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*India's Trade Flows: Alternative Policy
Scenarios: 1995-2000*

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INDIA'S TRADE FLOWS: ALTERNATIVE POLICY SCENARIOS: 1995-2000

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ABSTRACT

The paper presents a moderately disaggregative model of India's trade flows covering the period 1971-91. It incorporates distinct demand-supply factors, takes into account the effect of relative prices, import tariffs, export subsidies, and levels of economic activity, and allows for adjustments in domestic prices in response to exchange rate adjustments. The model is solved forward to assess the impact on trade flows and possible policy implications under the following scenarios: (a) accelerated domestic growth, (b) depreciation of nominal exchange rate, (c) reduction in tariffs and subsidies, and (d) sustained higher world economic growth.

1. Introduction*

Perceptions regarding the role of the external sector, particularly that of trade, have been at the root of alternative views on the appropriate strategy for India's economic development. The view that this role was severely limited came to be widely held by those at the helm of policy formulation almost at the start and continued to dominate their modes of thought for nearly three decades. The explicit recognition of this view in the Second Plan began to be widely questioned only in the early eighties. The pros and cons of the resultant

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import substituting industrialization strategy were, however never subjected to rigorous empirical evaluation. The debate was largely based on predetermined ideological views of the global political economy and at best, sometimes in terms of fragmentary evidence and casual empiricism. A rigorous statistical analysis within a suitable analytical framework has till recently been conspicuous by its absence. In a marked departure from the past, a number of rigorous empirical studies on India's trade have appeared during the last decade or so. Most of these, however, fall broadly under two categories. The first consists of studies that are highly aggregative in which diverse movements of different components get considerably blurred in the totality of magnitudes. More seriously, such studies fail to be useful for policy guidance in a pragmatic way. In the second category, we have studies dealing with specific products in some detail. While such studies are useful in understanding problems at an industry level, they fail to highlight the total picture at the macro level and the linkages across sectors.

The present paper is thus aimed at filling an important gap in the literature on India's trade flows by dealing with both imports and exports at a moderate level of disaggregation within a fairly well specified analytical framework. Since our interest has mainly been to highlight the scenarios that are likely to emerge between now and the start of the next century (millinium) greater disaggregation or a more complex theoretical model was considered to be neither possible nor even necessary. As far as we are aware, this study is at present the only one which attempts to look ahead rather than just analyze the past. The task is obviously beset with many difficulties because a marked shift in the policy regime renders past data unreliable for future developments. We shall return to these issues in the subsequent pages when we consider them in some depth.

2. The Major Issues

The view that neither exports nor imports had adequately large price elasticities, for one reason or the other, provided the anchor sheet for import substituting industrialization strategy (Bhagwati and Srinivasan, 1975). It was also argued that India's domestic market was so large that unless the level of production was very high there would be little scope for increasing exports (Nayyar, 1976). Clearly, the presumption was that exports were supply constrained. A corollary of the low price elasticity hypothesis was that incentives provided by devaluation would not be of much help in promoting exports. Moreover, low price elasticities meant that even if the volume of exports increased revenues in dollar terms could even go down.

A second argument supporting export pessimism has been that demand for the bulk of India's exports, which were agro based, was unlikely to increase even as the world income grew at an adequate pace. This "composition" disadvantage is rooted in the assumption of a low income elasticity of demand. Another closely related argument rests on the empirical observation that in international markets, the terms of trade have secularly turned against developing countries by virtue of the composition of their exports and imports.

The consideration that trade and aid relations are not independent of global political alignments in a divided world further strengthened the view that prospects for export expansion were bleak for a non-aligned country. Other arguments like discriminatory quota restrictions on various grounds often provided a political economy backdrop to this debate. Quite clearly, if there is limited scope for expanding exports the ability to import is equally limited. Import substituting industrialization is thus an obvious corollary if the thesis of export pessimism is accepted.

Looking ahead we need to take account of two major changes that are very relevant in the present context. *First*, the global power structure has undergone a sea change with the result that India like most other countries has to fend for itself in the world markets in a harder, more innovative and strategic manner. *Second*, the domestic policy regime has shifted drastically - relying more and more on domestic and international market forces.

Under the emerging new regime of domestic policies and of developments in the world economy, we believe that issues of immediate interest would be the extent to which trade flows and prices will respond to acceleration in the rate of growth in domestic activities, shifts in relative prices brought about through changes in the nominal exchange rate, reduction in tariffs on imports and subsidies for exports, and finally a faster and sustained growth of the world economy.

Though the new policies were explicitly introduced only in 1991-92 and now cover in varying degrees all segments of the economy, these are not entirely new as far as trade is concerned. Some bits of liberalization have been in place since the early eighties and more significantly since the mid-eighties as far as trade is concerned. It is perhaps also true that during the seventies too the grip of import substituting industrialization strategy was not as stringent as it was during the fifties and the sixties. With this, we believe that data for seventies and eighties are capable of giving us considerable insights into the issues we are focusing on. Some biases may persist but these can be taken care of with judicious adjustments in the results we obtain.

3. Empirical Evidence and Policy Implications

Most empirical studies as well as policy debates have largely focused on the role of prices in determining trade flows and thereby, trade balance. Literature is replete with widely contrasting views on both empirical evidence as well as on the policy implications. Since the literature spanning three decades is vast, it is neither necessary nor feasible to present a comprehensive survey.¹ We shall therefore only selectively consider some of the recent studies. In a typically pessimistic view of the prospects for improvement in trade performance by virtue of liberalized exchange rate management, for instance, Sarkar (1992) argues that depreciation of the exchange rate since 1971 has led to no acceleration of exports, the current policies will only make the situation worse. This is based on a disaggregative trend analysis of four components of exports covering SITC groups 0 and 1, 2 and 4, 3 and 5-9. Since this analysis does not consider either a structural model or a reduced form nor adjust prices for exchange rate changes, its results cannot be taken at their face value. Ghosh (1990) takes a similar view but with greater moderation and rather persuasively. Her main contention that exclusive reliance on exchange rate adjustment will not ensure an adequate growth of exports is by itself quite plausible. What supplementary policies need to be incorporated is, however, not at all free of controversies. For instance, what Reidel, Hall and Grawe (1984) have brought out much earlier in this regard would hardly be acceptable to many critics of India's policy of trade liberalization. Their contention that prospects for trade performance cannot be seen in isolation of industrial reforms and that the structure of domestic markets has to be oriented towards the needs of an open economy appears to us quite right.

As regards rigorous empirical studies in recent years, we have already mentioned that these fall in two categories. The first one dealing with specific commodities includes the studies by Lucas (1988) and Rajaraman (1991). The former analyses the behaviour of exports of 23 manufactured commodities and finds that the price elasticities of the export demand for these commodities varies very widely implying that aggregative analysis can be misleading. In fact many of the commodities analyzed exhibit large price elasticities contrary to what aggregative studies show. Rajaraman (1991) similarly considers exports of specific manufactures by specific destinations and shows real bilateral exchange rate

¹ A comprehensive documentation of early debate is to be found in Bhagwati and Srinivasan (1975) who have consistently criticised import substituting industrialization strategy. For a different view on exports, see Nayyar (1976).

having a significant effect on exports. Almost all these studies go only upto the mid-eighties. Since then, exports have presumably grown even more responsive to prices and exchange rate.

In the second category, two of the recent studies which are generally comparable to the present one are those by Virmani (1991), and Patra and Pattanaik (1994). Both of these studies model the behaviour of imports as well as exports. Also, unlike the studies undertaken in the sixties and the seventies, they clearly distinguish between demand and supply. Virmani deals separately with manufactures and primary commodities whereas Patra and Pattanaik deal only with aggregate exports and imports. While the former covers the period 1973-74 through 1986-87, the latter has a longer sample period at both ends spanning 1970-71 through 1992-93. Virmani's analysis strongly refutes the price elasticity pessimism - giving a considerable effectiveness to the real exchange rate adjustment policies. The result of Patra and Pattanaik are less equivocal in so far as they show that the benefits of devaluation are only partially passed on to importers of Indian products. We shall return to these two studies in the subsequent sections.

4. Model Specification

In many ways the analytical and empirical methodology followed in this paper is an extension of an earlier study by one of us (Pandit, 1986). The analytical model in its essentials is indeed quite simple and fairly close to the one employed by Khan (1974). Our prime objective has been to clearly distinguish between the demand and supply functions² so that effectiveness of policy changes is clearly understood. In formulating the structural models we are, by and large, guided by the "small country" view of India in the international markets. This is believed to be right for most products³. Consider exports first. For the volume of the *i*th category of exports, we specify the demand and supply functions respectively as:

$$ZEX_i^d = f [ZGDPW, EXUV_i / (RSUS * WEUV_i)]$$

(+) (-)

and

$$ZEX_i^s = h [ZGDP_i / ZGDP, EXUV_i (1 + S_i) / WP_i]$$

(+) (+)

² It has rightly been pointed out (Joshi and Little, 1994) that many econometric studies till recently have used confusing relationships which are neither structural equations nor reduced forms.

³ See Lucas (1988).

The world demand for our exports (volume) is determined by world real GDP (ZGDPW), the unit value of exports (EXUV_i) relative to international unit value index (WEUV_i) which is in dollars, multiplied by the exchange rate (RSUS) which is rupees per dollar. The second variable is thus the appropriate relative price and equivalent to the real exchange rate relevant to a particular set of products. Similarly, the supply function for *i*th category of exports (volume) is determined by physical supply-demand balance of that commodity in the domestic market and the appropriate relative price. The former is measured in terms of the output in the appropriate sector (ZGDP_i) relative to total real GDP (ZGDP), a proxy for overall demand⁴. The second argument in the supply function is the unit value index of exports (EXUV_i) inclusive of the ad valorem subsidy⁵(S) relative to the appropriate price level in the domestic markets (WP_i). Quite clearly this variable reflects incentive to export rather than sell in the domestic market. Given international prices, export subsidy and import tariffs, higher domestic prices reflect to some extent supply-demand imbalance in the home market.

For estimation we renormalize the supply relation, treating the export price, inclusive of subsidy, as the dependent variable. We also add lagged dependent variables as explanatory variables, whenever necessary, to allow for slow adjustment. Thus typical demand supply equations as estimated in equilibrium ($ZEX_i^d = ZEX_i^s = ZEX_i$) would look as follows:

$$ZEX_i = \alpha_0 + \alpha_1 ZGDPW - \alpha_2 EXUV_i / (RSUS * WEUV_i) + \alpha_3 ZEX_i (-1)$$

$$EXUV_i(1+S_i) = \beta_0 + \beta_1 ZEX_i - \beta_2 ZGDP_i / ZGDP + \beta_3 WP_i + \beta_4 EXUV_i (-1)$$

(All variables are measured in the logarithmic scale).

