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Country Economics Department
The World Bank
October 1988
WPS 120

Public Policy and Private Investment in Turkey

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Turkey's public policy for expenditure and growth encouraged private investment despite the high real interest rates necessary to induce private domestic savings in a period of declining foreign savings.

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Developing countries trying to emerge from recessionary spirals must recognize the importance of public-private interactions in designing growth-oriented adjustment programs. They must appreciate the complex impact of fiscal policy on the economy — the way government credit, investment, and (indirectly) exchange rate policies affect export performance and hence growth and capacity utilization, thus encouraging private investment.

Turkey is an interesting country for studying how public policy can stimulate private investment. The reason is that unlike other high-debt countries, Turkey has managed to increase the rate of investment in recent years despite external constraints and high real interest rates.

Turkey's strategy nevertheless has limits. The surges in public investment in 1986 and 1987 have since hurt macro stability. And private investment has tilted toward such nontradables as housing — partly as a result of special credit schemes directed at mass housing and partly because housing investment is an attractive hedge against inflation. Unless corrected, this shift could hurt future export prospects.

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This paper is part of a larger study on Turkey's recovery from the debt crisis, undertaken jointly with Ritu Anand and Roberto Rocha, both from the World Bank. We are indebted to them for many helpful discussions, and to John Brondolo and Reza Firuzabadi for competent research assistance. In Turkey the assistance provided by Hasan Ersel, Yavuz Ege, Given Sak and Gazi Ercel is gratefully acknowledged. The authors also thank B. Balassa and J. Khalilzadeh-Shirazi for very useful comments. The views expressed in this paper are our own and do not necessarily reflect those of the institutions we are affiliated with.

I. INTRODUCTION

A marked pattern in the adjustment process in the 1980's has been the inability of many developing countries to maintain investment rates. Caught between the need to reduce budget deficits and rising interest payments, many governments have found it necessary to cut public sector investment.[1] In many countries, private investment has fallen too, under the combined impact of forced import compression, uncertainty over future demand prospects and tighter credit markets. As a consequence, output growth has gone down sharply in most high-debt countries. The question of how to revive investment without jeopardizing external and internal balance is critical for the recovery to a stable growth path. Government policies clearly have a crucial role to play. Governments can raise the investment rate directly through an increase in public investment. But if such an increase is offset by a corresponding fall in private investment, little if anything is gained in aggregate. Hence the importance of an assessment of the impact of public sector policy on private investment.

A clearer understanding of the impact of government policy on private investment is also important for the design of short-run stabilization programs aimed at current account improvement. A reduction in the budget deficit would only have an impact on the current account of the balance of payments if private savings and investment behavior do not offset the initial budget cut.[2]

1/ See Chhibber and Khalilzadeh-Shirazi (1988) for a detailed discussion of public finance issues during the adjustment phase in the 1980's.

2/ See Anand, Chhibber and van Wijnbergen (1988) for an extensive empirical analysis of this issue for Turkey.

Determinants of private investment have been studied more extensively for developed than developing countries, but even there it remains a relatively under-researched field.[3] The available studies stress different factors in explaining private investment behavior; but most indicate as the more important determinants of private investment (a) expected demand, typically proxied by sales or output (Kuh (1971), Jorgensen and Siebert (1968) and measured indirectly as profits or cash flow (Elliott (1973), Bischoff (1971); (b) cost of capital relative to wages (Bischoff (1969), Eisner (1970)); and (c) the level of capacity utilization (Feldstein and Foot (1971) and Eisner (1972)). A more recent survey by Chirinko (1986) shows that the differences in results from various neoclassical investment models can largely be traced to differences in assumptions about the dynamics of investment behavior.[4]

Studies of private investment behavior in developing countries are scarce. Some have attempted to adapt neoclassical models of investment to study private investment behavior in individual developing countries (Conway (1987), Sundarajan and Takur (1980), Tun Wai and Wong (1982) and van Wijnbergen (1982)). A recent, more wide ranging study by Blejer and Khan (1984) has attempted a more explicit analysis of the impact of government policies on private investment for 24 developing countries, with data pooled over the period 1971-79. They attempt to incorporate variables which could

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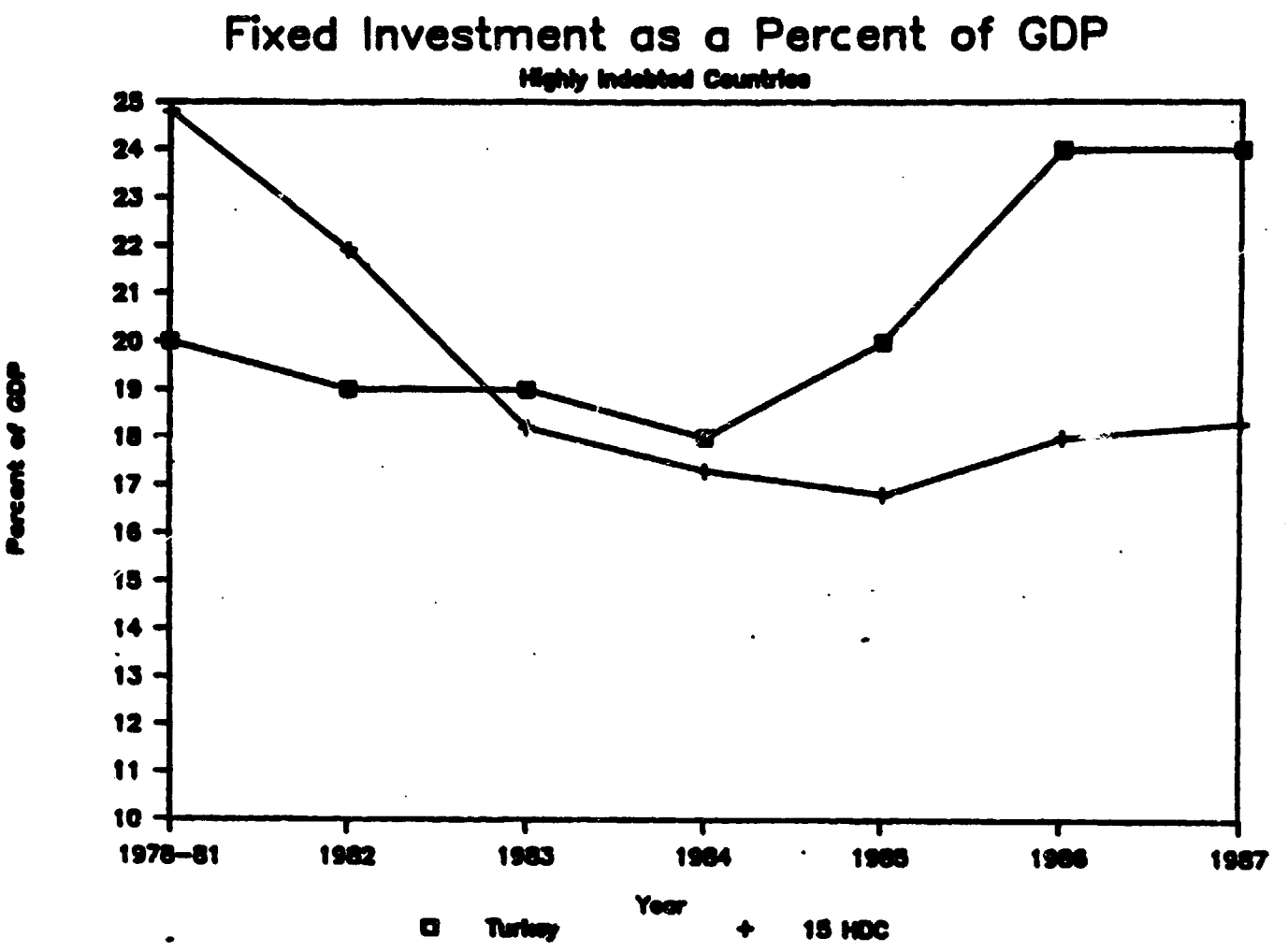
3/ For surveys see Eisner and Strotz (1963), Jorgensen (1971) and Nickell (1978).

