

**CAPITAL INFLOWS AND
CENTRAL BANK'S POLICY RESPONSE^(*)**

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December 1998**

(*)This paper is originally prepared as a World Bank project. The views expressed are the author's own and does not necessarily represent those of the Central Bank of the Republic of Turkey. The author would like to thank Murat Ucer for helpful comments and editing, and Avni Arikan for expert help with computer work.
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ABSTRACT

The surge in capital inflows to emerging market economies in the 1990's led to much research on their causes, appropriate policy-mix in the face of large inflows and their sudden reversals. The financial crisis that started out in Asia in 1997 and spread to other emerging markets later on reinforced further interest in risk associated with capital inflows. Capital inflows, while providing additional finance and enhancing investment opportunities, tend to pose problems in macroeconomic management. Most typically, in the absence of Central Bank intervention, heavy inflows will lead to appreciation of the domestic currency, which will eventually threaten competitiveness, intervention however, will lead to monetary expansion and inflation, unless sterilized. Sterilized intervention in turn, can be costly, since it carries the risk of increasing interest rates and reinforcing further capital inflows, thereby causing quasi-fiscal losses to the Central Bank. In this paper, capital inflow episode after the liberalization of capital account in Turkey is examined with special emphasis on the Central Bank policy response. The cause of the inflows and its decomposition into consumption and investment is discussed. Sterilization mechanism, with the help of an intervention equation for the foreign currency market and a domestic credit reaction function for the Central Bank, is analyzed and sterilization cost as share of reserve money is calculated. The results confirm that inflows have been the engine of growth and that it is mostly consumption driven. They also indicate in the direction of high public sector borrowing requirement and the resulting high interest rates and the fact that with a loose fiscal policy the Central Bank can at best try to smooth out the volatility in the financial markets rather than decrease inflation.

I. BACKGROUND

Capital inflows to developing countries (DC's) surged in the 1990's, following the long break after the 1982 debt crisis (World Bank,1997). However, the composition of the inflows in the 1990's was different than in the 1980's. The private syndicated bank loans and multilateral lending of the earlier period were replaced predominantly by equity flows In the 1990's. Also the pattern became more volatile. The peak in 1993 turned into a slowdown in early 1994 and then came to a complete halt in early 1995, following the Mexican crisis in December 1994. As many observers argued, economic recovery in industrial countries as well as the increase in US interest rates played a key role in reversal of inflows. As table I indicates private flows to emerging markets recovered relatively rapidly after the Mexican crisis, reaching a peak in 1996, slowed down again in 1997 following the onset of South-East Asian crisis mainly in short term international bank credit and portfolio flows, as major international banks started pulling back from emerging markets, first from Asia than to Latin America. However, the slowdown was more than offset by new bond and equity issues which has been gaining more importance as finance item than bank lending in recent years, foreign direct investment being the most important one (IMF 1998).

TABLE I
EMERGING MARKET ECONOMIES' EXTERNAL FINANCE
(billions of dollars)

	1995	1996	1997
Current Account Balance	-95.0	-95.4	-76.2
External Financing, net	267.8	311.1	282.4
Private Flows, net	228.1	307.6	241.7
Equity Investment	106.7	128.2	144.9
Direct Equity	82.2	94.9	119.7
Portfolio Equity	24.5	33.4	25.2
Private Creditors	121.4	179.3	96.8
Commercial Banks	103.1	113.3	22.2
Non-bank private creditors	18.3	66.0	74.6
Official flows, net	39.7	3.5	40.7
International Financial Institutions	20.4	7.2	28.3
Bilateral Creditors	19.3	-3.7	12.4
Resident Lending/other net	-77.7	-128.6	-161.3
Reserves excl. gold (-increase)	-95.0	-87.1	-44.8

Source: Institute of International Finance

How did Turkey fare during this period compared to emerging market economies? Table II indicates that Turkey also received substantial inflows in this period like others which allowed the financing of a mild current account deficit (around 2-3 billion a year) along with a substantial reserve accumulation at the central bank. However, unlike the emerging market economies which suffered sharpest cutbacks in commercial bank flows^(*) in 1997, Turkey

^(*)Commercial bank flows in this categorization include bank loans, non-guaranteed trade credits and net purchases of government securities i.e all of commercial banks loans including foreign exchange

experienced major inflow from international banks. This can be explained by the fact that the Asian crisis immediately affected other emerging market economies in the region, but Turkey managed to insulate itself from the adverse effects of the crisis in 1997 and it wasn't until 1998 Russian devaluation that Turkey was affected like all other emerging markets when the investors became excessively risk averse and started pulling back from these markets.

TABLE II
TURKEY'S EXTERNAL FINANCE
(millions of dollars)

	1995	1996	1997
Current Account Balance	-2339	-2437	-2680
External Financing, net	8338	11962	12774
Private Flows, net	10225	8923	11224
Equity Investment	2110	-149	414
Direct Equity	772	612	554
Portfolio Equity	1338	-761	-140
Private Creditors	8115	9072	10810
Commercial Banks	4529	3805	6346
Non-bank private creditors	3586	5267	4464
Official flows, net	-1887	2039	1550
International Financial Institutions	348	589	264
Bilateral Creditors	1539	1450	1814
Resident Lending	-1841	323	-1750
Net errors and omissions	848	-4303	-5028
Reserves excl. gold (-increase)	-5005	-4545	-3316

Source: Institute of International Finance

TABLE III
NET PRIVATE CAPITAL FLOWS IN TURKEY
(Million dollars)

	1980-82	1983-90	1991-92	1993	1994	1995	1996	1997	1998*
Direct Investment	168	2206	1562	622	559	772	612	554	220
Portfolio Investment	0	-118	-339	190	1059	-149	-761	-140	37
Bank Credits	42	1669	1541	4375	-7188	781	2727	6030	4042
Total Private Capital	210	3757	2764	5187	-5570	1404	2578	6444	4299

*First 6 months

Source: Balance of Payments Statistics, the Central Bank of the Republic of Turkey.