Notice that the supply function as specified incorporates both domestic availability relative to demand as well as the domestic price effects. This reflects that in a fix price set-up, price rigidities may prevent supply-demand imbalances to get fully reflected in prices. The model as it stands is capable of giving rise to both supply constrained as well as demand constrained situations depending on the magnitudes of price elasticities.

With regard to imports, the specification of demand and supply functions is easier by virtue of the fairly justifiable small economy assumption. India is a price taker so far

⁴ Compare this to Virmani's specification in which rainfall is taken to capture demand and real GDP supply.

⁵ Virmani specified subsidy as a separate argument but failed to get a significant coefficient for it.

as imports are concerned. It can only adjust these in terms of domestic currency by changing the exchange rate. Thus, the supply of imports is infinitely elastic⁶. The demand function is specified in terms of import price ($IMUV_i$) relative to the corresponding domestic price (WP_i), domestic level of activity which is captured by real GDP i.e., $ZGDP$ ⁷. The supply function which merely explains supply price of imports ($IMUV_i$) in domestic currency in terms of the international prices ($IMUVW_i$) in dollars, and the exchange rate ($RSUS$). Prima facie one could merely set this up as an identity but due to some degree of mismatch in data arising from coverage of items and calendar year versus financial year, the relation has to be estimated. Thus, allowing for lagged adjustments we have a two equation set-up for import volumes for the i th category given by:

$$ZIM_i = f [ZGDP, IMUV_i/WP_i, ZIM_i (-1)]$$

(+) (-) (+)

$$IMUV_i = h [RSUS, IMUVW_i, IMUV_i (-1)]$$

(+) (+) (+)

It may be worth noting here that in earlier similar studies⁸ we used to specify the stock of foreign currency reserves deflated by import unit value index as a determinant of the volume of imports. The justification for this was that under the erstwhile policy regime, imports were rationed according to priorities and in doing so foreign currency reserves served as a budget or resource constraint. In the present exercise this has been avoided to take account of the new policy environment. Also, the foreign exchange constraint during a large part of seventies and eighties compared to the earlier two decades has been less stringent due to foreign exchange inflows from non resident Indians, among others.

Finally, a distinguishing feature of this study is that it incorporates the effect of exchange rate variations on domestic prices so as to examine more comprehensively the 'exchange rate pass through' phenomenon. To the extent that Patra and Pattanaik (1994) do not explicitly recognise this, the treatment of the phenomenon is partial in their study. Virmani (1991) surprisingly ignores this factor altogether which leads him to rather exaggerated view of the effectiveness of exchange rate policies.

⁶ Compare this to specification of import supply function by Patra and Pattanaik (1994) which violates the small economy assumption.

⁷ Alternatively, domestic capital formation may be more relevant, in some cases.

⁸ See for example Pandit (1986).

5. The Structural Model

Before we highlight the salient features of the estimated structural model, given in annexure A, a few points need to be clarified for a better understanding of the ensuing results. *First*, the sample period for this exercise was chosen to be financial years 1970-71 through 1990-91. The choice of the terminal year is simply dictated by the fact that complete data set at the chosen level of disaggregation is available only up to that year. The initial year was selected because we believe that it was only from that year onwards that exchange rate was allowed to depreciate and for some other reasons prices gradually started playing some role in influencing trade flows.

All the same it is well known that a variety of non-price ad hoc influences continued to get imposed on rational, market oriented behaviour of trade flows. Rupee trade agreements with countries in Eastern Europe, foreign currency resource crunch in some years, lobbying by pressure groups, oil shocks, political considerations particularly during election years, vagaries of weather and erratic developments in international markets to which the economy could not quickly adjust are some of the factors that have remained important. Since our interest has been to get at a model that may more accurately reflect behaviour under the new policy regime, we have deliberately used a rather large number of dummy variables to isolate factors which are less likely to be important under the new policy regime. However, be it noted that introduction of these dummy variables have never changed the sign of the estimated parameters and only marginally altered their magnitude. In some cases, they have led to an increase in the associated t-statistic by improving goodness of fit.

Second, the present model of trade behaviour is embedded in a larger economy wide model (Krishnamurty and Pandit, et al., 1994) consisting of over 200 equations. Many variables which have been treated here as exogenous are actually endogenous in the larger model. This has some implications about how policy simulations can be carried out which will be taken up later.

Third, since variables pertaining to the domestic economy are on a financial year (April through March) basis and those relating to the international markets (e.g., world GDP) are on a calendar year basis, the latter have often been given a one period lag; the actual lag being only one quarter.

Fourth, both imports and exports are disaggregated into four groups as follows:

Group 1: SITC categories 0 and 1 which largely consist of food articles.

Group 2: SITC categories 2 and 4 which include raw and semi processed materials.

Group 3: SITC categories 3 which consists of petroleum and related (POL) products.

Group 4: SITC category 5 to 9 which are a variety of manufactures.

Imports of SITC category 2 and 4 are given separate treatment particularly because of animal and vegetable oils etc. (SITC 4) have specific domestic factors, such as oilseeds production, having an important role in influencing their imports. Since India's export of POL products is minuscule and erratic, we take them to be exogenous and their unit value merely equal to the international prices of such products in terms of dollars. The structural model consists of 43 equations of which 19 are behavioural relationships and 24 are definitional and other identities. Their distribution is given in Table 1 below.

Table: 1
Size of the Model

Block	Total Number of Equations	Behavioural Equations	Identities
Exports	16	7	9
Volume	4	3	1
Price	6	4	2
Value	6	-	6
Imports	21	10	11
Volume	7	5	2
Price	9	5	4
Value	5	-	5
Trade Balance	2	-	2
Domestic Prices	4	2	2
Total	43	19	24

Note: * one additional equation for index of exchange rate is not counted in the total number of equations.

Since we have only about 20 observations and far too many exogenous variables, the use of either 2SLS or 3SLS estimation procedures has not been possible. Our reliance on OLS estimation in some cases incorporating the Cochran-Orcutt procedure to take care of serially correlated errors has thus been unavoidable. How seriously this affects the accuracy of our results is hard to know, but OLS estimation in the context of large models is believed to be quite robust.

Along with the estimated equations given in annexure A we provide all conventional summary statistics including Durbin's h-statistic wherever relevant. From these we see that

each equation appears to be well estimated in terms of goodness of fit as well as signs and statistical significance of the individual coefficients. Finally, each equation is estimated in the log-linear form so that coefficients are elasticities. However, the equations for domestic price formation are estimated in linear form.

Turning now to the economic significance of the estimated relations, let us consider exports first (equation 1 through 7). For group 1 which consists of food articles etc., (SITC 0 and 1) we have used the world market unit value for food articles as the competing price in the demand function⁹. The short run elasticity of demand with respect to the relative price (or, the relevant real exchange rate) is about 0.52 whereas the long run elasticity is approximately 0.75. In explaining the supply price for this group of commodities the volume of exports works only with a lag. Also, its coefficient is neither statistically very significant nor numerically large. We can, therefore, infer that the supply function is more or less infinitely elastic with respect to international price and supply price is strongly influenced by the domestic price of food articles. The relevant elasticity is about 0.65 in the short run and nearly unity in the long run. Thus, movements in the domestic prices are eventually more or less fully passed on to the international markets.

For group 2 products (SITC 2 and 4) the relative price elasticity of demand is statistically significant but numerically low. There are no lagged effects so that elasticities in the long run are the same as in the short run. Also for this group of products elasticity with respect to world output (ZGDPW) is not statistically significant nor numerically large. Supply is infinitely elastic, with supply price strongly determined by the domestic price of non-food agricultural products. While the short run elasticity is approximately 0.4, the long run elasticity is in excess of unity.

For group 4 products i.e., manufactures (SITC 5 to 9) which constitute the bulk of India's exports, relative price elasticity of demand is 0.48 in the short run but in excess of 2 in the long run. Elasticities with respect to the real world income (ZGDPW) are of the same magnitude. As far as supply decision is concerned, it is important to note that the relevant price is the unit value index inclusive of export subsidy namely EXP59 which is

⁹ This as well as the world GDP had to be specified with lag of one period because, as stated earlier, while domestic economy variables pertain to April of last year to March this year, variables for rest of the world are from January to December this year. Thus, one period lag amounts to only a one quarter lag. This must be noted for each equation in the model.

equal to $EXUV59 (1 + SREX59/100)$. This formulation was also successfully used earlier by Malik (1994). We assume that the entire subsidy amount is allocated to export of manufactures. This is not entirely correct but not misleading either because the lion's share of such subsidy goes to this group of exports. This price is related, for given subsidy rates, to domestic price of manufactures (WPMN) and domestic supply-demand balance¹⁰ captured by index of industrial production (IPMN) relative to real GDP (ZGDP). The elasticity with respect to domestic prices is as high as 0.94. The coefficient of the volume of exports is close to 0.5 implying a price elasticity of supply equal to 2.

We present the various elasticities for exports and imports in Table 2 below. Since exports of SITC 3 (POL products) are exogenous, they are excluded.

Table 2
Estimated Price Elasticities of Export and Import Volumes

Product Group	Exports				Imports	
	Demand		Supply		Demand	
	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
SITC 01	-0.52	-0.73	5.54	3.60	-1.38	-1.38
SITC 2	-	-	-	-	-1.28	-1.28
SITC 3	-	-	-	-	-0.11	-0.60
SITC 4	-	-	-	-	-1.03	-5.96
SITC 24	-0.21	-0.21	∞	∞	-	-
SITC 59	-0.48	-2.22	2.03	2.03	-1.04	-1.04

Let us now consider imports which are dealt with in equations 8 through 17. As mentioned earlier, the small economy assumption implies that supply is infinitely elastic. Hence we simply relate unit values of imports in rupees to the corresponding international unit value and the exchange rate. Use of definitional identities is not possible because while one is for calendar year, the other is for financial year. Also, there is no perfect matching between the two sets of unit value indexes.