4/ One class of models, based on among others Eisner's work, stresses the importance of expectations, whereas the studies inspired by Jorgensen's work stress intertemporal aspects of technology.

measure the extent of "crowding out" of the private sector and the impact of changes in the composition of public investment on private investment. However, due to insufficient data on a number of countries, Blejer and Khan end up using a number of proxy variables to assess the impact of government policy on private investment that are not always convincing. For example they use the trend in investment as a proxy for infrastructure investment. Moreover, interest rates play no role in their analysis.

This paper attempts a more detailed investigation of the relation between public policy and private investment than is apparently possible on a cross-country basis. In order to do so, it abandons the multi-country approach taken by Blejer and Khan (1986) for a country specific exercise on Turkey. Turkey presents an interesting case to study because, unlike many other high debt countries, it has managed to increase the rate of investment in recent years (see Figure 1), despite external constraints and high real interest rates in the economy. On the one hand, high interest rates necessary to reconcile the public sector's borrowing requirement with external balance have held back private investment. However, government policies, other than its interest rate policy, have been very important in encouraging private investment. Thus, Turkey is a promising candidate for a study of the impact of over-all public policy on private investment. The model estimated in this paper pays special emphasis to the government's credit policy, its investment policy, the overall size of the fiscal deficit and indirectly its exchange rate policy through its impact on export performance and hence on growth and capacity utilization.

Figure 1:



NOTE: Data for the 15 high debt countries are taken from the IMF's World Economic Outlook, October 1987.

The remainder of the paper is divided into four sections. Section II sets the stage by briefly describing investment trends in Turkey since 1980. Section III sets up the model to be estimated. The calculation for the effective cost of borrowing which are done differently from previous work by including the impact of compensating balances are in Section IV. In Section V the estimation results are presented. In Section VI, these results are used for counter factual simulations to assess the impact of individual government policies on private investment. Section VII concludes.

II. INVESTMENT TRENDS

Aggregate investment has recovered from the sharp cutbacks made during the macroeconomic turmoil of the 1978-1980 period. The share of total fixed investment in GNP is currently (1986-1987) 5.8 percentage points above the average over the five year period between 1967 and 1971 (see Figure 2). This is the period just before the major increase in public sector investment that triggered the fiscal and current account deficits of the mid-seventies which eventually culminated in the external debt rescheduling of 1978-80. In fact, the 1987 fixed investment share in GNP is almost equal to the share in the peak year 1977 (23.7% in 1987 versus 24.2% in 1977). This recovery has taken place in spite of a substantial increase in real interest rates. Several factors contribute to an explanation of this somewhat surprising development.

By far the largest part of the increase in investment is due to higher public sector investment (see Figure 3). The ratio of public sector capital expenditure to GNP increased from 11 percent to 14 percent between 1980 and 1987. Public sector investment now makes up 60% of total government expenditure (net of stock changes), up from 47% in 1980. This shift in

Figure 2:

