.6	-4.0
Primary balance	-3.4	-0.7	-0.8	-1.3	-1.5	0.8	1.5	0.3	0.9	0.6	0.6	-1.2	-0.3	-0.7	3.8	3.3
Interest payments	0.6	0.9	0.8	1.5	2.0	1.9	2.6	3.1	4.0	3.8	3.5	3.8	3.8	6.1	7.5	7.3
Domestic	0.4	0.5	0.3	0.6	0.8	0.7	1.3	1.7	2.5	2.3	2.5	2.7	2.8	4.8	5.8	6.0
Foreign	0.2	0.4	0.5	0.9	1.2	1.2	1.3	1.4	1.5	1.4	1.1	1.1	0.9	1.3	1.6	1.3
Domestic debt[a]	7.3	6.1	5.7	5.4	6.4	6.6	6.6	7.7	7.6	7.7	7.0	8.9	11.0	11.4	16.7	17.0
Foreign debt[b]	12.9	14.5	17.7	21.6	22.0	21.0	23.1	26.4	30.0	22.3	17.8	20.0	20.1	1.4	29.4	24.1
Inflation tax[c]	12.2	2.9	2.8	5.4	5.6	3.4	2.1	5.2	5.2	4.7	3.3	3.7	3.7	3.5	7.6	2.7
Interest tax[d]	1.3	0.1	0.3	0.3	0.6	0.5	-0.4	0.3	-0.2	0.2	-0.4	-0.2	0.2	-2.1	2.3	-0.5
Principal erosion[e]	1.7	0.6	0.6	0.9	1.4	1.2	0.9	2.0	2.4	2.5	2.0	2.5	3.0	2.8	8.1	5.5
Devaluation effect[f]	4.2	2.9	2.5	1.8	0.5	-1.3	-1.2	-3.0	1.8	-4.8	-2.6	1.8	0.9	1.2	1.9	-0.3

Memo items: (period averages)	1980-1985	1986-1995	1980-1995
Real domestic interest rate[g]	0.8	5.3	3.6
Real exchange rate depreciation[h]	9.2	-2.1	2.1
Premium on domestic assets[i]	-13.2	4.6	-2.0

* Consolidated budget figures and in nominal terms; own calculations based on data its sources given in the appendix.
[a] End-period stock of bonds, bills and short-term advances to the Treasury.
[b] End-period stock of foreign debt owned by consolidated budget, converted into domestic currency multiplying by the end-period TL/$ exchange rate.
[c] End-period stock of M1 (currency and demand deposits) times end-period inflation rate.
[d] Principal erosion less domestic interest payments. A positive sign indicates a real interest tax on bond holders (see Spaventa (1988)).
[e] Inflation rate times the nominal domestic debt net of short-term advances.
[f] End-period real exchange rate depreciation times the stock of foreign debt in domestic currency. A minus sign indicates inflationary erosion of foreign debt stock as it exceeds the nominal depreciation.
[g] Based on 1-year time deposit rat; the series on bond and bill rate is not complete.
[h] Based on TL/$ rate.
[i] Differential between 1-year TL deposits and 1-year Eurodollar rate (end-period) adjusted for nominal depreciation.

In fact, at the background, lies the fact that a policy of reducing foreign debt service in domestic currency through lower depreciation cannot be permanent. With capital mobility and a deregulated financial system, intentionally lower exchange rates can only be maintained by a continuous rise in the domestic interest rate, which must compensate for the expected devaluation. In the end, the pressure from foreign debt service is reduced at the expense of domestic debt service. As was the

case in Turkey this may be accompanied by a confidence crisis which originates in the foreign exchange market and spreads to the rest of domestic financial system. Even with a highly flexible (crawling peg) regime, maxi-devaluations and a jump in the domestic interest rate were unavoidable to get out of the confidence crisis. The realignment of the exchange rate will, contrary to what was initially desired, increases the foreign debt service in domestic currency terms.

To see more closely the link between the exchange rate policy and the domestic interest rate we present the real exchange rate (e) and the differential between the real domestic (rd) and foreign (rf) interest rates in Figure 1 below[6]. The crucial question is whether the real exchange rate overshooting has helped to reduce the domestic interest rate and thus the domestic debt service burden. This would happen if the exchange rate is expected to appreciate following a real exchange rate overshooting. In the end a gradual real exchange rate appreciation would be accompanied by a lower real domestic interest rate (or interest rate differential).

---

[6] The real exchange rate refers the TL/US$ bilateral rate, and a rise (fall) indicates a real depreciation (appreciation) of the lira. The nominal interest rates used are 1-year TL deposit and Eurodollar rates. The sources of data are given in the appendix.