In explaining import volume demand we use the appropriate relative prices and domestic activity levels. Some additional quantity variables are also included to supplement price effects. For group 1 (SITC 0 and 1) short and long run price elasticity is about -1.4. Response to real GDP and domestic output of agricultural products is also very strong. For SITC 2 also the price elasticity is -1.3. The price elasticity for SITC 4 is almost equal to unity. An important feature of results for this group of products is that domestic production

¹⁰ The presumption as mentioned earlier is that prices do not fully reflect this balance.

of oilseeds have strong negative impact on imports. Understandably, price elasticity is quite low for POL products (SITC 3) in the short run but relatively large in the long run. Elasticities with respect to domestic economic activity, manufacturing output and real GDP are also large for SITC 2 and SITC 3. A distinct aspect of the result for imports of SITC 3 is that domestic production of crude oil influence imports inversely.

For import volume of manufactures elasticity with respect to price as well as activity levels are nearly unity. This class of imports are heavily influenced not only by manufacturing output but also by real capital formation for obvious reasons. It is important to note here that for POL products and manufactures the relative prices are adjusted for import duties.¹¹ The assumption is, as explained earlier, that all duties are imposed only on these two kinds of products. The motivation for this is that these two components account for an overwhelming proportion of total imports. The tariff rates are computed by dividing the same total customs revenue by the value of imports under the two categories. We do not consider that this is likely to distort our results in any serious way. Ignoring tariffs altogether would have been clearly more misleading.

Finally, a distinctive feature of this exercise is that it incorporates the effects of exchange rate changes and international prices on domestic prices. Domestic price of manufactures is influenced by overall import prices and energy-mineral related administered prices, among others. Further, administered prices are affected by import prices of POL products and lagged wholesale price for all commodities. This could be viewed as a reaction function in fixing administered prices. As we see in equations 18 and 19, these effects are fairly significant and coupled with upward sloping supply functions prove to be considerably important.

6. Model Validation

Model validation exercise has been split into two parts. First we check how well it captures movements during the second half of the sample period¹² namely, 1980 through 1991. Next we solve the model beyond the sample period upto 1995 with 1989 as the initial year. Since the sample period is 1971 through 1991, the second solution covers four years namely 1992, 1993, 1994 and 1995 beyond the sample period.

¹¹ See equations 12, 16, 29 and 30, and variables IMP3 and IMP59.

¹² Years refer to financial years ending March; say 1971 corresponds 1970-71.

Table 3 below gives a distribution of variables by the magnitude of root mean squared percentage error (RMSPE). By conventional standards this table does not appear to be very impressive. Of the 35 endogenous variables considered for this exercise, only 6 have RMSPE less than 5 per cent. Another 17 have RMSPE in excess of 5 per cent. However, most of the variables for which this error exceeds 10 per cent are either values of differences or those with small magnitudes. In all such cases the error in per cent terms tends to get unduly magnified. It is also important that our focus is primarily on total trade flows, and total unit values namely ZEX09, EXVV09, EX09, EX09 \$, ZIM09, IMUV09, IM09 and IM09 \$. Of these eight variables three have RMSPE below 5 per cent and the other five a bit above 5 per cent. Moreover for most variables the model is able to pick up major turning points.

Table: 3

Historical Validation, 1980-91: Frequency Distribution of Root Mean Square Error for Some Important Variables

Root Mean Square Error (RMPSE)	Frequency	Variable		
		Quantities	Price	Value
0-5	6	ZEX24 ZEX09 ZIM3	EXUV09 IMUV09 IMUV59	
5-10	17	ZEX01 ZEX59 ZIM09 ZIM59 IMUV3	EXUV01 EXUV3 EXUV59 IMUV2 EX24	EX01 EX3 EX09 EX09 \$ IM3 IM09 IM09 \$
10+	12	ZIM0 ZIM2 ZIM4	1IMUV01 IMUV4	EX59 IM01 IM2 IM4 IM59 TB Rs. TB \$
Total	35	10	10	15

Note: (i) Dynamic simulation results.

$$(ii) \quad RMSPE = \left[\frac{1}{T} \sum_{t=1}^T \frac{(F_t - A_t)^2}{A_t^2} \right]^{1/2} * 100$$

Where A actual and F is simulated values

With regard to the second exercise depicting the performance of the model beyond the sample period for the four years 1992 through 1995, we carry out two exercises. In the first one, the model is solved routinely as it has been estimated. In the second we tune the model by incorporating whatever additional information like the import compression in 1992. However, in both cases the model performs quite well for two years 1992 and 1993 for all variables (Tables 4 and 4a)¹³. We are in particular concerned here with nominal exports, nominal imports and trade balance - all in US dollars. While exports are under predicted for 1995, imports are over predicted for the year 1994 as well as 1995. Consequently, the trade deficit is over predicted for the years, 1994 and 1995. On the other hand, the tuned forecasts are fairly close to the actual values for all three variables as shown in charts 1 to 3 (also, see Table 4a). It is also important to note in this context that our information is rather tentative for many of the exogenous as well as endogenous variables beyond the sample period. With that we cannot be absolutely sure of the manner in which prediction errors in non-stochastic simulations can be attributed to imprecision of the model or to that of exogenous variables.

7. Simulations for Policy Inference

Since the structural model appears to be fairly robust we subject it to a few simulation exercises in order to elicit some possible policy implications. Primarily, we are interested four questions. These are as follows:

- (a) *If domestic economic growth accelerates as expected, how are trade flows likely to behave; in particular, what will be the dimension of the trade deficit.*
- (b) *How and in what manner would depreciation of nominal exchange rate be effective in narrowing the trade deficit.*
- (c) *How far can export subsidies and/or import duties be substituted by depreciation of nominal exchange rate.*
- (d) *To what extent will sustained world growth at a higher level benefit Indian economy.*

¹³ Text tables relating to various simulations viz., 4 through 12 present per cent deviations of forecasts from actual or controlled simulations from chosen base line simulations. Tables in Annexure B, provide level and growth rate of endogenous variables for various simulations.

Table: 4
Validation Beyond Sample Period: 1992-95

Year	ZEX09		EXUV09		EX09		ZIM09		IMUV09		IM09	
	A	F	A	F	A	F	A	F	A	F	A	F
1991	122.8	119.9 (-2.36)	265.2	258.6 (-2.49)	325.6	310.0 (-4.79)	209.5	211.9 (1.15)	206.2	207.6 (0.68)	431.9	440.0 (1.88)
1992	132.9	134.0 (0.83)	331.4	326.3 (-1.54)	440.4	437.1 (-0.75)	201.3	211.0 (4.82)	237.7	250.6 (5.43)	478.5	528.8 (10.51)
1993	146.8	146.4 (-0.27)	365.7	391.3 (7.00)	536.9	573.0 (6.72)	245.6	227.5 (-7.37)	256.1	292.5 (14.21)	629.2	665.4 (5.75)
1994	NA	153.2	NA	440.4	697.5	674.7 (-3.27)	NA	265.7	NA	309.2	723.2	821.5 (13.59)
1995	NA	155.9	NA	486.0	822.6	757.5 (-7.91)	NA	316.0	NA	324.3	886.2	1024.9 (15.65)

Table: 4 Cont...

Year	TB Rs.		EX09 \$		IM09 \$		TB \$		WPMN		WP	
	A	F	A	F	A	F	A	F	A	F	A	F
1991	-106.4	-129.9	18.14	17.28 (-4.74)	24.07	24.52 (1.87)	-5.93	-7.24	182.8	182.2 (-0.33)	182.7	181.1 (-0.88)
1992	-37.8	-91.6	17.87	17.86 (-0.06)	19.41	21.6 (11.28)	-1.55	-3.74	203.4	213.5 (4.97)	207.8	215.4 (3.66)
1993	-96.3	-92.3	18.54	19.91 (7.39)	21.88	23.11 (5.62)	-3.45	-3.21	225.6	238.5 (5.72)	228.7	240.3 (5.07)
1994	-33.5	-146.8	22.17	21.51 (-2.98)	23.21	26.19 (12.84)	-1.07	-4.68	243.2	257.9 (6.04)	247.6	258.1 (4.24)
1995	-63.6	-267.4	26.22	24.15 (-7.89)	28.25	32.67 (15.65)	-2.03	-8.52	266.5	280.4 (5.22)	274.1	285.1 (4.01)

Note: A: Actual; F: Forecast; NA: Not Available; Figures in parentheses are percentage deviation of forecast from actual.

Table: 4a
Validation Beyond Sample Period: 1992-95

Year	ZEX09		EXUV09		EX09		ZIM09		IMUV09		IM09	
	A	F	A	F	A	F	A	F	A	F	A	F
1991	122.8	128.8 (4.89)	265.2	267.4 (0.83)	325.6	328.2 (0.80)	209.5	205.5 (-1.91)	206.2	210.3 (1.99)	431.9	432.2 (0.07)
1992	132.9	133.2 (0.23)	331.4	330.6 (-0.24)	440.4	440.3 (-0.02)	201.3	204.8 (1.74)	237.7	245.8 (3.41)	478.5	503.2 (5.16)
1993	146.8	145.9 (-0.61)	365.7	380.8 (4.13)	536.9	555.5 (3.46)	245.6	249.2 (1.47)	256.1	253.7 (-0.94)	629.2	632.1 (0.46)
1994	NA	155.5	NA	442.6	697.5	688.2 (3.46)	NA	264.7	NA	270.5	723.2	716.0 (-1.00)
1995	NA	165.0	NA	996.0	822.6	688.2 (-0.40)	NA	299.9	NA	298.4	886.2	895.0 (0.99)

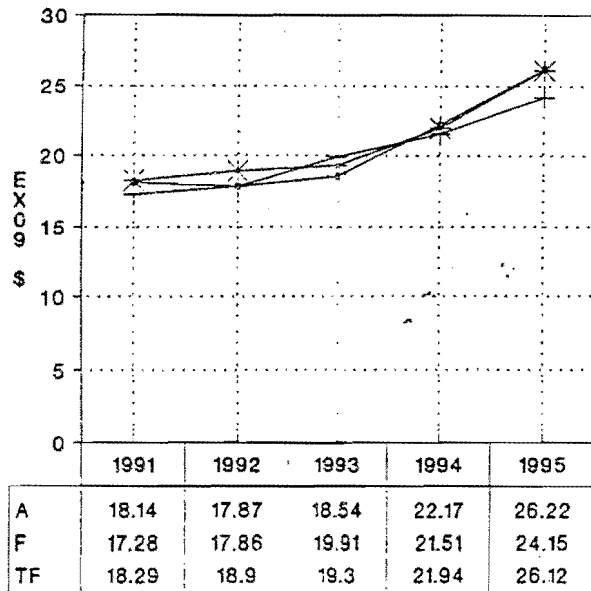
Table: 4a Cont....

