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FISCAL OPTIONS FOR STABILISATION AND GROWTH

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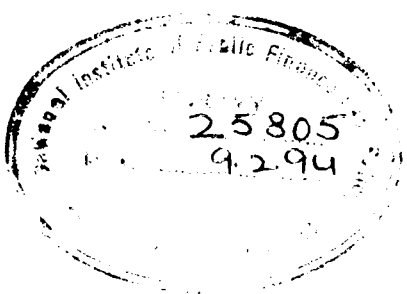

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FISCAL OPTIONS FOR STABILISATION AND GROWTH*

Sudipto Mundle
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I. Introduction

India has now completed the first phase of its adjustment programme. Here as elsewhere the government has found it extremely difficult to keep the deficit under control. Nevertheless, a reduction of the deficit: GDP ratio from nearly 9 per cent to around 6 per cent within two years has helped to substantially curb the growth of domestic demand. Restraint on administered price increases and a succession of good harvests has brought the inflation rate down from over 13 per cent to under 10 per cent today. Exports, which remained stagnant during the first two years of the reform programme, are reported to have grown at about 20 per cent per annum in US dollar terms during the first three quarters of fiscal 1993-94. Foreign exchange reserves have also been built up to around 10 billion dollars as compared to less than a billion dollars in early 1991, though much of this unfortunately consists of fresh accumulation of external debt. In other words, though the underlying situation remains fragile, macro economic stability has been restored in the short span of two years.

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These short term stabilisation measures are being combined with longer term structural adjustment measures for the revival of growth as is typical of any Fund-Bank economic reform package. The question of whether or not the supply side structural adjustment policies will eventually transform India into a dynamic export led economy is not addressed in this paper. Our main objective is to explore the implications of alternative fiscal policies in terms of their short term macro-economic impact on growth and other endogenous variables in the presence of certain features peculiar to what is still a highly regulated economy.

The most important of these features relates to the process of price formation. It is now generally recognised that manufactured good prices in India are fixed on a cost plus mark-up basis. Furthermore, since many of these goods as well as services are publicly provided, their prices are administered directly or indirectly by the government itself. Recent structuralist models in India now typically incorporate such a fix price segment in a dual-economy framework.[1]

The effect of administered prices on the ruling market price are asymmetric for a rise and fall in the market clearing price. Market clearing pricing cannot be prevented from settling above administered prices. However, the latter sets a floor to the ruling price which could vary independently of the state of demand. This qualitatively alters the process of inflation as

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1. For recent empirical work on industrial prices in India see Chatterjee (1989). Rakshit (1989) and several of the papers in Rakshit (ed.)(1989) present analytical models where, typically, the agricultural sector is flex price while industry is a fix price sector.

compared to a flexible price regime. It also implies that in a demand-constrained regime expenditure reducing measures might mainly effect output rather than inflation.[2]

The second special feature relates to the determination of investment. Conventional theories of investment usually make private investment a function of either changes in the level of economic activity or the cost of capital. However, in India private investment is basically governed by the availability of credit from public sector financial institutions like the IDBI, ICICI, LIC, etc. Apart from exercising significant control over these institutions, the government itself undertakes a large part of total investment. It is possible that these conditions may change in the future as a consequence of the on-going process of financial liberalisation and a reduced role for the public sector. But as of now government decisions are still of crucial importance in the determination of the level of total investment in India. As a matter of deliberate policy, interest rates have been administered and held below their market clearing levels in the past, thus creating a persistent excess demand for funds. Private investment decisions, have consequently been driven not so much by the level of economic activity or the cost of funds but the availability of own funds and the loan rationing decisions of public sector financial institutions.

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2. The relationship between administered prices and inflation has been explored specially in the context of procurement prices by Patnaik (1975), Patnaik, Rao and Sanyal (1976), Bose (1985) and Dasgupta (1989). On the inflationary implications of administered industrial prices see Jha and Mundle (1987) and Sikdar (1989). See also Balakrishnan (1991).

Finally, in an economy where prices and interest rates are administered, variations in money supply do not get transmitted through the usual channels. However, it does get transmitted to the rest of the system through several alternative channels. The level of inventory investment, which generally accounts for 10 to 15 per cent of total investment, is greatly influenced by bank credit to the commercial sector. Second, investments by commercial banks are an important source of funds for the financial institutions. Third, in a credit constrained economy with differential interest rates and possibilities of arbitrage through diversion of funds, changes in the flow of bank credit could also effect the availability of non-institutional investable resources, including the own funds of firms. Changes in the flow of bank credit could also change the overall level of transactions in the economy even without a change in interest rates if availability of funds is the binding constraint. For these and other reasons, changes in money supply can alter the level of aggregate demand. Whether this would lead to a change in the level of output or a change in the level of both prices and output will depend on whether the economy is initially in a Keynesian demand constrained condition or the supply-constrained world of classical economic theory.

II. The Model[3]

In this part of the paper a macro economic model is developed incorporating the three special features of the Indian

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3. This section and the associated appendices are largely drawn from our earlier paper **"Stabilisation and the Control of Government Expenditure in India"** (Mundle, Sudipto and Hiranya, Mukhopadhyay 1993a).

economy described above, i.e., (1) The existence of administered prices covering a very large segment of the economy, (2) Government control of the level of investment, and (3) The altered mechanism through which the effect of money supply variation is transmitted in the presence of (1) and (2).

Price and Output Determination

Macro econometric models in the fifties and the sixties tended to assume that aggregate supply was infinitely elastic and that the level of output was determined by aggregate demand (Bodkin et. al., 1991).[4] However, it is desirable that, atleast at the level of its theoretical structure, an empirical macro model should allow for the economy to be either demand constrained or supply constrained, leaving the matter of which constraint is binding to be resolved empirically. Accordingly, in this model output and the price level are simultaneously determined by the intersection of a downward sloping aggregate demand curve with a supply curve which is horizontal upto some normal level of capacity output Q_n and sloping upwards thereafter. The system is either demand constrained or supply constrained depending on whether the demand and supply curves intersect at a level of output less than or greater than Q_n.[5]

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4. This was also a dominant point of view in the so called `stagnation debate' initiated by Raj (1976). Among other contributions to the debate see Bagchi (1970), Mundle (1977 & 1981), Srinivasan (1977), Nayyar (1978), Chakravarty (1979), Patnaik (1981), Desai (1981), Rangarajan (1982) and Mukhopadhyay (1993) etc. For a supply side view along with a survey of the debate see Ahluwalia (1985).