Figure 1
Real exchange rate and real interest differential

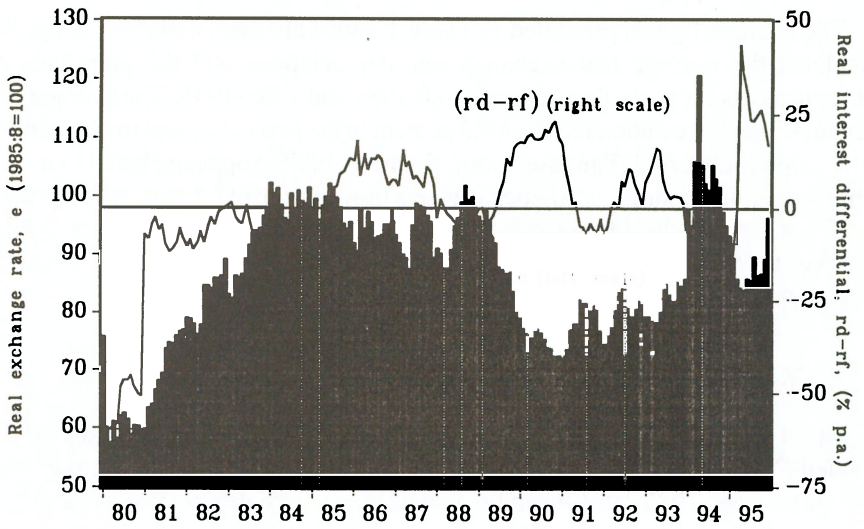


Figure 1 illustrates the evolution of the exchange rate policy as briefly described above. There was a steep rise (depreciation) in the real exchange rate over 1980-1984, which then stabilized around a constant slightly lower than the PPP parity over 1985-1988. Beginning with 1989, the real exchange rate fell (appreciated) steadily, except mid-1994 when the lira was devaluated sharply by about 30 percent. How have these changes have affected the real domestic interest rate or the differential between the TL and foreign interest rates? Figure 1 indicates an interesting association between the real exchange rate and the interest rates. Up to 1985, the real domestic interest rate stayed below the foreign real interest rate adjusted for depreciation. The opposite occurred for most of the sample period; the domestic rate generally exceeded the international rate over 1985-1993 and 1995, 1994 being an exception.

If the actual and expected inflations do not match[7] this will lead to a divergence between the realized and expected real interest rates. To see whether this was the case in Turkey over the sample period we compare the nominal domestic-foreign interest rate differential with the inflation differential. The interest rate differential did not imply any significant decline in the expected inflation.

The average figures presented in Table 1 above are even more revealing. We calculated the average real exchange rate depreciations and the premiums on domestic assets for two subperiods of 1980-1985 and 1986-1995. The average real exchange rate depreciation fell from 9.2 percent in the first subperiod to -2.1 percent in the second subperiod. The asset return figures exhibited opposite behaviour. The average nominal premium on domestic assets moved from -13.1 percent per year in the first subperiod to 4.6 percent in the second subperiod[8]. The move from a negative to a positive premium on domestic assets[9] after 1985 implies a deterioration in both the exchange rate and inflation expectations.

2.1 How does it fit the theory?

The Turkish situation is broadly in consistent with the prediction of the Mundell-Fleming-Dornbusch model: A lower real domestic interest rate was realized between 1980-1984 when the real exchange rate depreciated steadily and approached the PPP rate, and in 1994 when the real exchange overshooting reached its peak. During the rest of the sample period, a higher real domestic interest rate was realized along with a steady real exchange rate appreciation.

However, fiscal stability did not benefit from the exchange rate overshooting mechanism, especially during the 1986-1995 period. If anything, the exchange rate in this period seems to depict an undershooting rather overshooting[10]. This in turn

---

[7] Owing to price flexibility or policy credibility. This issue has led to the expectations approach to stabilization or disinflation programs (see, e.g., Dornbusch, 1993).

[8] The interest rate on foreign deposits at domestic banks, which consists of a country risk premium, was also considered in place of the Eurodollar rate. The result did not qualitatively change.

[9] This is known as the peso problem.

[10] The year 1994 is an exception which partially accords with the overshooting hypothesis in the second period. The hypothesis predicts, after an overshooting (undershooting), a *gradual* real appreciation (depreciation) will be accompanied by a lower (higher) real domestic interest rate. The appreciation observed in 1994 was, by conrast, *swift* and short-lived.

requires that the real exchange rate-interest rate movements were largely affected by fundamentals rather than monetary policy. In other words, the recent Turkish experience can be interpreted on the basis of equilibrium dynamics rather than disequilibrium dynamics or mere speculation.

Indeed, the (inconsistent) policy mix that prevailed during the 1986-1995 period is consistent with the underlying theory. The concurrence of persistent budget deficits, capital inflows and somewhat tight domestic money (or controlled monetary growth) favors fundamentals rather than the monetary policy (which drives the overshooting result) as the main explanation[11].

