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DEFICIT FINANCING, INDIRECT TAXATION AND EXCHANGE RATE ADJUSTMENT: A PRELIMINARY EXERCISE

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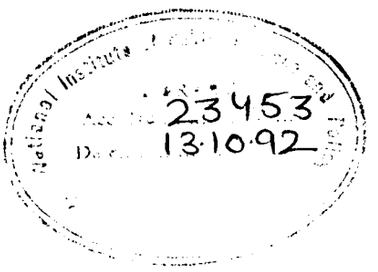

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Abstract

This paper makes an attempt to analyse the effect of two important policy instruments which are used extensively for achieving government expenditure targets, namely, indirect taxation and deficit financing on aggregate output, domestic absorption, exchange rate and exports. The analysis is based on an aggregative open general equilibrium model in which the exchange rate is market determined.

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I. Introduction

A number of countries all over the world have been undertaking various stabilization programmes since the early 80's. The most important objective of stabilization is the reduction or elimination of a balance of payments deficit. External balance and internal balance (i.e, equality between domestic output and absorption) are not two separate issues, they are related. An excess of absorption over output (or GNP) is matched by an equal deficit in the external account.[1] It is believed that excessive government expenditure is the principal cause of internal imbalance in many developing countries.

A combination of `expenditure-reducing' and `expenditure-switching' policies constitutes the core of stabilization programmes in many countries, including India. Reduction in government expenditure, credit squeeze are some of the major `expenditure-reducing' policies. Exchange rate adjustments (either devaluation or transformation from a fixed exchange rate regime to a floating exchange rate regime, with or without restrictions on capital movements) is the main `expenditure-switching' policy.

However, nominal government expenditure can not remain fixed even in two consecutive financial years for various reasons. An increase in nominal government expenditure can be financed in several ways: (a) borrowing from domestic sources and/ or from abroad, (b) collecting more revenues (tax and/or non-tax) and (c) through deficit financing. In the current Indian context, the choice seems to be restricted to the last two. A few things should be noted at this juncture. First the share of

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1. National Income (Y) is given by total spending (domestic and foreign) on domestic goods; $Y = A-M+X$ or, $(Y-A) = (X-M)$
where, A = Absorption or total spending of domestic residents
X-M = Net exports inclusive of net factor receipts.

direct taxes in tax revenue has gone down sharply from about 23 percent in the early sixties to around 11 percent recently. Secondly, non-tax revenue has remained at only around 2.5 percent of GDP throughout the 70's and 80's. Public sector profit is the main source of non-tax revenue, and without any significant improvement in the operational efficiency of various public sector units, more non-tax revenue can be obtained through raising the administered prices.

In a recent paper, Sikdar (1989) examined the efficacy of three mutually exclusive policies, namely (a) indirect taxation, (b) administered price variation, and (c) deficit financing. Sikdar's model is a closed aggregative general equilibrium framework of the Kaleckian-dual-economy type. However, it seems to us that any closed model insulated from external transactions has lost its relevance at the present juncture. Effectiveness of different stabilization policies in an open economy has also been discussed by many (see for example, Dornbush 1980, Carlin and Soskice 1990 and Cook and Kirkpatrick 1990). However, those analyses, which are based on standard IS-LM framework, sometimes do not capture correctly the causal links between different variables in a developing country, like India.

Our paper makes an attempt to examine the effect of two important policy instruments which are used extensively for achieving government expenditure targets, namely, indirect taxation and deficit financing on aggregate output, domestic absorption, exchange rate and exports. It is based on an open general equilibrium structure in which the exchange rate is market determined. Furthermore, if we assume that every industrial unit requires an essential imported intermediate input, then the concept of exogenously fixed prices (i.e., administered prices) is no more valid. Finally, the absence of direct taxes is not an unreasonable assumption, because as mentioned earlier, direct taxes constitute very small proportion of the total tax revenue.

In the next section, we present the basic model and derive the main propositions.