Table III indicates development of private capital in Turkey. It was the short-term foreign exchange (fx) credits that responded immediately to capital account liberalization of 1990 in Turkey. Portfolio investment, was slow and mostly in the form of government securities placed abroad until 1992. Overall, net portfolio investment peaked in 1994 and started to decline after the financial crisis, while short term fx credits, except for the Gulf Crisis in 1991 and the financial crisis in 1994, continued increasing afterwards. The negative sign in 1994 is partly due to capital outflow and partly to early payment of fx debt to debtors with fears of devaluatory expectations. Statistics indicates that the long-term private capital peaked in 1996. However, in this peak the effect of increase in Resource Utilization Fund, which was put into effect in July 1996 and worked like a tax on short term FX credits, was influential.^(*) Hence, due to predominance of banks in Turkish financial markets, bank credits, except for 1994, is still the major channel where private

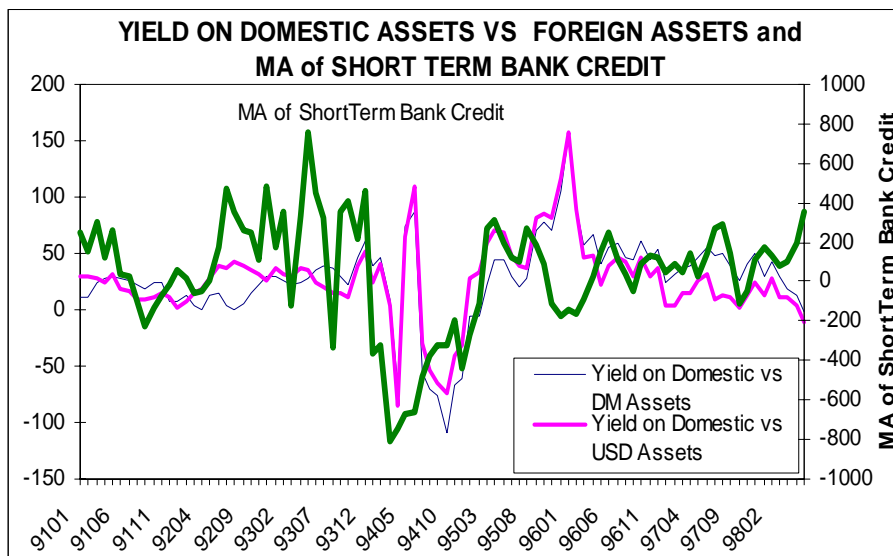
^(*) To avoid the tax on short term FX credits, starting from the last months of 1996, banks started obtaining FX credits with a maturity slightly over 1 year, so as to include them in long term credits.

capital inflow enters the country, and not the portfolio investment which was the case in most DC's

II. CAUSES of CAPITAL INFLOWS: PULL or PUSH FACTORS?

A key question concerns whether private inflows were mostly "pulled" by sound macroeconomic policies and/or attractive yields, or "pushed" by external factors such as slow down in growth or decrease in interest rates in developed countries. In Latin America, since portfolio investments were considered more sensitive to external conditions than direct investment, external factors were more influential, while in Asian countries inflows were dominated mostly by internal factors.

To answer the same question for Turkey, the response of short term flows to domestic and foreign returns is examined, which broadly capture the external and domestic factors respectively. The chart below shows the link between interest differential and short term flows:



In fact, a regression of short term FX credits on return on holding foreign assets and on domestic assets indicated that it is negatively related to return on holding foreign asset and positively to return of holding domestic assets. The data is annual covering the period 1980-1997.

$$\text{scr} = -9.5 (i_t^* + \Delta e_t) + 17.3 i_t - 72.6 D1$$

$$(2.6) \quad (3.1) \quad (5.7)$$

$$R^2 = 0.82 \quad DW = 1.79$$

where i_t^* is foreign interest rate and Δe_t is expected rate of annual change in exchange rate proxied by the actual depreciation, i_t domestic interest rate and $D1$ is dummy for financial crisis in 1994,

At first glance, it appeared as though both internal and external factors mattered for Turkey. In order to truly see the effect of domestic and foreign factors however, short term FX credits is regressed on each of the above variables separately. The results indicated that it is mostly the domestic interest rates that effect the short term credits, foreign interest rates and exchange rate depreciation are insignificant:

$$\text{scr} = -53.68 (i_t^*) - 0.98 (\Delta e_t) + 15.23 i_t - 82.61 D1$$

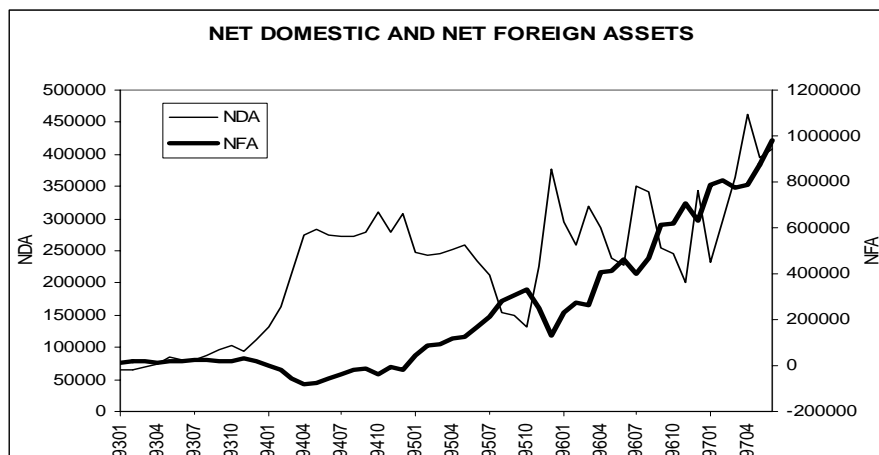
$$(1.21) \quad (0.08) \quad (2.46) \quad (6.41)$$

$$R^2 = 0.82 \quad DW = 1.79$$

Of course, as was in the case of Asian crisis October 1997, international financial markets may limit access to foreign credit. However, for the estimation period, in Turkey, this was not the case and it was the domestic variables mainly high interest rates which affected short term FX inflows.