To obtain further insight into this basic but highly controversial issue of international finance we also attempt to estimate a coefficient of overshooting/undershooting following Driskill (1981). This is done by estimating a short-run reduced form of the monetarist model of exchange rate determination or its asset-market based variants. The coefficient of money supply is expected to be strictly greater than unity if an overshooting is to be realized. The regression result, based on a regression of the exchange rate on money supply (M3) and domestic prices (actually, first differences were used because almost all variables are I(1) and a cointegration variable for the long-run equilibrium relation is included) does not yield strong evidence for overshooting. The parameter of money supply tends to be unity but never reaches a value such as 2 as the hypothesis requires. This is not surprising for a high inflation economy where the exchange rate and money supply show large fluctuations (see McNown and Wallace (1994) for similar high inflation economies)[12].

The high real interest differential observed might also imply that the real exchange rate was lower than the equilibrium rate, or the equilibrium rate itself shifted upward. A test of whether there is a rise in the equilibrium real exchange rate is to regress the rate of change in the actual real exchange rate (e) on the real interest rate differential (define this - r^*), where r^* is the real foreign rate in foreign currency. A regression coefficient close to one means that most of the changes in the real spot

---

[11] Agenor et al. (1997) reach the same conclusion in their VAR analysis: namely that fiscal policy and capital inflows rather than monetary policy were the main determinants of the real exchange rate movements.

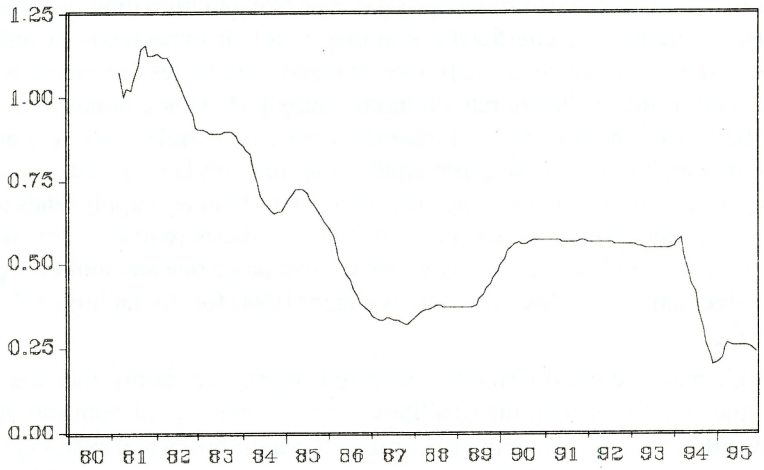
[12] The presence of a J-curve effect, which was verified for Turkey in Erol and van Wijnbergen (1997), is another explanation for such a result.

rate are due to changes in the interest rate differential, implying that there is no significant change in the long-run equilibrium value of (e). Moreover, a constant coefficient over time would indicate no change in the time span in which (e) returns to its long-run equilibrium[13].

The point estimate of the coefficient over 1980-1995 is 0.24[14]. However, significant changes in the coefficient value were observed through time. In the early 1980s, it approached and even exceeded one, and then declined steadily, as given by the recursive coefficient estimate in Figure 2.

Figure 2

An estimate of the change in equilibrium real exchange rate



Note :Decline mens a rise (depreciation) in the equilibrium value

---

[13] The preceding test implicitly assumes that the forward exchange rate remains constant, implying that the spot rate returns to initial equilibrium with the period of the cover. A better test would be based on covered interest parity whereby the changes in the forward exchange rate a measure of the expected future rate is also taken into account (see Somensatto, 1985). Unfortunately, the absence of data on the forward market for the TL (introduced only in 1996) does not allow further analysis in this direction.

[14] Based on the monthly series expressed in annual terms, i.e., annual interest rate differential and real depreciation.

The recursive estimate provides a preliminary evidence that the equilibrium real exchange rate has *increased* over time. The evolution of this coefficient is also consistent with the exchange rate-interest rate cycle discussed above. Namely, during the 'real exchange rate depreciation-lower domestic interest rate' phase in the early 1980s, the increase in the equilibrium exchange rate is smaller, while it is much higher in the later real appreciation-higher domestic interest rate' phase.

The equilibrium real exchange rate might be influenced by a number of factors ranging from the budget and external deficits to consumption/investment[15]. We finally present the figures for the trade balance, consumption and investment ratios and terms of trade in Table 2. Although not decisive, the deterioration in the trade balance and terms of trade (and the budget deficit in Table 1), the increase in consumption, and the decline in the gross fixed investment are consistent with the predicted rise in the equilibrium real exchange rate[16].