5. For an earlier attempt to identify whether the demand constraint or supply is binding in the case of industrial goods see Lahiri and Roy (1986). In this

Aggregate real demand Q_d is a function of price P (in a one commodity model P is the aggregate price level) and nominal income Y, where

$$Y = C + I + G_1 - D \qquad (1)$$

C is consumption expenditure, I is gross capital formation, G_1 is government consumption expenditure and D is the trade deficit, all measured in rupees at current prices. Assuming $C = C(Y)$ we have

$$Q_d = Q_d(P, A) \quad ; \quad Q_{d1} < 0, \quad Q_{d2} > 0 \qquad (2)$$

where $A = I + G_1 - D$

Alternatively we can write the aggregate inverse demand function

$$P = P(Q_d, A) \quad ; \quad P_1, P_2 > 0 \qquad (3)$$

If P_f is a floor price level, Q_n is the normal capacity (real) output and Q the level of real output at a given point of time, then the aggregate supply function described above can be written as

$$\left.\begin{aligned} & P = P_f \text{ for } Q \leq Q_n \\ \text{and } & P = P_f + F(Q - Q_n) \text{ for } Q > Q_n \; ; \; F_1 > 0 \end{aligned}\right] \qquad (4)$$

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paper the terms are used to imply equilibrium points lying on the horizontal (fix price) segment of the aggregate supply curve, where markets are cleared only through quantity adjustments, and equilibrium points lying on the upward sloping (flex price) segment of the supply curve, where markets clear through the adjustment of both prices and quantities.

In other words for output greater than Q_n, the supply price is a function of the excess of output over normal capacity output.[6]

Where the market clearing output $\hat{Q}$ is greater than Q_n, from (3) and (4) we have

$$\hat{Q} = Q\ (P_f,\ Q_n,\ A) \tag{5}$$

and by logarithmic differentiation

$$\dot{\hat{Q}} = \alpha_1 \dot{P}_f + \alpha_2 \dot{Q}_n + \alpha_3 \dot{A} \tag{6}$$

where a dot over the variable denotes the rate of growth of the variable and α_i, $i = 1, 2, 3$ denotes the elasticities of equilibrium output with respect to the relevant variable. It can be easily verified that when $Q \leq Q_n$

$$\dot{\hat{Q}} = \alpha_1 \dot{P}_f + \alpha_3 \dot{A} \tag{7}$$

Similarly the aggregate demand function (3) and the aggregate supply function (4) yield the equilibrium price equation

$$\hat{P} = P\ (P_f,\ Q_n,\ A) \tag{8}$$

It follows that

$$\dot{\hat{P}} = \beta_1 \dot{P}_f + \beta_2 \dot{Q}_n + \beta_3 \dot{A} \tag{9}$$

where β_1, β_2, β_3 are the elasticities of equilibrium price level

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6. The empirical counterpart of P_f may be interpreted as the minimum general level of prices which would prevail for a given vector of administered prices P_a^*.

$\hat{P}$ with respect to P_f, Q_n and A respectively.

It can be verified that for $Q \leq Q_n$

$$\dot{\hat{P}} = \dot{P}_f \qquad (10)$$

Equations (6) and (9) (or 7 and 10) give us the computable equations for output growth and inflation. The empirical counterpart of $\dot{P}_f$ should be interpreted as the minimum percentage change of the general price level (WPI) which would occur, ceteris paribus, as a consequence of the direct and indirect effects of $\dot{P}_a^*$, the average of given percentage changes in administered prices of foodgrains (procurement prices) or other agricultural commodities and industrial commodities (including fuel, power and lubricants).

The relationship between administered price changes, demand management and inflation have been discussed at some length above. While Brahmananda (1977) and Krishnamurthy (1984) maintain that the expansion of money supply can trigger demand pull inflation, others like Bhattacharya (1987) and Balakrishnan (1991) reject the view that inflation in India is attributable to excessive money supply growth. The present model allows for both cost push inflation as well as demand pull inflation, leaving the relative importance of their effects to be determined empirically. This will be evident from equations (9) and (10). The empirical exercise for identifying the relevant segment of the aggregate supply curve and the corresponding choice of the

appropriate reduced form equation for determining the rates of change of equilibrium output and prices is discussed in the Appendix.

Finally, normal capacity output in period t, $Q_n(t)$ is proportional to fixed capital stock at the end of the previous period.

$$Q_n(t) = \theta K(t-1) \qquad (11)$$

where θ is the output capital ratio and K is the stock of real fixed capital. It follows from (11) that

$$\dot{Q}_n(t) = I_F(t-1) / K(t-2) \qquad (12)$$

where $I_F(t-1)$ is real net fixed capital formation in the previous period. The determination of investment and fixed capital formation are discussed further below.

The Government Budget Constraint

Total government expenditure at current prices E is subject to the government budget constraint[7]

$$E = T + F \qquad (13)$$

where T denotes total tax plus non-tax revenue and F is the fiscal deficit. Given revenue buoyancy t^*, total revenue in the current period is given by

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7. In the simulation exercises Centre's expenditure E_1 has been derived from E assuming E_1 = 64.62 per cent of E.

$$T = \{1 + t^* (\dot{P} + \dot{Q})\} T(t-1) \qquad (14)$$

where $\dot{P}$ and $\dot{Q}$ are endogenously determined. t^* is a policy parameter which could change in response to institutional changes like tax reform.

The fiscal deficit is derived from PQ the endogenously determined nominal GDP and f^*, the ratio of fiscal deficit to GDP, which is assumed to be a key policy parameter in the model:[8]

$$F = f^* PQ \qquad (15)$$

On the expenditure side, government consumption expenditure G_1 is treated as a function of total government expenditure E and $G_1(t-1)$. The lagged dependent variable $G_1(t-1)$ is included to capture a certain degree of irreversibility which is built into government consumption expenditure (Pandit, 1985):

$$\dot{G}_1 = G_1 [\dot{E}, \dot{G}_{1(t-1)}] \quad ; G_{11} > 0, G_{12} > 0 \qquad (16)$$

Regarding capital expenditure, it has been observed that in India departmental capital expenditure by the government or its budgetary support to non-departmental enterprises is a residual after deducting total revenue expenditure G, which includes government consumption expenditure G_1 as well as current transfers such as interest payments, subsidies, etc. (Toye 1981,

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8. In the empirical exercise f^* is manipulated through adjustments of the Central Government fiscal deficit to GDP ratio f^*_1, assuming

$$f^* = 1.27\ f^*_1$$

Mundle and Rao 1992). $G = g^* PQ$ where the revenue expenditure to GDP ratio g^* is a policy parameter. It can be manipulated by varying the level of subsidies, reducing or increasing public debt, modifying other transfers, etc., thereby altering the flow of government capital expenditure S_1

$$S_1 = E - G \qquad (17)$$

S_1 is one source of financing public sector capital formation. A second source is the gross capital formation of public enterprises S_2. However, total public sector investment is not equal to the sum of S_1 and S_2 because a part of S_1 is actually deployed to finance a part of S_2 by way of budget support to public enterprises. Also, a portion of S_1 may be set aside for portfolio investment, defence capital expenditure and other items which do not constitute capital formation. Public sector capital formation I_g is therefore only a fraction k of $S_1 + S_2$

$$I_g = k(S_1+S_2) \qquad (18)$$

where k is an empirically determined exogenous parameter.