Year	TB Rs.		EX09 \$		IM09 \$		TB \$		WPMN		WP	
	A	F	A	F	A	F	A	F	A	F	A	F
1991	-106.4	-104.0	18.14	18.29 (0.83)	24.07	24.09 (0.08)	-5.93	-5.8	182.8	210.3 (-1.99)	182.7	181.1 (-0.88)
1992	-37.8	-62.9	17.87	18.90 (5.76)	19.41	20.56 (5.92)	-1.55	-2.57	203.4	245.8 (3.41)	207.8	215.4 (3.66)
1993	-96.3	-76.6	18.54	19.30 (4.10)	21.88	21.96 (0.37)	-3.45	-2.66	225.6	253.7 (-0.94)	228.7	240.3 (5.07)
1994	-33.5	-27.7	22.17	21.94 (-1.04)	23.21	22.82 (-1.68)	-1.07	-0.88	243.2	270.5 (6.04)	247.6	258.1 (4.24)
1995	-63.6	-75.7	26.22	26.12 (-0.38)	28.25	28.53 (0.99)	-2.03	-2.41	266.5	280.4 (5.22)	274.1	285.1 (4.01)

Note: A: Actual; F: Forecast; NA: Not Available; Figures in parentheses are percentage deviation of forecast from actual;

*: with tuning the model for directly Non-measurable policy changes and other factors.

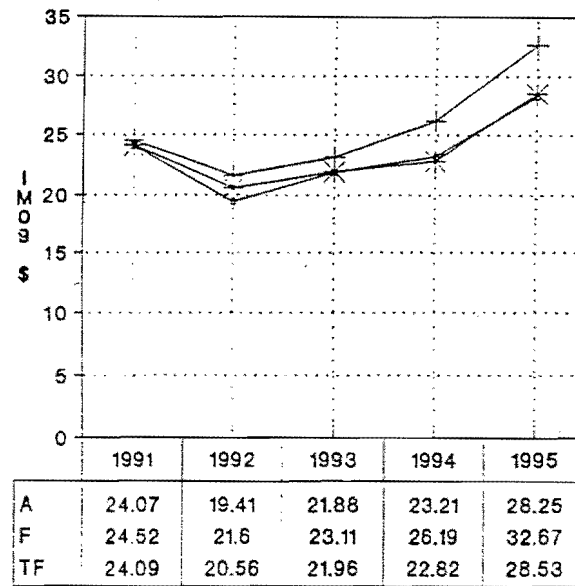
Chart 1
Nominal Exports US \$ Billion



—○— A — F * TF

A:Actual; F:Forecast; TF:Tuned Forecast

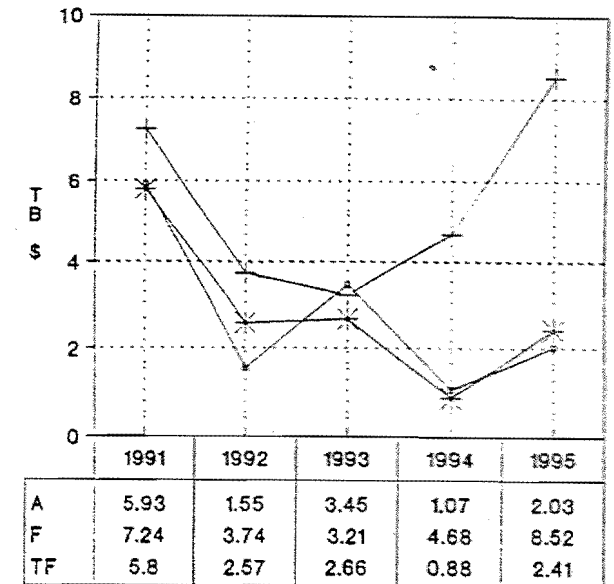
Chart 2
Nominal Imports US \$ Billion



—○— A — F * TF

A:Actual; F:Forecast; TF:Tuned Forecast

Chart 3
Trade Deficit US \$ Billion



—○— A — F * TF

A:Actual; F:Forecast; TF:Tuned Forecast

To carry out these exercises, the model has been solved for the five year period 1996 through 2000. Before undertaking the necessary simulations the model has been tuned and calibrated as indicated earlier. In this way we ensure that we start with initial values which have taken account of important developments that are not part of the model¹⁴. This way we also provide reasonably precise initial conditions. Second, and more important a mild exponential trend with 3 per cent growth rate has been added to export demand (volume) function for raw and semi processed materials (SITC 24) and manufactures (SITC 59). This has been done to reflect the recent change in trade and industrial reforms which in the present context should result in such things as quality improvements, efficient market penetration and improved foreign consumer interest in Indian products.

As we have mentioned earlier we must now come back to the fact that the sub model under analysis here is a part of a larger economy wide model consisting of over 200 estimated behavioural/technological relationships and accounting/ definitional identities. We have first solved the entire model for the period 1995 through 2000 under certain assumptions explained elsewhere (Krishnamurty, Pandit, et al. 1995). For all variables exogenous to the trade sub model but endogenous to the complete model (e.g., real gross domestic product), we take the forecast values as given while carrying out the various simulations exercises. For variables that are exogenous to the complete model we retain the assumption underlying the forecasts. However, departures from these assumptions are explicitly stated as we go along. Here let it be noted that the forecast solution which sometimes serves as a reference is designated as Sim O. Similarly, other solutions are designated as Sim B, C, D, E, F, G, H, I, J, K, and L. In all these simulations rainfall is assumed to be normal for the years 1996-2000. These are described briefly as follows. For more details see annexure B. Assumed forecast and other values for all exogenous variables are also given in the same annexure (Table 1B).

Sim O: Exogenous variables as in March 1995 economy wide model forecast and assumptions.

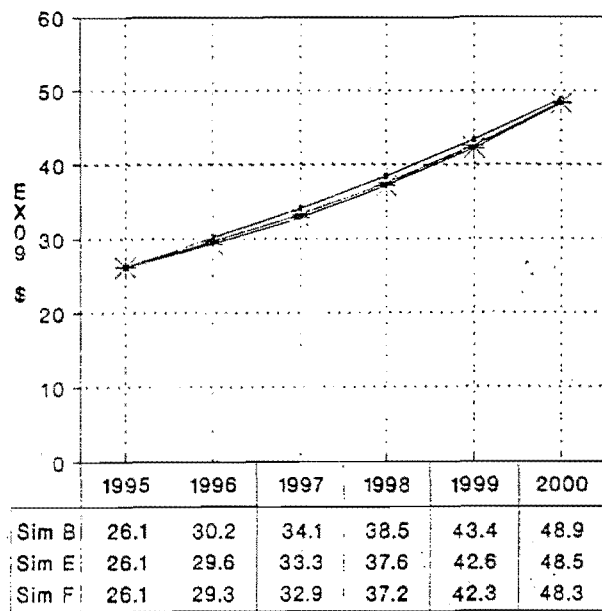
Sim C: Same as Sim O except real GDP grows at 5 per cent per annum and exchange rate rupees per US dollar (RSUS) held at its 1995 level.

¹⁴ For explanation and application of this methodology see, Adams and Klein (1991), Christ (1976), Klein (1983 and 1991).

- Sim D:* Same as *Sim O* except real GDP grows at 8 per cent per annum and RSUS held at its 1995 level.
- Sim B:* Same as *Sim O* except RSUS held at its 1995 level.
- Sim E:* Same as *Sim O* except RSUS goes up at 5 per cent per annum.
- Sim F:* Same as *Sim O* except RSUS goes up at 7.5 per cent per annum.
- Sim G:* Combines *Sim C* and *Sim E*.
- Sim H:* Combines *Sim D* and *Sim F*.
- Sim I:* Same as *Sim O* except import tariff rates cut to half from their 1995 levels and RSUS goes up at 7.5 per cent per annum.
- Sim J:* Same as *Sim O* except export subsidy rate set at zero and RSUS goes up at 7.5 per cent per annum.
- Sim K:* Combines *Sim I* and *Sim J*.
- Sim L:* Same as *Sim O* except world real GDP rises at 5 per cent per annum and RSUS held at its 1995 level.

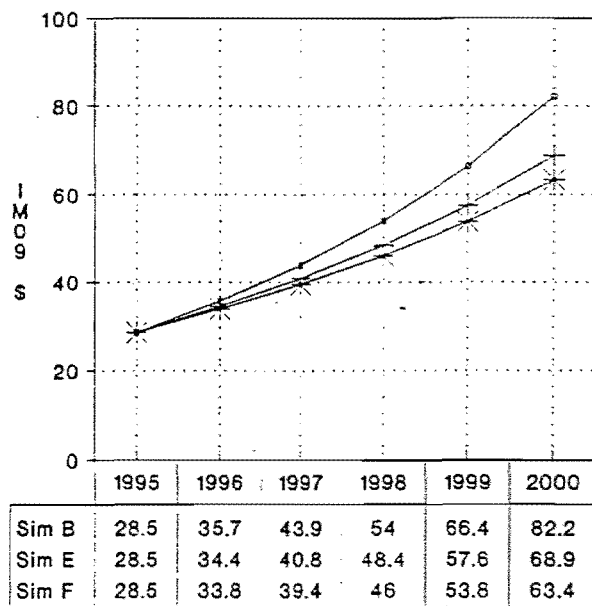
Clearly simulations B, E and F bring out the effect of changes in exchange rate and hence the effectiveness of exchange rate adjustments. Here it must be noted that simulation O assumes increase in the exchange rate fairly close to 5 per cent per annum. Hence it is not very different from E. Charts 4 to 6 show nominal exports, imports and trade deficit (all in US dollars) for simulations E and F along with B in which exchange rate is held constant at its 1995 level. The striking feature of these solutions is that export earnings in dollars more or less stay about the same level for all years in all three cases. If anything, they show a slight decline in response to depreciation of the rupee. On the other hand the response of imports is striking for all years - a sizeable reduction in response to devaluation. The former result must be attributed to the feedback effect of devaluation on domestic prices, which works through energy and mineral related prices in addition to that on the rupee value of world prices. Also, we have strongly upward rising supply curves for manufactures which weaken the effectiveness of devaluation. Note that Virmani (1991) neither finds supply elasticities to be large nor allows for the feedback effects of devaluation on domestic prices. With these limitations of his analysis, his results tend to exaggerate the effectiveness of exchange rate adjustment. Note however, that in all simulations devaluation (i) raises both volume, unit value of exports in domestic currency as well as the rupee value