Table 2

Possible determinants of the equilibrium real exchange rate

	1987	1988	1989	1990	1991	1992	1993	1994	1995
Trade balance/GDP	-2.2	1.1	-1.6	-4.3	-2.8	-2.9	-5.9	0.9	-4.4
Consumption/GDP	76.4	73.0	77.4	79.7	80.3	79.7	79.6	78.8	80.2
Investment/GDP	24.8	26.8	23.5	22.9	23.4	22.9	25.1	23.3	20.4
Terms of trade	109.3	100.1	99.1	98.3	97.4	101.8	113.1	91.2	94.5

Source: Author's calculations based on the data provided in the appendix.

Cointegration estimates of the real exchange rate on the budget deficit ratio and real interest rate differential confirms the causal relations derived from Table 2 and

[15] The resulting lower (higher) domestic saving and real wealth will lead to a depreciation (appreciation) of the domestic currency.

[16] The exceptional positive trade and budget balance ratios in 1994 are mainly due the austerity program implemented.

Figure 1[17]. During the 1980-1985 period the cointegration estimation yields a positive association between the real exchange rate (a rise means real depreciation) and real domestic-foreign interest differential, which is strongly negative during most of the sample period (1986-1995). The estimated coefficient on the budget deficit ratio is negative during both periods but it is much higher in the second period. Finally, the presence of a J-curve effect rr.

3. Implications of alternative exchange rate regimes

In this section we formally analyze the implications of alternative exchange rate regimes for fiscal stability through simulation of an econometric model. The model developed elsewhere was modified for this purpose[18]. The interaction between the exchange rate, interest rate and interest payments by the government is explicitly incorporated in the model. Two alternative regimes, a passive (flexible) and an active (fixed) crawls, are considered. Within the fixed regime, further, the credible and noncredible cases are distinguished. This is necessary given the essential role played by expectations or policy credibility in fixed exchange rate regimes.

The model describes the financial and real sectors in sufficient detail. The financial sector specifies the private sector portfolio allocation and the domestic interest rate. Government interest payments on domestic and foreign debt are the determined in response to variations in the exchange rate and the domestic interest rate. The portfolio allocation model is similar to the open economy portfolio balance model in its treatment of the exchange and interest rates. In that, assets denominated in different currencies are imperfect substitutes and the two parities (purchasing power and uncovered interest rate) are not enforced. The interest rate on domestic borrowing is determined as an oligopolistic pricing equation, where alternative interest rates (discount and foreign borrowing rates) and the market pressure are the main arguments.

In the specification of the real sector, the emphasis is on the demand side, and the supply side is sufficiently embodied. Output is demand-determined, but a measure of demand pressure is derived by contrasting the actual output with capacity output. The external trade balance is explicitly incorporated by specifying

---

[17] The results are not presented here but can be obtained upon request.

[18] In Erol (1996). Since it was described in detail there we preferred only a shortcut here.

import and export demand functions. An expectation-augmented inflation equation is another building block of the real side of the economy. The model was applied to quarterly Turkish data over the 1980-1993 period.

When estimating the government interest payments two common sources of inefficiencies were encountered. These are the maturity structure of the debt stocks and the terms structure of the interest rates. In principal, the interest payments are the product of the outstanding stock of debt and the relevant interest rate. For the calculation of domestic interest payments, the requirement of accurate data on the amount and maturity structure of the government domestic debt stock is essential. For foreign interest payments, furthermore, the currency denomination is also important. We have tried different lag structures of the debt stocks and interest rates in order to obtain a good approximation of the interest payments. As expected, the technical equation describing the domestic interest payments tends to require shorter lags compared to the equation describing the foreign interest payments. The simulation model including all technical and behavioral equations are presented as a file in the data appendix[19].

Four different simulations were run to quantify the implications of the alternative exchange rate regimes for the budget balance or more precisely the interest budget. These are a baseline simulation[20] and three specific policy regimes. One policy regime corresponds to a passive crawling peg regime or a full indexation of depreciation to inflation. The other two correspond respectively to a credible and a noncredible fixed exchange rate regime. In the case of full indexation, the rate of depreciation is set equal to the last period inflation differential. The credible fixed regime is defined as the case where the policy is fully credible, i.e., there is no expectation of a devaluation. In the noncredible case, there is an expectation of devaluation, which is greater than zero (policy-determined devaluation rate). The expected devaluation rate is assumed to be determined by the interest rate differential.