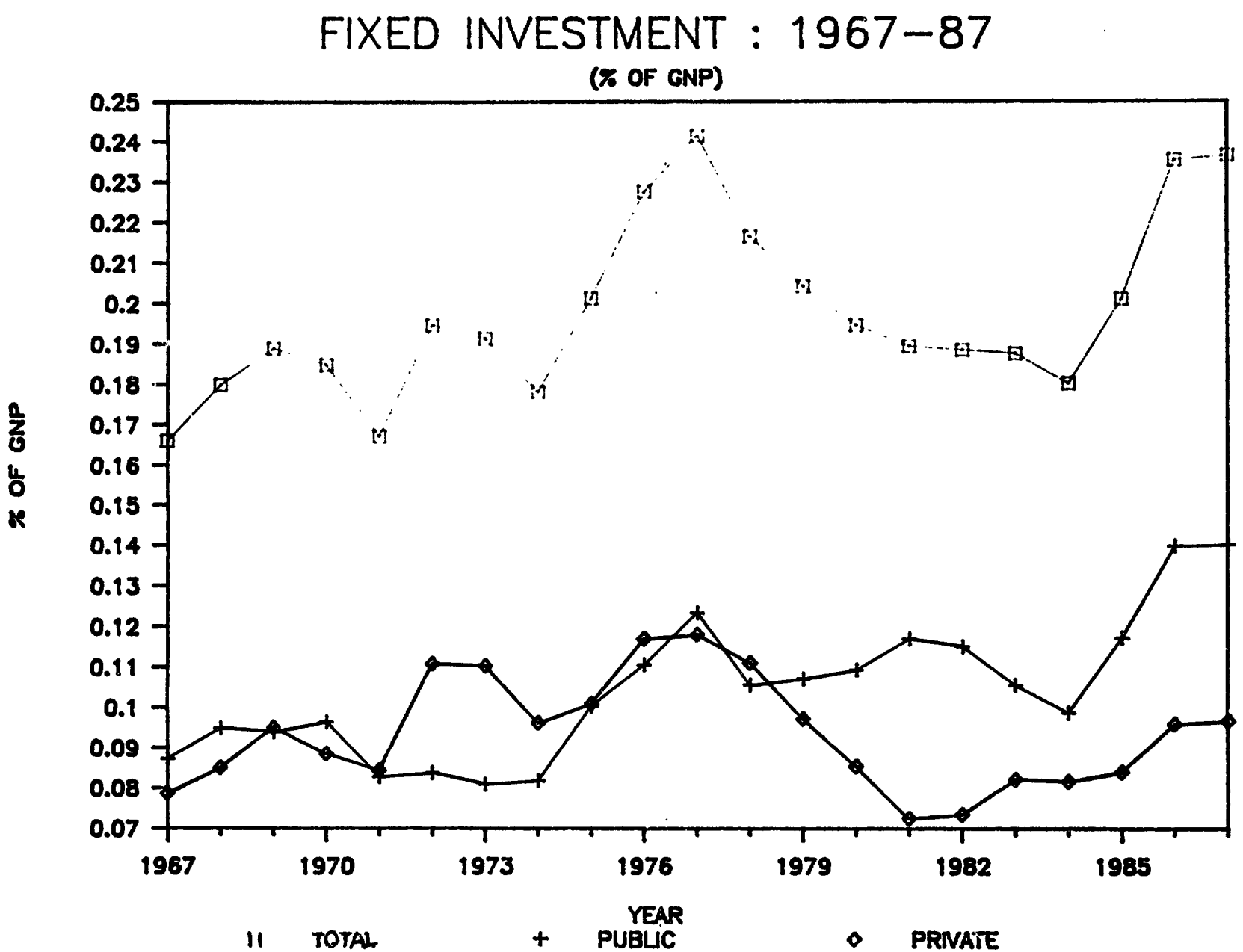
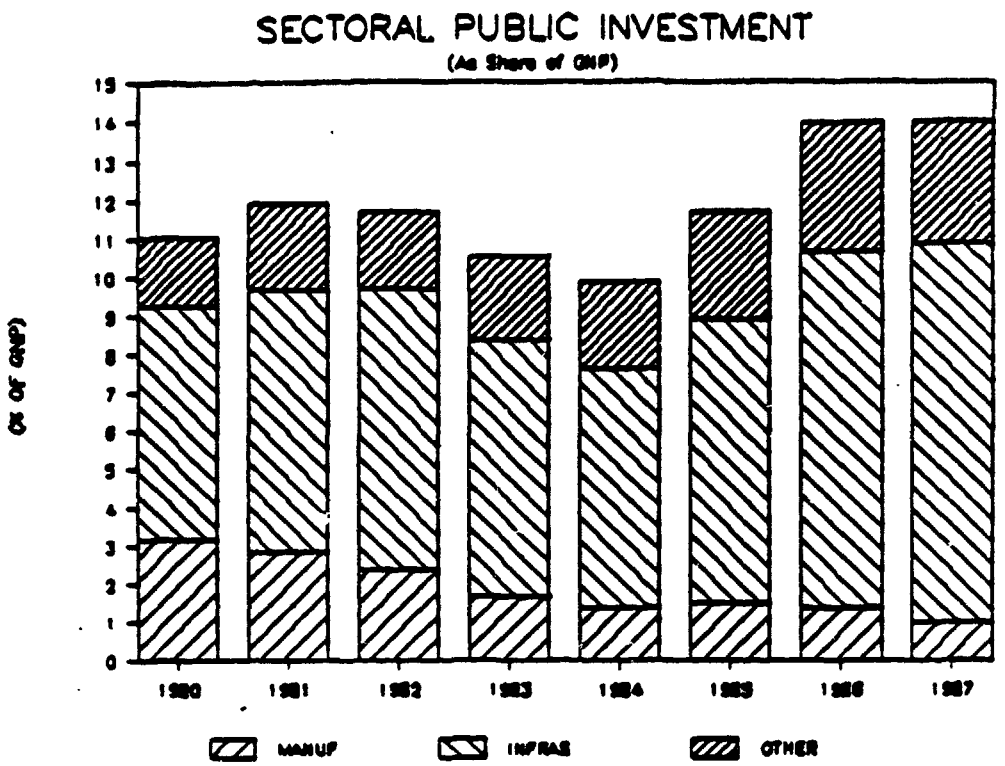
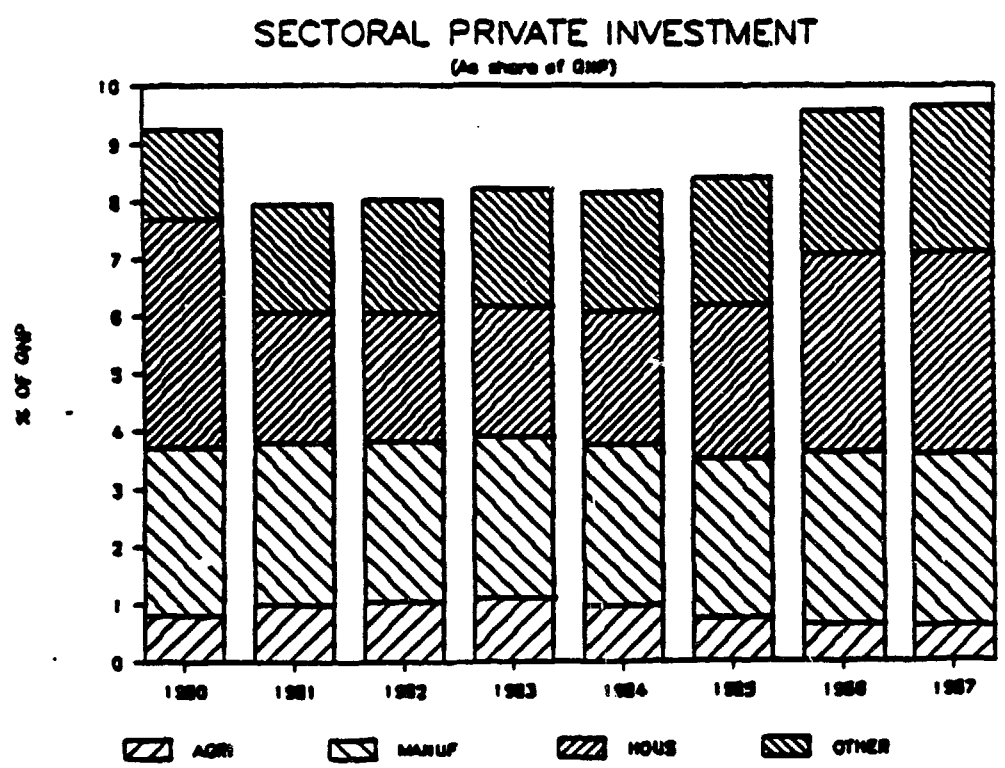

FIXED INVESTMENT : 1967–87
(% OF GNP)
% OF GNP
0.25
0.24
0.23
0.22
0.21
0.2
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
1967
1970
1973
1976
1979
1982
1985
YEAR
TOTAL
PUBLIC
PRIVATE

Figure 3:





Source: SPO

government expenditure towards investment is one important reason why output growth has not suffered from the mismatch between fiscal deficits and external targets and the resulting high real interest rates.

Private fixed investment, while increasing from the low point (7.2% of GNP) reached in 1981, has not recovered significantly beyond the levels reached in the early seventies. It averaged 9.6% in 1986-1987 as against 9% of GNP over 1967-1972. Private investment net of housing has remained sluggish: it was 5.7% of GNP in 1981 and only 6.1% of GNP in 1986 and 1987. Housing investment has increased sharply in the past few years in resp to the availability of subsidized credit from the MHF, and the fact that real estate remains a good hedge against high inflation.

To sum up, aggregate investment in Turkey has recovered from the recession induced shortfall at the onset of this decade. It has done so partly as a consequence of a strong recovery in public sector investment. However, and this in spite of sharply higher real interest rates, private investment has recovered too, under the impact of various government policies. To assess the impact of at least those government policies whose impact can in fact be quantified, we develop and use the model to the presentation of which we turn next.

