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Fiscal imbalances, capital inflows, and the real exchange rate: The case of Turkey

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Abstract

This paper examines the links between fiscal policy, capital inflows and the real exchange rate in Turkey since the late 1980s. The first part provides an overview of recent macroeconomic developments in Turkey. The second part estimates a vector autoregression model linking government spending, interest rate differentials, capital inflows, and the temporary component of the real exchange rate – estimated using three alternative techniques. Positive shocks to government spending and capital inflows lead to a real appreciation, whereas positive shocks to the uncovered interest rate differential lead to a capital inflow and an appreciation of the real exchange rate. Our findings highlight the role of fiscal adjustment for restoring macroeconomic stability in Turkey. © 1997 Elsevier Science B.V.

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1. Introduction

The Turkish economy has opened up substantially over the past 15 years through extensive reforms in the external and financial sectors, while registering relatively high growth rates. Nevertheless, except through the first half of the 1980s, macroeconomic balances have deteriorated almost continuously, with inflation gradually taking a chronic nature, and the economy becoming increasingly dollarized.

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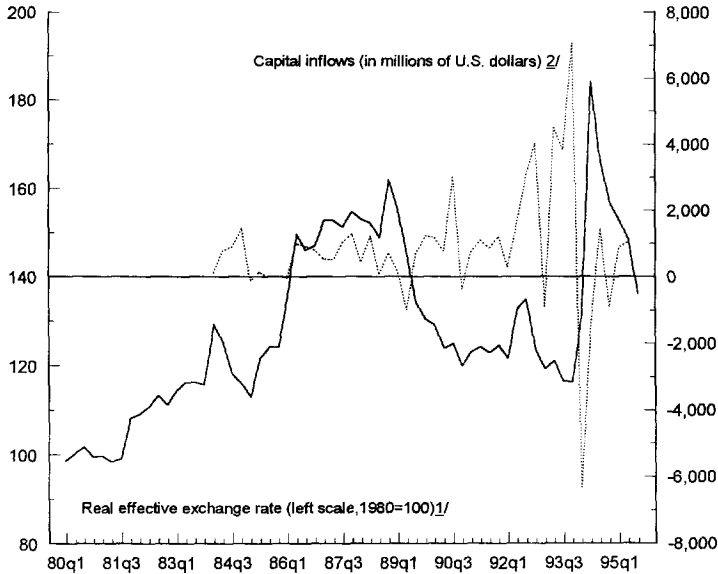


Fig. 1. Turkey: Real exchange rate and capital inflows. (Source: IFS and Information Notice System, IMF.) (1) An increase is a depreciation. (2) Calculated as the sum of net direct investment from abroad, net portfolio investment liabilities, other net investment liabilities, and net errors and omissions; data not available before 1984.

To a large extent, this deterioration has been a reflection of slow progress in the area of fiscal reform. The public sector borrowing requirement (PSBR) rose from an average of 4–5 percent in the first half of 1980s to about 10 percent in the early 1990s, with the share of government consumption in GNP also rising during the period. The deterioration in macroeconomic balances became much more pronounced during the second half of the 1980s. Reflecting lax financial policies and the stalling stabilization efforts, annual inflation jumped to almost 75 percent in 1988 and above 100 percent in 1994 – fuelled in part by a large depreciation of the nominal exchange rate. In the fiscal area, the PSBR increased every year between 1988 and 1993 – as a result mostly of higher expenditure, associated with wage increases for public sector workers and civil servants, generous agricultural support policies, as well as continued worsening of the performance of the state enterprise sector. The PSBR expanded from around 4 percent in mid-1980s to over 12 percent in 1993.

Despite this mixed record, Turkey began to receive substantial private capital inflows in the late 1980s, following the full liberalization of the capital account (Fig. 1). These inflows have taken place against a background of policy inconsistencies, at least through early 1993. While the fiscal deficit was expanding, the central bank attempted to maintain monetary growth under control. This policy mix resulted in high interest rates (pushing the private sector to borrow offshore)

and an appreciating exchange rate. Expansionary economic policies (particularly in 1993) and the resulting high growth rate led to a deterioration of external accounts and culminated in a foreign exchange crisis in early 1994.

This paper explores the links between fiscal imbalances, capital inflows and the real exchange rate in Turkey since the late 1980s using an (unrestricted) vector autoregression (VAR) model. We begin by describing the specification of the model, and examine the time-series properties of the variables included in the system. We then focus on the analysis of the short-run dynamic interactions among these variables by using standard innovation accounting techniques: variance decompositions (VDCs) and impulse response functions (IRFs).