The simulations cover seven quarters between 1992.1-1993.3, and their results are shown in Figure 3. The simulated paths of the budget deficits, expressed as the ratio to GDP and as the difference from the baseline, are denoted by SIM1, SIMFIX1, and SIMFIX2. They are onçe again defined as:

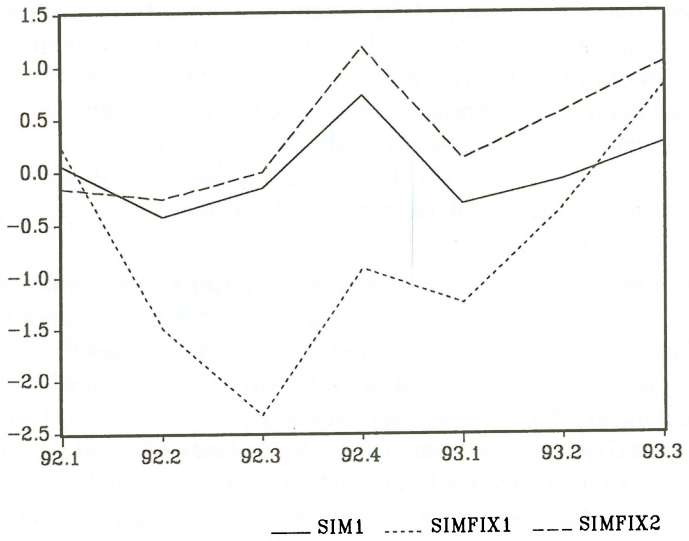
---

[19] Remember that the noninterest government budget is taken to be exogenous in the model.

[20] Whereby the exchange rate depreciation is exogenous, i.e., set to its historical values.

SIM1: Actual devaluation = expected devaluation = inflation differential
SIMFIX1: Actual devaluation = expected devaluation = 0
SIMFIX2: Actual devaluation = 0, expected devaluation = interest rate differential

Figure 3
Budget deficit output ratio (difference from baseline)



A complete indexation of the exchange rate to the inflation differential would lead to a slightly higher budget deficit-GDP ratio (from 5.24 to 5.26 on average). A fully credible fixing would substantially reduce the deficit-GDP ratio in especially the first four quarters (from 5.24 to 4.49 on average)[21]. Finally, a noncredible fixing would however increase the deficit ratio (from 5.24 to 5.60 on average). Interestingly enough, this is an ever-accelerating increase, indicating that a fixed

[21] The figure indicates a reversal in the deficit ratio as the time passes. This reversal is partly due to the decline in output (an evidence for the "recession-later hypothesis"), averaging to 4.48 percent. See Erol (1996).

regime lacking credibility is unsustainable.

This result is consistent with the actual experience of the period between 1986-1993 when the lower depreciations were allowed to reduce the domestic currency counterpart of the foreign debt service. As noted before, this policy culminated in a financial crisis rooted in the foreign exchange market, and had the un desirable consequence of a larger debt service due to sharp rises in the domestic interest and the exchange rates.

4. Concluding remarks

Like inflation tax on money balances, a discrete devaluation may, under some assumptions, inflict a capital tax on domestic bond holders. These assumptions are the full flexible of domestic goods prices and the long-term maturity of government debt. Under these assumptions, a discrete devaluation will induce a jump in the price level and reduce the debt service by lowering the domestic debt stock in real terms. If, however, prices are sticky and the maturity of domestic debt is short-term, the desired reduction in domestic debt service requires an overshooting of the real exchange rate. Real exchange rate overshooting, by inducing expectations of appreciation, lowers the domestic interest rate and therefore the real interest payments on the domestic debt. The gradual appreciation phase following the overshooting thus generates an interest tax on the domestic currency debt.

However, the need for a sustained real devaluation to generate a trade surplus might push domestic prices above the long-run equilibrium value of the purchasing power parity, leaving little room for overshooting. This upward shift in prices must soon be accommodated by depreciation, raising the budgetary transfers for external debt service in domestic currency terms. The presence of asset substitution (by reducing, for example, the taxable stock of domestic assets) and bond indexation (by preventing the erosion of principal and inflicting interest tax) would also limit the role overshooting in reducing the domestic debt service. All these and other limitations may imply an unpleasant tradeoff between external adjustment and fiscal stability.

We put the issue in the context of the Turkish economy. We have examined, both historically and ex ante, the impact of the exchange rate policy on fiscal stability in Turkey. Although the exchange regime since 1980 may be characterized as a managed float, its impact on fiscal stability has been variant. Between 1980-1985 fiscal stability seems to have benefitted from the lower real domestic interest

rate that was accompanied with a sustained real depreciation. Between 1986-1995, with the exception of 1994, the relatively higher real domestic interest rate that was accompanied in general by real appreciation did not contribute to fiscal stability.

The Turkish experience in general fits the Mundell-Fleming-Dornbusch model: A lower (higher) real domestic interest rate or interest differential was accompanied by a *steady* real exchange rate depreciation (appreciation). However, the specific overshooting effect has not been realized especially in the second half of the 1980s. If anything, the exchange rate in this period characterizes an undershooting, in contrast to the previous period of overshooting. Persistent fiscal (and current account) deficits seem to have effected this result by leading to a higher real domestic interest rate and therefore a higher long-run equilibrium exchange rate[22].