III. DETERMINANTS OF PRIVATE FIXED INVESTMENT: MODEL SPECIFICATION

The model used to distinguish the determinants of private fixed investment is an adapted accelerator model; and includes variables designed to capture constraints and structural characteristics typical for a developing country. In steady state, desired f › .d investment is a function of the desired capital stock:

$$I_t^* = [1-(1-d)L]\, K_t^* \qquad \ldots(1)$$

where d stands for the proportional rate of depreciation.

The desired capital stock is in turn a function of the expected level of output:

$$Kt^* = a.Yt^e \qquad \ldots(2)$$

From this equation there are two ways to deriving an investment equation. The first one postulates the coefficient "a" as a function of variables like capacity utilization, and so on. The next step involves making a local quadratic approximation to adjustment costs, which results, in standard fashion, in a gradual adjustment of the actual to the desired capital stock. The gradual change in the actual capital stock so derived constitutes the investment function we are after. An alternative method keeps "a" constant, but assumes that the parameters of the quadratic adjustment cost function are a function of variables such as real interest rates, capacity utilization and so on. Blejer and Khan (1984) demonstrate that both methods in fact result in the same equation to be estimated, so the choice is a matter of taste only. The presentation in this paper is based on the second approach.

In this formulation, we start with a partial adjustment function derived from a quadratic adjustment cost model:

$$[It - It\text{-}1] = b\,[It^* - It\text{-}1] \qquad \ldots(3)$$

where I_t^* is the desired level of investment of equations (1).

The speed at which private investors respond to the gap between desired and actual investment, as measured by b, depends in this formulation on government policies and other economic factors. These include the degree of capacity utilization, real interest rates, availability of credit to the private sector and the composition of public sector investment. We discuss each in turn.

The level of capacity utilization, while obviously not a steady state issue, is likely to have a substantial impact on the timing of investment outlays. This is in fact one of the reasons why we prefer the second approach to the derivation of an investment equation: that is exactly the way it is brought in. If capacity utilization (CU) is low, then investment will remain sluggish even if output is expected to grow rapidly later on. The extent to which un-utilized capacity will act as a deterrent to new investment will in practice of course depend on changes in the pattern of demand and the ease with which capital can be shifted into new industries and out of old ones. If the government is major investor in the economy, its investment policy might also play a role in this process. Data availability precludes anything more sophisticated than a simple linear dependence of the adjustment speed on a measure of capacity utilization.

The specification of financial variables in the case of Turkey is somewhat complicated. It is widely accepted that in countries with constraints on lending rates and as a consequence credit allocation systems based on rationing, the quantity rather than the cost of financing is likely to be the major constraint on investment. However, Turkey liberalized interest rates in 1980 as part of the wide-ranging reform program started at that time. But government intervention in the credit market continued and selective credit allocation for special investment schemes to encourage exports and regional diversification still exist. The government has also used Extra Budgetary Funds (EBFs) for targeting credit for selected uses such as the Mass Housing Fund. The net result of all this is, as we will demonstrate, that both the volume of credit allocated to the private sector and the cost of credit influence the pace of investment.

The effective cost of funds to investors consists of more than just the lending rates corrected for inflation. In addition to interest rates, there are special charges and taxes on financial intermediation which are passed on to the borrower. Furthermore, Turkey's financial system has often resorted to the use of compensating balances which raise the effective cost of loans, particularly to non-prime borrowers. The detailed calculations of the impact of compensating balance-ratios, special charges and taxes etc. on effective cost of borrowing are given in Section IV.

Finally the impact of public sector investment on private sector capital accumulation. Public investment could, in principle, be either complementary or a substitute to private investment. High levels of public investment will, ceterus paribus, increase the size of the fiscal deficit. This might in turn necessitate higher real interest rates if external balance targets are to be met (see Anand, Chhibber and van Wijnbergen (1988) for an empirical assessment). Public investment in infrastructure, however, can be complementary to the private sector's investment program as it reduces the private sector's cost of production and distribution. On the other hand, public investment in non-infrastructure, while possibly beneficial to some ancillary sectors, is on balance more likely to crowd out private sector investment. The impact of shifts in the composition of public investment will however be felt with a lag since it is the capacity of infrastructure rather than the additional current investment that will benefit the private sector at a given time.

To incorporate all these effects, the adjustment coefficient is specified, in a way similar to Coen (1971) and subsequently Blejer and Khan (1984), as:

$$b = b_0 + \frac{1}{(I_t^* - I_{t-1})} (b_1 CU + b_2 CRY + b_3 RL + b_4.SII) \quad \ldots(4)$$

$$b1>o,\ b2>o,\ b3<o,\ b4>o$$

CU is the index of capacity utilization, CRY is credit to the private sector (scaled by GNP), RL is the effective real cost of borrowing and SII is the composition of public fixed investment. Substituting (1), (2) and (4) into (3) yields:

$$I_t = i_0 + b_0 a[1-(1-d)L]\ Y^e + b_1 CU + b_2 CRY + b_3 RL + b_4 SII + (1-b_0)\ I_{t-1} \quad \ldots(5)$$

Equation (5) was estimated on annual data for Turkey over the period 1970-86. In line with the literature, lagged output was used as a proxy for expected output. The stock of credit to the private sector as a share of GNP was used to capture the overall quantity of financing available to the private sector. Public investment was split into two components: infrastructure and non-infrastructure. The infrastructure component includes irrigation, power, transport and communications and health and education. Health and education were included because their public investment component involves the building of schools and hospitals. Provision of textbooks, medicines etc. is included in current expenditures.

A capacity utilization index is available only for the industrial sector based on a quarterly survey carried out by the State Institute of Statistics (see Table 4). Since no economy-wide index exists, this index was used to measure cyclical swings in the economy in relation to existing capacity.

IV. EFFECTIVE COST OF BORROWING

The derivation of the real lending rate (the effective cost of borrowing) draws on Ersel & Sak (1987). The main contribution of their work is the incorporation of the costs incurred due to the obligation to maintain low-interest compensating balances. In many developing countries such procedures are used routinely as a device to evade ceilings on lending rates.

Table 1 below gives the details of the calculation of the effective cost of borrowing for Turkey during the period 1980-1986. Line A gives the nominal interest for lending as shown in the Quarterly Bulletin of the Central Bank of Turkey. Line B is the sum of all commissions and taxes on loans. Line C simply adds A and B. Line D calculates the compounded rate. This is necessary because the Quarterly Bulletin presents quarterly rates annualized without compounding; this clearly underestimates the actual year-to-year cost of borrowing.