II. The Model

The model has one manufactured good (Y) and the price is denoted by P_y. Production of one unit of Y needs b units of labour (L) and `a' units of imported intermediate input (for example, oil). The dollar price of imported input is assumed to be one. All the input coefficients and wage (W) are given exogenously. The industrial price (P_y) is based on profit mark-up (m) on labour and material cost.[2]

A fixed fraction`r' of the industrialist's profit is spent on Y and the rest is saved. The entire wage income is consumed. Total output of Y is divided between domestic absorption and exports. Exports depend on dollar price of Y (i.e, P_y/e, where e is the market exchange rate) and world income Z. An indirect tax (t) is imposed on per unit of Y. Expenditure of the central authorities is financed by total tax revenue (tY) plus a fixed amount of deficit financing (D).

Further, we assume zero capital mobility. It may be noted that during the early phase of transformation, many developing countries do not allow free capital movements.

Price of Y

$$P_y = (1+m)\ (bW+ae) + t \qquad (1)$$

where

m is the mark-up rate.

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2. Many studies found strong evidences in favour of the mark-up pricing rule in India. See for example, Chatterjee (1989).

Export demand function (E)

$$E = E(Z, P_y/e) \qquad (2)$$
$$E^1 > 0,\ E^2 < 0$$

We also assume $|o| = |(E^2 P_y/e)/E| > 1$. In other words, the export demand is price elastic. The role of this assumption in our model will be clear soon.

Nominal domestic absorption of Y

$$P_y C = bWY + rm(bWY + aeY) + G+I \qquad (3)$$

where C is real domestic absorption of Y. G is total government expenditure, I is autonomous private investment, and m (bWY + aeY) is total industrial profit.

Trade balance

$$aY = E(P_y/e) \qquad (4)$$

It may be noted that the dollar price of imported intermediate input is assumed to be one. Therefore, the total import of intermediate input is E. P_y/e, and total output (Y) produced is E. $P_y/e/a$.

Government expenditure

$$G = tY+D \qquad (5)$$

Product division

$$Y = C+E \qquad (6)$$

We have six endogenous variables, namely P_y, Y,C,E,G and e and six equations. Therefore, the system is closed.

Totally differentiating (4) we get,

$$dY = 1/ae\ (P_y dE + E dP_y - aY de) \qquad (7)$$

from (1) we get

$$dP_y = (1+m)ade + dt \qquad (8)$$

Substituting (8) into (7) we derive,

$$dY = P_y dE/ae + de/e(E(1+m)-Y) + E/ae\ dt \qquad (9)$$

Since,

$dC = dY - dE$, therefore,

$$dC = dE\ (P_y/ae - 1) + de/e(E\ (1+m)-Y) + Edt/ae \qquad (10)$$

It may be recalled that $Y = EP_y/ae$, and $dP_y = (1+m)de$ (assuming $dt=0$), therefore, $Y > E(1+m)$ implies $de/e > dP_y/P_y$. In other words, as the exchange rate depreciates, the dollar price of Y falls.

Again totally differentiating (3) and after substituting (9) and $dC = dY-dE$, we get

$$dE(kP_y/ae - P_y) + de[(kE(1+m)-Yk)/e + Ca(1+m)-ramY]$$
$$=dD + dI + dt(1-k/ae)E \qquad (11)$$

Where, $k = P_y - bW - rm\ (Wb+ae) - t > 0$

It should be noted that the coefficient of dE in (11) is positive iff $k > ae$. k is always greater than ae provided $r < 1$. The intuitive meaning of k is the difference between changes in nominal supply and nominal domestic demand (nominal demand and nominal absorption P_yC are used synonymously) when Y changes (nominal demand would rise by bW+rm (Wb+ae) + t when Y rises). Similarly the coefficient of de in (11) shows the difference between two changes as e changes. We also assume the coefficient to be positive. Otherwise domestic absorption C should rise when e rises to maintain equilibrium in the domestic market. However, as e rises, total output Y should fall (assuming exports do not change, see equation 9) and, therefore, C can not rise.

