Liberalized Exchange Rate Management System and Devaluation in India: Trade Balance Effect

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Abstract

This paper examines the short run trade balance effects of the recent exchange rate policies in India in terms of the extended Jones-Corden [1976] model. With rigidity of money wage rate as the target of concurrent fiscal policy, a change in the LERMS formula improves trade balance only if non-tradeables are relatively labour-intensive. A devaluation might still fail to improve trade balance, on the other hand, in presence of imported input. The Jones-Corden condition thus gets modified in presence of imported input.

I. Introduction

In efforts to come out of the balance of payments (BOP) crisis the LDCs have time and again resorted to the exchange rate policies. India is no exception also. Facing the severe BOP constraint by the turn of this decade, it has begun to liberalize its trade and exchange rate regime. The firsts phase of it consisted of devaluation of the Rupee by nearly 20 percent during June-July 1991, followed by some import liberalization policies. In the second phase, the Liberalised Exchange Rate Management System (LERMS) was introduced in March 1992. In this system 60 percent of all export earn-

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ings and inward foreign exchange (forex) remittances were allowed to convert at the market-determined exchange rate, and the rest at the official discount rate. This 40:60 LERMS formula was, however, only a transition phase with the aim at making it 0:100 one.[1] This year's Union Budget finally introduces this thereby abolishing the dual exchange rate regime in operation during last one year.

The move to the present system of unified market-determined exchange rate system can also be seen as an once-for-all export-incentive scheme or one-way devaluation. A devaluation by making exports cheaper and imports dearer in terms of the foreign currency (with respect to which the domestic currency is devalued), acts as a combination of export-subsidy and import-tax. On this interpretation the move form 40:60 to 0:100 LERMS formula emerges as an implicit one-way devaluation. Once we realize this, it becomes clear why the Indian policymakers expect better export performance and a consequent BOP improvement following LERMS.[2] Optimism also stems from the success of financial liberalization in the countries like Argentina, Chile, Mexico, Peru and South Korea.[3]

The purpose of this paper is to examine the BOP and other macroeconomic effects of the above mentioned exchange rate policies in terms of the two-sector structuralist model developed by Findlay [1973] and Jones and Corden [1976]. In doing so we extend the Jones-Corden (hereafter J-C) model by introducing an imported input. Thus, our analysis can also be

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1. The 40:60 LERMS formula is often labelled as "partial convertibility" whereas the 0:100 formula as the "full convertibility of Rupee on trade account." But actually full convertibility is something else than just this 0:100 formula. After all, LERMS does not allow unrestricted purchase of foreign currencies. At best, it can be seen as a system of "limited" or "managed" float.

2. But providing incentives to the exporters, whether in the form of direct subsidies or in the present form of LERMS, may not be a sufficient condition for better export performance (relative to imports) and hence a BOP improvement. At least the Indian experience in recent past does not indicate so. Instead, the export-incentive schemes, in operation for several years in the past, have resulted in an incentive-bargaining environment (Jalan [1991]).

3. Contrarily, external debt as a percentage of GNP for these Latin American countries have increased significantly during 1980s. Also, Mexico ranked second among highly indebted countries in 1990 (World Development Report [1985, 1987, 1992]).

seen as a reexamination of the J-C result in an extended framework. The plan of the paper is as follows. In section II we present the extended J-C model; section III and IV spell out the BOP and macroeconomic effects of LERMS and devaluation; finally, in section V we conclude the paper.

II. The Extended Jones-Corden Model

Consider a small open economy that faces given world prices for its tradeables. It produces two goods – exportable (good-1) and non-tradeables (good-N). For simplicity, we assume away any domestic production of the importables. There are two sectorally mobile, but internationally immobile, and fully employed domestic factors of production – labour (L) and capital (K). Rate of return to capital (r) is perfectly flexible and moves up and down to wipe out any excess demand for capital. The money wage rate (W) is fixed. Full employment is then maintained by active fiscal policy aimed at avoiding any excess demand or supply of labour. There is also an imported input (I) which can be used in the production of either non-traded or export good.[4] The particular assumption regarding the use of the imported input is crucial in the case of devaluation.

Suppose the initial exchange rate regime is of the following nature: k_M fraction of per unit forex earned by the exporters is allowed to convert at the market rate (e_M) and the rest, k_0 fraction, is required to be converted at the official rate (e_0), i.e.,

$$P_1 = (k_M e_M + k_0 e_0) P_1^* \qquad (1)$$

where P_1^* is the world price of exports and P_1 is the domestic-currency price of the same. The purchase of the imported input, on the other hand, is to be financed by forex bought at the market rate, i.e.,

$$P_I = e_M P_I^* \qquad (2)$$

However, in the analysis of devaluation we will assume that the imported input is financed by forex bought at the official rate (as was actually the case

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4. Oil is one such imported input. Also, Indian exports like engineering goods, computers etc. to erstwhile USSR have significant import content.

in India in pre-1991-devaluation period).