We have also undertaken an ex ante analysis to quantify the implications of the alternative exchange rate regimes for fiscal stability. This was done through the simulation of an econometric model where the interactions between the exchange rate, interest rates and interest payments were embodied in. The paths of fiscal balances under complete indexation, and a credible and a noncredible fixed regimes were generated. The simulation on complete indexation implied a slightly higher budget deficit relative to the baseline. A complete indexation might be preferred to the actual record of the same period (1992-1993) given this negligible deterioration in the fiscal balance but significant improvement in the trade balance. The simulation on the credible fixed regime produced a significant improvement in the fiscal balance, while the simulation on the noncredible fixed regime implied a deterioration. More important is the result that gaining fiscal stability through a fixed exchange rate regime is only a temporary solution. After one year, the budget deficit ratio starts rising under the credible policy case and accelerates further under the noncredible policy case.

---

[22] This also implies that rational expectations prevailed in the foreign exchange market: A steady real depreciation narrows the gap between the equilibrium and actual exchange rates, leads to a lower expected devaluation, and thus tends to reduce the domestic interest rate. Similarly, a steady real appreciation widens the gap, and induces a higher expected real depreciation and domestic interest rate.

Data Appendix

A. Simulation model and variable definitions

Real sector

```
consp1 = 1.523-0.148*reml+0.786*ydisl-0.139*idsq+0.0318*seas3+0.025*conspl(-4)
inpl   = -4.45+6.286*log(1+caputlp)+0.257*rexl+0.351*yl-0.395*log(1+ibq)
         -0.057*seas1+0.20*seas2+0.463*inpl(-4)
expl   = -2.50+0.360*rexl(-1)+0.2029*oecdimpl+0.0662*seas2+0.1286*seas3
         +0.3267*seas4+0.679*expl(-1)
impl   = 2.79-0.607*reml+0.290*absorbl-0.184*seas1+0.122*seas4+0.518*impl(-1)
pdhat  = -0.0815+0.3572*ehat1+0.1147*pmfhat+0.2148*caputlp+0.0304*seas1
         -0.0294*seas3
loanpr = -0.22-0.40*ibq+0.276*ilfq+0.106*yinvpra+0.262*loanpr(-1)
```

Financial sector

```
curr   = 0.014-0.1296*idtq-0.0139*edtq-0.0715*idsq+0.3052*ywealra-0.2458*pdhat
         -0.00046*time3+0.1824*curr(-1)
sdepr  = 0.091-0.279*idtq-0.086*edtq+0.291*idsq+0.184*wealtra-0.019*seas1
         +0.015*seas4 +0.545*sdepr(-1)
tdepr  = 0.088+0.229*idtq-0.040*edtq-0.315*idsq-0.0168*seas3-0.0219*seas4
         -0.001*time3 +0.816*tdepr(-1)
fdepr  = 0.012+0.165*edtq-0.163*idsq-0.074*wealtra-0.010*seas2+0.001*time2
         +0.939*fdepr(-1)
ibq    = -0.053+0.43*loansp(-1)+0.189*loansg(-1)+0.608*irq+0.298*ilfq
         +0.246*ibq(-1) loanpca = exp(inpl)*loanpr*pd
         d(dc)= def1-d(lgct)-d(flgc)
```

Identities

Real sector identities

```
yl      =  log(y)
ydisl   =  log(y-tax)
absorbl =  log(0.8*(exp(inpl)+exp(invgl))+0.2*(exp(conspl)+exp(consgl)))
y       =  exp(conspl)+exp(inpl)+exp(consgl)+exp(invgl)+exp(expl)-exp(impl)
yinvpra =  y/exp(inpl)
wealthra =  1000/wealthca
ywealra =  0.1*pd*y/wealthca
```

Fiscal identities

```
defl   = defprime+intd+intf
intd   = 0.333*(lgct+lgct(-1)+lgct(-2))*ibc(-1)
intf   = 0.333*(flgc+flgc(-1)+flgc(-2))*0.333*(ilfc+ilfc(-1)+ilfc(-2))
```

