IMF WORKING PAPER

MASTER FILES
ROOM C-130   0440

Fiscal Policy and External Performance: The Turkish Experience*

Prepared by George Kopits and David Robinson

March 2, 1989

Abstract

In 1980 Turkey embarked on a far-reaching stabilization and liberalization program, which contributed to export-led growth and a significant movement toward both domestic and external equilibrium. Later, as fiscal policy was partly reoriented from a restrictive to an expansionary stance while adhering to a flexible exchange rate policy, inflationary pressures intensified but the external current account did not deteriorate. Counterfactual simulations, performed with a computational general equilibrium model, suggest that Turkey would have experienced a significantly lower inflation rate, with only a small reduction in growth, if it had adopted a less expansionary fiscal stance.

Contents   <u>Page</u>

Summary

Facing a severe balance of payments crisis, high inflation and economic stagnation, in 1980 Turkey embarked on a far-reaching stabilization and liberalization program. In the early years, structural reform measures were accompanied by a restrictive fiscal policy stance, which contributed to export-led economic growth and a significant movement toward both domestic and external equilibrium. Since 1984, however, along with further structural adjustment, fiscal policy was partly reoriented to high growth, and social and regional development objectives. Notwithstanding the acceleration of economic growth to increasingly less sustainable rates (averaging nearly 8 percent in 1986-87), and a surge in inflation (to an annual rate of more than 70 percent by mid-1988, from about 25 percent at end-1986), the external current account continued to improve (with a deficit equivalent to 1 1/2 percent of GNP in 1987, as against almost 6 percent of GNP in 1980). Consistent with the implications of the Mundell-Fleming model, this outcome was attributable to the combination of a largely monetized fiscal expansion (PSBR averaging 7 percent of GNP in 1984-87) and a flexible exchange rate policy.

Policy simulations, conducted on the basis of a computational dynamic general equilibrium model, suggest that an unchanged PSBR during 1981-87 (equivalent to over 5 1/2 percent of GNP), assisted by a reduced rate of real depreciation, would have contributed, on balance, to an improvement in economic performance. In the years 1984-87, Turkey would have experienced a significantly lower inflation rate (averaging about 6 1/2 percentage points less per year) and an unchanged reduction in the external imbalance, at a relatively small cost in terms of output foregone (less than 1 percentage point reduction in real GNP growth), compared with the actual outcome.

I. Introduction

At the beginning of the decade, Turkey emerged from a severe
balance of payments crisis and five decades of virtual economic
isolation, through a comprehensive stabilization and liberalization
program. 1/ The program has led to both a substantial reduction in the
external imbalance and satisfactory economic growth. The external
current account deficit was equivalent to 1 1/2 percent of GNP in 1987,
as against almost 6 percent of GNP in 1980. Real GNP growth averaged
4 percent yearly during 1981-83, rose to 5 1/2 percent in 1984-85, and
accelerated to nearly 8 percent--a rate that was hardly sustainable--in
1986-87. As compared with the initial years of the program, when growth
had been underpinned largely by an extraordinary export performance, the
recent expansion involved a marked increase in real domestic demand
growth. The adjustment effort met with less success in restoring
internal balance. Following a deceleration from triple digits in 1980
to about 25 percent in 1982, the annual rate of inflation rebounded to
50 percent in 1984, fell back again to 25 percent at the end of 1986,
and soared above 70 percent in the middle of 1988.

As background for the analysis of the role of fiscal policy in
these developments, Section II summarizes some theoretical
considerations--drawing largely on the Mundell-Fleming model--of
relevance to the Turkish experience. Section III provides an overview
of economic policies and performance in Turkey over two phases separated
by a shift in fiscal stance in 1984. Section IV discusses simulations
of the macroeconomic impact of alternative combinations of fiscal and
exchange rate policies during 1984-87, performed with a computational
dynamic general equilibrium model.

II. Conceptual Setting

Among the macroeconomic consequences of fiscal policy, the effects
on output and employment have been the focus of attention of Keynesian
analysis under excess supply conditions. On the other hand, increasing
preoccupation with the effects on the price level and on the external
balance has given prominence to the monetary approach. Rooted in this
double tradition, contemporary analysis of the effects of fiscal policy,
especially on the balance of payments, rests for the most part on the
well-known Mundell-Fleming model. 2/

The model traces the impact of fiscal and monetary policies under
different exchange rate regimes. In a small open economy, with flexible
exchange rates, an increase in the government budget deficit financed
with debt results in a temporary rise in the domestic interest rate
which attracts capital from abroad; as a consequence, the exchange rate

---

1/ For detailed discussion of the adjustment program and the
principal lessons derived from it, see Kopits (1987).
2/ For a recent exposition, see Frenkel and Razin (1987).

appreciates with a loss in competitiveness and a deterioration in the external current account. The latter offsets the initial demand expansion, while crowding out leaves output unaffected. If the increased public sector deficit is financed with money creation, changes in the exchange rate and the current account are ambiguous, while the levels of income, output and employment rise. However, with less than full capital mobility, as in Turkey, the exchange rate will tend to depreciate and the current account not to deteriorate. By contrast, under a fixed exchange rate, with money determined endogenously, an expansionary fiscal stance leads to a rise in domestic activity and a worsening of the current account. Of course, the deterioration of the external position, whether under fixed or flexible exchange rates, cannot be incurred over the long run.

The basic model has been extended in a number of directions, including allowance for: price flexibility, imperfect capital mobility, rational expectations, various forms of unemployment, disequilibrium conditions, and interactions in a multi-country context. 1/ Among these extensions, it has been shown that a money-financed (and in certain cases debt-financed) increase in government expenditure tends to result, inter alia, in a rise in the domestic price level, especially under flexible exchange rates.