2. The VAR model

The basic variables used in the VAR analysis are as follows. The *fiscal variable* g_t is defined as the deseasonalized value of the ratio of government expenditure to GNP. The (ex post) *interest rate differential* ρ_t is the difference between the 3-month Turkish treasury bill rate and the domestic rate of return on foreign bonds – calculated as the sum of 3-month eurodollar rate in London plus the actual rate of depreciation. The *capital flows* variable f_t is defined as a broad measure of net private capital inflows (including errors and omissions) in proportion of GNP. z_t is the inverse of the real *effective exchange rate* index, as calculated by the IMF, so that a rise in z_t corresponds to a real depreciation.

Stationarity tests based on the Augmented Dickey–Fuller test and the Philipps–Perron test were performed on all these variables.¹ As described in Agénor et al. (1996), the results indicate that (the logarithm of) the real exchange rate lz_t is nonstationary in levels, whereas the other three series – the interest differential, and government spending and capital flows, both in percent of GNP – are stationary in levels.

To avoid mixing stationary and nonstationary variables in the VAR, and in order to use standard VAR techniques, we use the temporary component of the real exchange rate (TCRER). This component, denoted lz_t^c , is calculated by decomposing the original series into nonstationary (trend) and stationary (cyclical or transitory) components. From an economic point of view, the use of the TCRER is motivated by our focus on high-frequency factors in the determination of changes in relative prices, as opposed to low-frequency ones, such as changes in productivity across sectors.

The TCRER was calculated using three alternative techniques: the first-differenced series, the Hodrick–Prescott (HP) filter, and a non-parametric (NP)

¹ Quarterly data covering the period 1987:1 to 1995:1 (33 observations in all) were used for estimation. See Agénor et al. (1996) for more details.

Table 1
Variance decompositions

Quarters	HP filter				FD filter				NP filter			
	g_t	ρ_t	f_t	lz_t^c	g_t	ρ_t	f_t	lz_t^c	g_t	ρ_t	f_t	lz_t^c
<i>Decomposition of ρ_t</i>												
1	5.0	94.0	0.0	0.0	1.7	98.3	0.0	0.0	10.5	89.5	0.0	0.0
4	7.1	77.8	10.3	4.8	5.3	86.8	7.0	0.9	11.6	68.2	13.8	6.5
8	7.0	75.3	12.0	5.7	5.9	83.8	8.8	1.6	11.2	63.7	17.0	8.1
12	6.9	75.1	12.3	5.8	5.8	83.5	9.0	1.7	11.0	62.7	17.9	8.4
16	6.8	75.1	12.2	5.8	5.8	83.4	9.1	1.7	10.9	62.4	18.2	8.4
<i>Decomposition of f_t</i>												
1	2.2	0.5	97.4	0.0	3.9	3.3	92.9	0.0	2.2	0.2	97.6	0.0
4	5.6	22.8	67.8	3.8	3.3	42.1	51.5	3.1	8.5	17.7	68.0	5.8
8	4.8	30.2	58.9	6.1	3.2	43.3	50.2	3.3	7.4	23.8	61.0	7.8
12	4.6	31.1	58.0	6.3	3.2	43.7	49.8	3.3	7.3	25.0	59.4	8.3
16	4.6	31.2	57.8	6.4	3.2	43.8	50.0	3.4	7.2	25.3	59.0	8.5
<i>Decomposition of lz_t^c</i>												
1	11.1	0.3	9.1	79.6	15.9	0.1	0.4	83.6	15.8	0.7	14.4	69.1
4	12.2	52.3	12.4	23.1	17.0	54.2	2.2	26.5	18.4	35.8	23.4	22.4
8	11.1	52.2	14.5	22.3	16.7	55.1	6.2	22.1	16.0	36.7	25.8	22.0
12	10.8	52.5	14.6	22.0	16.3	55.2	6.8	21.6	15.2	36.9	26.1	21.8
16	10.8	52.5	14.7	22.0	16.3	55.3	6.9	21.5	15.1	36.9	26.2	21.8

The numbers in the table indicate the proportion of the variance of the interest rate differential, capital inflows, and the temporary component of the (logarithm of) the real exchange rate attributable to each of the variables in the system, after the number of quarters specified in the first column.

method.² The basic assumption of the first method is that the trend component of the series is a random walk with no drift. Thus, the series has a unit root which is entirely due to the trend component. The HP filter consists essentially in specifying an adjustment rule whereby the trend component of the series moves continuously and adjusts gradually. Finally, the NP method exploits the fact that it is possible to estimate a trend function nonparametrically without reference to a specific form.

3. Variance decompositions

We estimated the VAR using g_t , ρ_t , f_t , and the three alternative measures of lz_t^c , in the order specified.³ We also added a constant term and a dummy variable

² See Agénor et al. (1996) for a detailed discussion of these methods and appropriate references.