Price, interest and exchange rates identities

```
pd     = pd(-1)*(1+pdhat)
edex   = edex(-1)*(1+ehat)
reml   = log((pmf*edex)/pd)
rexl   = log((pxf*edex)/pd)
idtq   = (1+idtc/4)/(1+pdhat)-1
edtq   = (1+ehat1)*(1+idfc/4)/(1+pdhat)-1
idsq   = (1+idsc/4)/(1+pdhat)-1
ibc    = ((1+ibq)*(1+pdhat)-1)*4
flgc   = floangf*E
E      = E(-1)*(1+ehat)
E1     = E1(-1)*(1+ehat1)
loansp = loanpca/(wealthca*(sder+tder+fder)+gdep+redisco)
loansg = loangca/(wealthca*(sder+tder+fder)+gdep+redisco)
ilfq   = (1+ilfc/4)*(1+ehat)/(1+pdhat)-1
irq    = (1+irc/4)/(1+pdhat)-1
tradebal = (impl-expl)
idtc   = 0.309+0.144*ibc-0.318*tder-0.156*rrrd+0.213*dum884+0.637*idtc(-1)
idsc   = 0.194-0.358*sder-0.164*ibc(-3)+0.623*idsc(-1)
ehat   = ehat1 = (1+pdhat)/(1+pushat)-1 for SIM1
ehat   = ehat1 = 0 for SIMFIX1
ehat   = 0, ehat1 =(1+idtc/4)/(1+idfc/4)-1 for SIMFIX2
```

Alphabetic list of all variables used

absorb	real domestic absorbtion
caputlp	capacity utilization rate in private sector
consp	real private consumption
consg	real public sector consumption
cur	demand for domestic currency
dc	short-term advances to Treasury
defl	consolidated budget deficit (nominal)
sdep	demand for domestic demand deposits (nominal)
E	TL/$ exchange rate

edex	exchange rate index
edtq	real interest rate on foreign deposits (per quarter)
ehat	actual nominal exchange rate depreciation
ehatl	expected nominal exchange rate depreciation
exp	real exports
fdep	demand for foreign exchange deposits
flgc, floangf	government foreign borrowing in domestic, foreign currencies
gdep	government deposits at domestic banks
ibq, ibc	real, nominal interest rates on domestic bank loans
idfq, idfc	real, nominal interest rates on Eurodollar deposits (per quarter)
idsq, idsc	real, nominal real interest rates on domestic demand deposits (per quarter)
idtq, idtc	real, nominal interests rate on domestic time deposits (per quarter)
ilfq, ilfc	real, nominal foreign interest rates on foreign deposits and loans
impo	real total imports
intd	government interest payments on domestic debt (nominal)
intf	government interest payments on foreign debt (nominal)
inp	real private investment
invg	real public sector investment
irq, irc	real, nominal discount interest rate
loanp	private sector demand for domestic credits (nominal)
loanf	public sector demand for domestic bank loans (nominal)
oecdimp	volume of OECD real import (index)
pd, pdhat	domestic price index, inflation rate
pus, pushat	US price index, inflation rate
pmf, pxf	foreign currency price imports, exports
redisco	central bank rediscount credits
rem, rex	real exchange rate indices for imports, exports
$seas_i$	seasonal dummies
tax	real taxes
tdep	demand for domestic time deposits
wealthca	private financial assets (nominal)
y	real domestic output
ydis	real disposable income

Note: A l at the end of a variable means logarithmic transformation, and r means a ratio. * specifies multiplication.

B. Data sources

Bank deposits and domestic currency
Source: IFS (International Financial Statistics) for 1980.01-1985.12; CBTUR (Central Bank of Turkey, 1993) for 1986.01-1991.12. CBTUR (1993) is a special issue of monthly money and banking statistics for 1986.01-1991.12; CBTUR Quarterly Bulletins after 1992:01.

Domestic borrowings
Source: same as financial assets above.

Government foreign borrowing
Source: Under-Secretary of Treasury and Foreign Trade.

Interest rate on bank deposits and loans
Source: CBTUR Monthly and Quarterly Bulletins.

Interest rate on foreign borrowing
Source: World Debt Tables, various issues, The World Bank.

Foreign exchange rate
Source: CBTUR, Quarterly Bulletins.

Budget deficit and interest payments by the public sector
Source: Under-Secretary of Treasury.

Domestic and foreign price indexes
Source: OECD Main Indicators for domestic deflators; CBTUR Quarterly Bulletins for imports and exports price indices.

Components of GDP
Source: Özmucur [A quarterly econometric model of Turkey, 1987, TUSIAD] for 1980.1-1986.4, and State Institute of Statistics (SIS) since 1987:1.

Capacity utilization rate
Source: State Institute of Statistics (ISS).

References

AGENOR, P.-R., MCDERMOTT, C. J. and ÜÇER, M. (1997), "Fiscal imbalances, capital inflows, and the real exchange rate: The case of Turkey", *European Economic Review*, 41 (special issue), 819-25.

BALASSA, B. (1987), "Effects of exchange rate changes in developing countries", *DRD Discussion Paper*, No. 291, World Bank.

BUITER, W. H. (1985), "A guide to public sector debt and deficits", *Economic Policy*, 1, 13-79.

DORNBUSCH, R. (1986), *Dollars, Debt, and Deficits*, Cambridge, Mass.: MIT Press.

——— (1993), *Stabilization, Debt, and Reform: Policy Analysis for Developing Countries*, Harvester-Wheatsheaf.