A less explored case, where the nominal exchange rate is adjusted continuously to the inflation differential at home and abroad, deserves particular attention as it may have some relevance to recent developments in Turkey. With flexible prices and all variables deflated by the price level, such a real exchange rule can be viewed much like a fixed exchange rate regime cast in real terms. The real exchange rule has been characterized as a policy of full monetary accommodation, since any shock to the price level is validated by a nominal exchange rate change and capital movements in the balance of payments, which, in turn, are reflected in the money supply. Under the circumstances, and particularly with sticky prices or inflationary expectations, maintenance of external competitiveness may entail loss of control over inflation. 2/ Furthermore, although an unchanged real exchange rate, even when accompanied by an expansionary fiscal stance, can prevent a deterioration in the current account in the near term, the fundamental disequilibrium ensuing from a continued fiscal expansion cannot be bottled up indefinitely and over time it will be reflected in a widening external deficit.

In general, theoretical analysis is limited in coping with the macroeconomic repercussions of fiscal, monetary and exchange rate policies undertaken in the presence of structural reform measures, such as trade and financial liberalization. It is, however, in this broader context that the Turkish experience must be examined.

1/ See, for example, the theoretical treatment in Dornbusch (1980), Henderson (1983), and Cuddington and Viñals (1986a, 1986b), and the empirical application to industrial countries in Viñals (1986).
2/ See Adams and Gros (1986).

III. Policies and Outcome

1. Structural reform

Since 1980, the Turkish economy underwent for the most part an outward- and market-oriented transformation, underpinned by a set of far-reaching structural measures: broad-based price liberalization, including flexible determination of exchange and interest rates; changes in wage determination; foreign trade liberalization; exchange and payments liberalization; financial sector reform; streamlining of state economic enterprises (SEEs); tax reform; and fiscal decentralization. Commodity and factor price liberalization was undertaken to bring about a more efficient allocation of real and financial resources in the economy. Increased openness, through external trade and payments liberalization, comprised an integral part of this process. Tax reform was intended to assist in the improvement of allocative efficiency and to strengthen incentives to save and to work. The overhaul of SEE operations would be conducive to greater managerial efficiency in a more competitive environment. Fiscal decentralization would contribute to social infrastructure and regional development.

In 1980, the government freed private sector prices and sharply adjusted the prices of basic commodities and services supplied by SEEs and state monopolies. Except for a few items whose prices continued to be subsidized, SEEs were instructed to set prices on the basis of cost developments--a policy that has been broadly followed since then, with the exception of a temporary slowdown in administered price adjustments in the course of 1983 and 1987, prior to general elections. Subsidies on agricultural products and inputs were reduced considerably.

After several small increments, interest rates on time deposits were decontrolled in mid-1980, allowing commercial banks to determine them through a gentlemen's agreement. Since December 1983, the central bank has periodically reviewed and set ceilings on domestic bank deposit rates--with one-year deposit rates fully decontrolled during the second half of 1987--taking into account fluctuations in the rate of inflation and the expected yield on foreign currency deposits, which were determined freely. On the lending side, banks were allowed to set nonpreferential interest rates. Except for parts of 1983-84 and of 1987-88, key time deposits and lending rates have been positive in real terms. In particular, real nonpreferential lending rates rose considerably in recent years reflecting high bank intermediation costs and a heavy tax burden.

In September 1980, the authorities introduced an incomes policy that was followed through 1985. Centrally determined wage increases, based on yearly inflation targets, were mandatory for the public sector. Since 1986, for most of the industrial labor force (including an increasing portion of the SEE labor force), wages have been set through collective bargaining.

Following a sharp devaluation in January 1980, the central bank began to adjust the exchange rate with increasing frequency to at least compensate for differences in inflation rates at home and in major industrial partner countries; since May 1981, adjustments in the nominal rate have taken place daily. Actually, over the period 1981-87, the Turkish lira was depreciated steadily in real terms, although subject occasionally to significant short-run fluctuations.

The highly restrictive import regime (consisting of nontariff barriers, tariffs, and advance deposit requirements) was relaxed significantly in 1980-81. In 1984, most imports were freed from licensing, and by the end of 1985, quantitative restrictions had been removed, many tariff rates were reduced, and deposit requirement rates were cut to very low rates. Since then, the authorities raised deposit requirement rates temporarily and imposed various import levies—with most of the revenue earmarked for newly-created extrabudgetary funds. Export subsidies, which had been intensified in the initial phase of the adjustment program, were trimmed and export restrictions were abolished in 1984; but some subsidies were again raised in 1987.

Early in the program, multiple exchange rates and several other restrictive practices were terminated. In January 1984, the exchange and payments system was further liberalized; in particular, residents were permitted to open foreign currency deposits with commercial banks; banks were allowed to engage in foreign exchange operations within certain limits; and restrictions on foreign travel and invisible transactions were eased and simplified.