III. STERILIZED INTERVENTION

Intervention literature distinguishes between two types of intervention: sterilized and non-sterilized; the difference between the two is that sterilized intervention leaves monetary base unchanged while for the non-sterilized case there is a room for the Central Bank to change monetary policy, at least in the short run. Since in a sterilized intervention exchange market intervention is combined with open market operations in a way that will leave the monetary base and hence the exchange rates unaffected and in the non-sterilized case appreciation of the exchange rate insulates the monetary aggregates from the expansionary affects of capital inflows, it is important to ascertain the motives for intervention and whether intervention is fully sterilized. To investigate the extent of the sterilization, most studies examine a domestic credit reaction function. A graphical illustration of major Central Bank balance sheet items, indicate that the net foreign assets (NFA) is followed by net domestic assets (NDA) in the opposite direction, indicating some sterilization. However, from the picture, it is not clear whether it was sterilization or offset or when was which, i.e. whether it was the NFA or the NDA that caused the reaction.



Before examining the reaction function for the Central Bank however, an intervention equation for the exchange market in Turkey is estimated in line with Edison(1993) to see how the Central Bank reacted to exchange rate changes.

Intervention equation for the period 1990:3 1998:6

$$I_t = -3.65 (s_t - s_t^*) + 0.46 \Delta s_{t-1} - 0.4 \text{int}_t + 0.65 \text{CA}_t - 1.4 \text{D2}$$

(3.25) (0.73) (2.9) (5.9) (4.2)

$$\rho = 0.32$$

(3.0)

$$R^2 = 0.56$$

where I = intervention defined as purchase-sales of FX

s = logarithm of maximum exchange rate observed

s^* = logarithm of indicative exchange rate

Δs = monthly exchange rate depreciation

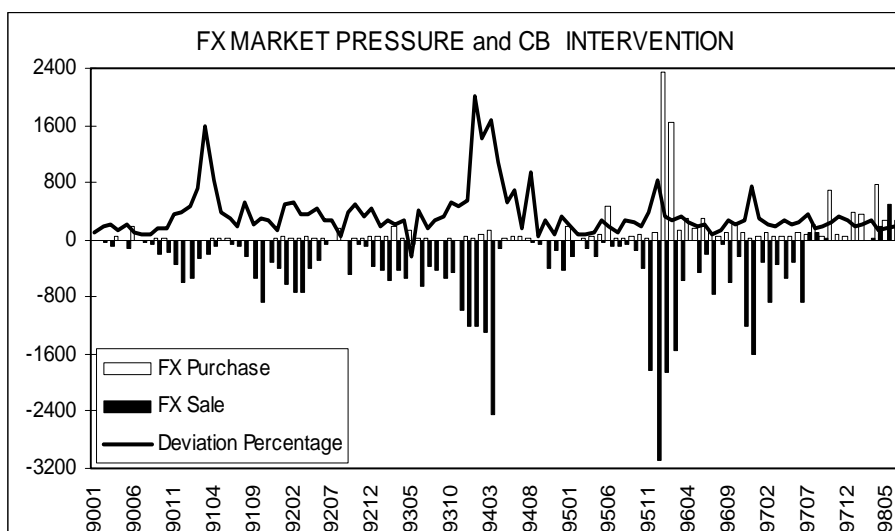
int = interbank O/N rate

CA = Current Account balance

D2 = post election announcement dummy covering the period 1995:11-1995:12

Here, the variable $(s - s^*)$ represents exchange market pressure and the negative coefficient in front of it indicates that the authorities intervene by selling, when the maximum rate deviates from the indicative exchange rate, i.e. when the exchange market pressure increases, while the variable Δs_{t-1} indicates if the CB leans against

the wind. However, the insignificance of this coefficient and its wrong sign (with increasing depreciation the CB should intervene in the direction of selling if there were to lean against the wind) indicates that this is not a relevant variable for Turkey. The current account balance however is significant and has a positive sign meaning that as current account gives a surplus CB intervenes to buy foreign exchange (fx). The negative coefficient of election dummy D2 indicate that the CB intervene in those months by selling fx as the pressure on exchange rate increases with the increase in uncertainty.



Re-estimating the equation by removing the insignificant variable Δs_{t-1} gives the following results:

$$I_t = -3.47 (s_t - s_t^*) + 0.66 CA_t - 0.38 int_t - 1.39 D2$$

(3.2) (5.9) (2.9) (4.2)

$$\rho = 0.32$$

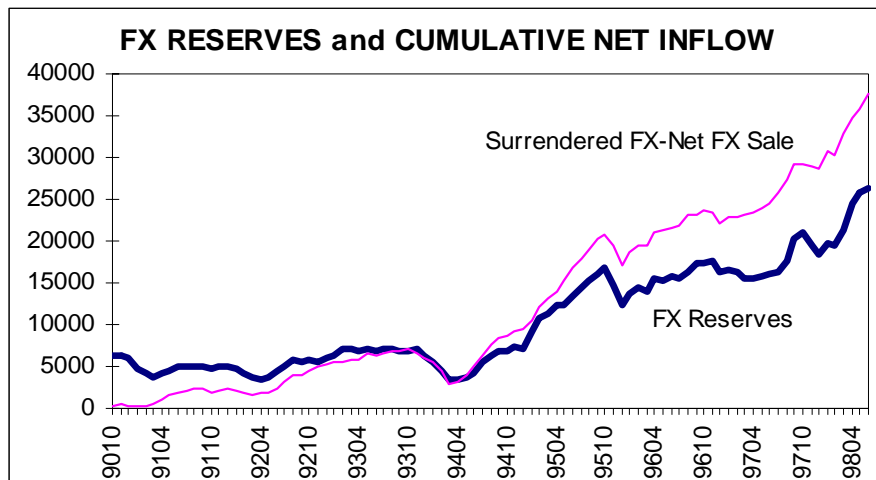
(3.2)

$$R^2 = 0.57$$

The current account balance again has positive sign, indicating

that as current account gives surplus the exchange rate would tend to appreciate and to prevent that the CB would intervene by purchasing fx. The negative coefficient of interbank rate indicates that as interbank rate gets higher, indicating the rising inflationary expectations, CB sells FX to mop up some of the excess liquidity in the market so as to dampen inflationary expectations. It can also be interpreted as with the increasing pressure in the FX markets, the CB intervenes partially by raising the O/N rate and partially by selling FX to satisfy high FX demand i.e. makes concerted intervention by making the TL necessary for buying the fx expensive.