Chart 4
Nominal Exports US \$ Billion



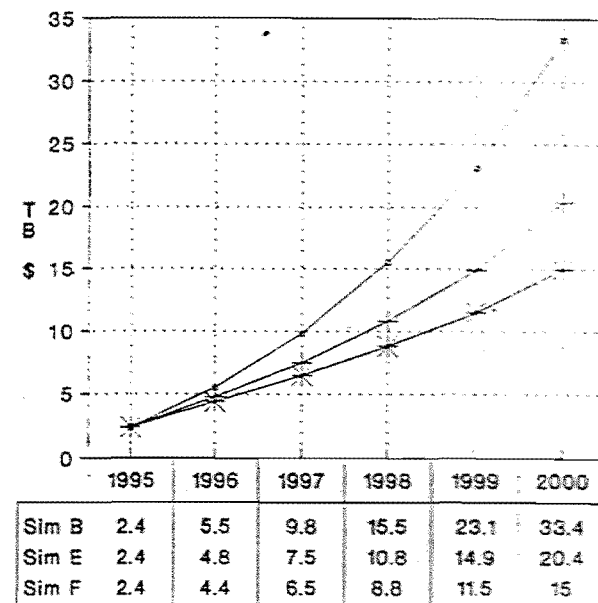
—○— Sim B — Sim E * Sim F

Chart 5
Nominal Imports US \$ Billion



—○— Sim B — Sim E * Sim F

Chart 6
Trade Deficit US \$ Billion



—○— Sim B + Sim E * Sim F

exports significantly which are accompanied by increased prices of manufactures and wholesale prices of all commodities; (ii) exports in dollars show some decline; (iii) import volumes gets depressed; (iv) import unit values in domestic currency go up; (v) import values in domestic currency increase; (vi) trade deficit in domestic currency narrows; (vii) import value in dollars is compressed and finally trade deficit in dollars reduces as import compression is relatively much higher than the decline in exports (Table 5). Thus, we see that with the system left to itself an exclusive reliance on price adjustments will have no effect on export earnings in dollars. There will however, be compression of imports and hence a reduction in trade deficit but this could also have adverse effects on domestic industrial production not incorporated here. In any case the important upshot is that the macro level policies cannot go far enough in the absence of micro level policies for quality improvements, increased efficiency and cost reductions which get reflected in export prices and better marketing etc.

Table 5
Exchange Rate Depreciation

In Per Cent

Year	ZEX09					EXUV09					EX09				
	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)
	B	B	B	C	D	B	B	B	C	D	B	B	B	C	D
	(1)					(2)					(3)				
1996	1.6	1.6	2.3	1.6	2.3	1.4	1.4	2.1	1.4	2.1	3.1	3.0	4.5	3.0	4.5
1997	3.3	3.9	5.8	3.9	5.8	3.0	3.5	5.3	3.5	5.3	6.5	7.5	11.4	7.5	11.4
1998	5.1	6.6	9.9	6.6	9.9	4.7	6.1	9.2	6.1	9.3	10.1	13.1	20.1	13.1	20.1
1999	7.9	9.7	14.7	9.7	14.6	7.3	8.9	13.6	8.9	13.7	15.8	19.5	30.3	19.5	30.3
2000	11.3	13.1	19.9	13.2	19.9	10.2	11.9	18.4	11.8	18.5	22.7	26.6	42.0	26.5	42.0

Year	ZIM09					IMUV09					IM09				
	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)
	B	B	B	C	D	B	B	B	C	D	B	B	B	C	D
	(4)					(5)					(6)				
1996	-2.1	-2.0	-3.0	-2.0	-3.0	3.4	3.2	4.8	3.2	4.8	1.2	1.1	1.7	1.2	1.7
1997	-4.3	-4.9	-7.1	-4.9	-7.1	6.6	7.7	11.6	7.7	11.7	2.0	2.4	3.7	2.4	3.7
1998	-6.5	-8.2	-11.7	-8.2	-11.5	10.0	13.1	19.8	13.0	19.8	2.9	3.8	5.8	3.8	6.0
1999	-9.6	-11.4	-16.1	-11.5	-15.8	15.5	18.9	29.0	18.8	28.9	4.4	5.3	8.2	5.2	8.5
2000	-12.8	-14.6	-20.3	-14.8	-19.8	21.6	25.1	38.8	25.0	38.5	6.0	6.9	10.6	6.6	11.1

Year	EX09 \$					IM09 \$					TB Rs.				
	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)
	B	B	B	C	D	B	B	B	C	D	B	B	B	C	D
	(7)					(8)					(9)				
1996	-2.0	-1.9	-2.8	-1.9	-2.8	-3.8	-3.7	-5.4	-3.7	-5.4	-9.3	-8.9	-13.3	-9.2	-10.0
1997	-1.8	-2.5	-3.6	-2.5	-3.6	-5.9	-7.1	-10.3	-7.1	-10.2	-13.6	-15.4	-23.2	-18.3	-16.9
1998	-1.3	-2.3	-3.3	-2.3	-3.3	-7.8	-10.3	-14.8	-10.4	-14.7	-15.1	-19.1	-29.4	-25.5	-21.1
1999	-1.8	-1.7	-2.4	-1.7	-2.4	-11.5	-13.4	-19.0	-13.5	-18.8	-17.0	-21.3	-33.4	-30.8	-23.3
2000	-1.3	-0.8	-1.1	-0.9	-1.1	-14.7	-16.3	-22.9	-16.5	-22.6	-18.3	-22.1	-35.3	-34.7	-24.1

Year	TB \$					WPMN					WP				
	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)	(O-B)	(E-B)	(F-B)	(G-C)	(H-D)
	B	B	B	C	D	B	B	B	C	D	B	B	B	C	D
	(10)					(11)					(12)				
1996	-13.7	-13.2	-19.3	-13.5	-16.3	0.9	0.9	1.3	0.9	1.3	0.6	0.6	0.9	0.6	0.9
1997	-20.3	-23.2	-33.6	-25.9	-28.1	1.8	2.1	3.2	2.1	3.2	1.2	1.4	2.2	1.4	2.2
1998	-23.9	-30.1	-43.2	-35.7	-36.5	2.7	3.5	5.2	3.4	5.4	1.8	2.4	3.6	2.3	3.6
1999	-29.6	-35.3	-50.1	-43.0	-42.5	4.0	4.9	7.4	4.7	7.6	2.7	3.3	5.1	3.3	5.1
2000	-34.3	-38.9	-54.9	-48.9	-47.1	5.4	6.2	9.6	6.0	9.8	3.7	4.3	6.6	4.2	6.7

Next we consider the impact of acceleration in (real) GDP growth. As the structure of the model suggests the impact of this acceleration will mainly be on imports. This is particularly so because we have taken account of the fact that accelerated growth of GDP cannot be taken in isolation of a corresponding acceleration in the growth of fixed capital formation and industrial production. The total impact of these three on imports of POL products and manufactured products is large. These two together account for a lion's share of total imports. The effect on exports is very nominal through domestic prices. Thus a comparison between simulations C and D (Tables 6) shows that export earnings remain more or less unchanged due to downward shift in domestic and export prices notwithstanding an upward shift in export quantum. Imports (quantum and value) are not only higher but progressively tend to be larger reaching about 27 per cent higher in the year 2000. Trade deficit naturally widens. It is higher by one-third in 8 per cent growth scenario (D) in 1996 as compared to 5 per cent scenario (C) with exchange rate pegged at its 1995 level in both the cases. The deficit gradually increases to over three-fourths by the year 2000. Trade deficit three-fourths enlarges from about US \$ 5 billion in 1996 to nearly 24 billion by 2000 in C scenario, whereas in D, it increases from 7 billion to 43 billion. Thus, accelerated growth will not be sustainable unless accompanied by a faster growth of exports or net invisibles.

A related issue is about the impact of changes in the level of world activity in real terms. For this we deviate from the forecast solutions O which assumes an approximately 3 per cent growth of world GDP (ZGDPW). Instead we now consider a 5 per cent sustained growth in simulation L, an unlikely phenomenon but all the same a useful supposition for our purpose. We also hold the exchange rate fixed at its 1995 level. Thus, the results under simulation L are comparable to those under B. Clearly we see that while imports do not change, as expected exports are larger both in volume and value terms (Table 12). The trade deficit narrows gradually and by the year 2000, it is nearly 10 per cent lower. The corollary obviously is the business cycles in the world economy will significantly affect our trade flows and thereby, the rest of the economy. Notice also that upward shift in demand also raises mildly the price of exports along the supply price.

Finally, we consider the policy makers' choice between reduction of tariffs on imports or abolition of export subsidies on the one hand and changes in nominal exchange rate on the other. To examine this, we work out simulations I, J and K. In each simulation RSUS is allowed to increase at the rate of 7.5 per cent every year. In simulation I all

import duties are cut to half whereas in J all export subsidies are eliminated. In simulation K reduced import duties are combined with removal of all export subsidies. Also, exchange rate RSUS is set to go up at the rate of 7.5 per cent per annum in all the cases.

We can thus compare I, J, and K simulations with B and possibly with F (Table 7 to 11). Removal of export subsidy poses no problem if exchange rate is allowed to depreciate as far as export volume is concerned. But if only subsidy is removed there is a slip in export volume. In contrast, the volume of imports does go up considerably when import duties are reduced. But when this is combined with nominal depreciation, imports are considerably controlled in volumetric terms. In fact they tend to be lower in the later years. Elimination of subsidies lowers somewhat export earnings but widening of trade deficit in dollars is marginal. If exchange rate depreciation accompanies subsidy elimination, import bill is substantially lower compared to export earnings and thus, reduction of trade deficit in dollars is very sizeable (Table 9 and 10).

Reduction of import tariffs increases import bill by a wide margin and consequently trade deficit in dollars widens significantly. However, a combination of exchange rate depreciation and tariff reduction depresses both export earnings and import bill, and narrowing of trade deficit in dollars with a lag is notable (Table 7 and 8). Finally, policies that combine subsidy elimination, tariff reduction and exchange rate depreciation reduces import bill more than export earnings and consequently, improvement in trade deficit in dollars with a lag is noticeable (Table 10) as in the case of tariff reduction with exchange rate depreciations.