There is no direct information on compensating balances. We therefore follow the procedure suggested in Ersel and Sak (1987). Regressions of commercial deposits (DP) on Loans (L) were run across banks for each each year:

$$DP = b_0 + b_1 L$$

The value of the coefficient b1 is interpreted as the average compensating balance in that particular year. The logic behind this specification is that commercial deposits are held either for transactions purposes or as compensating balances. But the amounts held for transactions purposes should be uncorrelated with the amount of loans made by the bank and are hence reflected in the coefficient b0. Compensating balances on the other hand are clearly a function of the value of loans made by the bank. Line E presents

Table 1:

EFFECTIVE COST OF BORROWING- TURKEY 1970:1986 (Z)

	1970	1971	1972	1973	1974	1975
Interest Rate Nominal (A)	10	10	10	12	12.5	14
Commission and Taxes (B)	5.1	5.1	5.1	5.1	5.1	5.1
Borrowing Rate Nominal (C)	15.1	15.1	15.1	17.1	17.6	19.1
Borrowing Rate Nominal Compounded (D)	15.98	15.98	15.98	18.23	18.80	20.51
Compensating Balances (E)	0.36	0.35	0.43	0.35	0.39	0.36
Interest Rate on CD's (F)	0	0	0	0	0	0
Effective Cost of Loans to Borrower						
Nominal((C-(E.F))/(1-E))	23.59	23.23	26.49	26.31	28.85	29.84
Nominal Compounded ((D-(E.F)))/(1-E))	24.96	24.58	28.03	28.04	30.81	32.05

	1976	1977	1978	1979	1980	1981
Interest Rate Nominal (A)	14	14	15.5	18.58	25.67	33
Commission and Taxes (B)	5.1	5.1	5.1	5.1	10.1	8.8
Borrowing Rate Nominal (C)	19.1	19.1	20.6	23.68	35.77	41.8
Borrowing Rate Nominal Compounded (D)	20.51	20.51	22.25	25.87	40.86	48.82
Compensating Balances (E)	0.33	0.37	0.35	0.46	0.52	0.49
Interest Rate on CD's (F)	0	0	0	0	0	0
Effective Cost of Loans to Borrower						
Nominal((C-(E.F))/(1-E))	28.51	30.32	31.69	43.85	74.52	81.96
Nominal Compounded ((D-(E.F)))/(1-E))	30.62	32.56	34.23	47.90	85.13	95.73

	1982	1983	1984	1985	1986
Interest Rate Nominal (A)	38	38	45.6	52	52
Commission and Taxes (B)	7.8	7.3	7.5	6.5	6.4
Borrowing Rate Nominal (C)	45.8	45.3	53.1	58.5	58.4
Borrowing Rate Nominal Compounded (D)	54.28	53.59	64.64	72.63	72.48
Compensating Balances (E)	0.38	0.29	0.32	0.33	0.3
Interest Rate on CD's (F)	0	0	5.1	7.5	14.6
Effective Cost of Loans to Borrower					
Nominal((C-(E.F))/(1-E))	73.87	63.80	75.69	83.62	77.17
Nominal Compounded ((D-(E.F)))/(1-E))	87.55	75.48	92.66	104.71	97.29

SOURCE: Central Bank of Turkey,
Capital Markets Board,
Institute of Bankers,
World Bank Staff Estimates

the compensating balance ratio (cbr) calculated in this manner for each year. It is interesting to note that prior to 1977 the cbr remained steady at around 0.36. During the period of economic turmoil between 1978-80, with high uncertainty in the financial system, it rose sharply to around 0.50, but has since gradually declined to around 0.30 in 1986.

The last two lines show the simple and compounded effective cost of loans to the borrower. The formula used to calculate them is also shown in the Table.

V. ESTIMATION RESULTS

The estimated results under alternate specifications are presented in Tables 2 and 3. The results first of all show a rapid adjustment speed: the lagged dependent variable has an extremely low t-statistic (only 0.13; see equation 2.5 in Table 2). Since the coefficient (1-bo) is insignificant,we dropped it from the model; see equations 2.1-2.4. Its exclusion dramatically increases the precision at which the other explanatory variables are estimated, which indicates that the constraints to adjusting investment to its desired level are captured by explicit variables in the model.

Equation (2.2) shows the results once the insignificant lagged dependent variable is dropped. The elasticity of private fixed investment with respect to the real cost borrowing is -1.71 and has a t- statistic of 4.37. Omitting all variables that fail to pass a 5% significance test lowers the coefficient on the real cost of borrowing to -1.43, but actually raises the t-statistic to 5.5 (see equ.(2.4)). Clearly the real cost of borrowing, once taxes, countervailing balances and so on are taken into account, exerts a highly significant influence on private sector investment in Turkey.

As discussed in Section III, we expect both the real cost of borrowing as well as the quantity of credit to the private sector to affect

TABLE 2

Estimates of Private Fixed Investment Equation: Turkey 1970-86
(In Logs)

Equation	Constant	I(-1)	CU	RL	CRY	SII(-3)	GNP(-1)	$\bar{R}2$	D.W.
2.1	-15.7495		1.4452	-1.7089	1.2557	0.3613	1.2148	0.78	1.67
	(4.23)		(1.39)	(4.37)	(2.57)	(1.20)	(6.60)		
2.2	-12.2442			-1.8448	1.7634	0.4609	1.1694	0.76	1.81
	(4.61)			(4.24)	(4.57)	(1.44)	(6.07)		
2.3	-13.7767		1.5472	-1.2677	0.9158		1.0596	0.83	1.21
	(4.49)		(1.59)	(5.40)	(2.37)		(8.32)		
2.4	-10.0654			-1.4296	1.4872		0.9834	0.79	1.24
	(5.38)			(5.50)	(5.10)		(7.93)		
2.5	-16.7350	0.0957	1.4798	-1.8956	1.3475	0.4051	1.3394	0.73	1.67
	(1.91)	(0.13)	(1.23)	(1.24)	(1.46)	(0.84)	(1.34)		

All Equations were estimated with two stage least squares, using TSP. The instruments used were: capacity utilization index, credit to private sector as a share of GNP, lagged GNP, public sector deficit as a share of GNP, terms of trade loss as a share of GNP, real exchange rate, and the real interest rate on US$. Figures in brackets are t-statistics.

I = Private Fixed Investment in Constant Prices
CU = Capacity Utilization Index
RL = Real Effective cost of borrowing
CRY = Ratio of Stock of Credit to Private Sector to GNP
SII = Share of Infrastructure Investment in Public Fixed Investment
GNP = Gross National Product in Constant Prices

All variables are entered as logarithms, except RL which was entered as: log (I+RL).

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the level of private investment. The results confirm this hypothesis; the coefficient of the ratio of credit to the private sector (Equation 2.1) as a share of GNP is 1.26 with a t-statistic of 2.57.

TABLE 3

Estimates of Private Fixed Investment Equation: Turkey 1970-86
(In Logs)

Equation

	Constant	I(-1)	CU	RL	CRY	NII(-3)	GNP(-1)	$\bar{R}2$	D.W.
3.1	-15.4848		1.4893	-1.5902	0.9594	-0.1864	1.4633	0.83	1.84
	(4.90)		(1.64)	(5.78)	(2.50)	(1.85)	(5.90)		
3.2	-11.3372			-1.6299	1.4194	-0.1904	1.3721	0.81	1.84
	(5.55)			(5.50)	(5.03)	(1.75)	(5.25)		
3.3	-12.7550	0.2592	1.3947	-1.0857	0.7658	-0.1262	1.0390	0.87	1.80
	(2.25)	(0.51)	(1.66)	(1.17)	(1.63)	(0.94)	(1.28)		

All Equations were estimated with two stage least squares, using TSP. The instruments used were: capacity utilization index, credit to private sector as a share of GNP, lagged GNP, public sector deficit as a share of GNP, terms of trade loss as a share of GNP, real exchange rate, and the real interest rate on US$. Figures in brackets are t-statistics.