Major banking reform legislation was introduced in 1985, with provisions on capital requirements, accounting and reporting standards, and a deposit insurance scheme. In addition, indirect instruments of monetary control were strengthened: the reserve and liquidity requirement system has been simplified and made more effective since 1983, and weekly auctions of government paper were introduced in 1985, interbank money market transactions in 1986 and open market operations in 1987. In recent years, there was a significant diversification of financial instruments (commercial paper and bonds issued by private enterprises; a wider range of government paper, including bonds and income-sharing certificates issued by specialized extrabudgetary funds). 1/

Besides obtaining authorization for regular price adjustments, SEEs were subject to a hiring freeze and a slowdown of wages in the initial years of the program. More fundamentally, in 1983 the legal basis for SEE reform was established, requiring enterprises to be run along

---

1/ For a description of recent financial innovations, see Central Bank of the Republic of Turkey (1988).

commercial lines. By the end of 1984, enterprises had lost almost all tax, tariff and credit preferences. 1/

Following an upward adjustment of personal income tax brackets in 1981 to compensate for the effect of inflation, marginal tax rates were reduced each year during 1982-86. The corporation income tax was unified in 1981 and was extended to SEEs in the following year. In 1984, withholding tax rates on financial income and transactions were reduced substantially. In January 1985, Turkey substituted a value-added tax (VAT) for a number of indirect taxes. Since 1984, wage earners have been granted a rebate for domestic indirect taxes against their income tax liability, in proportion to certain expenditures.

In 1984 the authorities created a number of extrabudgetary funds for special-purpose expenditure and lending (mostly for housing, transport, tourism and education projects) financed with earmarked indirect taxes, operating revenue, and sale of income-sharing certificates. Local governments were encouraged to expand urban and rural infrastructure in part with revenue shared with the central government. Also, extrabudgetary funds and local governments had gained access to external borrowing, to finance large-scale investment projects. Overall, the importance of decentralized government entities has grown markedly in recent years. 2/

2. Fiscal policy

At the risk of oversimplification, the period since 1980 can be split into two subperiods. In the first subperiod, spanning through 1983, fiscal policy—supported by monetary and incomes policies—was aimed principally at reining in the growth of domestic demand, while structural measures underlay an export-led rise in output, to restore domestic and external balance. Since 1984, however, the internal stabilization goal seems to have given way to high growth, as well as social and regional development objectives—as set out in the Fifth Five-Year Development Plan—to be pursued mainly through fiscal instruments.

Between 1980 and 1982, the fiscal stance was tightened markedly; the general government deficit, in proportion to GNP, was more than halved to 1.6 percent. Subsequently, poor revenue performance, partly compensated for with expenditure cuts, led to a rise in the deficit, reaching 4.5 percent of GNP by 1984. The introduction of the VAT, followed by a one-time revenue boost from reduced income tax collection lags, contributed to a fall in the deficit to 2.5 percent of GNP in

---

1/ In 1986, legislative authority was granted to sell SEEs to the private sector; since then, a number of enterprises have been selected as candidates for privatization.

2/ The share of extrabudgetary funds and local governments in total general government outlays rose from less than one tenth in 1983 to about one fourth in 1987.

1985-86. However, as part of the revenue gain wore off and outlays continued to rise rapidly, the deficit-to-GNP ratio doubled in 1987. After adjustment for cyclical variations, the economy experienced a cumulative contractionary impulse of 4.2 percent of GNP during 1980-83. In the years 1984-87, the general government injected an expansionary fiscal impulse totaling 4.8 percent of GNP, net of a withdrawal of stimulus equivalent to 2 percentage points in 1985. 1/

Since the outset of the adjustment program the revenue performance by and large has been less than satisfactory. Revenue failed to respond in the short term to supply-side cuts in marginal tax rates; in fact, the direct tax ratio dropped by some 6 percent of GNP during 1981-85, followed by a rebound of almost 2 percentage points in 1986 due to the phase-in of advanced income tax payments by businesses. The fall in indirect tax receipts, owing largely to cuts in tax rates on financial transactions in 1984, was more than reversed in the following year by the introduction of the VAT and various import levies. All told, in 1987, the ratio of general government revenue to GNP stood at 25 percent, which is slightly below the ratio that prevailed at the end of the 1970s.

Given lackluster tax buoyancy, the stabilization burden fell chiefly on government spending. The proportion of expenditure and net lending to GNP fell 5.5 percentage points in 1980-82, fluctuated around 24 percent in 1983-85, and jumped to nearly 30 percent in 1986-87. Budgetary restraint in the early years was achieved through a hiring freeze, real wage cuts, and sharp reductions in transfers to SEEs. By contrast, other transfers (mainly tax rebates to wage earners and exporters), interest payments (reflecting since 1985 near-market yields on auctioned government paper and income-sharing certificates), capital expenditures and net lending (mainly by the extrabudgetary funds and local governments), increased strongly in real terms.

The SEEs made an important contribution to the initial stabilization effort. As a result of price adjustments and some austerity measures, their operating surplus rose steadily from nothing in 1980 to almost 4 percent of GNP in 1985, and the net inflow from the budget (transfers less direct taxes), which totaled 4.5 percent of GNP in 1980, turned into a small net outflow from 1985 onward. The SEEs' borrowing requirement was halved from 5.2 percent of GNP in 1980. An apparent relaxation in employment policy and stepped-up investment outlays in subsequent years, and more recently, insufficient price

---

1/ The fiscal impulse is equivalent to the annual change in the difference between the cyclically neutral budget balance and the actual budget balance. In turn, the cyclically neutral budget balance is the difference between revenue that bears a constant proportion to actual nominal GNP and expenditure that bears a constant proportion to potential (trend) GNP--the proportions being measured in reference to a base year. for a discussion of the methodology, see Heller, Haas and Mansur (1986).

adjustments, led to an erosion in the enterprises' operating surplus to an estimated 1.6 percent of GNP and a rebound in their borrowing requirement to 4.3 percent of GNP by 1987.