Now, the move from 40:60 to 0:100 LERMS formula can be captured here as a fall in k_0, i.e., $\hat{k}_0 < 0$. Such a policy raises the domestic price of exports while leaves that of the imported input unaffected:

$$\hat{P}_1 = k_0 P_1^* (e_0 - e_M)\hat{k}_0 / P_1 > 0 \tag{3}$$

$$\hat{P}_I = 0 \tag{4}$$

A devaluation, on the other hand, affects both the prices:

$$\hat{P}_I = \gamma_0 \hat{e}_0 > 0 \tag{5}$$

$$\hat{P}_I = \hat{e}_0 > 0 \tag{6}$$

where. $\gamma_0 = k_0 e_0 P_1^* / P_1$ = per unit share of export revenue at e_0.

In this model, an excess supply of non-tradeables is viewed as a situation of trade deficit. The underlying idea is that in face of an excess supply of non-tradeables in relation to exportables prompts the government to pursue an expansionary fiscal policy to prevent any corresponding lay-off at the constant money wage rate so that the economy spends more than its produced income leading to a trade deficit.[5] Thus, an exchange rate policy is successful in improving the BOP only if it can raise the relative price of the exportables.[6]

In absence of any imported input, as in J-C model, a devaluation raises absolute price of exports and consequently the capital cost. Such increased capital cost then raises absolute price of non-tradeables so that trade balance improves only if the exportables are relatively capital intensive. This is the J-C condition.

5. For details see Caves and Jones [1973] and Jones and Corden [1976].

6. Actually, in J-C model the trade balance improves whenever devaluation raises relative price of "composite" traded good (P_T/P_N) which is also referred to as real exchange rate. But, as we have assumed away domestic production of importables, and by small country assumption, its price remains constant, so a change in relative price of exportables reflect a change in P_T/P_N in same direction and leads to a production adjustment along the production possibility frontier, and accordingly indicates change in the trade balance.

III. BOP Effects of LERMS and Devaluation

Here we consider two alternative systems which differ from each other only in respect of the use of the imported input.

A. Imported Input Used in Non-traded Good Sector

In this case the long run competitive price equations can be written as,

$$P_1 = a_{L1}\overline{W} + a_{K1}r \tag{7}$$

$$P_N = a_{LN}\overline{W} + a_{KN}r + a_{IN}P_I \tag{8}$$

where, a_{ij}'s $(i = L, K, I; j = 1, N)$ are the (flexible) input-output coefficients. Taking the percentage change forms of (7) and (8) we then obtain,

$$\hat{P}_1 - \hat{P}_N = (\theta_{K1} - \theta_{KN})\hat{r} - \theta_{IN}\hat{P}_I \tag{9}$$

where a "hat" ($\hat{}$) over a variable denotes its proportional change, i.e., $\hat{P}_1 = dP_1 / P_1$; θ_{ij} denotes the cost-share of the i-th input in the j-th sector. Eq. (9) thus gives us the general expression for the change in the relative price of exportables.

LERMS: As we move from k_0: k_M formula to the 0:100 one, the rate of return to capital (r) increases which can be calculated as,

$$\hat{r} = k_0 P_1^*(e_0 - e_M)\hat{k}_0 / \theta_{K1}P_1 > 0. \tag{10}$$

Substitution of (4) and (10) in (9) then yields,

$$\hat{P}_1 - \hat{P}_N = k_0 P_1^*(e_0 - e_M)(\theta_{K1} - \theta_{KN})\hat{k}_0 / \theta_{K1}P_1 \tag{11}$$

Therefore, the J-C condition, i.e., the exportables are relatively capital intensive, ensures that the change in the LERMS formula will raise the relative price of exportables and thus improve the trade balance.

Devaluation: Under the devaluation of currency, the change in price of export good and imported input are as given in (5) and (6). Once again there will be a corresponding increase in rate of interest:

$$\hat{r} = \gamma_0 \hat{e}_0 / \theta_{K1} \tag{12}$$

But, now the non-tradeables sector is not only hit by this increased capital

cost but also by the increased imported-input cost. The change in relative price of exportables is thus no longer determined solely by the relative capital intensities:

$$\hat{P}_1 - \hat{P}_N = \left[\frac{\gamma_0(\theta_{K1} - \theta_{KN})}{\theta_{K1}} - \theta_{IN} \right] \hat{e}_0. \tag{13}$$

Therefore, the J-C condition is no longer sufficient to guarantee a trade balance improvement following the devaluation.[7]

B. Imported Input Used in the Export Good Sector

In this case the competitive price equations can be written as,

$$P_1 = a_{L1}\overline{W} + a_{K1}r + a_{I1}P_I \tag{14}$$

$$P_N = a_{LN}\overline{W} + a_{KN}r \tag{15}$$

Again taking the percentage changes of these two we obtain,

$$\hat{P}_1 - \hat{P}_N = (\theta_{K1} - \theta_{KN}) \hat{r} + \theta_{I1}\hat{P}_I \tag{16}$$

Contrary to the previous case, any increase in the cost of the imported input now favorably affects the relative price of exports.