I = Private Fixed Investment in Constant Prices
CU = Capacity Utilization Index
RL = Real Effective cost of borrowing
CRY = Ratio of Stock of Credit to Private Sector to GNP
NII = Non-Infrastructure Public Fixed Investment in Constant Prices
GNP = Gross National Product in Constant Prices

All variables are entered as logarithms, except RL which was entered as: log (I+RL).

The impact of the expected output variable, measured in this model by lagged GNP, is also highly significant with a coefficient of one. This is in line with the theory model (keep in mind that the model is estimated in logs; proportionality, as in equation (1), thus requires a coefficient of one)). The unit coefficient implies that the long-run capital output ratio should be constant for given values of the other explanatory variables, as predicted by theory.

The other two explanatory variables--capacity utilization (CU) and the share of infrastructure investment in public fixed investment (SII), have the correct sign but the precision on both coefficients is low. It is interesting to note that the interest elasticity of investment increases with the inclusion of these two variables. There is some evidence of multicollinearity between the two variables as the t-statistics on both improve (although marginally) when the other is dropped from the equation (Equations 2.3 and 2.4).

On entering, the composition of public investment, i.e. infrastructure and non-infrastructure in constant prices separately rather than a share as in the equations in Table 2 we found the non-infrastructure component to have a negative effect on private investment (Table 3). The infrastructure component appears to have no significant direct effect on private investment. It should be noted that the precision of the two variables-capacity utilization (CU) and non-infrastructure (NII) improves in the equation 3.1 as compared to equation 2.1. The direct impact of the government reducing its investments in areas where it is in competition with the private sector therefore appears to be important in the case of Turkey.

VI. THE MODEL APPLIED: AN EMPIRICAL ANALYSIS OF PRIVATE INVESTMENT IN TURKEY 1980-86

The above equations show that high real interest rates have been an important factor behind the somewhat lacklustre performance of private sector investment. Domestic real rates of interest to non-prime borrowers have been as high as 30% in real terms in some years between 1981 and 1987 (Figure 4).[5] A counterfactual model run using the private investment function in Equation 2.1 of Table 2, with real lending rates kept at 10% from 1981 through 1986 (as against an actual average of 22.5% over the same period), indicates that private investment would have been higher by 19 percent on average over that period (see Figure 5).

Several factors have worked against this negative impact of high real interest rates, and explain why private investment has in fact been rising at all over the past five or six years. First, except for 1984, the growth rate of credit extended to the private sector has consistently exceeded the rate of output growth, in most years by a substantial margin. Model simulation shows that if real credit would have grown only as much as GNP growth from 1981 onwards, investment would have been lower by almost 9.5% (see Figure 6; the impact of credit growth in excess of GNP is measured by the difference between line C and D).

Second, capacity utilization increased over this period. Capacity utilization was low in the early 1980s under the combined impact of the investment boom of 1975-77 and the slump that followed the debt crisis of 1978. But with high output growth since 1981 and low investment rates in the early 1980s, capacity utilization improved substantially by 1984 (see Table

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5/ The average borrowing rate is lower because of lower rates on selective credit and on loans to prime borrowers.

Figure 4:

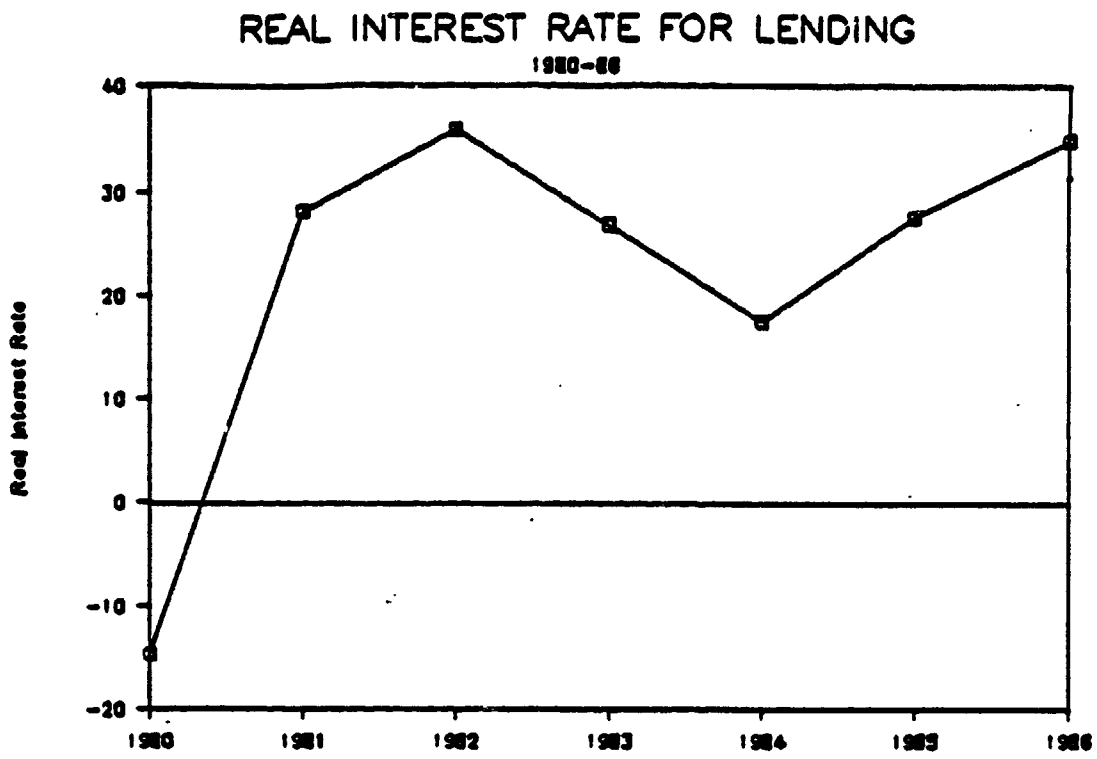
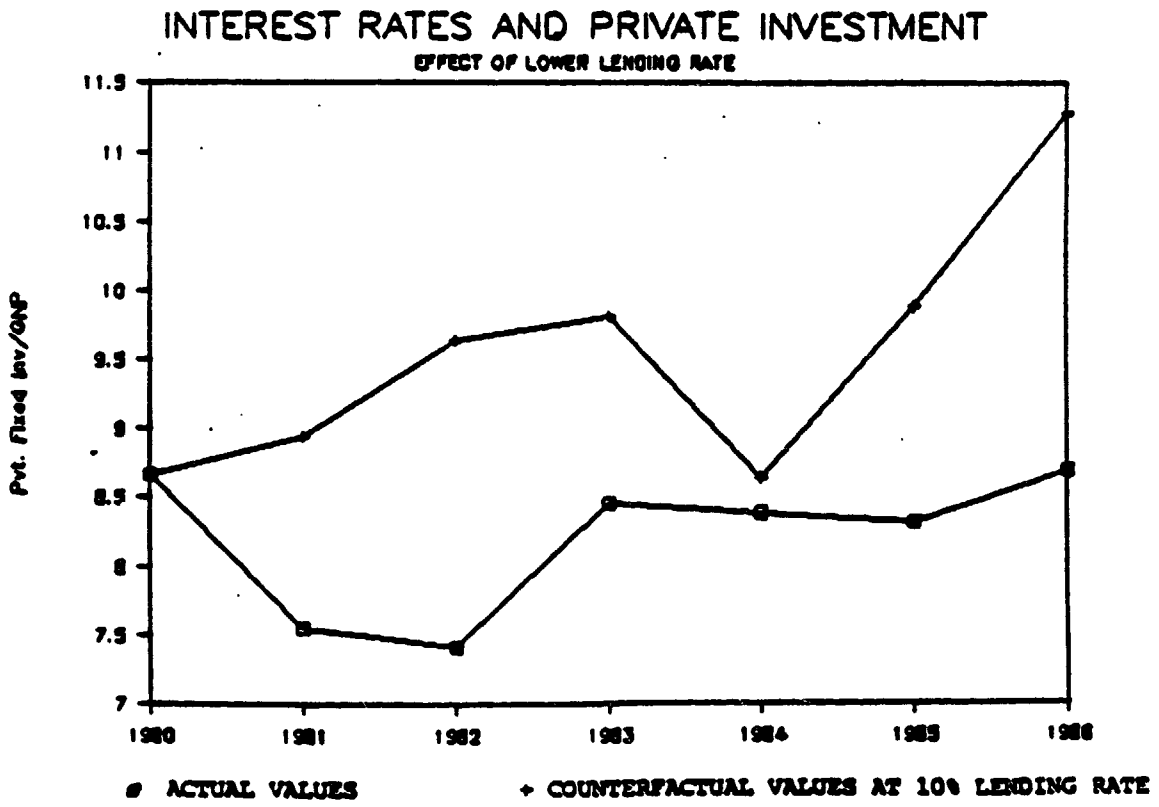