——— (1989), "Real exchange rates and macroeconomics: A selective survey", *Scandinavian Journal of Economics*, 91, 401-32.

DRISKILL, A. R. (1981), "Exchange rate Dynamics: An empirical investigation", *Journal of Political Economy*, 89, 357-71.

EROL, T. (1996), *Exchange Rate Policy in Turkey: External Competitiveness and Internal Stability*, Tinbergen Institute Research Series, No. 113, Amsterdam.

EROL, T. and VAN WIJNBERGEN, S. (1997), "Real exchange rate targeting and inflation in Turkey: An empirical analysis with policy credibility", *World Development*, No.1.

FRENKEL, A. J. and RODRIQUEZ, C. A. (1982), "Exchange rate dynamics and the overshooting hypothesis", *IMF Staff Papers*, 29, 1-30, International Monetary Fund.

GUIDOTTI, E. P. and KUMAR, M. S. (1991), *Domestic Public Debt of Externally Indebted Countries*, Occasional Paper No. 80, International Monetary Fund.

IZE, A. and Ortiz, G. (1989), "Fiscal rigidities, public debt, and capital flight" M.I. Blejer and K. Chu (eds.), in *Fiscal Policy, Stabilization, and Growth in Developing Countries*, International Monetary Fund.

MCNOWN, R. and WALLACE, M. S. (1994), "Cointegration tests of the monetary exchange rate model for three high-inflation economies", *Journal of Money, Credit, and Banking*, 26, 396-411.

OECD (1996), *Economic Survey, Turkey*, Paris: OECD.

REISEN, H. (1988), "Export orientation, public debt, and fiscal rigidities: The different performance in Brazil, Korea, and Mexico" *Journal of International Integration*, 3, 99-115.

——— (1990), "Interaction between the exchange rate and the public budget in major debtor developing countries" in V. Tanzi (ed.) *Fiscal Policy in Open Developing Economies*, International Monetary Fund.

SEADE, J. (1988), Tax revenue implications of exchange rate adjustment", Paper presented at International Institute of Public Finance, 44th Congress, Istanbul.

SPAVENTA, L. (1988), "Introduction: Is there a public debt problem in Italy?", F. Giavazzi and L. Spaventa (eds.), in *High Public Debt: The Italian Experience,* Cambridge , Mass.: Camdridge University Press.

SOMENSATTO, E. (1985), "Budget deficits, exchange rates, international capital flows, and trade", in P.Cagan (ed.), *Essays in Contemporary Economic Problems: The Economy in Deficit*, American Enterprise Institute.

Özet

Kur rejimleri ve mali istikrar: Türkiye için bir uygulama

Yurtiçi fiyatları tam esnek olduğunda ya da devlet borcunun uzun vadeli olduğu durumlarda, yapılan devalüasyonlar yurtiçi bono sahiplerine bir sermaye vergisi gibi yansıyabilir ve aynı zamanda borç servis yükünü azaltır. Devalüasyon, fiyat seviyesinde ani bir yükselişe yol açar ve yurtiçi borç stokunu reel olarak düşürüp, ekonomiyi mali istikrara doğru götürür. Aksi takdirde, yurtiçi borç seviyesindeki azalma, reel kur hedefinin aşılmasını gerektirebilir. Reel kurun hedefini aştığından sonraki ve reel paranın azar azar değer kazandığı dönemde, yerli para cinsinden olan borcun faiz yükü, sanki bir faiz vergisi konulmuş gibi artar.

Diğer taraftan, oluşan ticaret fazlasını sürdürebilmek için gereken reel devalüasyonlar, yurtiçi fiyatlarını 'satınalma gücü paritesi'nin uzun vadedeki seviyesinden daha yüksek bir seviyeye iterek, reel kur hedefinin aşılma olasılığını azaltır. Böylce mali istikrar ve dış denge hedefleri arasında bir tercih söz konusu olur. Bu makalede, değişik kur politikalarının mali istikrar üzerindeki etkilerine türkiye açısından hem tarihi, hem de *ex ante* olarak bakılmaktadır. Türkiye'de 1980'den itibaren uygulanan kur plitikası genelde 'managed float'olarak tanımlansa da, bu politikaların mali istikrar üzerindeki etkileri çok çeşitli olmuştur. Genel bir gözlem ise, reel yutiçi faiz oranları veya yurtiçi-yurtdışı faiz farkı arttığında (azaldığında), reel kur sürekli değer kaybetmektedir (kazanmaktadır). Reel kur hedefinin aşılması ise mali istikrarı sağlamakta pek faydalı olmamıştır. Değişik kur politikalarının mali istikrar üzerindeki etkilerine baktığımızda, sabit kur politikasının bu hedefi salt geçici olarak sağladığını görüyoruz.