Reflecting the above developments, the public sector borrowing requirement (PSBR) declined by more than 3 percentage points, to 5.4 percent of GNP, between 1980 and 1983; thereafter, albeit subject to some swings, it rose at an accelerated pace to reach 9.3 percent of GNP in 1987. The shift in fiscal stance in 1983-84 was broadly paralleled by monetary policy. The initial reduction in the PSBR permitted a significant slowdown in reserve money creation and interest rates became highly positive in real terms. Lacking effective safeguards against unsound financial practices and protection of bank deposits, monetary tightness culminated in a financial crisis in 1982. The crisis prompted some monetary accommodation, including cuts in time deposit rates. Subsequent efforts to reimpose monetary restraint were complicated by the rise in the PSBR, capital inflows from abroad, and currency substitution--reflected in a marked slowdown of the real growth of M2 relative to that of M2X (defined to include resident foreign exchange deposits), following the decontrol of foreign exchange deposits in 1984 and spurred by the rise in inflationary expectations.

3. Outcome

As shown in Table 1, Turkey experienced an extraordinary recovery in the years 1981-83. The economy moved rapidly toward a sustainable growth path, significantly correcting both domestic and external imbalances. During 1984-87, further progress was made in narrowing the external current account deficit and in particular the trade deficit. Indeed, the most successful aspect of the recovery was the growth and diversification of exports. Merchandise exports more than tripled in terms of both volume and share in GNP. 1/ However, the continued external adjustment--interrupted briefly by some weakening in 1986--was not matched by a similar process internally. The pickup in output growth, based largely on a surge in domestic demand, was accompanied by a revival of inflationary pressures. Whereas domestic developments seem to have reflected the greater ease of financial and incomes policies, the external outcome did not. Before attempting to explain this distinction in terms of specific policy measures, it is necessary to identify outside factors and structural measures that may have had a bearing on the comparability of the two subperiods.

It might be tempting to argue that whereas in the first subperiod Turkey's current account position was hurt by a deterioration in the terms of trade of some 5 percent a year on average, in the second

---

1/ Although officially recorded exports are believed to be overstated on account of fictitious shipments or over-invoicing by exporters seeking to benefit from various subsidies, there is no hard evidence-- based on partner country data--to suggest that such practices are large or that they have intensified in recent years.

Table 1. Turkey: Selected Economic Indicators, 1980-87

	1980	1981-83	1984-87
(Average annual percentage change, unless otherwise noted)			
Real GNP	-1.1	4.0	6.6
Real domestic expenditure	-1.2	3.0	6.8
Implicit GNP deflator	103.8	32.3	40.4
Real effective exchange rate 1/	-21.9	-6.6	-6.6
Terms of trade	-22.7	-5.1	3.8
Real broad money (M2) 2/	-23.4	20.8	5.3
Real broad money (M2X) 2/	-23.4	20.8	10.2
Time deposit rate			
(in percent per annum) 3/	10.4	37.0	45.7
(Average annual level in percentage of GNP)			
Nonfinancial public sector 4/			
PSBR 5/	8.6	5.7	6.9
SEE borrowing requirement	5.2	4.0	3.3
General government deficit 5/6/	3.4	1.7	3.6
Fiscal impulse 6/ 7/	-2.0	-0.7	1.2
Balance of payments			
Merchandise trade balance	-7.8	-5.8	-5.4
Merchandise and services			
trade balance	-9.5	-6.9	-6.0
Current account balance	-5.8	-2.9	-2.2
Induced net capital inflows 8/	3.0	2.5	3.6

Source: Undersecretariat of the Treasury and Foreign Trade, State Institute of Statistics, State Planning Organization, Central Bank of Turkey, and authors' calculations.

1/ Trade-weighted and adjusted for changes in relative consumer prices of major partner countries. An increase indicates appreciation.
2/ Average broad money stock divided by GNP deflator. M2X consists of M2 plus resident foreign exchange deposits with commercial banks.
3/ After-tax interest yield on six-month deposits denominated in Turkish lira.
4/ All accounts shown are on a commitment basis.
5/ Inclusive of net lending by the general government.
6/ General government is defined as the consolidated budget, extrabudgetary funds and revolving funds of the central government, plus local governments. Prior to 1982, fiscal year ending in February of the following year; for 1982, underlying official data (March through December) has been multiplied by 1.2; from 1983 onward, calendar year data.
7/ Calculated for the general government, as explained in the footnote of page 6.
8/ Excluding net inflows to resident official sector, but including Dresdner Bank deposits.

subperiod it benefited from a nearly 4 percent average annual terms of
trade gain. However, the effect of the turnaround in the terms of trade
on the current account was to a large extent tempered by the adverse
consequence of the concomitant contraction in oil-exporting countries'
demand--brought about by the oil price decline underlying the terms of
trade improvement--reflected in a fall of Turkish exports in 1986 for
the first time since the beginning of the decade. More importantly, the
substantial passthrough of the decline in oil import prices helped
contain the rate of inflation below the rate that would have prevailed
under unchanged oil prices, but by the same token, it contributed to a
surge in real domestic demand growth.

Besides the structural measures that impinged directly on demand
management--tax overhaul, fiscal decentralization, SEE reform, and
phase-out of incomes policy--trade and payments liberalization, as well
as financial sector reform, may partly account for some differences
between the two subperiods. The removal of nontariff import and export
barriers 1/ and decontrol of foreign exchange deposits resulted in more
open current and capital accounts since 1984, as compared with previous
years. In addition, several financial innovations enhanced the
potential for debt-financing of the public sector deficit; a larger
portion of the PSBR was financed by commercial banks and--in very modest
amounts--by the nonbank public, with appreciably less recourse to direct
central bank financing than previously.