Investment Expenditure

Reference has been made earlier to the highly interventionist role of government in determining, among other things, the level of investment (capital formation) in the economy. This should be captured in a model of investment behaviour in India. Such intervention has two distinct components. One is the direct public sector investment I_g

determined endogenously through equation (18) above. This, together with private investment I_p gives total investment

$$I = I_g + I_p \qquad (19)$$

Hence

$$\dot{I} = b\,\dot{I}_g + (1-b)\,\dot{I}_p \quad ; \quad 0<b<1 \qquad (20)$$

where b and (1-b) are respectively the weights of public and private investment.

The second component of intervention is the control of private investment through the financial institutions and banks, which are largely owned and controlled by the government. Empirical researchers in India have usually tried to interpret the behaviour of private investment in terms of specifications which incorporate elements of both the accelerator theory as well as the neo-classical theory of investment.[9] However, while both these theories assume that the supply of funds is elastic, it is now recognised that in India investment funds have been rationed at below market clearing rates of interest (Krishnamurthy and Shastri 1976; Lahiri, Madhur, Purkayastha and Roy 1984). Conventional variables such as the level of output, capacity utilisation, interest rates, etc. should not therefore be expected to perform very well as compared to the availability of internal and external funds (Rangarajan 1972; Lahiri, Madhur,

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9. For recent surveys of alternative theories of investment see Precious (1987), Artus and Muet (1990). Bhattacharya (1975) and Krishnamurthy and Sastry (1976) have surveyed the empirical literatures on investment behaviour in India.

Purkayastha and Roy 1984). It was also explained at some length above that in a regime of `financial repression' changes in money supply would affect the level of investment and economic activity. Hence the private investment function may be written as

$$I_p = I_p(S_3, Z^*, M_3) \quad ; \quad I_1, I_2, I_3 > 0 \quad (21)$$

where S_3, the gross savings of the private corporate sector, is a measure of the availability of internal funds, Z^* is a policy variable measuring the disbursement of long term loans by the financial institutions and M_3 broad money supply.

Empirical estimation of the investment function is discussed in the appendix.

Real investment growth $\dot{I}_r$ is given by the difference between growth of nominal investment and the inflation rate

$$\dot{I}_r = \dot{I} - \dot{P} \quad (22)$$

The bulk of real investment consists of fixed capital formation in India. Inventory investment accounted for only about a tenth of total investment prior to the mid sixties. During the subsequent decade of slow growth the share of this component doubled. However, in the period of recovery from about the mid-seventies, fixed capital formation recovered and it now accounts for over 85 per cent of total investment (Mundle and Mukhopadhyay 1992). Assuming, therefore, that fixed capital formation is a stable function of total investment, we have

$$\dot{I}_F = \tau \dot{I}_r \quad (23)$$

where τ is the elasticity of real fixed capital formation with respect to total real investment.

Money Supply

Given a money multiplier v, the supply of money M_3 depends on the stock of high powered money H:

$$M_3 = vH \qquad (24)$$

Since the money multiplier has been empirically observed to have been stable throughout the eighties,[10] we have

$$\dot{M}_3 = \dot{H} \qquad (25)$$

The rate of growth of high powered money $\dot{H}$ is in turn given by

$$\dot{H} = \frac{F_m + R}{H(t-1)} \qquad (26)$$

where R is the exogenously determined change in foreign currency assets of the Reserve Bank of India and F_m is the change in stock of monetized debt. This is assumed to be a proportion h^* of GDP, the proportion itself being an exogenously determined policy parameter.

$$F_m = h^* PQ \qquad (27)$$

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10. See Report on Currency and Finance, 1987-88, Vol. 1, Reserve Bank of India, 1988.

External Sector

The demand for real imports M_r is assumed to depend on real GDP Q:

$$M_r = M(Q) \quad ; \quad M_1 > 0 \qquad (28)$$

Denoting the elasticity of real import demand with respect to GDP as m^* we have

$$\dot{M}_r = m^* \dot{Q} \qquad (29)$$

Though m^* is a behavioural parameter it is useful to think of it as a policy parameter since it can be manipulated through changes in the trade policy regime. Thus, expenditure switching policies such as imposition of quota restriction, raising tariffs or a devaluation of the exchange rate would all lead to a downward shift in this parameter.

The growth in nominal (rupee) imports can now be written as

$$\dot{M} = \dot{P}_m + \dot{e} + m^*\dot{Q} \qquad (30)$$

where $\dot{P}_m$ is the rate of change in dollar prices of imports and $\dot{e}$ is the rate of change of the exchange rate. Recall that the trade deficit in rupees has been denoted as D (equation 1). Now, using equation (30) and writing the dollar value of exports as X, the change in trade deficit $\dot{D}$ may be written as

$$\dot{D} = \delta (\dot{P}_m + \dot{e} + m^*\dot{Q}) - (\delta-1) (\dot{X}+\dot{e}) \qquad (31)$$

where δ is the ratio of imports to trade deficit.