When one considers the mechanism the Central Bank acquires FX reserves, we see that the compulsory FX sales by banks to the CB, comprise a big bulk of FX reserves rather than the amount purchased in the FX market. This is indicated by the following graph, where the surrendered flow amounts are cumulated so as to form sort of a stock comparable to FX reserves. Hence, It is quite possible that when the authorities intervene in the FX market, the amount of compulsory FX sales realized and/or expected plays a role in deciding how much to intervene (purchase) i.e. those two variables; compulsory sales and amount of net FX purchased in the FX market to smooth out the exchange rate fluctuations may very well be not independent of each other.



With this consideration, the intervention equation was re-estimated, adding compulsory sales to FX purchases and subtracting FX sales and naming the new variable, I_2 , and adding inflation variable Π to the earlier format.

The results are reported below:

$$I_2 = -3.4 (s_t - s_t^*) + 0.9 CA_t - 0.4 int_t + 0.95 \Pi_t - 1.52 D2$$

(2.28) (5.54) (2.44) (6.0) (4.2)

$$\rho = 0.43$$

(4.3)

$$R^2 = 0.53$$

which can be explained by the fact that as inflation increases, the amount of FX surrendered increase due to increase in nominal money demand. Earlier arguments still apply to the other variables in the equation.

IV. THE EFFECT of FX INFLOWS on RESERVE MONEY GROWTH

Before estimating a reaction function for the Central bank, it will be useful to see the source of growth of reserve money in terms of its components. Table IV shows the relative contribution of Net Domestic Assets and Net Foreign Assets to growth rate of Reserve Money during the capital inflow period, assuming that the reserve money growth is 100 percent. The last column shows the actual growth rate of reserve money.

TABLE IV
RELATIVE CONTRIBUTION to RESERVE MONEY

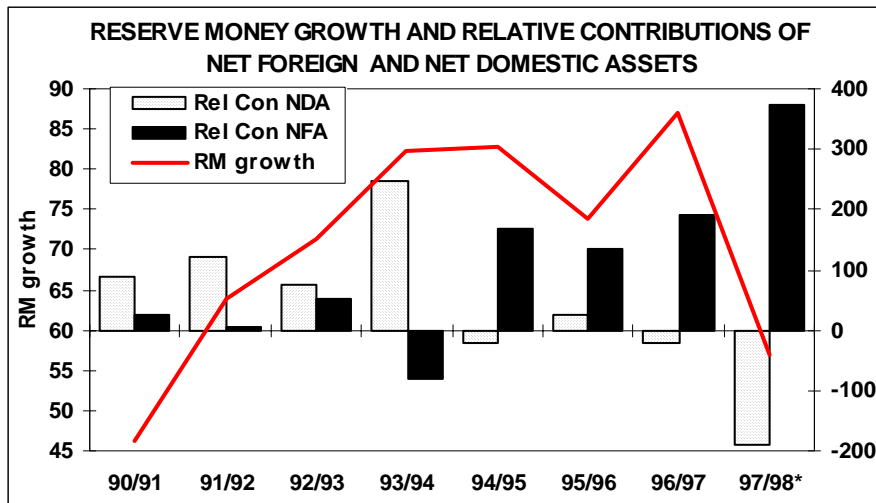
	NDA*	NFA	FX Deposits	% Δ in RM
1991	87,2	26,1	-13,3	46,35
1992	128,1	5,6	-33,8	63,8
1993	70,6	51,1	-21,7	71,3
1994	247,5	-80,1	-67,4	82,2
1995	-21,4	169,0	-47,5	82,8
1996	27,5	134,5	-59,9	73,9
1997	-19,6	191,4	-71,8	87,1
1998**	-191,0	373,8	-82,8	56,9

*According to IMF definition: $NDA = RM - NFA + FX \text{ Deposits}$.

**First 6 months

The table also indicates that while between the years 1990-94, due to various factors (e.g. election, the Gulf crisis and the Treasury's resort to short term advances with the aim of lowering interest rates), the increase in reserve money has stemmed from NDA growth, between 1995-98 (June) however, it was the NFA growth which caused the RM growth. In the time span examined, the largest increase in reserve money growth has been experienced in 1997, in 1995 and in 1994 financial crisis period, with 87.1, 82.8 and 82.2

percent respectively. Table V indicates that, the largest capital inflow as share of GDP had been realized in 1996, 1993 and in 1997. Hence, largest inflows did not always result in highest reserve money growth. In 1993, it was NDA growth, with relative contribution of 70.6 percent, that led to reserve money growth. Also in 1994, NDA growth, with 250.1 percent relative contribution, caused reserve money growth, inspite of efforts to offset the NDA growth with FX sales and ending up with massive reserve loss and 80.1 percent decline in relative contribution of NFA i.e. NFA decrease was not enough to offset the increase in NDA to keep the growth rate of reserve money constant. Between 1994-95 however, after the stabilization package of April 1994, the large FX reserve build-up has caused the relative contribution of NFA to increase to 170.5 percent, serious sterilization efforts put into effect through open market operations resulted in a 23.2 percent decrease in the relative contribution of NDA, resulting in 82,2 percent increase in reserve money. Table V indicates that economy had already started overheating from 1992 with growth rate of 6.4 percent. and current account deficit opening up, reaching 3,6 percent of GDP at the end of 1993, culminating in the financial crisis in the beginning of 1994.