Nevertheless, none of these measures seems to have strengthened
significantly the relationship between the budget deficit and the trade
deficit. 2/ At most, increased substitution between foreign and
domestic goods, and between foreign and domestic financial assets, and
greater availability of government debt instruments, may have brought
Turkey closer to some of the basic assumptions of the Mundell-Fleming
construct in recent years. Accordingly, the reduction in the trade
deficit between 1981-83 and 1984-87, at a time when the budget deficit
widened, is attributable principally to continued direct or indirect
monetization of the budget deficit and exchange rate flexibility.

In principle, the exchange rate regime adopted in the 1980s can be
characterized as a real exchange rate rule. However, in practice, the
6.6 percent average annual real effective depreciation--probably

---

1/ However, as observed above, some of the 1984-85 reductions in
import duties and deposit requirements, and in export tax rebates, were
rolled back or replaced with similar measures in 1986-87.
2/ Herein the focus of attention is the trade account which responds
to variations in income and relative prices, rather than the current
account, which includes sizeable unrequited transfers consisting almost
entirely of remittances by Turkish workers abroad, determined by wage
levels in the host country and exchange rate expectations.

underestimated in the second subperiod--1/ subject to considerable
variance from year to year, 2/ seems to have taken Turkey closer to the
flexible exchange rate case of the Mundell-Fleming model. Given greater
capital mobility in the second than in the first subperiod--reflected to
an extent in the rise in induced net capital inflows--the exchange rate
depreciation in the second subperiod was probably lower than it would
have been without the liberalization of the capital account that had
taken place in 1984. Clearly, the exchange rate had become increasingly
the key to sustaining the external stabilization effort, but not without
considerable cost in terms of reviving inflationary pressures.

IV. Policy Simulations

For a broad assessment of the quantitative impact of an alternative
set of policies on economic performance during 1984-87, several counter-
factual simulations were conducted on the basis of a computational
dynamic general equilibrium model of the Turkish economy. 3/ The model
distinguishes among three products: manufacturing and agricultural
goods, which are tradable, and nontradables. Producers choose their
output level and mix by maximizing revenue, given a quadratic production
function, while households choose their expenditure basket by maximizing
utility, expressed as a simple loglinear function of consumption of each
product, subject to an overall budget constraint. Excess demand
(supply) for either tradable good is directly reflected in a trade
deficit (surplus); for nontradables, excess demand (supply) results in a
drawdown (buildup) of inventories. Prices of tradables are a function
of foreign prices, together with the exchange rate, import taxes and
export subsidies; prices of nontradables are determined by wages (which
adjust partially with a lag to changes in the price level) and excess
demand for nontradables. The model incorporates simple government and
monetary sectors. Government expenditure is exogenous, while revenue is
a function of national income. Excess money supply, derived in part

---

1/ The real exchange rate index in Table 1 has been calculated
without accounting for the effect of changes in the trade regime, and
notably, without allowing for the introduction of the VAT (levied
initially at a 10 percent basic rate, raised later by 2 percentage
points, and augmented by earmarked taxes and by advance income tax
payments by businesses, set at one half of the taxpayers' VAT
liability), adjusted at the border on both exports and imports.
2/ Instances of fluctuations were a 0.7 percent real appreciation in
1985 to dampen inflationary pressures, followed by 16.2 percent real
depreciation in 1986, partly to stave off speculation against the
Turkish lira in the early part of the year.
3/ A description of the model is provided in the Appendix. An
earlier version, including a number of simulations, was presented by one
of the authors at a seminar in the Central Bank of the Republic of
Turkey on March 20, 1986. For a discussion of similar models and a
simulation of the effects of external liberalization, see Khan and
Zahler (1983).

from a standard money demand function, influences the level of private sector expenditures, and thereby, both prices and the balance of payments. The parameters of production and consumption functions were estimated using nonlinear techniques. Other parameter values were drawn from earlier work on the Turkish economy, or where necessary, from work on other comparable countries.

The model was used to simulate the impact of three specific policy experiments, expressed in reference to those actually adopted during 1984-87: a reduction in public sector expenditure of one percent of GNP per year (simulation 1); a one percentage point reduction in the annual rate of real exchange rate depreciation (simulation 2); and a package, comprised of cuts in both public sector outlays and the rate of depreciation, designed to maintain the current account at its baseline level (simulation 3). Real after-tax interest rates are assumed to remain constant in each of the three simulations. The results, shown as deviations from the baseline solution, are summarized in Table 2.

Table 2. Turkey: Policy Simulation Results, 1984-87

	Reduced Public Expenditure (1)	Reduced Rate of Depreciation (2)	Reduced Public Expenditure and Rate of Depreciation (3)
	(Deviation from average annual percentage change)		
Real GNP	--	-0.2	-0.6
Implicit GNP deflator	-0.5	-2.6	-6.5
Real effective exchange rate	--	1.0	2.4
	(Deviation from average annual level in percentage of GNP)		
PSBR	-1.0	--	-1.2
Current account balance	1.0	-0.6	--

Source: authors' calculations.

Under simulation 1, the cut in the PSBR, assisted by a concurrent fall in private sector demand (as excess liquidity in the economy is reduced) leads to a reduction in the current account deficit equivalent to 1 percent of GNP per year. The effect on inflation is very small

because of the unchanged rate of real depreciation. Also, the effect on output growth is negligible, as the external contribution substitutes for the fall in domestic demand.

Under simulation 2, as a result of the cut in the rate of real depreciation, the inflation rate falls by 2.6 percentage points, while the relative price of nontradables increases, stimulating excess supply in that market. At the same time, the current account deficit deteriorates by 0.6 percent of GNP, as output of tradables falls and their consumption rises.