III. Stabilisation Experiments with Alternative Fiscal Policies

The model developed above is used in this part of the paper to simulate the impact of alternative fiscal policies for aggregate demand management. The fiscal policies analysed include tax policy (t^*), administered price policy ($\dot{P}_a^*$), and fiscal deficit (f_1^*) reduction through either capital expenditure compression or revenue expenditure (g^*) compression. We also analyse the impact of variations in the rate of growth of exports and the impact of variations in term lending by financial institutions. The outcomes are monitored in terms of a vector of six target variables, i.e., inflation ($\dot{P}$), and the rates of growth of output ($\dot{Q}$), investment ($\dot{I}$), money supply ($\dot{M}_3$), trade deficit ($\dot{D}$) and the level of Central government expenditure (E_1). In each experiment the model is run for alternative values of one policy instrument, keeping the other policy instruments fixed at their base values. These are either values observed in the recent past or envisaged in the stabilisation programme. The impact of each policy instrument can be assessed by comparing alternative solutions for the target vector with the solution in the base run. A dynamic element is introduced in these comparative static exercises by using the 1993-94 solutions as the exogenously predetermined values for the 1994-95 simulations.

The base run shows that with all other policy instruments set at their recently observed values and the fiscal deficit of the Central government set at 5.5 per cent of GDP,

growth is a little over 4 per cent in the current year but rises to nearly 6 per cent in 1994-95. Money supply growth is around 14 per cent in both years but inflation stays between 10 and 11 per cent. Central government expenditure rises from around Rs. 138,000 crore in 1993-94 to Rs. 161,000 crore in 1994-95. The rupee trade deficit declines by about 45 per cent in both years.

a. <u>The Macro Economic Effects of Tax Reform</u>. The macro-economic effects of each fiscal policy instrument is explored in turn, starting with tax policy. The effects of tax policy can be captured in the model by perturbing revenue buoyancy t^*, which is a policy parameter. Since 85 per cent of all revenue consists of tax revenue, changes in revenue buoyancy would largely reflect changes in tax policy and vice versa. The macro economic effects of changes in revenue buoyancy are summarised in Table 3.1. The existing revenue buoyancy with respect to GDP is around 1. The effect of increases in t^* upto 1.75 have been simulated. However, even an increase upto 1.25 would be impressive. This would yield extra growth of about 1.2 per cent and 1.5 per cent during the current year and in 1994-95 respectively without any extra inflation compared to the base run. The increase in aggregate demand accounting for this extra growth would come mainly through higher public expenditure and higher growth of public investment. This increase in domestic absorption does not lead to a deterioration in rupee trade deficit if exports (US $) are assumed to grow at 15 per cent as in the base scenario. Rupee trade deficit continues to decline at about 44 per cent in both the years.

b. <u>The Inflationary Impact of Administered Price Increases</u>. In the Indian context administered prices have often been raised purely for revenue considerations. An increase in

prices of goods or services provided by departmental or non-departmental undertakings would lead to an increase in non-tax revenues. While the main impact would take the form of increased tax revenue flow as a consequence of higher growth of nominal GDP. However, it has already been explained in the earlier discussion why administered price increases can be expected to have an

TABLE 3.1

Macro Effects of Changes in Revenue Buoyancy

	1993-94						1994-95					
t^*	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
1.00	4.3	10.5	17.7	13.9	-44.9	138	5.9	10.7	20.7	13.7	-44.6	161
1.25	5.5	10.5	20.2	14.0	-44.7	143	7.4	10.7	23.6	13.9	-44.4	173
1.50	6.7	10.5	23.2	14.1	-44.5	149	9.1	10.7	27.2	14.1	-44.0	189
1.75	8.3	10.5	26.7	14.2	-44.2	155	11.4	10.7	32.0	14.3	-43.6	209

Note: Assumptions: f_1^*=5.5%, $\dot{P}_a^*$=9%, g^*=23%, m^*=0.9%, Z^*=24295 crores (1993-94) and 30039 crores (1994-95), $\dot{X}$=15%. For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

inflationary impact in the Indian context. In the past administered prices have risen at an average rate of around 9 per cent. Table 3.2 shows that as the average annual rate of administered price increase is varied in the simulations from 5 per cent to 20 per cent, the inflation rate rises from about 10 to 13 per cent in 1993-94 and 9 to 15 per cent in 1994-95. Note

that the simulations for 1994-95 involve a second round of administered price increases at the specified rate on top of the increases introduced in 1993-94. Output growth is effected adversely. It declines from 4.5 to 3.8 per cent in 1993-94 and 6.1 to 5.2 per cent in 1994-95 for the given administered price variations. A higher inflation rate lowers the net growth of real demand when the rate of administered price increase is higher. The reduced growth of real absorption also marginally accelerates the rate of decline of the rupee trade deficit.

c. **Deficit Reduction Through Capital Expenditure Compression**. In the first two experiments we analysed the effect of measures on the revenue side of the budget, keeping the fiscal deficit fixed at the base ratio and allowing public expenditure to adjust to variations in revenue. We now turn to the impact of variations in the fiscal deficit ratio. In the third experiment the fiscal deficit to GDP ratio is varied from 5 per cent to 6.5 per cent while keeping revenue expenditure to GDP ratio fixed at 23 per cent. In other words, variations in the fiscal deficit are completely absorbed through variations in capital expenditure. The results are summarised in Table 3.3. Reducing the fiscal deficit from 6.5 per cent to 5.0 per cent substantially reduces public investment. The rate of growth of output consequently falls from 6.5 per cent to only 3.3 per cent in 1993-94, recovering to about 5.8 per cent in 1994-95. Inflation is not responsive to variations in aggregate demand or fiscal deficit reduction because of structural factors and the demand-constrained condition embodied in the exercise. Note however that the effect of a one shot reduction in the fiscal deficit is quite short lived. By the second year all the target variables with a 5 per cent fiscal deficit take on values which are quite similar to those observed with a 6.5 per cent deficit.

TABLE 3.2

Macro Effects of Changes in Administered Prices

	1993-94						1994-95					
$\dot{P}_a^*$	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{O}$	E_1 (000, crores)	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
5%	4.5	9.5	17.5	13.9	-44.9	137	6.1	9.2	20.6	13.6	-44.6	158
9%	4.3	10.5	17.7	13.9	-44.9	138	5.9	10.7	20.7	13.7	-44.6	161
15%	4.0	11.9	17.8	14.0	-45.0	139	5.5	12.8	20.9	13.9	-44.7	165
20%	3.8	13.1	17.9	14.1	-45.1	140	5.2	14.6	21.1	14.0	-44.8	168

Note: Assumptions: f_1^*=5.5%, t^*=1.0%, g^*=23%, m^*=0.9%, Z^*=24295 crores (1993-94) and 30039 crores (1994-95), $\dot{X}$=15%. For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

d. **Fiscal Deficit and Revenue Expenditure Compression**. In the previous exercise a reduction in the fiscal deficit ratio was entirely absorbed by a fall in capital expenditure since that the revenue expenditure ratio was held constant at the base value. Now revenue expenditure is reduced along with a reduction in the fiscal deficit, such that the capital expenditure to GDP ratio is maintained at the base level. The results are summarised in Table 3.4. Unlike in the previous experiment, now there is a reduction of less than one per cent in the rate of growth of output in 1993-94 and less than half a percentage point in 1994-95 despite a fairly sharp reduction in the fiscal deficit from 6.5 per cent of GDP to 5 per cent. Governments almost always prefer to cut capital expenditure rather than current expenditure, because deferring capital expenditure is much easier than cutting current expenditure. The latter involves interest on

accumulated debt, compensation of government employees and various subsidies to politically powerful groups. However, this experiment clearly shows that such a policy is socially very costly in terms of the losses of potential output and employment in the short run. The longer term losses in terms of foregone productive capacity are probably even greater. But, these cannot be captured in our short run model.