Figure 5:



4). Econometric analysis suggests that the increase in capacity utilization between 1981 and 1983 led to an increase in private fixed investment of 0.7 percentage point of GNP. This is more than a nine percent increase over what it would have been without this increase in capacity utilization. Subsequent improvements in capacity utilization since 1983 added an additional half percentage point of GNP to investment (see Figure 5; the impact of improved capacity utilization is measured by the difference between line B and C).

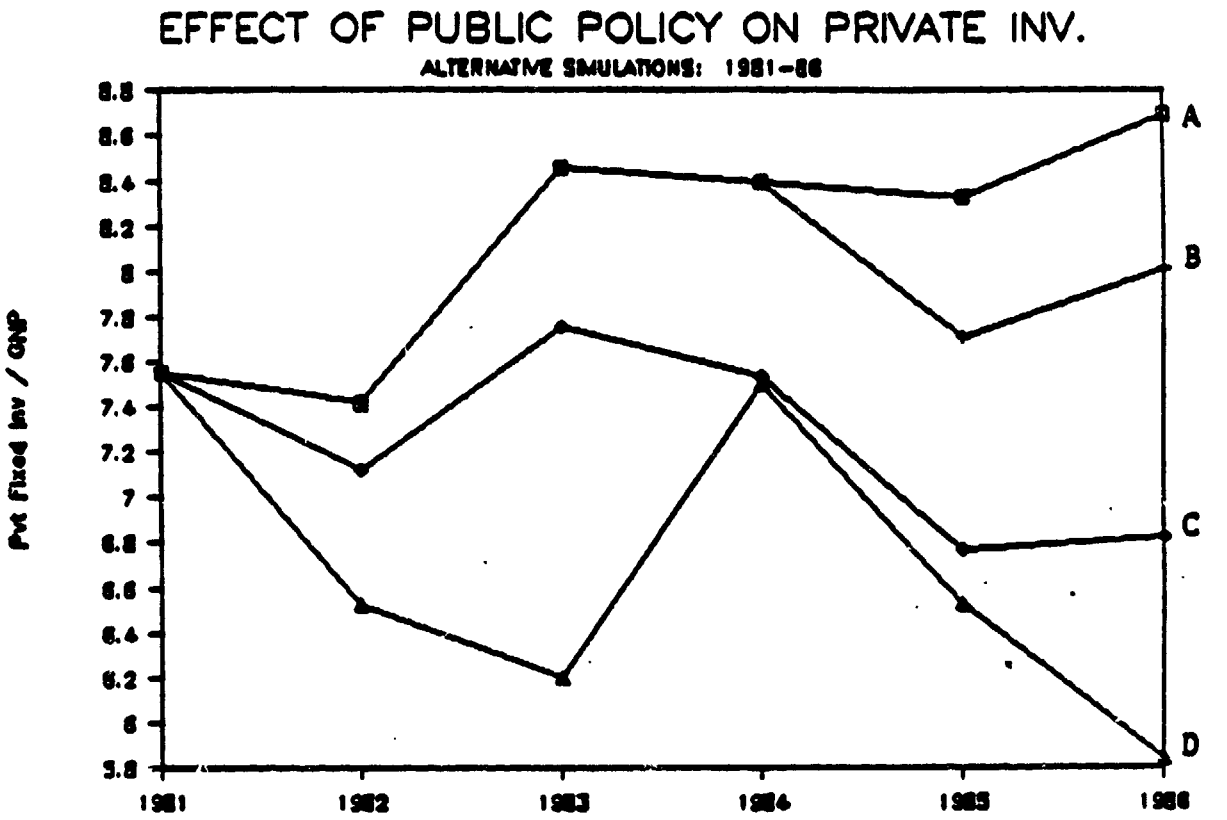
TABLE 4: CAPACITY UTILIZATION IN PRIVATE SECTOR MANUFACTURING INDUSTRY 1977-87

	State Institute of Statistics (SIS)	Istanbul Chamber of Industry
1977	63.6 a/	-
1978	61.1 b/	-
1979	57.1 b/	45.0
1980	55.5	51.1 b/
1981	57.4	62.1
1982	59.0 c/	66.8
1983	61.0 c/	69.6
1984	62.0 c/	72.0
1985	62.9 c/	72.7
1986	64.2 c/	72.0
1987		73.6 d/

a/ July-December 1977
b/ Unweighted
c/ Fourth quarter
d/ First two quarters only

The final factor is more directly related to fiscal policy. At issue is the composition of public investment. Since 1980, the Government has shifted the composition of its public sector investment program heavily towards sectors where it does not compete with private sector investment. Large cuts were made in public sector investment in manufacturing. At the

Figure 6:



A: Base Run: Actual values

B: Base Run plus share of govt. infrastructure investment fixed at 1981 level from 1981 onwards

C: B plus capacity utilization in private sector fixed at 1981 level from 1981 onwards

D: C plus share of total credit to private sector as a share of GDP fixed at 1981 level from 1981 onwards

same time, the share of investment in infrastructure[6] in total public investment increased from 50% to almost 70% (see Fig. 3). The largest increases came in the transport and communications sector, where fixed investment grew on average by 17 percent annually in real terms since 1981. Its share in total public sector investment increased from 18% in 1981 to 34.3% in 1987. Public sector investment in power, education and health also increased rapidly.