In 1996 and the first half of 1997 monetary policy was accommodative. The cut back on NDA growth in the second half of 1997 due to Treasury's paying back its debt to the Central Bank and not resorting to short term advances was not enough to sterilize the effect of short term fx inflows on the reserve money growth. In 1998, inspite of massive sterilization efforts due to large amount of capital inflows starting from March, reserve money grew 56,9 percent in the first half of the year.

TABLE V

	GNP Growth Rate	Current Account/GDP	WPI Inflation	PSBR/GNP	Real Interest Rate**	Real Exchange Rate	Capital Inflow/GDP
1989	1.6	0.9	62.3	5.3	-10.30	-16.5	0.73
1990	9.4	-1.7	48.6	7.4	8.30	-7	2.68
1991	0.3	0.2	59.2	10.2	22.3	6.1	-1.59
1992	6.4	-0.6	61.4	10.6	34.3	4.4	2.29
1993	8.1	-3.6	60.3	12.0	44.9	3.3	4.97
1994	-6.1	2.0	149	7.9	3.46	12.6	-3.2
1995	8.0	-1.4	59.1	5.2	102.54	2.3	2.73
1996	7.1	-1.3	88.4	9.0	20.55	-4.5	5.37
1997	8.3	-1.4	90.6	9.4	19.98	-3.7	4.54

*Real exchange rate is calculated using US and German PPI, equally weighted and WPI (87=100) for Turkey. Negative value indicates appreciation.

**Real interest rate is calculated using compound 3-month t-bill rate average and CPI inflation.

V. THE CENTRAL BANK REACTION FUNCTION

To investigate the degree of sterilization, Central Bank reaction function is estimated. Here, assuming that the CB has in its objective function, variables such as reserve money growth, deviation of domestic interest rates from international interest rates and real exchange rate growth targets and that NDA is the variable that CB has in its control, Net Domestic Asset reaction function for the Central bank is estimated for the entire period. The fact that both the monetary program of 1990 and the IMF Stand-by Agreement following the financial crisis (1995) used NDA one of the targeted variables justifies the reasoning. However, the domestic credit reaction function is not stable for the entire period and exhibits different characteristics for the pre-financial crisis and post-financial crisis period. Hence, the sample is divided into two and a reaction

function for each is estimated.

Reaction function for the period 1990:2 1993:10

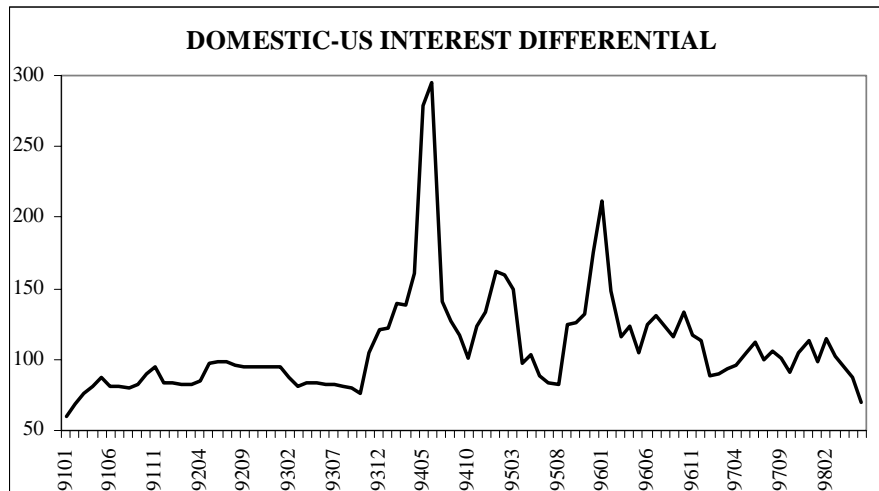
$$\Delta NDA_t = -1.04 \Delta NFA_t + 0.08 (i-i^*)_t - 0.48 \text{re}x_{t-1}$$

(-6.5)
(0.2)
(-2.3)

$$\rho = 0.67 \quad R^2 = 0.81$$

(4.77)

During the pre-financial crisis period, it seems that the Central Bank was reacting to changes in NFA and to real exchange rate growth and not to interest differential. The negative sign of both of these variables indicates that increase in real depreciation increases inflationary expectations, which requires tightening of monetary policy and so does increase in net foreign assets. In the post financial crisis period, however the Central Bank's policy seemed to have changed and it started observing interest differential as well as the earlier arguments, which makes sense, when one considers the large amount of capital outflow experienced during the crisis period. The following graph indicates the increasing volatility of the interest differential from 1994 onwards, which may be the reason for CB to follow this variable more closely from that time.



From the second equation, it also seems that the CB reacted more to NFA change in the post financial crisis period compared to the pre-crisis period, by contracting domestic credit more tightly in the period under study. The estimates also indicate that the CB had an accommodating monetary policy trying to maintain the stability in financial markets rather than to reduce inflation, which is sensible given the fact that fiscal policy was always loose except for a transitory period following the financial crisis in 1994.

Reaction function for the period 1994:4 1998:6

$$\Delta NDA_t = \underset{(23.7)}{-0.93} \Delta NFA_t + \underset{(2.6)}{0.18} (i_t - i_t^*) - \underset{(4.8)}{0.46} \text{re}xg_{t-1}$$

$$\rho = \underset{(3.7)}{0.5} \quad R^2 = 0.95$$

where ΔNFA = change in net foreign assets (in dollars)

ΔNDA = change in net domestic assets (in dollars)

$i_t - i_t^*$ = domestic-foreign interest differential

$rexg_{t-1}$ = real exchange rate growth

ρ = serial correlation coefficient

Granger causality tests between NDA and NFA changes indicated that between the two variables there is a one way causality from one lag of change in NFA to contemporaneous change in NDA. **

VI. EXCHANGE RATE POLICY

In Turkey, capital account liberalization has been a gradual process, starting with the 1980 stabilization package where the multiple exchange practices were eliminated, the crawling-peg regime with daily adjustments were initiated (1981), with major steps taken in 1984 toward achieving trade and external financial liberalization simultaneously (Altinkemer and Ekinci 1992) and finally achieving TL convertibility in April 1990 by accepting the obligations of the Article VIII of IMF.