TABLE 3.3

Macro Effects of Changes in Fiscal Deficit Ratio
With Capital Expenditure Compression

	1993-94						1994-95					
f_1^*	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
5.0%3.3	10.5	15.3	13.8	-45.1	134	5.8	10.7	20.7	13.6	-44.6	156	
5.5%4.3	10.5	17.7	13.9	-44.9	138	5.9	10.7	20.7	13.7	-44.6	161	
6.0%5.4	10.5	20.0	14.0	-44.7	143	6.0	10.7	20.7	13.8	-44.6	166	
6.5%6.5	10.5	22.5	14.1	-44.5	147	6.2	10.7	20.6	13.9	-44.6	172	

Note: Assumptions: $\dot{P}_a^*$=9%, t^*=1.0%, g^*=23%, m^*=0.9%, Z^*=24295 crores (1993-94) and 30039 crores (1994-95), $\dot{X}$=15%. For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

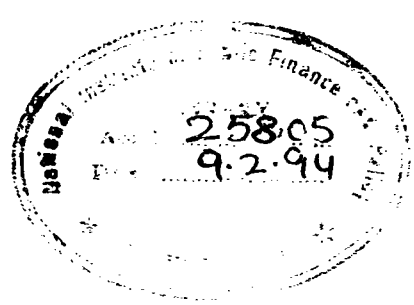

TABLE 3.4

Macro Effects of Changes in Fiscal Deficit With Revenue Expenditure Compression

		1993-94						1994-95					
f_1^*	g^*	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
5.0%	22.3%	4.0	10.5	17.6	13.9	-45.0	134	5.8	10.7	20.7	13.7	-44.7	157
5.5%	23.0%	4.3	10.5	17.7	13.9	-44.9	138	5.9	10.7	20.7	13.7	-44.6	161
6.0%	23.6%	4.6	10.5	17.6	14.0	-44.9	142	6.0	10.7	20.7	13.7	-44.6	165
6.5%	24.2%	4.9	10.5	17.8	14.0	-44.9	145	6.1	10.7	20.7	13.8	-44.6	170

Note: Assumptions: $\dot{P}_a^*$=9%, t^*=1.0%, m^*=0.9%, Z^*=24295 crores (1993-94) and 30039 crores (1994-95), $\dot{X}$=15%. For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

e. Macro-Economic Effects of Variations in Export Growth. The effects of alternative fiscal policies have so far been explored with export performance held constant at a base growth rate of 15 per cent in US dollars. The trade balance was therefore varying only in response to internal fiscal policy changes via their impact on domestic output and the propensity to import. Export performance can clearly be influenced by changes in trade and exchange rate policies of the kind introduced during the past two years. However, it also depends in large measure on external conditions beyond our control and macro-economic outcomes could be significantly effected by changes in export performance. The model is therefore simulated with varying rates

of export growth (US $) to check the sensitivity of overall economic performance to variations in trade performance.

The results are presented in Table 3.5. The most striking result is that output growth turns out to be relatively insensitive to trade performance. Varying the rate of growth of exports (US $) from 10 per cent to as much as 25 per cent yields extra growth of only around 1.0 per cent in both the years. Therefore, the possibilities of export led growth appear to be quite limited for the present. The export : GDP ratio will have to rise quite substantially before exports can take over as the principal engine of growth. Other endogenous variables such as the rate of growth of total investment or money supply and Central government expenditure also appear to be quite insensitive to trade performance. However, the decline in trade deficit brought about by improvements in export growth are quite impressive. With an increase in export growth (US $) from the base rate of 15 per cent to 20 per cent, the rate of decline of the rupee trade deficit would jump from 44 per cent to 60 per cent per annum. If the export growth rate rose to 25 per cent, the trade deficit would be reduced by 75 per cent in a single year.

f. **The Impact of Variations in Term Lending**. In this final set of simulations all policy parameters are maintained at their base levels, except term lending by financial institutions for financing investment. This is not a fiscal policy instrument. However, it is a very powerful instrument in the hands of the government for regulating

TABLE 3.5

Macro Effects of Alternative Rates of Growth of Exports

	1993-94						1994-95					
$\dot{X}$	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)	$\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
10%	4.0	10.5	17.6	12.9	-29.7	138	5.6	10.7	20.7	12.8	-29.4	160
15%	4.3	10.5	17.7	13.9	-44.9	138	5.9	10.7	20.7	13.7	-44.6	161
20%	4.6	10.5	17.7	14.9	-60.1	138	6.2	10.7	20.7	14.6	-59.8	162
25%	4.9	10.5	17.7	16.0	-75.3	139	6.6	10.7	20.8	15.4	-75.1	163

Note: Assumptions: $f_1^* = 5.5\%$, $\dot{P}_a^* = 9\%$, $t^* = 1.0\%$, $g^* = 23\%$, $m^* = 0.9\%$, $Z^* = 24295$ crores (1993-94) and 30039 crores (1994-95). For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

the level of economic activity since these institutions are controlled by government and the availability of term loans for private investment is rationed.

Term loans have been growing at around 26 per cent to 24 per cent in the recent past. The levels of term lending by major financial institutions (Z^*) in the base run reflect these increments over 1992-93 and thus over 1993-94. As against this the first simulation with Z^* = Rs. 23153 crore (1993-94) and Rs. 27783 crore (1994-95) implies an annual growth of only 20 per cent. The third simulations Z^* = Rs. 24696 crore (1993-94) and Rs.31611 crore (1994-95) implies an annual growth of 28 per cent in term lending by financial institutions. The last simulation,

Z^* = Rs. 25082 crore (1993-94) and Rs. 32607 crore (1994-95) implies term lending growth of 30 per cent per annum.