Our results negate the view frequently expressed that import liberalization despite devaluation will escalate import bill to unmanageable heights. Further, since exports in any way are only marginally affected, another broad conclusion is that tariffs and subsidies can be reduced if an adequate exchange rate adjustment is also put into effect.

Table: 6
Increase in Real GDP Growth
(D-C)/C in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	0.4	-0.8	-0.5	4.0	0.4	4.5	-0.5	4.5	32.5	32.5	-1.0	-0.5
1997	1.0	-1.6	-0.7	8.8	0.4	9.3	-0.7	9.3	49.7	49.7	-2.2	-1.3
1998	1.9	-2.5	-0.7	14.4	0.1	14.5	-0.7	14.5	62.3	62.3	-3.5	-2.1
1999	3.0	-3.4	-0.5	20.9	-0.6	20.2	-0.5	20.2	72.3	72.3	-5.0	-3.0
2000	4.3	-4.2	-0.1	28.4	-1.5	26.5	-0.1	26.5	81.6	81.6	-6.5	-3.9

Table: 7
Import Tariff Reduction
(I-F)/F in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	-0.2	0.5	0.3	12.9	3.3	16.6	0.3	16.6	124.2	124.2	0.8	0.4
1997	-0.4	0.4	0.1	13.0	3.3	16.7	0.1	16.7	100.8	100.8	0.9	0.5
1998	-0.5	0.4	-0.1	13.1	3.2	16.7	-0.1	16.7	87.5	87.5	0.9	0.5
1999	-0.5	0.4	-0.2	13.1	3.2	16.7	-0.2	16.7	78.9	78.9	0.9	0.6
2000	-0.6	0.4	-0.2	13.0	3.2	16.7	-0.2	16.7	71.2	71.2	0.9	0.6

Table: 8
Tariff Reduction and Exchange Rate Depreciation
(I-B)/B in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	2.1	2.6	4.7	9.5	8.3	18.6	-2.6	10.3	94.4	80.8	2.1	1.3
1997	5.4	5.7	11.5	4.9	15.3	21.0	-3.6	4.7	54.2	33.4	4.0	2.7
1998	9.4	9.7	20.0	-0.1	23.7	23.6	-3.4	-0.5	32.4	6.6	6.2	4.2
1999	14.1	14.1	30.1	-5.1	33.1	26.3	-2.6	-5.4	19.1	-10.8	8.4	5.7
2000	19.2	18.9	41.7	-9.9	43.3	29.1	-1.3	-10.1	10.8	-22.8	10.6	7.2

Table: 9
Export Subsidy Reduction
(J-F)/F in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	-1.4	3.3	1.9	0.0	0.0	0.0	1.9	0.0	-12.3	-12.3	0.0	0.0
1997	-2.2	2.8	0.5	0.0	0.0	0.0	0.5	0.0	-2.4	-2.4	0.0	0.0
1998	-2.8	2.5	-0.4	0.0	0.0	0.0	-0.4	0.0	1.7	1.7	0.0	0.0
1999	-3.2	2.3	-1.0	0.0	0.0	0.0	-1.0	0.0	3.5	3.5	0.0	0.0
2000	-3.4	2.2	-1.3	0.0	0.0	0.0	-1.3	0.0	4.3	4.3	0.0	0.0

Table: 10
Export Subsidy Reduction and Exchange Rate Depreciation
(J-B)/B in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	0.9	5.4	6.4	-3.0	4.8	1.7	-1.0	-5.4	-23.9	-29.2	1.3	0.9
1997	3.4	8.2	11.9	-7.1	11.6	3.7	-3.2	-10.3	-25.1	-35.2	3.2	2.2
1998	6.9	11.9	19.6	-11.7	19.8	5.8	-3.7	-14.8	-28.2	-42.2	5.2	3.6
1999	11.1	16.2	29.0	-16.1	29.0	8.2	-3.4	-19.0	-31.1	-48.4	7.4	5.1
2000	15.8	21.0	40.1	-20.3	38.8	10.6	-2.4	-22.9	-32.5	-53.0	9.6	6.6

Table: 11
Import Tariff - Export Subsidy Reduction and Exchange Rate Depreciation
(K-B)/B in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	0.7	5.9	6.7	9.5	8.3	18.6	-0.8	10.3	83.7	70.9	2.1	1.3
1997	3.0	8.7	12.0	4.9	15.3	21.0	-3.1	4.7	52.3	31.8	4.0	2.7
1998	6.4	12.4	19.5	-0.1	23.7	23.6	-3.8	-0.5	33.5	7.5	6.2	4.2
1999	10.5	16.7	28.8	-5.1	33.1	26.3	-3.5	-5.4	21.4	-9.1	8.4	5.7
2000	15.1	21.5	39.8	-9.9	43.3	29.1	-2.6	-10.1	13.5	-20.9	10.6	7.2

Table: 12
Increase in World Real GDP Growth
(L-B)/B in Per Cent

Year	ZEX09	EXUV09	EX09	ZIM09	IMUV09	IM09	EX09 \$	IM09 \$	TB Rs.	TB \$	WPMN	WP
1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0.7	0.3	0.9	0.0	0.0	0.0	0.9	0.0	-3.3	-3.3	0.0	0.0
1998	1.6	0.7	2.4	0.0	0.0	0.0	2.4	0.0	-5.9	-5.9	0.0	0.0
1999	2.9	1.4	4.3	0.0	0.0	0.0	4.3	0.0	-8.1	-8.1	0.0	0.0
2000	4.4	2.1	6.6	0.0	0.0	0.0	6.6	0.0	-9.7	-9.7	0.0	0.0

8. A Summing Up

This paper has aimed at exploring answers to a number of questions relating to India's trade which appear to be of considerable importance in the context of India's recent major policy thrust for trade and industrial reforms. *First*, there is the question of sustainability of India's economic growth at an accelerated rate. *Next*, it is important to note the impact of subsidies and tariffs on exports and imports and, more importantly whether these can be substituted by a suitable adjustment in exchange rates. A relatively less interesting but of some significance is the question about the extent to which our trade performance is influenced by fluctuations in the world economic activity. *Finally*, our most important and major concern has been to evaluate the effectiveness of exchange rate adjustments in promoting exports, rationalization of import structure and value. As far as we are aware, it is the first time that a structural model of trade has been estimated and solved forward to deal with these questions in a systematic and rigorous manner. The model is moderately disaggregative. It incorporates distinct demand and supply factors and takes into account fairly clearly the effect of relative prices and incomes/levels of activity. The model also allows for adjustments in domestic prices in response to exchange rate adjustments.

Briefly stated our main conclusions are that (a) accelerated growth of the Indian economy is not sustainable unless accompanied by policies to promote larger export earnings, (b) exchange rate adjustments by themselves do not considerably change export earnings in dollars - though they promote an expansion of volume of exports as well as export earnings in rupees. Hence, the need to adopt micro level policies and quicker industrial reforms which result in better quality products, lower costs, more efficient market penetration etc., to supplement macro level policies such as exchange rate depreciation, (c) exchange rate adjustments are quite effective in dealing with imports in term of volume, as well as value (in rupees and in dollars). Hence, exchange rate is quite effective if the objective is the reduction of trade balance as such. It must be noted that while one may focus only on dollar value of imports and exports, their volume is equally important for domestic activities. For, larger real exports can stimulate demand, and curtailed volume of imports can compress output supply. These aspects have not been taken up in this analysis and (d) finally, our results do show that in the first place reduced import duties and export subsidies are not likely to play havoc with trade deficit if a proper exchange rate adjustment is used.

Needless to mention that we have focussed only on total imports, total exports and trade balance. There are interesting results regarding components of trade flows which have not been highlighted to keep the paper within manageable limits.

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ANNEXURE A: THE MODEL AND DESCRIPTION OF VARIABLES

1: THE MODEL

Merchandise Real Exports and Unit Values: DGCIE&SSITC : 0 and 1

$$1 : \ln(\text{ZEX01}) = 1.4568 + 0.6764 \ln[(\text{ZGDPW}(-1))] \\ (2.21) \quad (3.98)$$

$$-0.5188 \ln[(\text{EXUV01}/\text{WEUVF}(-1)*100)/\text{INXRSUS}]*100] \\ (4.50)$$

$$+0.2927 \ln[\text{ZEX01}(-1)] \\ (2.04)$$

$$\text{OLS}; \bar{R}^2 = 0.81; \text{DW} = 2.10; h = -0.30; 1971-91$$

$$2 : \ln(\text{EXUV01}) = -0.4250 + 0.6487 \ln[\text{WPF}] \\ (2.12) \quad (5.96)$$

$$+ 0.1805 \ln[\text{ZEX01}(-1)] + 0.3495 \ln[\text{EXUV01}(-1)] \\ (1.61) \quad (3.85)$$

$$+ 0.3692 \text{DUM78} \\ (5.05)$$

$$\text{OLS}; \bar{R}^2 = 0.98; \text{DW} = 1.82; h = 0.45; 1971-91$$

SITC : 2 and 4

$$3 : \ln(\text{ZEX24}) = 2.6549 - 0.2117 \ln[(\text{EXUV24}/\text{WEUVP}(-1)*100)/\text{INXRSUS}]*100] \\ (4.79) \quad (3.71)$$

$$+0.0591 \ln[\text{ZGDPW}(-1)] + 0.1953 \text{DUM778187} - 0.1295 \text{DUM788390} \\ (0.71) \quad (4.86) \quad (3.24)$$

$$\text{OLS}; \bar{R}^2 = 0.76; \text{DW} = 2.29; 1971-91$$

$$4 : \ln(\text{EXUV24}) = -0.1724 + 0.3955 \ln[\text{WPNF}] \\ (1.51) \quad (4.30)$$

$$+ 0.6698 \ln[\text{EXUV24}(-1)] - 0.1799 \text{DUM8791} \\ (8.04) \quad (4.45)$$

$$+ 0.1458 \text{DUM8290} \\ (3.99)$$

$$\text{OLS}; \bar{R}^2 = 0.99; \text{DW} = 2.05; h = -0.14; 1971-91$$

SITC : 3

$$\begin{aligned}
 5: \ln(\text{EXUV3}) &= -1.7841 + 0.6848 \ln[\text{DIUVFU}(-1)] \\
 &\quad (4.09) \quad (21.06) \\
 &+ 0.6952 \ln(\text{INXRSUS}) + 0.5153 \text{DUM738090} - 0.4593 \text{DUM83} \\
 &\quad (7.02) \quad (7.93) \quad (4.20) \\
 \text{OLS; } \bar{R}^2 &= 0.98; \text{DW} = 1.94; 1971-91
 \end{aligned}$$