The increase in short term FX credits following the liberalization of capital account in 1989, has resulted in appreciation of the TL., in spite of the Central Bank's intervention in the direction of purchasing so as to slow down appreciation. The appreciation had continued in 1990. The success of the first announced monetary program of 1990

** 1 lag of NFA causing contemporaneous change in NDA; $F(3,108)=0.03$

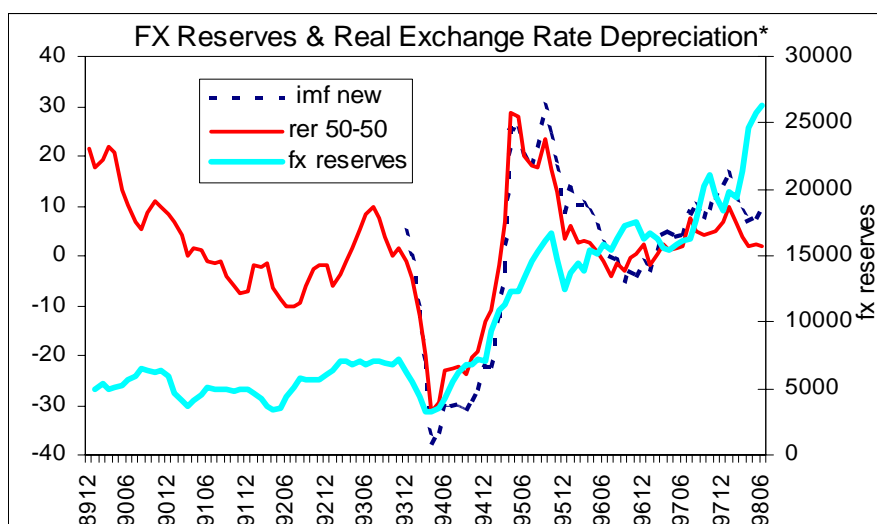
$$\Delta NFA_{t-1} \longrightarrow \Delta NDA_t$$

while NDA change not affecting contemporaneous change in NFA:

helped to reduce the instability in the market, resulted in decrease in inflation and increase in aggregate demand, in imports and capital inflow in terms of short term fx credit.

In 1991 however, the uncertainties created by Gulf crisis and early election atmosphere, led to a very high PSBR which increased the pressure on the financial system leading to high inflationary expectations and high interest rates, rapid depreciation and reserve loss even though the reserve loss was made up by the end of the year. Real depreciation continued till 1994 throughout which the Central Bank was a net seller of FX in the FX market (not including surrendered FX). At the beginning of 1994, increasing PSBR together with the speculative demand for foreign currency has culminated in increasing cost of borrowing for Treasury. What's more, lowering of Turkey's credit rating by international rating agencies left the Central Bank as the sole source of finance for the Treasury. High interest rates and exchange rates, by increasing the banking sector's cost has increased the sector's open position. In addition the flight of Turkish lira and FX deposits out of the banking system increased the speculative demand for foreign currency to close their open positions. Also the Treasury's policy of keeping the interest rates low in the last months of 1993 by canceling auctions, has channeled the excess liquidity left in the market to the foreign exchange market, all of which helped to reduce the foreign reserves. After the financial crisis and large depreciation experienced in 1994, in 1995 with the help of nominal anchor policy that was applied till September, real exchange started appreciating slightly. The effect of election announcement together with the abandoning of nominal anchor policy and the initiation of forward exchange contracts, caused turbulence in the financial markets, skyrocketing real interest rates and to satisfy the

speculative FX demand the Central Bank intervened and lost large amount of reserves. Real exchange rate continued appreciating slightly in 1996 and in 1997 with a loose fiscal and monetary policy (Table V). The change in government in July and the realization that the earlier government's claim of balanced budget will not hold necessitated a supplementary budget in October, which, increased expenditures and hence PSBR to 9.4 percent in 1997. It wasn't until the first half of 1998 that the fiscal position strengthened and monetary policy tightened albeit increasing capital inflows starting from March. Exchange rate management in 1998 continued to aim at minimizing the real exchange rate volatility as was in the earlier years.



*RER index weighs both the Us and German currencies equally while the new IMF index uses Turkey's major trading partners' currencies, hence their relevant weights. In both cases negative implies depreciation.

VII. QUASI FISCAL COST

Quasi-fiscal cost, arising from sterilization of the FX inflows through open market operations is calculated, assuming that the CB earns on its foreign assets a return equal to US 3 month treasury bill rate and that it is paying a rate equal to domestic 3 month treasury bill rate on the reverse repos used to withdraw the liquidity from the market. Subtracting the cost of sterilization, calculated by multiplying the t-bill rate with the changing stock of reverse repos outstanding, from the return of holding foreign assets, calculated by multiplying US 3 month t-bill rate with the change in NFA the results are reported below.