Two points are worth noting here. First, real GDP growth is highly sensitive to Z^*. The growth rate rises from 2.3 per cent to 5.8 per cent in 1993-94 and 5.3 per cent to 7.8 per cent in 1994-95 as the annual growth of term lending is varied from 20 per cent to 30 per cent (Table 3.6). Further, since all fiscal instruments remain set at base levels, all the high growth outcomes occur even while a restrictive macro policy stance is maintained.

In other words, restrictive fiscal policies need not be a barrier to high growth if private investment is simultaneously raised through accelerated growth of term lending. If this can be combined with restraint in administered price increases, inflation could also be brought down along with high growth. Furthermore, the rupee trade deficit (D) continues to decline at the base rate of 44 to 45 per cent in all simulations.

TABLE 3.6

Macro Effects of Changes in Loans Disbursed by Financial Institutions

Z^* (000, crores)	1993-94 $\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)	1994-95 $\dot{Q}$	$\dot{P}$	$\dot{I}$	$\dot{M}$	$\dot{D}$	E_1 (000, crores)
23.2 (1993-94)	2.3	10.5	11.5	13.8	-45.3	136	5.3	10.7	19.2	13.6	-44.7	157
27.8 (1994-95)												
24.3 (1993-94)	4.3	10.5	17.7	13.9	-44.9	138	6.9	10.7	20.7	13.7	-44.6	161
30.0 (1994-95)												
24.7 (1993-94)	5.1	10.5	19.8	14.0	-44.8	139	7.2	10.7	24.7	13.8	-44.4	164
31.6 (1994-95)												
25.1 (1993-94)	5.8	10.5	21.9	14.0	-44.7	140	7.8	10.7	26.1	13.9	-44.2	166
32.6 (1994-95)												

Note: Assumption f_1^*=5.5%, $\dot{P}_a^*$=9%, t^*=1.0%, g^*=23%, m^*=0.9%, $\dot{X}$=15%. For identification of symbols see list of variables and parameters in the appendix. Base run is in bold type.

IV. Concluding Remarks

In this paper the impact of alternative fiscal policies on macro-economic performance of the Indian economy have been analysed with the help of a macro-economic model which attempts to capture some specific features of India's interventionist economic regime, i.e., the dominant role of administered prices, the nature of the corresponding inflation mechanism, the effect of government intervention on aggregate investment behaviour and the role of money supply in this interventionist policy environment.

It must be pointed out in this context that the quantitative estimates of the impact of alternative fiscal policies have to be interpreted with caution. Some of the underlying behavioural parameters may be changing as a consequence of the structural adjustment programme pursued during the past three years. Our main purpose was to derive certain qualitative lessons regarding alternative fiscal strategies rather than offer any precise measures of the impact of one or another policy.

The most important lesson emerging from this exercise is that the possibilities of export led growth appear to be quite limited in the medium term, even if exports (US $) were to grow at rates of 20 or 25 per cent per annum. The main advantage of high export growth is that it help us to substantially cut down the trade deficit and therefore allows for a higher rate of growth of real domestic output and absorption if this can be stimulated by other means. However, strong government

intervention to support export growth is essential, particularly keeping in view the prevailing recessionary conditions abroad, the disruption of trade with some of India's major trade partners in the C.I.S. countries and the emergence of various regional trading blocks.

The rate of growth of domestic output can be revived in a sustainable manner through three possible routes: (i) raising the rate of private investment; (ii) restoring the public investment programme, especially in areas which complement and encourage private investment, and (iii) larger flows of foreign direct investment.

The simulation exercises show that the macro-economic impact of a given set of fiscal policies can be quite sensitive to variations in private investment and, hence, the term lending policies of the financial institutions. A reduction in the degree of financial repression and substantial expansion of term lending by the financial institutions could lead to a significant increase in the rate of private investment. However, from the point of view of fiscal policy, the crucial question is how to restore the public investment programme. Our simulations show that when deficit reduction is absorbed through compression of revenue expenditure, there is little adverse effect on growth. However, when the same reduction is achieved through cuts in capital expenditure, this leads to a distinct reduction in growth. This result is also confirmed by the industrial recession experienced in the country during the past three years in the wake of fiscal compression accomplished through cuts in real capital expenditure.

The simulations also show that a larger fiscal deficit, by itself, need not lead to higher inflation. But such an increase of the deficit is not desirable for other reasons. Rapid growth of fiscal deficit has raised the cost and limited the availability of household savings for private investment. At the same time, a sharp increase in the burden of public debt has distorted the allocation of government resources in the recent period. Interest on public debt is now one of the largest and fastest growing components of government expenditure. It is already diverting public spending away from capital expenditure, expenditure on social services like health or education and spending on `merit goods' like subsidised food or the anti-poverty programmes. Therefore, greater revenue mobilisation to finance additional capital and social expenditure should be given the highest priority in the current period. This should be attempted through tax reforms aimed at widening the base of direct taxes, reducing tax shelters, and improving enforcement rather than raising rates.[11]

With regard to foreign direct investment we have argued elsewhere that it is not easy to attract large volumes of such investment during the first few years of an adjustment programme. Foreign direct investment rarely leads an economic boom. Instead it usually follows a spurt in growth provided appropriate economic policies including those for remittances of profit are in place (see Mundle and Mukhopadhyay, 1993b).

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11. Tax reform proposals for India which follow this approach are detailed in the Report of the Tax Reforms Committee (Chelliah Committee, 1991). See also S. Mundle and M. Govinda Rao (1992).

Finally, on the question of inflation, government policy on administered prices seems to be more important than its policy on fiscal deficit. The simulation exercises show that if administered price increases are moderated, this helps to curb inflation. On the other hand, if large administered price increases persist, then reducing the fiscal deficit will mainly contain growth not inflation. Therefore, unless administered price increases are required by input costs increases, the raising of administered prices merely as a means of mobilising revenue should be avoided.

APPENDIX : ESTIMATION, DATA SOURCES AND LIST OF VARIABLES AND PARAMETERS

The macro economic model set out in the main text consists of 31 equations. However, many of these equations are either identities or intermediate equations not used in the final model. Altogether only ten equations required some estimation.[12] Of these, three in particular require discussion. These include (i) estimation of the aggregate supply function in order to determine whether the economy is on the demand constrained segment or the supply constrained segment, (ii) estimation of the corresponding function for inflation and (iii) estimation of the private investment function.