Simulation 3 measures the impact of fiscal policy aimed at containing the PSBR at its average 1981-83 level, while the current account is constrained to remain at its 1984-87 actual level, both in proportion to GNP. The fall in the PSBR allows a slowdown in the rate of real depreciation by 2.4 percent a year, contributing to a 6.5 percentage point reduction in the average inflation rate. GNP growth falls by 0.6 percent, largely due to the impact of the slower real depreciation on manufacturing output, combined with weaker demand for nontradables.

While broadly consistent with the basic Mundell-Fleming framework, the simulation model is in certain respects more versatile (e.g., it allows for flexible prices), but in others, less general (e.g., it precludes capital mobility). Overall, the simulation results need to be interpreted keeping in mind the properties of the model and its applicability to the Turkish economy. In this regard, it may be noted that the first two simulations are simply meant to provide a sensitivity analysis. Simulation 1 is predicated on a fixed real exchange rate, whereby the fiscal correction produces an equivalent improvement in the current account; similarly, simulation 2 is restricted to an exogenous change in the real exchange rate. By contrast, simulation 3 is a more realistic experiment in that it combines exchange rate flexibility with a more moderate fiscal stance.

V. Concluding Observations

In general terms, the Turkish experience of the 1980s highlights two phases in the conduct of fiscal policy: broadly restrictive until 1983, and expansionary thereafter. As throughout this period the public sector deficit has been largely monetized and the exchange rate remained fairly flexible, the impact of the shift in fiscal stance on external performance was limited. However, real GNP growth accelerated and the inflation rate picked up significantly—the latter despite the decline in the price of oil. Admittedly, developments in Turkey have been far more complex than depicted here, in particular when viewed against the backdrop of economy-wide structural changes. Nonetheless, they illustrate the case of a small open economy where a significant rise in the public sector deficit accompanied by real exchange rate depreciation and increasing real wage stickiness, can fuel a surge in inflationary

pressures. In essence, protection of the balance of payments through real depreciation, without tackling the root cause of the problem, namely, the fiscal imbalance, is not a viable option over the medium term.

Policy simulations with a computational general equilibrium model suggest that an unchanged PSBR during 1981-87, equivalent to over 5 1/2 percent of GNP (still a rather high level, in view of the lack of a sufficiently developed domestic financial market), combined with a lower than actual rate of real depreciation, would have contributed, on balance, to an improvement in economic performance. It was found that during 1984-87, Turkey would have experienced a reduction of about 6 1/2 percentage points in the annual rate of inflation and an unchanged decline in the external current account deficit, at a cost of less than 1 percentage point cut in annual real GNP growth, in comparison with actual rates. Needless to say, these results are experimental in nature and are to be viewed with caution given the inherent limitations of the model--which cannot capture fully the important structural changes that have taken place over the last decade--and of the underlying data. However, they do convey an overall sense of the policy tradeoffs faced by Turkey in its quest for a number of valid economic and social goals, within a rather short time horizon and constrained by a limited number of instruments.

Appendix: The Model

1. **Overview**

The dynamic computable general model used for policy simulations was calibrated to replicate the baseline data (over the period 1977-87) by adding a vector of constants to each equation, and the effects of policy changes were then calculated in terms of the difference from the baseline solution. The following is a brief description of the key equations in the model, and the methods by which the parameters were derived or chosen. The selected parameter values are provided in Table 3.

The two key blocs of the model are those determining the production and consumption decisions in the economy. Equations 1 to 3 describe the output of manufactured, agricultural and nontraded goods. Producers are assumed to maximize their total revenue at given prices subject to a quadratic production function, with potential output given exogenously. Equations 9-12, in turn, describe the consumption of the three goods produced in the economy, and of oil. Consumers (including the public sector) are assumed to maximize a simple log linear utility function, subject to their budget constraint, and subject to a minimum consumption level of each type of good. The parameters of both the production and consumption equations were estimated simultaneously using nonlinear techniques.

Both manufactured and agricultural goods were assumed to be freely exportable; thus, the difference between production and consumption is exported (equations 21 and 22). Excess supply (demand) of nontradeables, however, is assumed to build up excess (shortfall of) inventories (equation 8). For the purposes of the simulations, it was assumed that actual and desired inventory accumulation in the baseline was in equilibrium: but changes in inventories induced by simulated policy changes resulted in an undesired buildup (rundown) of stocks. These excess inventories tend to reduce the supply of nontradeables (equation 3), and to reduce their prices (equation 18). In the absence of any empirical evidence it was assumed that supply would be reduced by one half the excess stock of inventories in the previous period, and that the price elasticity of the excess demand for nontradeables was 0.6. The effect of these two assumptions is to eliminate about three-quarters of the excess stocks existing in the previous period.

The model incorporates simple fiscal and monetary sectors. General government expenditures are taken as an exogenous policy variable, as are operating surpluses of state economic enterprises. Government revenues are assumed to have an elasticity of one with respect to GNP, which corresponds closely with actual experience over the bulk of the period. Money supply (equation 36) is equivalent to the domestic financing of the PSBR plus the demand for credit from the private sector, taken as exogenous. In the simulations it was assumed that one half of any additional net domestic financing required by the public