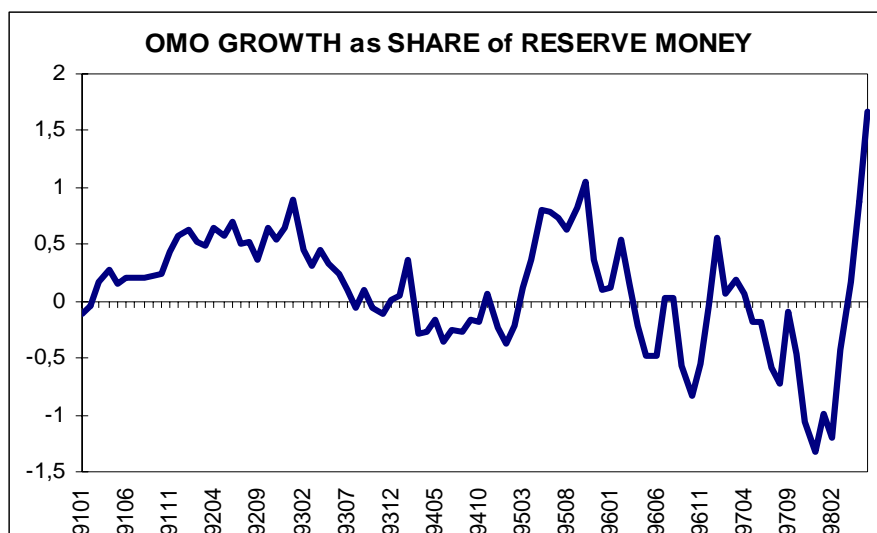
TABLE VI

	Quasi Fiscal Cost(billion TL)	Share of Reserve Money
1990	678.9	2.8
1991	4610	12.8
1992	16410	26.8
1993	20687.5	20.3
1994	67878.3	35.7
1995	209518.0	61.0
1996	256664.0	41.3
1997	262847.3	22.3
1998*	1363035.2	86.5

* First six months

This sort of calculation assumes that the CB earns a return only on its foreign reserves. To be more precise, to this calculation, return on short-term advances should also be included. However, for one thing the return on giving short term advances is only 4% which is negligible, second, short term advances are very volatile within a month, hence, it would be misleading to take the month-end number.

Besides, for our purposes, we are interested in the cost due to sterilizing the liquidity arising from capital inflows, hence for practical purposes the return on short-term advances can be ignored. There is also the simplification here which assumes that all the liquidity withdrawn by reverse repos are due to capital inflows and that the repos are not related to capital outflows. At any rate, Table VI indicate that the share of sterilization cost in reserve money was highest in 1995 and in 1994 which is due to high interest rates. This cost is not reflected in reserve money, but will be transferred to Treasury through the Central Bank's profit and loss account and will help to widen the fiscal deficit at the end.



VIII. DECOMPOSING THE IMPACT OF CAPITAL INFLOWS

Table V indicates that in Turkey capital inflow has been the engine of growth in the period following capital account liberalization. In 1990, even though the capital account has been just liberalized, we see that the economy experienced the largest growth rate in its post liberalization history; 9.4 percent growth with inflows amounting to 2.7 percent of GDP. Similar growth rates that was realized later on necessitated larger amount of inflows which sort of indicates diminishing marginal return on capital inflow. How was this growth achieved, which component of domestic absorption, consumption or investment contribute to growth and how did capital inflows affect current account deficit? Table VII answers these questions.

TABLE VII

Period	Allocation of Capital Account		Use of Domestic Absorption		Marginal Investment
	Reserve Accumulation	Current Account	Consumption	Investment	Impact of Capital Inflow
(1)	(2)	(3)	(4)	(5)	(6)
1990-93	0.29	0.71	2.28	-1.29	-0.90
1994-97	0.45	0.55	1.82	-0.82	-0.45

Capital flows are assumed to either to finance current deficit and/or to accumulate reserves. Here, reserve accumulation and current account is calculated as shares of Capital Account-inclusive of Grants and Errors and Omissions during the capital inflow period (1990 onwards) The inflow period is divided into two sub-periods 1990-1993 and 1994-1997 due to the fact that the pre-inflow period data for consumption and investment is available from 1987 onwards and the inflow period starts at 1990, hence to compare the two

periods of more or less of equal duration, the pre-inflow and inflow periods are taken as 1987-1989 and 1990-1993 respectively. Financial crisis in 1994 helps us to distinguish the second inflow period of 1994-97 from the very first one of 1990-93. Table VII indicates that during the first inflow period following liberalization of capital account, 71 percent of the capital inflow financed current account while only 29 percent ended up as reserves. In the second inflow period following the crisis however, the percent of capital account that financed current account decreased to 55 percent while that of reserves increased to 45 percent.

Columns 4 and 5 show the use of domestic absorption as change in the shares of (average) consumption and investment to GDP (as percent of absorption), between the pre-inflow and the inflow periods. The second row indicate the values between 1994-97 period compared to 1990-93 period i.e. between the two inflow periods. Consumption and Investment in column 4 and 5 are derived as follows:

$$\left[\frac{(C/GDP)_t - (C/GDP)_{t-1}}{(A/GDP)_t - (A/GDP)_{t-1}} \right]$$

where t and t-1 are the inflow and pre-inflow periods respectively and A is absorption. The last column on “marginal investment” measures the impact of additional unit of capital inflow, that was not used for reserve accumulation, on investment.

$$\text{i.e } (1-0.29)*(-1.28) = -0.9; \text{ marginal investment is } -0.9.$$

Comparison of pre-inflow and the inflow period immediately following it shows that, consumption as share of GDP increased in

the inflow period by 6.3 percent (1990-93) compared to the pre-inflow period (1987-89), while the share of investment in GDP in the same period declined, by 3.6 percent, implying that the capital inflow which was used to finance current account helped to increase consumption rather than investment.

A similar comparison between the post-crisis (1994-97) and the pre-crisis (1990-93) inflow periods however reveal that the consumption- GDP ratio in the post crisis period declined by 2.6 percent while that of the investment-GDP increased by 1.2 percent, which indicates that capital inflow that was channeled to current account was used to finance investment rather than consumption in the post-crisis period. However, the decline in absorption-GDP ratio at the same time, rendered investment absorption ratio negative and consumption-absorption ratio positive.

The decline in consumption and absorption probably can be explained best by the relatively tighter fiscal policy that was followed in 1994-1995 following the financial crisis due to IMF program.