(i) **The aggregate supply function**: In the model this function has been defined as either

$$P = P_f \quad \text{when } Q \leq Q_n \qquad \text{(A1)}$$

$$\text{or} \quad P = P_f + F(Q-Q_n) \quad \text{when } Q > Q_n \qquad \text{(A2)}$$

In order to run the model empirically it is necessary to establish which segment of the supply function is relevant. The administered floor price level P_f is derived as a function of the weighted average of all administered prices (P^*_a). Hence for $Q > Q_n$ equation A2 may be written as

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12. These include equation numbers 4, 7, 10, 14, 16, 21 and 28 in addition to the measurement of some ratios in equations 18, 20 and 31.

$$P = a_o + a_1 P_a^* + a_2(Q-Q_n) \qquad (A3)$$

Substituting Q_n by equation (11) from the main model yields

$$P = a_o + a_1 P_a^* + a_2[Q-\Theta K(t-1)] \qquad (A4)$$

However Θ here is conceptually the optimal capital output ratio, which may be different from the observed ratio. Hence A4 is rewritten as

$$P = a_o + a_1 P_a^* + a_3 Q/K(t-1) \qquad (A5)$$

where $a_3 = a_2/\Theta$. Since Θ is positive, $\gtrless$ $a_3 < 0$ when $a_2 \gtrless 0$

OLS estimates of the parameters of (A5) fitted to data for the years 1975-76 to 1988-89 are as follows (t-values in parenthesis),

$$P = -67.81 + 0.39 P_a^* + 149.07 \left[\frac{Q}{K(t-1)}\right] \qquad (A6)$$

$$\qquad (-1.24) \qquad (22.48) \qquad (1.31)$$

$$R^2 = 0.98; \quad \bar{R}^2 = 0.97; \quad D.W. = 1.09$$

The equation was also fitted to a longer time period 1970-71 to 1988-89, with a dummy (D) introduced to capture the shocks of drought in the outlier years 1972-73 and 1987-88. In this case the estimated equation is

$$P = -47.09 + 0.38 P_a^* + 116.84 \left[\frac{Q}{K(t-1)}\right] + 9.6\ D \qquad (A7)$$

$$\qquad (-1.27) \qquad (37.19) \qquad (1.52) \qquad (2.78)$$

$$R^2 = 0.99; \quad R^2 = 0.98; \quad D.W. = 1.47$$

In both estimated equations (A6) and (A7) the coefficient of

$$\left[\frac{Q}{K(t-1)}\right]$$

turns out to be insignificant, suggesting that the relevant supply function is the demand constrained segment (A1) rather than the supply constrained segment (A2). However, this should be treated only as a tentative conclusion. It is possible that the capacity utilisation variable appears to be insignificant because its variations are small compared to those in the administered price model. Also a more disaggregate model may show some capacities to be binding while others are not.

This identification has important implications for the estimated impact of demand management policies. Hence these must also be treated as tentative pending further research. In the segment $P = P_f$ output is demand determined and the equilibrium price level is largely independent of demand. Shifts in demand will therefore primarily lead to changes in output rather than price. It is appropriate in this situation to normalize the demand function with respect to output (Q). The robustness of the result that price is independent of demand can be tested by applying the Wu-Hausman test in the output normalized demand function (equation 2 in the model).[13]

$$Q = Q(P, A) \qquad (A8)$$

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13. For a discussion of these issues see Maddala (1989).

Applying the test to an expanded version of equation A8 yielded a t-statistic of 0.29 for the predicted price variable, which does not allow rejection of the null hypothesis that price is exogenous in the demand function.

(ii) <u>The inflation function</u>: Having identified the economy as lying on the demand constrained segment of the aggregate supply curve

$$P = P_f \quad \text{with} \quad Q \leq Q_n \qquad \text{(A1)}$$

the corresponding inflation process is represented by equation (10) of the model

$$\dot{P} = \dot{P}_f \qquad \text{(A9)}$$

Hence, it is now necessary to estimate the function for determining P_f and therefore the inflation rate of equilibrium prices $\dot{P}$.

Recall that $\dot{P}_f$ was defined as the change in floor price level which would follow purely as a consequence of change in administered price increases, other things remain the same. In other words $\dot{P}$ is equal to $\dot{P}_f$ while the latter is a function of the average rate of administered price increases $\dot{P}^*_a$, hence $\dot{P} = F(\dot{P}^*_a)$. **(A10)**

Accordingly, treating $\dot{P}$ as an observed proxy for $\dot{P}$, this was regressed on the average rate of administered price increases $\dot{P}^*_a$ for the period 970-71 to 1988-89, along with dummies to capture

the impact of shocks in outlier years, i.e., D for drought years and D_1 for the Emergency year 1975-76 when P became negative. The estimated function t-values in parenthesis) is as follows:

$$\dot{P} = \underset{(3.86)}{0.07D} - \underset{(-1.45)}{0.05D_1} + \underset{(8.34)}{0.54\ \dot{P}_a^*} \qquad \text{(A11)}$$

$$R^2 = 0.57;\ \bar{R}^2 = 0.51;\ F(1, 15) = 5.77$$

The F-statistic (lagrange multiplier test of first order residual serial correlation) shows the presence of serial correlation at the 5 per cent level. Two alternative functional forms were therefore tried to correct for dynamic misspecification, one introduced the lagged dependent variable $\dot{P}(t-1)$ and the other a lagged independent variable $\dot{P}_a^*(t-1)$. The results are as follows

$$\dot{P} = \underset{(4.93)}{0.07D} - \underset{(-3.40)}{0.11D_1} + \underset{(2.14)}{0.24\ \dot{P}_a^*} + \underset{(3.20)}{0.52\ \dot{P}(t-1)} \qquad \text{(A12)}$$

$$R^2 = 0.75,\ \bar{R}^2 = 0.69,\ F(1, 14) = 0.12 \text{ and,}$$

$$\dot{P} = \underset{(5.28)}{0.08D} - \underset{(-3.37)}{0.18D_1} + \underset{(2.70)}{0.29\ \dot{P}_a^*} + \underset{(2.88)}{0.39\ \dot{P}_a^*(t-1)} \qquad \text{(A13)}$$

$$R^2 = 0.72;\ \bar{R}^2 = 0.66,\ F(1, 14) = 0.61$$

The higher value of $\bar{R}^2$ would suggest that equation (A11) be chosen over (A12) for policy simulation. This choice is supported also by some other tests for selection between non-nested regression models.