Finally totally differentiating (2) and after substituting (8) we get,

$$dE - E^2/e(a(1+m)-P_y/e)\ de = E^1dZ + E^2/e\ \ dt \qquad (12)$$

(11) and (12) constitute the structure for comparative static analysis which is as follows:

$$\begin{bmatrix} \frac{kP_y}{ae} - P_y & \frac{kE\ (1+m)-Yk}{e} + Ca\ (1+m) - ramY \\ 1 & -\frac{E^2}{e}\ (a\ (1+m) - Py/e) \end{bmatrix} \begin{bmatrix} dE \\ de \end{bmatrix} = \begin{bmatrix} dD + dI+dt(1-k/ae) \\ E^1dZ + E^2/e\ dt \end{bmatrix} \qquad (13)$$

The determinant (δ) of the system is negative.

Proposition 1a

Higher deficit financing leads to higher exports.

From (13) we get,

$$dE/dD = -\ 1/\delta[E^2/e\ (a(1+m)-P_y/e)] > 0 \quad (\text{ determinant is negative})$$

A rise in deficit financing increases the demand for Y in the domestic market, consequently the demand for imported intermediate input rises and hence the exchange rate also increases. Since $de/e > dP_y/P_y$ therefore, dollar price of Y falls and as a result, exports rise.

Proposition 2a

Higher deficit financing also leads to higher exchange rate.

$$de/dD = -1/\delta > 0$$

Initially, due to additional deficit financing the exchange rate (e) rises. However, as exports go up, there would be a downward pressure on the exchange rate but it will not bring the exchange rate below the previous equilibrium level.

Now plugging the values of dE/dD and de/dD in (9) we derive,

$$dY/dD = 1/\delta e[-P_y E^2/ae\ (a(1+m)-\ P_y/e)-\ (E(1+m)-Y)]$$

or, $$dY/dD = 1/\delta[E(1+m)(1-\sigma)/e + \sigma EP_y/ae -Y] \qquad (14)$$

Substituting the value of $Y = EP_y/ae$ in (14) we get,

$$dY/dD = 1/\delta[E(1+m)(1-\sigma)/e + EP_y(\sigma-1)/ae] \qquad (15)$$

Since Py > ae (1+m), therefore, the expression inside the bracket is positive iff $|\sigma|$ >1,which proves the following proposition:

Proposition 3a. Higher deficit financing yields more output iff $|\sigma|>1$.

If $|\sigma|<1$, the total revenue in dollar from exports declines as the dollar price of Y falls. Therefore, the economy can import less amount of intermediate input, consequently total output falls.

Since the coefficient of dE (10) is positive (it may be noted that Py/ae>1), therefore, domestic real absorption (C) also increases due to higher deficit financing provided $|\sigma|>1$. However, here $|\sigma|>1$ is a necessary condition for dC/dD to be positive.[3]

Proposition 1b

An increase in t (the indirect tax rate) reduces exports. We derive the following expression for dE/dt from (13)

$$dE/dt = 1/\delta[-(1-k/ae)(E^2/e(a(1+m)-P_y/e))-E^2/e\ ((kE(1+m)-Yk)/e + Ca(1+m)-ramY)] < 0$$

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3. substituting dE/dD and de/dD in (10) we get,

$$dC/dD = 1/\delta[E/ae(P_y/ae -(1+m))(1-\sigma) +\sigma E/P_y(P_y/e -a(1+m))]$$

Since the entire expression inside the bracket is positive, therefore, $dE/dt < 0$. As the tax rate (t) increases, the dollar price of Y also rises, consequently exports fall. However, exchange rate depreciation (because total inflow of foreign exchange declines) partially improves partially exports and total foreign exchange supply in the economy. It may also be noted that the dollar price of Y, (P_y/e) is, therefore, higher in the new situation (see the appendix)[4] .

Proposition 2b

An increase in t depreciates the exchange rate.

$$de/dt = 1/\delta[(kP_y/ae - P_y)E^2 - E(1-k/ae)] > 0$$

The expression inside the bracket is negative for $|\sigma|>1$, as a result $de/dt>o$. As the dollar price of Y goes up, total foreign exchange earning declines and consequently the market clearing exchange rate is higher in the new equilibrium situation. Needless to say, that total output would also fall because $|\sigma|>1$. In other words, as the dollar price of Y rises, total foreign exchange earning declines. Furthermore, $|\sigma|>1$ is also the necessary condition for C (real domestic absorption) to decline (a reduction in C implies that loss in output is more than reduction in exports).