SITC : 5 to 9

$$\begin{aligned}
 6: \ln(\text{ZEX59}) &= 0.9463 + 0.4774 \ln[(\text{ZGDPW}(-1))] \\
 &\quad (0.61) \quad (2.04) \\
 &- 0.4788 \ln[(\text{EXUV59}/\text{WEUVMF}(-1)*100)/\text{INXRSUS}]*100) \\
 &\quad (1.81) \\
 &+ 0.7840 \ln[(\text{ZEX59}(-1))] + 0.2397 \text{DUM77} \\
 &\quad (6.69) \quad (4.02) \\
 &- 0.1408 \text{DUM83} \\
 &\quad (2.36) \\
 \text{OLS; } \bar{R}^2 &= 0.98; \text{DW} = 1.67; h = 0.89; 1971-91
 \end{aligned}$$

$$\begin{aligned}
 7: \ln(\text{EXP59}) &= -2.2671 + 0.9391 \ln(\text{WPMN}) + 0.4919 \ln(\text{ZEX59}) \\
 &\quad (2.72) \quad (19.52) \quad (7.03) \\
 &- 0.4139 \ln(\text{IPMN}/\text{ZGDP}) - 0.1552 \text{DUM81} \\
 &\quad (1.56) \quad (3.80) \\
 \text{OLS; } \bar{R}^2 &= 0.99; \text{DW} = 2.22; 1971-91
 \end{aligned}$$

Merchandise Real Imports and Unit Values: DGC1&8SITC : 0 and 1

$$\begin{aligned}
 8: \ln(\text{ZIM01}) &= 6.7132 - 2.0468 \ln(\text{IPAC}(-1)) \\
 &\quad (2.57) \quad (1.89) \\
 &- 1.3824 \ln[(\text{IMUV01}/\text{WPAG})*100] + 1.5759 \ln(\text{ZGDP}) \\
 &\quad (4.35) \quad (2.13) \\
 &+ 1.2198 \text{DUM75-77} \\
 &\quad (5.96) \\
 \text{OLS; } \bar{R}^2 &= 0.70; \text{DW} = 2.18; 1971-91
 \end{aligned}$$

$$\begin{aligned}
 9: \ln(\text{IMUV01}) &= -1.8339 + 0.7349 \ln[\text{WEUVF}(-1)] \\
 &\quad (1.94) \quad (2.71) \\
 &\quad + 0.2905 \ln(\text{INXRSUS}) \\
 &\quad \quad (1.79) \\
 &\quad + 0.3966 \ln[\text{IMUV01}(-1)] \\
 &\quad \quad (2.16)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.93$; DW = 1.96; h = 0.17; 1971-91

SITC : 2

$$\begin{aligned}
 10: \ln(\text{ZIM2}) &= -1.2450 + 1.6792 \ln(\text{ZXMN}) \\
 &\quad (0.49) \quad (5.99) \\
 &\quad - 1.2750 \ln[(\text{IMUV2}/\text{WPMN}) * 100] + [\text{AR}(1) = 0.5500] \\
 &\quad (2.80) \quad \quad \quad (2.57) \\
 &\quad \bar{R}^2 = 0.88; \text{DW} = 1.60; 1971-91
 \end{aligned}$$

$$\begin{aligned}
 11: \ln(\text{IMUV2}) &= -3.8118 + 0.5021 \ln[(\text{WEUVP}(-1))] \\
 &\quad (10.95) \quad (12.97) \\
 &\quad + 1.2999 \ln(\text{INXRSUS}) \\
 &\quad \quad (16.40)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.97$; DW = 1.59; 1971-91

SITC : 3

$$\begin{aligned}
 12: \ln(\text{ZIM3}) &= -4.1197 + 0.8437 \ln(\text{ZGDP}) - 0.2568 \ln(\text{DPCR}) \\
 &\quad (1.83) \quad (2.15) \quad \quad \quad (1.72) \\
 &\quad - 0.1115 \ln[(\text{IMP3}/\text{WP}) * 100] + 0.8171 \ln[\text{ZIM3}(-1)] \\
 &\quad (1.76) \quad \quad \quad (5.14) \\
 &\quad - 0.3679 \text{DUM75} + 0.1922 \text{DUM80-83} \\
 &\quad (2.87) \quad \quad \quad (2.09)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.90$; DW = 2.26; h = -0.87; 1971-91

$$\begin{aligned}
 13: \ln(\text{IMUV3}) &= -4.0226 + 1.0166 \ln[(\text{DIUVFU}(-1))] \\
 &\quad (10.49) \quad (33.71) \\
 &\quad + 0.8495 \ln(\text{INXRSUS}) - 0.4824 \text{DUM73} \\
 &\quad (10.10) \quad \quad \quad (4.74) \\
 &\quad + 0.2307 \text{DUM7475} \\
 &\quad \quad (3.25)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.99$; DW = 2.08; 1971-91

SITC : 4

$$\begin{aligned}
 14: \ln(ZIM4) &= 13.1892 - 1.6480 \ln(IPOS) \\
 &\quad (3.64) \quad (2.95) \\
 &- 1.0305 \ln[(IMUV4/WPNF)*100] + 0.8271 \ln(ZIM4(-1)) \\
 &\quad (3.27) \quad (9.69) \\
 &- 1.0619 DUM7375 + 1.6363 DUM7778 \\
 &\quad (3.45) \quad (5.20)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.92$; DW = 2.35; h = -0.90; 1971-91

$$\begin{aligned}
 15: \ln(IMUV4) &= 1.8325 + 0.2764 \ln[(WEUVP(-1))] \\
 &\quad (3.16) \quad (4.24) \\
 &+ 0.3783 \ln(INXRSUS) + 0.3269 DUM7585 \\
 &\quad (2.88) \quad (3.11) \\
 &- 0.3569 DUM8387 \\
 &\quad (3.35)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.75$; DW = 1.44; 1971-91

SITC : 5 to 9

$$\begin{aligned}
 16: \ln(ZIM59) &= -0.3872 + 0.9471 \ln(ZXMN) \\
 &\quad (1.01) \quad (3.78) \\
 &- 1.0406 \ln[(IMP59/WPMN)*100] \\
 &\quad (11.59) \\
 &+ 0.8375 \ln(ZGFIT) + 0.1286 DUM758087 \\
 &\quad (3.58) \quad (3.52)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.99$; DW = 2.23; 1971-91

$$\begin{aligned}
 17: \ln(IMUV59) &= -2.1359 + 0.3618 \ln[(WEUVMF(-1))] \\
 &\quad (5.83) \quad (3.00) \\
 &+ 0.6059 \ln(INXRSUS) + 0.4882 \ln(IMUV59(-1)) \\
 &\quad (5.81) \quad (4.45) \\
 &+ 0.2540 DUM7576 + 0.1777 DUM7980 \\
 &\quad (5.25) \quad (3.32)
 \end{aligned}$$

OLS; $\bar{R}^2 = 0.99$; DW = 2.18; h = -0.48; 1971-91

Domestic Prices

$$8: \text{WPADMN} = -12.6613 + 0.8263 \text{WP}(-1) + 0.3087 \text{IMUV3}$$

$$(5.97) \quad (20.66) \quad (8.41)$$

$$+ 15.6993 \text{DUM87} - 18.5399 \text{DUM91}$$

$$(3.70) \quad (4.20)$$

$$\text{OLS}; \bar{R}^2 = 0.99; \text{DW} = 1.55; 1971-91$$

$$9: \text{WPMN} = 19.0258 + 53.0797 [((\text{M3} + \text{M3}(-1)) / (2 * \text{ZGDP}))]$$

$$(7.49) \quad (5.29)$$

$$+ 0.2034 \text{WPADMN} + 0.2182 \text{IMUV09}$$

$$(4.99) \quad (6.00)$$

$$+ 0.1296 \text{WPNF} - 4.4035 \text{DUM798088}$$

$$(1.62) \quad (3.37)$$

$$\text{OLS}; \bar{R}^2 = 0.99; \text{DW} = 1.29; 1971-91$$

Identities

$$0: \text{EX01} = (\text{ZEX01} * \text{EXUV01}) / 100$$

$$1: \text{EX24} = (\text{ZEX24} * \text{EXUV24}) / 100$$

$$2: \text{EX59} = (\text{ZEX59} * \text{EXUV59}) / 100$$

$$3: \text{EX3} = (\text{ZEX3} * \text{EXUV3}) / 100$$

$$4: \text{ZEX09} = \text{ZEX01} + \text{ZEX24} + \text{ZEX3} + \text{ZEX59}$$

$$5: \text{EX09} = \text{EX01} + \text{EX24} + \text{EX3} + \text{EX59}$$

$$6: \text{EXUV09} = (\text{EX09} / \text{ZEX09}) * 100$$

$$7: \text{EXP59} = \text{EXUV59} * (1 + \text{SREX59} / 100)$$

$$8: \text{EX09\$} = (\text{EX09} / \text{RSUS})$$

$$9: \text{IMP3} = \text{IMUV3} * (1 + \text{NTRM09} / 100)$$

$$10: \text{IMP59} = \text{IMUV59} * (1 + \text{NTRM59} / 100)$$

$$11: \text{IM01} = (\text{ZIM01} * \text{IMUV01}) / 100$$

$$12: \text{IM3} = (\text{ZIM3} * \text{IMUV3}) / 100$$

$$13: \text{IM24} = (\text{ZIM2} * \text{IMUV2} + \text{ZIM4} * \text{IMUV4}) / 100$$

$$14: \text{ZIM24} = \text{ZIM2} + \text{ZIM4}$$

$$15: \text{IM59} = \text{ZIM59} * \text{IMUV59} / 100$$

$$16: \text{IM09} = \text{IM01} + \text{IM24} + \text{IM3} + \text{IM59}$$

$$37: ZIM09 = ZIM01 + ZIM24 + ZIM3 + ZIM59$$

$$38: IMUV09 = ((IM09/ZIM09) * 100)$$

$$39: INXRSUS = (RSUS/RSUS(1981)) * 100$$

$$40: IM09\$ = (IM09/RSUS)$$

$$41: TBDGCIS = EX09 - IM09$$

$$42: TBDGCIS\$ = EX09\$ - IM09\$$$

$$43: WPAG = (17.386 * WPF + 10.081 * WPNF) / 27.467$$

$$44: WP = (27.467 * WPAG + 15.491 * WPADMN + 57.042 * WPMN) / 100$$

Note:

1. The Model is estimated with annual series. The series refer to financial years ending March; say 1971 refers to 1970-71.
2. Figures in parentheses under the coefficients are 't' values.