IX. CONCLUDING REMARKS

Turkey received substantial inflows in the 1990's which, at times, appeared to have constrained monetary policy. The inflows were attracted by high domestic interest rates driven by a large PSBR whereby investors attracted by high yields in domestic securities brought foreign currency, converted it into TL and bought domestic securities, later on to convert it back into foreign currency.

For banks, capital inflows increased FX deposits or more broadly, liquidity and stimulated lending both in FX and TL, which in turn, through higher consumption, investment and/or imports led to an expansion in aggregate demand. Capital inflows found their way routinely into the Central Bank balance sheet through foreign exchange reserves with the help of compulsory foreign currency sales. Even though, the surrender ratio declined gradually over the years, it was a key factor behind the increase in FX reserves.

A pertinent question to ask is whether capital inflows were inflationary. The answer to this question depends on whether capital inflows were due to autonomous increases in money demand and/or whether they were due to increase in the productivity of capital. If capital inflows are due to these reasons they are unlikely to be inflationary otherwise, unless sterilized, the increase in foreign reserves leads to an increase in reserve money, increase inflationary expectations and a deterioration of external position, (Haque et al, 1997).

Sterilization, on the other hand, depending on the magnitude, may result in an increase in interest rates and lead to a quasi-fiscal costs which, as were the case for Turkey, might be as high as 30-60 percent of reserve money, which are potentially inflationary

hence higher reserve money growth, with the difference between the two being the timing of the inflation.

There are no strong reasons to believe that capital inflows to Turkey were due to an increase in money demand given that there was no credible stabilization program, that would have led to a decrease in inflation, except perhaps in 1998. However, capital inflows, by increasing income might have led to some increase in money demand.

To be able to deal with large inflows successfully tight fiscal policy is a must. Otherwise, inconsistent policy mix of loose fiscal policy combined with a relatively tighter monetary policy will result in high interest rates which will attract further inflows and decrease money demand. Tighter fiscal policy is also likely to favor investment over consumption in the allocation of the inflows.

One thing is clear though, with the increase in political uncertainty at home and investors abroad having lost risk appetite given to current situation in global financial markets, one does not need to worry much about, at least while this paper is being issued, the consequences of capital inflows, but rather of outflows. Experience suggests however, some of the work in this paper may soon be quite pertinent.

BIBLIOGRAPHY

Altinkemer M. and N. Ekinçi (1992), "Capital Account Liberalization: The Case of Turkey", *New Perspectives on Turkey*, Fall 1992, No.8.

_____ (1996), "Capital Flows: The Turkish Case", CBRT Discussion Paper, No. 9601.

Calvo, Guillermo A., Leiderman L. and M. Reinhart (1995), "Capital Inflows to Latin America with Reference to the Asian Experience", in *Capital Controls Exchange Rates and Monetary Policy in the World Economy*, ed. by Sabastian Edwards, Cambridge University Press.

_____ "The Perils of Sterilization" (1991), *Staff Papers*, International Monetary Fund, Vol. 38, *World Economy*.

Central Bank of the Republic of Turkey, *Annual Report*, various issues.

Claessens, S. Dooley M and A. Warner (1993), "Portfolio Capital Flows: Hot or Cool?" *Portfolio Investment in Developing Countries*, A World Bank Symposium, September 9-10, 1993.

Corbo, V. and L. Hernandez (1994), "Macroeconomic Adjustment to Capital Inflows, Latin American Style versus East Asian Style", *Policy Research Working Paper 1377*, World Bank.

_____ and J.Desormeaux (July 1996), "Capital Inflows and Financial Integration: The Case of Chile", *First Incomplete Draft*.

Cumby, Robert E. and M. Obstfeld (1983), "Capital Mobility and the Scope for Sterilization: Mexico in the 1970s", in P.A. Armella, R. Dornbush and M. Obstfeld (eds) *Financial Policies and the World Capital Market: The Problem of Latin American Countries*, University of Chicago Press, NBER 245-76.

Darby Michael R., "Sterilization and Monetary Control: Concepts, Issues, and Reduced-From Test".

Edison H.J. (1993), "The effectiveness of Central Bank Intervention: A Survey of the literature after 1982", *Special Papers in International Economics*, No. 18, International Finance Section, Princeton New Jersey.

Fernandez-Arias E. (1996), "The new wave of private capital inflows: Push or Pull?" *Journal of Development Economics*, No.48.

_____ and Peter J. Montiel (1996), *The Surge in Capital Inflows to Developing Countries: An Analytical Overview*, *The World Bank Economic Review*, Vol. 10, No.1.

Haque Ul N., D. Mathieson and S. Sharma (1997), "Causes of Capital Inflows and Policy Responses to Them", *Finance & Development*, March 1997.

International Monetary Fund (1995,1998). *International Capital Markets, Developments, Prospects, and Policy Issues*. *World Economic and Financial Surveys*, Washington, International Monetary Fund (1995,1998).

- Kamas L. (1986), "The Balance of Payments Offset to Monetary Policy: Monetary, Portfolio Balance and Keynesian Estimates for Mexico and Venezuela", *Journal of Money Credit and Banking*, Vol. 18, No. 4.
- Kamin, S.B. and J.H. Rogers (1995), "Monetary Policy in the End-Game to Exchange-Rate Baset Stabilizations: The Case of Mexico", *Journal of International Economics*, 41, 285-307.
- _____ and P. R. Wood (1996), "Capital Inflows, Financial Intermediation, and Aggregate Demand, Empirical Evidence from Mexico and Other Pacific Basin Countries", *International Finance Discussion Papers*, No. 583, Board of Governors of the Federal Reserve System.
- Lee, Jang-Yung, (1996), "Implications of a Surge in Capital Inflows: Available Tools and Cansequences for the Conduct of Monetary Policy", *International Monetary Fund*, IMF working paper.
- World Bank (1997), *Private Capital Flows to Developing Countries*, World Bank- Oxford University Press.