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4. Suppose the dollar price, total export and, therefore, total output remain the same in the new situation. Domestic absorption C should therefore, also remain at the old level. However,as e rises there will be a positive difference (Ca(1+m)-ramY) between nominal supply and nominal demand in the domestic market (it may be recalled that the coefficient of de in (11) is positive, which ensures Ca(1+m) > ramY), therefore, C should fall.

III. Conclusion

A moderate attempt has been made in this paper to use a simple aggregative framework to evaluate two important sources of financing government expenditure, namely deficit financing and indirect taxation. It was demonstrated that a rise in the indirect tax rate is stagflationary. The output declines and price increases. However, an additional dose of deficit financing helps to achieve higher output, domestic absorption and exports inspite of a rise in the price level. Needless to say, the crucial factor in our model is changes in the exchange rate. Domestic price responds to changes in the exchange rate. This is a very common characteristic in many developing countries, because dependence on imported intermediate goods is unavoidable in those countries. However, this type of causal link can be eliminated through the fixed exchange rate system at the cost of balance of payments difficulties.

The important results of the paper are based on a very crucial assumption, namely export demand is price elastic (which makes the supply curve of foreign exchange upward sloping with respect to the exchange rate. If total demand for Y (domestic plus foreign) is a negative function of the exchange rate, then stability in the market for foreign exchange is ensured). Goldstein (1985) reported that the long run (greater or equal 2 years) price elasticity of demand for exports in some developed countries would be between -1.25 to -2.50. However, short run (0-6 months) elasticities are considerably smaller than the long run elasticities. For India, no unanimity has so far been reached. Virmani(1991) found a very high (-1.64) elasticity of manufactured exports with respect to the US dollar price, although the elasticity for primary exports was lower than 1 in absolute term. In Lucas (1988), the point estimates of price elasticity of demand for different commodity groups showed a substantial range: from greater than six to somewhat

below one. Therefore, without any concrete evidence about the aggregate price elasticity of demand for exports, we can hope that our results hold the same for India.

The entire exercise was based on a static short-run framework. Our model does not address few issues like determinants of investments, the role of exchange rate expectations etc. Furthermore, we also ignored some important issues like capital mobility and the effects of deficit financing on the money market. The well known 'real wage resistance' phenomenon was absent in the model, but even if we index wage partially to the price level, it will not change the results qualitatively.

Appendix

Proof of the proposition $\frac{d(P_y/e)}{dt} > 0$

$d(P_y/e)/dt > 0$ iff

$e-(P_y - a(1+m))\, de/dt > 0$

Now

$de/dt = [E\,(k/ae - 1)(1-\sigma)]/\delta$

where

$\delta = -(k/ae-1)\sigma E/e(P_y - ae(1+m))-[(kE(1+m)-Yk)/e + Ca(1+m)-ramY] < 0$

It may be noted that the expression inside the third bracket is the coefficient of de in (11) and which is positive. Let us denote it by S.

Therefore the condition $e - (P_y - a(1+m)e)de/dt > 0$ can be written in the following way,

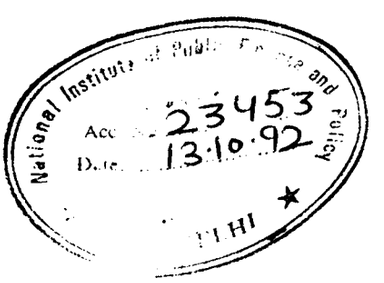
$$\delta e + E(k/ae - 1)(\sigma-1)A < 0$$

where $A = P_y - ae(1+m)$

or, $-(k/ae - 1)\sigma EA - eS + E\,(k/ae-1)\sigma A - EA\,(k/ae - 1) < 0$

or, $-eS - E(k/ae-1)A < 0$

Which is always true (note that $k > ae$, and $A > 0$).



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