LERMS: Since the change in the LERMS formula does not affect price of the imported input, the change in relative price of exportables will be same as given in (11). That is, once again the J-C condition ensures a trade balance improvements.

Devaluation: A devaluation in this case, as in the previous case, raises both the capital and imported-input cost. But, as imported input now is used in the production of the traded good, devaluation might hit the non-traded good sector less severely even if it is relatively-intensive. This is evident from the following:

$$\hat{P}_1 - \hat{P}_N = \left[\gamma_0(\theta_{K1} - \theta_{KN}) + \theta_{I1}\theta_{K1} \right] \hat{e}_0 / \theta_{K1} \tag{17}$$

Hence, even if the J-C condition is not satisfied, devaluation might improve trade balance.

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7. However, it can be easily verified that if capital is immobile, the trade balance unambiguously improves even in this set up. Thus the short-run J-C result holds.

In sum, the J-C condition ensures an improvement in BOP following the change in the *LERMS* formula, *i.e.*, following the move to the unified market determined exchange rate regime, irrespective of the use of the imported input. But the BOP effect of devaluation hinges on the nature of production structure, in addition to capital-intensities of the final goods. When an imported input is used in the production of non-tradeables, the J-C condition is a necessary but not sufficient condition for trade balance improvement. On the other hand, when the imported input is used in production of exportables, the J-C condition is a sufficient but not at all a necessary condition. Therefore, the effect of devaluation becomes uncertain only when the imported input is used in production of non-tradeables or both.[8]

IV. Other Macroeconomic Consequences

On the basis of the above theoretical analysis it is also possible to point out some other macroeconomic effects of the two exchange rate policies. First of all, the general price level will rise inevitably as the exchange rate policies raise prices of both the final goods directly as well as through increased factor costs.

Secondly, given full employment of the domestic factors of production and constant money wage, LERMS and/or devaluation raises the sum of domestic factor incomes (*i.e.*, national income) by raising the return to capital. Indeed much depends on maintaining full employment of labour by concurrent fiscal policy.[9] With (downward) rigidity of the money wage as the target, the fiscal authority must see that no imbalance between demand for and supply of labour develops following the change in the LERMS formula or devaluation.

8. When the imported input is used in production of both export and non-traded good, we have,

$$\hat{P}_1 - \hat{P}_N = \left[\gamma_0(\theta_{K1} - \theta_{KN}) - \gamma_{0R}\theta_{K1}\theta_{RN} + \theta_{KN}\theta_{I1} \right] \hat{e}_0 / \theta_{K1}$$

Once again, the J-C condition cannot by itself ensure a trade balance improvement.

9. Actually, as J-C(1976) pointed out, concurrent fiscal policy largely determines the BOP effect of devaluation as well. If, for example, money wage rate is allowed to change and P_N is kept fixed, devaluation always improves trade balance. But, in that case, if non-tradeables are relatively capital-intensive, money wage rate falls.

For example, consider the case where the imported input is used in non-traded good sector. If the exportables are relatively labour intensive (opposite of the J-C condition), exchange rate policies lower relative price of exportables. Thus, while the resources move out of the export sector and enters the non-traded sector, demand switches in favor of the former. This necessitates a concurrent expansionary fiscal policy (deficit-budget) to maintain balance between demand for and supply of non-tradeables and hence full employment of labour at the targeted wage rate. Sum of factor incomes then rises.[10] But, if the fiscal authority fails to do so, the excess supply of non-tradeables persists and consequently unemployment develops. Conversely, when exportables are relatively capital intensive, an exchange rate policy must be followed by a contractionary policy whenever P_1/P_N rises to maintain full employment. With such surplus budget, the sum of factor incomes once again increases.[11]

V. Conclusion

The central message of the above analysis is that the move from dual to unified exchange rate system, an important policy adopted in India, may not have the expected effects, namely, better export performance and a BOP improvement. This can happen only if exportables are relatively capital-intensive. But without proper empirical estimates it is difficult to conclude either way *a priori*.

The analysis of devaluation, on the other hand, points out an important modification of the result derived in J-C [1976]. The paradoxical case of devaluation leading to a trade deficit can occur even if the J-C condition is satisfied, when an imported input is used in production of non-tradeables or that of both the goods.

Besides the BOP effects, both the exchange rate policies are observed to be inflationary. Also, the fiscal authority must carefully pursue an accommodating fiscal policy to avoid any unemployment following the *LERMS* or

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10. However, the increased spending, due to expansionary fiscal policy, is more than the increased national income leading to an "overspending" and a consequent trade deficit.

11. But, now the economy "underspends" and a trade surplus develops.

devaluation. But this may be in conflict with the objective of reducing budget deficit in India when exportables are relatively labour-intensive that necessitates an expansionary fiscal policy. Unemployment may, therefore, be well on the card.

Indeed the above theoretical analysis is too simple so that it would be unwise to evaluate success of *LERMS* and devaluation solely in light of this. But the main point is that even in such a simple set up, many of the expectations may be belied.

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