(iii) **The private investment function**: In the main text it has been explained why the appropriate model of investment behaviour in India is neither a pure accelerator type model nor a neoclassical cost of funds model but a funds constrained model of the form

$$I_p = I_p(S_3, Z^*, M_3) \qquad \text{(A14)}$$

where I_p is nominal private investment, S_3 is gross savings of the private corporate sector, Z^* is the policy determined gross disbursement of term loans by financial institutions and M_3 is broad money supply.

In the empirical estimation the coefficient of S_3 turned out to be insignificant while the coefficients of Z^* and M_3 are themselves strongly correlated ($r^2 = 0.99$). So are their first differences ($r^2 = 0.91$). This is presumably because under the statutory liquidity ratio provision bank deposits, a major component of M_3, also constitutes a major source of funds for the financial institutions. Because of this multicollinearity problem one of the two variable had to be dropped. Z^* was retained, dropping M_3, since the former had a higher explanatory power in terms of both level as well as first differences.

Regarding the form of the functional relationship between I_p and Z^*, it has to be noted that there is a lag of a few months between the disbursement of funds by the financial institutions and their actual utilisation by borrowing firms for investment. This is not only because of transaction delays but also because firms would find it cheaper to temporarily use the term loans for working capital purposes, bank loans available for the latter having a higher interest cost. Therefore it has been

assumed that private investment in the current period is partly dependent on funds disbursed during the previous year and partly on the increase in disbursement level during the current year

$$I_p(t) = I[Z^*(t-1), \Delta Z^*(t)] \qquad \text{(A15)}$$

The above function was fitted for the period 1965-66 to 1988-89 along with three dummies D, D_1 and D_2 to adjust for abnormal years. The estimated results are as follows:

$$I_p(t) = \underset{(7.2683)}{3147.1} + \underset{(9.3686)}{9.3892}\ \Delta Z^*(t) + \underset{(17.1276)}{4.7433}\ Z^*(t-1)$$

$$+ \underset{(7.0709)}{3331.4D} - \underset{(-3.2038)}{2468.6D_1} + \underset{(4.6239)}{4813.6D_2} \qquad \text{(A16)}$$

$R^2 = 0.99$; $\bar{R}^2 = 0.99$; D.W. = 2.15

DATA SOURCES

The different price indices used in the exercise have been obtained from Chandhok (1990) and procurement price data from Economic Survey (various issues). National Accounts Statistics (various issues) have been used for obtaining time series data on gross domestic product, gross capital formation in private and public sectors, real net fixed capital stock and government consumption expenditure. Data on money supply, high powered money, foreign currency assets of RBI, exports and imports have been taken from various issues of RBI Report on Currency and Finance. Data on government revenue, expenditure and deficits have been taken from various issues of Indian Economic Statistics (Public Finance).

LIST OF VARIABLES AND PARAMETERS

Unless otherwise indicated, variables are in nominal values. A dot on a particular variable indicates growth rate of the variable. Exogenous variables and parameters have been estimated from past trend where necessary. Policy instruments have been set for the base run on the basis of policy statements, documents, etc. and perturbed as required for simulation.

Endogenous Variables:

P = Price.

$\hat{P}$ = Equilibrium level of prices.

P_f = Floor price level.

Q = Real output.

$\hat{Q}$ = Equilibrium level of real output.

c = Private final consumption expenditure.

A = Aggregate final demand net of private consumption $(I+G_1-D)$.

I_g = Gross capital formation in the public sector.

I_p = Gross capital formation in the private sector.

I = Total gross capital formation.

I_f = Real fixed capital formation.

G_1 = Government consumption expenditure (all governments).

E = Total government expenditure (all governments).

E_1 = Total Central government expenditure.

G = Government Revenue Expenditure (all governments).

S_1 = Government capital expenditure (all governments).

T = Total revenue (tax plus non-tax for all governments).

F = Fiscal deficit (all governments).

M_3 = Money supply

H = High-powered money.

F_m = Change in stock of monetized debt.

D = Trade deficit (imports minus exports).

M = Imports (in rupees).

M_r = Real imports.

Exogenous Variables:

$K_{(t-i)}$ = Stock of fixed capital in period (t-i).

$I_{f(t-i)}$ = Total real fixed investment in period (t-i).

$T_{(t-1)}$ = Total revenue in period (t-1).

S_2 = Total gross capital formation by non-departmental enterprises.

S_3 = Saving of private corporate sector.

R = Change in net foreign exchange asset of RBI set at rupees 2250 crore, 3375 crore, 4500 crore and 5625 crore per annum corresponding to dollar export growth rates of 10 per cent, 15 per cent, 20 per cent and 25 per cent, respectively in different simulations.

$\dot{X}$ = Growth of exports in dollars set at 15 per cent.

e = Exchange rate assumed constant at Rs 31.37 per US $.

Q_n = Normal capacity output.

$\dot{P}_m$ = Percentage change in dollar price of imports (Difference between percentage change in unit value index of imports and exchange rate).

Parameters

α_1 = Elasticity of equilibrium output with respect to floor price P_f.

α_2 = Elasticity of equilibrium output with respect to capacity output Q_n.

α_3 = Elasticity of equilibrium output with respect to A.

β_1 = Elasticity of equilibrium price with respect to P_f.

β_2 = Elasticity of equilibrium price with respect to Q_n.

β_3 = Elasticity of equilibrium price with respect to A.

θ = Output-capital ratio.

b = Share of public investment in total investment.

τ = Elasticity of real fixed investment with respect to total real investment.

v = Money multiplie

k = Ratio of public sector gross capital formation (I_g) to total capital expenditure in government (S_1) plus gross capital formation by non-departmental enterprises (S_2).

δ = Ratio of imports to trade deficit (rupees).

Policy Instruments

$\dot{P}_a^*$ = Average of percentage change in administered prices.

h^* = Ratio of change in stock of monetized debt to GDP.

f^* = Ratio of fiscal deficit to GDP controlled through adjustment of the Centre's fiscal deficit.

f_1^* = Ratio of Centre's fiscal deficit to GDP.

g^* = Ratio of revenue expenditure to GDP.

t^* = Tax buoyancy indirectly controlled through tax reforms.

Z^* = Loans disbursed by government controlled financial institutions.

m^* = Elasticity of real imports with respect to real output indirectly controlled through trade policy, exchange rate variation and tariff reforms. Here assumption to be 0.9 as against the observed 1.2 prior to rupee devaluation of 1991.

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