Table 3.   Parameter Values Used in the Model

Equation	Variable	Parameter Values	
		Behavioral	Structural
1-3	Output of agricultural, manufacturing and nontradeable goods	$g1 = 3.97$ $g2 = 6.23$ $g3 = 1.71$ $g4 = 0.50$	
9-12	Consumption of manufacturing, agricultural, nontradeable goods and oil	$g5 = 123.50$ $g6 = 0.42$ $g7 = 47.49$ $g8 = 42.77$ $g9 = 0.11$ $g10 = 1.73$ $g11 = --$	
14.	Final private domestic demand	$g12 = 1.0$ $g13 = 0.10$	
17.	Price of manufactured goods		$c_1 = 0.17$
18.	Price of nontraded goods	$g14 = 0.66$ $g15 = 0.60$	
19.	Nominal wages	$g16 = 0.73$	
29.	Price of nonoil imports		$c_2 = 0.8$
30.	Import prices		$c_3 = 0.3$
31.	Export prices		$c_4 = 0.75$
33.	Government revenues	$g17 = 1.00$	
37.	Money demand	$g18 = 1.25$ $g19 = 0.31$ $g20 = 0.37$	

sector was financed through the banking system. The demand for real
money balances (equation 37) is a function of real GNP, nominal interest
rates, and expected inflation (proxied by inflation in the previous
period) with the values of the parameters based on earlier work by
Kopits (1987). In the simulations, nominal interest rates are adjusted
in line with changes in inflation (equation 40), so that the real
interest rate remains constant.

Total domestic demand--effectively the budget constraint for the
consumption equations--is the sum of public and private domestic
demand. The former is derived directly as the difference between
government expenditure and transfers (both exogenous), while the latter
is a function of private disposable income and excess liquidity
(equation 14). The elasticity of private domestic demand with respect
to private disposable income, is assumed to be equal to unity, while the
elasticity of demand with respect to excess money supply is set at 0.1.

The prices of imports and exports (used in the determination of the
exchange rate in equation 38), and of agricultural and manufactured
goods are based on developments in foreign prices, with allowance made
for the impact of import protection and export subsidies for manu-
factured goods. The prices of nontradeable goods are related to wage
developments (equation 19), and to the excess demand for nontradeables
(defined as the demand for nontradeables divided by the available
supply, including excess inventories).

There remains scope to expand and refine the model in a number of
areas. First, while an effort has been made to estimate the key
parameters in the model econometrically, the choice of some was in the
last analysis essentially arbitrary. Further econometric work would be
desirable. Second, there remains scope to expand the fiscal and
monetary sectors of the model to incorporate the dynamic effect of
interest rates on the government deficit, and thereby inflation.

2. Equations

Variables with the suffix r are in real terms. Variables c1 etc.
are structural parameters; g1 etc. are behavioral parameters; and
p1 etc. are policy parameters. All domestic variables are in domestic
currency, and external variables in foreign currency, unless otherwise
stated. For simplicity, constant terms are excluded from the equations.

a. National income

Supply of agricultural goods

$$1. \qquad yar = \frac{pa * ypr}{g1} * \left(\frac{pa^2}{g1} + \frac{pm^2}{g2} + \frac{ps^2}{g3} \right)^{-\frac{1}{2}}$$

Supply of manufactured goods

$$2. \qquad ymr = \frac{pm * ypr}{g2} * \left(\frac{pa^2}{g1} + \frac{pm^2}{g2} + \frac{ps^2}{g3} \right)^{-\frac{1}{2}}$$

Supply of nontraded goods

3. $\quad ysr = \dfrac{ps * ypr}{g3} * (\dfrac{pa^2}{g1} + \dfrac{pm^2}{g2} + \dfrac{ps^2}{g3})^{-\frac{1}{2}} - invr(-1) * g4$

Unanticipated buildup in inventories

4. $\quad di = ys - (cs + xsnet * e)$

Real output

5. $\quad yr = yar + ymr + ysr$

Nominal output

6. $\quad y = ya + ym + ys$

Gross national product

7. $\quad yn = y + (xint - iint + wrm + ot) * e$

Excess inventories

8. $\quad invr = invr\,(-1) + \dfrac{di}{ps}$

b. **Aggregate demand**

Real consumption of nontradeable goods

9. $\quad csr = (g5 + g6 * (tdd/pop - g7 * pm - g8 * pa - g5 * ps - g10 * po)/ps) * pop$

Real consumption of agricultural goods

10. $\quad car = (g8 + g9 * (tdd/pop - g7 * pm - g8 * pa - g5 * ps - g10 * po)/pa) * pop$

Real consumption of oil products

11. $\quad cor = (g10 + g11 * (tdd/pop - g7 * pm - g8 * pa - g5 * ps - g10 * po)/po * pop$

Consumption of manufactured goods

12. $\quad cm = tdd - cs - ca - co$

Total domestic demand

13.   tdd = tddp + tddg

Final private domestic demand

14. $\log(tddp) = g12 * \log(ypdi) + g13 * (\log(m2) - \log(m2d))$

Private disposable income

15.   ypdi = yn - gt + gtrn

c.   <u>Domestic prices</u>

Price of agricultural goods

16. $\log(pa) = \log(pamf * e)$

Price of manufactured goods

17. $\log(pm) = cl * \log(pmmf * e * (1 + tirate)) +$
        $(1-cl) * \log(pmxf * e * (1+mxs))$

Price of nontraded goods

18. $\log(ps) = g14 * \log(w) + g15 * \log((cs+xsnet)/(ysr+invr(-1))$

Nominal wage

19. $\log(w) = g16 * \log(p(-1))$

GDP deflator

20. $p = pa * \dfrac{ya}{y} + pm * \dfrac{ym}{y} + ps * \dfrac{ys}{y}$

d.   <u>External accounts</u>

Net exports of manufactures

21.   xmnet = (ym-cm)/e

Net exports of agricultural goods

22.   xanet = (ya-ca)/e

Oil imports

23.   ioil = co/e

Trade balance

24.   tb = xmnet + xanet - ioil

Current account balance

25.   cas = tb + xsnet + xint - iint + wrm + ot

Interest payments

26.   iint = rf * (fdebt + fdebt(-1))/2

Foreign debt

27.   fdebt = fdebt(-1) + dk + dval

Capital inflows

28.   dk = cas - drv

e.   <u>Export and import prices</u>

Price of nonoil imports

29.   log(pinoil) = log(pinoil(-1)) + c2 * log(pmmf/pmmf(-1)) +
       (1-c2) * log(pamf/pamf(-1))