This shift in public sector investment away from sectors where it competes with private investment has important implications for private capital formation. In the empirical analysis presented in the previous section, it was shown that a decrease in the share of non-infrastructure in public sector investment has an expansionary impact on private investment. Since it is really completed investment that can trigger complementary private investment, one should expect, and does find, a considerable lag: the public sector investment has a significantly positive impact on private sector investment after a three year lag.

Figure 6 shows what would have happened if the composition of public investment had remained at its 1981 value. After the three year lag, private investment decreases by 0.7 percent of GNP in 1985 and 1986 (see Figure 6, line A and B). This represents an 8% decrease in private investment. These results suggest that the shift in composition of the public sector investment program had a significant and positive influence on the private sector investment recovery that took place over the past few years.

6/ Infrastructure is defined to include irrigation, power, transport and communications, education, health and housing.

From the econometric analysis it is clear that the negative impact of the high rates of interest dominated early on, but that their negative impact was gradually offset by the other measures discussed. From 1984 onwards, the impact of the positive measures more than offset the negative impact of real interest rates. By 1986, the net positive impact of the measures mentioned exceeded the negative impact of the high real interest rates by a full percentage point of GNP. This analysis therefore supports the view that the overall impact of fiscal policy and improved capacity utilization on private investment has been positive, the high real lending rates notwithstanding.

VII. CONCLUSIONS

This paper has shown that government policies have a marked impact on private investor behavior, through a variety of channels. The government can crowd-out the private sector if large budget deficits cannot be financed from abroad. The government must then resort to inflationary financing or domestic borrowing, and induce a sufficiently high private net savings surplus[7] through high real interest rates. This will slow down private investment (this is, of course, one of the ways the private net savings surplus is brought about). However, we have shown empirically that the overall impact of fiscal policy on the economy is far more complex. Exchange rate policies and other export promotion policies have a major impact on private investment. Export promotion policies increase capacity utilization, thus encouraging private investment. In addition, the composition of government investment and its credit policies will also influence private investment decisions.

7/ Net savings refers to savings minus investment.

The need to recognize these interactions is critical for the design of growth-oriented adjustment programs. As a large number of developing countries are attempting to emerge from recessionary spirals, the role fiscal policy played in Turkey's adjustment program provides important lessons. A key lesson is that in a period of external constraint a country may need to live with a dose of mild inflation and high interest rates, if the thrust of its program is growth-oriented both in the public and the private sector. The alternative is low investment, low savings and, ultimately, low growth.

There are limits to this strategy which suggest the need for some corrective action. The additional surge in public investment in 1986 and 1987, now threaten macro-stability.[8] Moreover, the composition of private investment is worrisome as it has tilted in favor of non-tradeables such as housing. This is in part due to special credit schemes directed at mass housing, and in part due to the attractiveness of housing investment as a hedge against inflation.

Nevertheless, the role of fiscal policy as a tool for purposes other than just restoring macro-imbalances needs careful study. A central ingredient here is the specification and testing of the impact of public policy on private investment. This paper demonstrates that using an eclectic combination of theory and institutional mechanisms and constraints prevalent in developing countries is a promising approach to this problem.

8/ See Anand, Chhibber, Rocha and van Wijnbergen (1988).

References:

Anand, R., A. Chhibber and S. van Wijnbergen (1988), "External Balance and Output Growth in Turkey: Can They Be Reconciled?", forthcoming in D. Rodrik and T.Aricanli (eds.), Turkey in the Decade Ahead.

Anand, R., A. Chhibber, R. Rocha and S. Van Wijnbergen (1988): "Turkey External Debt, Fiscal Policy and Sustainable Growth" Mimeo, The World Bank.

Bischoff, C.W (1969): "Hypothesis Testing and the demand for capital goods," Review of Economic and Statistics, 51 (August), 354-368

Bischoff, C.W (1969):" Business Investment in the 1970's: A Compassion of Models," Brookings Papers on Economic Activity, 1, 13-63.

Blejer, M. and M.S. Khan (1984): "Government Policy and Private Investment in developing countries," Staff Papers, International Monetary Fund.

Chirinko, R.S. (1986): "Will the Neo-Classical Theory of Investment Please Rise?: The General Structure of Investment Models and Implications for Tax Policy", Mimeo, March 1986, NBER.

Chhibber, A. and J. Khalilzadeh-Shrirazi (1988), "Public Finance in Adjustment Programs", mimeo, World Bank.

Coen, R.M., (1971), "The Effect of Cash Flow on the Speed of Adjustment", in G. Fromm (ed.), Tax Incentives and Capital Spending, Brookings Institution.

Conway, P. (1987), Economic Shocks and Structural Adjustment: Turkey after 1973, North Holland Publ. Co.

Ersel, H. and G. Sak (1987): "Public Borrowing and the Development of Financial Markets in Turkey," Mimeo, Capital Markets Board of Turkey.

Eisner, R. and Strotz, R. (1963): "Determinants of Business Investment," In Commission on Money and Credit Impacts of Monetary Policy, Englewood Cliffs, NJ: Prentice -Hall, pp 60-138.

Eisner, R. (1972): "Components of Capital Expenditures: Replacement and Modernization versus Expansion," Review of Economics and Statistics, pp 54,297-305.

Eisner, R. (1970): "Tax Policy and Investment Behaviour; further comment", American Economic Review, 60 (September) 746-752.

Elliot, J. W. (1973): "Theories of Corporate Investment Behaviour Revisited," American Economic Review, 63 (March, 195-207.

Feldstein, M. S. and Foot, D. (1971): " The other Half of Gross Investment: Replacement and Modernisation Expenditures," Review of Economics and Statistics," 53 (February); 49-58.

International Monetary Fund (1987), World Economic Outlook, Oct. 1987.

Jorgensen, D. W. (1971): "Econometric Studies of Investment Behaviour; a Survey," Journal of Econometric Literature, 9 (December), 1111-1147.

Jorgensen, D.W. and C.D. Siebert (1968): " A Companion of Alternative Theories of Corporate Investment Behaviour," American Economic Review, 58 (September) 681-712.

Kuh, E.(1971): Capital Stock Growth: A Micro Econometric Approach, Amsterdam: North Holland Publishing Company.

Nickell, S.J. (1978): The Investment Decisions of Firms, Cambridge Economic Handbooks, Cambridge University Press.

Sundarajan, V. and S. Thakur (1980),"Public Investment, Crowding Out and Growth: A Dynamic Model Applied to India and Korea", Staff Papers, International Monetary Fund, Vol 27, December 1980, pp 814-55.

Tunwai, V and C. Wong (1982): " Determinants of Private Investment in Developing Countries," Journal of Development Studies (London), Vol 19 (October 1982), pp 19-36.

van Wijnbergen, S.(1988), "External Debt, Inflation and the Public Sector: The Role of Fiscal Policy", mimeo, The World Bank.

van Wijnbergen, S. (1982): "Stagflationary Effects of Monetary Stabilization Policies: A Quantitative Analysis of South Korea," Journal of Development Economics, Vol.10, pp 133-69.

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