³ Placing g_t as the first variable in the VAR is consistent with the assumption that it is the most 'exogenous' in the system. Therefore, it is given the maximum chance of influencing other variables.

that takes the value 1 in the first quarter of 1994, in order to control for the particularly pronounced changes in the variables of the system during the exchange rate crisis. As Table 1 indicates, results obtained with all three alternative decompositions of the TCRER are quite similar. Although the percentage contribution of each variable to itself is very high, the results also indicate that the contribution of the variance of the interest rate differential to the variance of the TCRER is about 10 percent after one quarter, and reaches almost 50 percent after two quarters. This may reflect the impact of changes in domestic interest rates on private absorption and hence the relative price of nontraded goods. The contribution of the variance of the government spending-to-output ratio, as well as of capital flows, to that of the TCRER are also relatively large. Results obtained by using the nonparametric filter (our preferred method) indicate that the former reaches 35 percent during the second quarter (not shown), and then declines to about 18 (15) percent in the fourth (sixteenth) quarter. The relative importance of capital flows reaches about 23 percent in the fourth quarter and stabilizes at about 26 percent after 8 quarters.

4. Dynamic response to shocks

Analysis of the IRFs associated with shocks to the government spending-to-output ratio, the interest rate differential, and capital flows, lead to the following conclusions (Agénor et al., 1996). First, the results obtained with all three alternative methods of decomposing the real exchange rate are broadly similar, indicating robustness of our results to the choice of a specific filter.

Second, shocks to government spending (measured in proportion of GNP) have a significant impact on the TCRER, with an increase in g_t leading to a (temporary) real appreciation. This effect is consistent with theoretical predictions, and illustrates the type of relative price movements induced by an increase in government expenditure. At a given level of private expenditure, an increase in government spending on home goods – the main component of public sector outlays in Turkey – requires an increase in the relative price of nontraded goods to reduce private demand and maintain market equilibrium. The lower the elasticity of the supply of nontraded goods in the short run, the larger the required real appreciation.⁴ On the other hand, the response of capital inflows to government spending shocks is not significant.

⁴ See for instance Agénor (1996). In principle, if the induced reduction in private spending is very large (so that total domestic absorption would fall), and/or if the elasticity of supply of nontraded goods to relative price changes is high, the net effect on the real exchange rate could be a depreciation. However, a real appreciation appears consistent with Turkey's recent experience.

Third, the responses of both the TCRER and capital flows to the interest rate differential are significant, and have the right signs: an increase in the differential leads to a capital inflow and an appreciation of the TCRER. If the increase in the differential is interpreted as resulting from a tightening of monetary policy or, more generally, as indicative of an inconsistent mix of monetary and fiscal policies, this result also appears in line with the Turkish experience. Finally, as would be expected from the previous result, a positive shock to capital inflows leads to an appreciation of the TCRER.

5. Summary and conclusions

This paper examined the links between fiscal policy, uncovered interest rate differentials, the real exchange rate, and capital inflows in Turkey since the late 1980s. A formal testing of these links was performed with a VAR model which included the temporary component of the real exchange rate (calculated using three alternative techniques), government spending and (net) private capital inflows, both measured as percent of GNP, as well as the ex post interest rate differential.

Although the constraints imposed on the specification of the VAR by the small sample size prevent firm conclusions, our findings are broadly in line with a number of key developments in Turkey. Namely, they suggest that positive shocks to government spending lead to an appreciation of the temporary component of the real exchange rate, while capital flows respond to shocks to uncovered interest rate differentials. Furthermore, the temporary component of the real exchange rate responds significantly, and in the expected direction, to shocks to the interest rate differential, as well as to capital flows.

The above analysis illustrates the importance of fiscal adjustment for restoring macroeconomic stability in Turkey. Although the real appreciation observed in the early 1990s appears to have had a relatively weak effect on the growth rate of exports, it contributed to a sharp increase in imports and a deterioration of the current account balance. As illustrated by the crisis that took place in early 1994, market correction of real exchange rate misalignment may occur in traumatic fashion. Restoring fiscal equilibrium would promote a more orderly adjustment in relative prices.

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References

- Agénor, P.-R., 1996, The surge in capital flows: Analysis of ‘pull’ and ‘push’ factors, unpublished, International Monetary Fund (August), forthcoming, *International Journal of Finance and Economics*.
- Agénor, P.-R., C.J. McDermott and E.M. Ünçer, 1996, Fiscal imbalances, capital inflows, and the real exchange rate: The case of Turkey, Working paper no. 97/1, International Monetary Fund (September).