Import prices

30.   log(pi) = c3 * log(pioil) + (1-c3) * log(pinoil)

Export prices

31.   log(px) = log(px(-1)) + c4 * log(pmxf/pmxf(-1) + (1-c4) *
       log(paxf/paxf(-1)

f.   <u>Public sector</u>

Public sector borrowing requirement (PSBR)

32.   gd = gt - g - seeops

Government revenues

33.   log(gt) = g17 * log(y)

Total public sector demand

34.   tddg = g - gtrn

Domestic financing of the PSBR

35. $gdd = -gd - gdf$

g.   Monetary sector

36. $m2 = m2(-1) + gdd * p1$

Real money demand

37. $\log(m2d/p) = g18 * \log(yr) - g19 * \log(p(-1)/p(-2)) + g20 * rd$

h.   Policy rules

Exchange rate

38. $e = e(-1) * p/p(-1)/((px * pi/px(-1)/pi(-1)) ** .5) * p2$

Government expenditure

39. $g = yn * p3$

Domestic interest rate

40. $rd = rdr + \log(p(-1)/p(-2))$

3.   Variables

ca   =   Consumption of agricultural goods

cas   =   Current account balance

cm   =   Consumption of manufactures

cs   =   Consumption of nontradeables

di   =   Unanticipated stockbuilding

dk   =   Capital inflows

drv   =   Increase in reserves

dval   =   Valuation change on foreign debt

e   =   Exchange rate

fdebt =   Foreign debt

g   =   General government expenditure

gd	=	Public sector borrowing requirement (PSBR)
gdd	=	Net domestic financing of the PSBR
gdf	=	Net foreign financing of the PSBR
gt	=	Government revenues
gtrn	=	Government transfers
iint	=	Interest payments abroad
inv	=	Excess stocks
ioil	=	Imports of oil products
mxs	=	Export subsidy rate on manufactures
m2	=	Broad money
m2d	=	Demand for broad money
ot	=	Other transfers
p	=	GDP deflator
pa	=	Price of agricultural value added
pamf	=	Price of manufactured imports
paxf	=	Price of agricultural exports
pi	=	Price of imports
pinoil	=	Price of nonoil imports
pioil	=	Price of oil imports
pm	=	Price of manufacturing value added
pmmf	=	Price of manufactured imports
pmxf	=	Price of manufactured exports
po	=	Price of oil in domestic currency
pop	=	Population
ps	=	Price of value added in the nontradeables sector
px	=	Price of exports

rd   = Domestic interest rate, after tax

rf   = Foreign interest rate

seeops = Deficit of state economic enterprises

tb   = Trade balance

tdd   = Total domestic demand

tddg   = Public domestic demand

tddp   = Private domestic demand

tirate = Import taxes

w   = Wages

wrm   = Workers' remittances

xanet   = Net exports of agricultural goods

xint   = Interest receipts from abroad

xmnet   = Net exports of manufactures

xsnet   = Net exports of services

ya   = Agricultural output

ym   = Manufacturing output

yn   = Gross national product

yp   = Potential output

ypdi   = Private disposable income

ys   = Output of nontradeables

y   = Gross domestic product

References

Adams, C., and D. Gros, "The Consequences of Real Exchange Rate Rules for Inflation," International Monetary Fund Staff Papers, 33 (September 1986), pp. 439-476.

Cuddington, J.T., and J.M. Viñals (a), "Budget Deficits and the Current Account: An Intertemporal Disequilibrium Approach," Journal of International Economics, 21 (1986) pp. 1-24.

Cuddington, J.T., and J. M. Viñals (b), "Budget Deficits and the Current Account in the Presence of Classical Unemployment," Economic Journal, 96 (March 1986), pp. 101-119.

Dornbusch, R., Open Economy Macroeconomics, New York, Basic Books, 1980.

Frenkel, J.A., and A. Razin, "The Mundell-Fleming Model A Quarter Century Later," International Monetary Fund Staff Papers, 34 (December 1987), pp. 567-620.

Heller, P.S., R.D. Haas, and A.H. Mansur, A Review of the Fiscal Impulse Measure, Occasional Paper 44, International Monetary Fund, May 1986.

Henderson, D.W., "Comment," in The Canadian Balance of Payments: Perspectives and Policy Issues, ed. by D. Purvis, Montreal, Institute for Research on Public Policy, 1983, pp. 222-237.

Khan, M., and R. Zahler, "The Macroeconomic Effects of Changes in Barriers to Trade and Capital Flows: A Simulation Analysis," International Monetary Fund Staff Papers, 30 (June 1983), pp. 223-282.

Kopits, G., Structural Reform, Stabilization and Growth in Turkey, Occasional Paper 52, International Monetary Fund, May 1987.

Republic of Turkey, Central Bank, Annual Report, Ankara, various issues.

Republic of Turkey, State Planning Organization, Turkey: Main Economic Indicators, Ankara, various issues.

Viñals, J.M., "Fiscal Policy and the Current Account," Economic Policy, 1 (October 1986), pp. 712-744.