2: DESCRIPTION OF VARIABLES

Note.

Each data series is annual but covers a different 12-month period. The abbreviations used are as follows:

- CY : Calendar Year - January 1 through December 31; for instance CY 1970 refer to as 1970.
- FY : Fiscal (or financial) Year - April 1 through March 31; for instance FY 1970-71 refer to as 1971.
- AY : Agricultural Year - July 1 through June 30; for instance AY 1970-71 refer to as 1971.

Prefix 'Z' refer to series at constant prices i.e., at 1980-81 prices; referred to as constant/real.

Without prefix 'z' refers to nominal/current.

All value series are in Rupees billion or US dollars billion.

- DIUVFU : Unit Value Indices of Imports of Fuel of Developed Economies in US Dollars, (Base: 1980=100- UN Trade Statistics); CY
- DPCR : Domestic Production of Crude in million tonnes; FY
- DUM73 : Dummy Variable equal to 1 for 1972-73, 0 for all other years
- DUM7375 : Dummy Variable equal to 1 for 1972-73 and 1974-75, 0 for all other years

- DUM738090 : Dummy Variable equal to 1 for 1972-73, 1979-80 and 1989-90, 0 for all other years
- DUM7475 : Dummy Variable equal to 1 for 1973-74 and 1974-75, 0 for all other years
- DUM75 : Dummy Variable equal to 1 for 1974-75, 0 for all other years
- DUM75-77 : Dummy variable equal to 1 for 1974-75 to 1976-77, 0 for all other years
- DUM7576 : Dummy Variable equal to 1 for 1974-75 and 1975-76, 0 for all other years
- DUM758087 : Dummy Variable equal to 1 for 1974-75, 1979-80 and 1986-87, 0 for all other years
- DUM7585 : Dummy Variable equal to 1 for 1974-75 and 1984-85, 0 for all other years
- DUM77 : Dummy Variable equal to 1 for 1976-77, 0 for all other years
- DUM7778 : Dummy Variable equal to 1 for 1976-77 and 1977-78, 0 for all other years
- DUM778187 : Dummy Variable equal to 1 for 1976-77, 1980-81 and 1986-87 0 for all other years
- DUM78 : Dummy Variable equal to 1 for 1977-78, 0 for all other years
- DUM788390 : Dummy Variable equal to 1 for 1977-78, 1982-83 and 1989-90, 0 for all other years
- DUM7980 : Dummy Variable equal to 1 for 1978-79 and 1979-80, 0 for all other years
- DUM798088 : Dummy Variable equal to 1 for 1978-79, 1979-80 and 1987-88, 0 for all other years
- DUM80-83 : Dummy variable equal to 1 for 1979-80 to 1982-83, 0 for all other years
- DUM81 : Dummy Variable equal to 1 for 1980-81, 0 for all other years
- DUM8290 : Dummy Variable equal to 1 for 1981-82 and 1989-90, 0 for all other years
- DUM83 : Dummy Variable equal to 1 for 1982-83, 0 for all other years
- DUM8387 : Dummy Variable equal to 1 for 1982-83 and 1986-87, 0 for all other years
- DUM87 : Dummy Variable equal to 1 for 1986-87, 0 for all other years.
- DUM87-91 : Dummy Variable equal to 1 for 1986-87 to 1990-91, 0 for all other years.
- DUM91 : Dummy Variable equal to 1 for 1990-91, 0 for all other years.

EX01	:	Exports of Food and live Animals plus Beverages and Tobacco (Nominal), f.o.b; SITC 0 & 1; Directorate General of Commercial Intelligence and Statistics (DGCI&S); FY; $EX01 = (ZEX01 * EXUV01)/100$	UUV2
EX09	:	Total Exports (Nominal), f.o.b; SITC 0 to 9; DGCI&S; FY; $EX09 = EX01 + EX24 + EX3 + EX59$	UUV3 UUV4
EX24	:	$EX2 + EX4$	UUV5
EX3	:	Exports of Mineral Fuels, Lubricants and Related Materials (Nominal), f.o.b; SITC 3; DGCI&S; FY; $EX3 = (ZEX3 * EXUV3)/100$	XRSU
EX59	:	Nominal Exports SITC 5 to 9	AC
EXP59	:	$EXUV59*(1+SREX59/100)$	MN
EXUV01	:	Index of Export Unit Values: SITC 01; (Base 1980-81=100); DGCI&S; FY	OS
EXUV09	:	Index of Export Unit Values: SITC 0 to 9; (Base 1980-81=100); DGCI&S; FY	3
EXUV24	:	Index of Export Unit Values; SITC 2 and 4; (Base: 1980-81=100); DGCI&S; FY	TRMC
EXUV59	:	Implicit Price Deflator of Exports: SITC 5 to 9; (Base: 1980-81=100); DGCI&S; FY	TRM5 EFD
IM01	:	Imports of Food and Live Animals plus Beverages and Tobacco (Nominal), c.i.f.; SITC 0 & 1; DGCI&S; FY; $IM01 = (ZIM01 * IMUV01)/100$	SUS REX5
IM2	:	Imports of Crude Materials, Inedible, except Fuels (Nominal), c.i.f.; SITC 2; DGCI&S; FY; $IM2 = (ZIM2 * IMUV2)/100$	BDGI WEUV
IM3	:	Imports of Mineral Fuels, Lubricants and Related Materials, (Nominal), c.i.f.; SITC 3; DGCI&S; FY; $IM3 = (ZIM3 * IMUV3) / 100$	WEUV
IM4	:	Imports of Animal & Vegetable oils, Fats & Waxes (Nominal), c.i.f.; SITC 4; DGCI&S; FY; $IM4 = (ZIM4 * IMUV4)/100$	WEUV
IM59	:	Imports: SITC 5 to 9; DGCI&S; FY; $IM59 = (ZIM59*IMUV59)/100$	WP
IM09	:	Total Imports (Nominal), f.o.b; SITC 0 to 9; DGCI&S; FY; $IM09 = (ZIM09 * IMUV09)/100$	WPADI
IMP3	:	$IMUV3*(1+NTRM09/100)$	WPAG
IMP59	:	$IMUV59*(1+NTRM59/100)$	WPF
IMUV01	:	Index of Unit Value of Import of Food and Live Animals Chiefly for Food plus Beverages and Tobacco; SITC 01; (Base: 1980-81 = 100); DGCI&S; FY	WPMN
IMUV09	:	Index of Unit Value of Imports; SITC 0 to 9; (Base: 1980-81 = 100); DGCI&S; FY	

UV2	:	Index of Unit Value of Import of Crude Materials, inedible, except fuels; SITC 2; (Base: 1980-81 = 100); DGCI&S; FY
UV3	:	Index of Unit Value of Import of Mineral fuels, lubricants and related materials; SITC 3; (Base: 1980-81 = 100); DGCI&S; FY
UV4	:	Index of Unit Value of Import of Animal and vegetable oils, fats and waxes; SITC 4; (Base: 1980-81 = 100); DGCI&S; FY
UV59	:	Index of Unit Value of Import SITC 5 to 9; (Base 1980-81 = 100); DGCI&S; FY
XRSUS	:	Index of Exchange Rate-Rupees per Dollar; (Base 1980-81 = 100); FY
AC	:	Index of production of all crops (total); (trienium ending 1969-70 = 100); AY
MN	:	Index of production of Manufacturing; (Base: 1980-81 = 100); FY
OS	:	Index of Production of oil-seeds; (trienium ending 1969-70 = 100); AY
3	:	Money Stock (end March) wider definition (Currency With Public + Deposit Money of the Public + Post Office Savings Bank Deposits + Time Deposits With Banks); FY
TRM09	:	Rate of Net Import Duty on Imports of SITC 0 to 9 (percent)
TRM59	:	Rate of Net Import Duty on Imports of SITC 5 to 9 (percent)
REFD	:	Refunds and Drawback on Import Duties; Rs. billion
SUS	:	Exchange rate of the rupee against US Dollars; FY
REX59	:	Rate of subsidies on Exports of SITC 5 to 9 (percent)
BDGICS	:	Trade Balance; (DGCI&S); (current); FY
WEUVF	:	Unit Value Indices of Exports of Food of World in US Dollars, (Base: 1980=100-UN Trade Statistics); CY
WEUVMF	:	Unit Value Indices of Exports of Manufactured Goods of World in US Dollars, (Base: 1980=100- UN Trade Statistics); CY
WEUVP	:	Unit Value Indices of Exports of Primary Commodities of World in US Dollars, (Base: 1980=100- UN Trade Statistics); CY
WP	:	Wholesale Price Index of All commodities (Base 1981-82 = 100); FY
WPADMN	:	Wholesale Price Index of Minerals, Fuel, Power, Light and Lubricants; (Base: 1981-82 = 100); FY- Weighted Index of Minerals, and Fuel, Power, Light & Lubricants with weights 4.828 and 10.663 respectively
WPAG	:	Wholesale Price Index of agricultural items (derived); (Weight: 27.467); (Base: 1981-82 = 100); FY
WPF	:	Wholesale Price Index of Food articles (Weight: 17.386); (Base: 1981-82 = 100); FY
WPMN	:	Wholesale Price Index of Manufactured products (Weight: 57.042); (Base: 1981-82 = 100); FY

WPNF	:	Wholesale Price Index of Non food Agricultural Articles (Weight: 10.081); (Base: 1981-82 = 100); FY
ZEX01	:	ZEX0 + ZEX1 - Exports of Food and Live Animals plus Beverages and Tobacco (Real), f.o.b; SITC 0 & 1; FY
ZEX09	:	Total Exports (Real), SITC 0 to 9; f.o.b; FY; ZEX09 = ZEX01 + ZEX24 + ZEX3 + ZEX59
ZEX24	:	ZEX2 + ZEX4
ZEX59	:	Exports SITC 5 to 9; FY
ZGDP	:	Gross Domestic Product at Factor Cost (constant); FY
ZGDPW	:	Index of Real Gross Domestic Product of World, (Base: 1985=100-IMF); CY
ZGFIT	:	Gross Fixed Investment of All Using Sectors, (Public plus Private), (constant); FY
ZIM01	:	ZIM0 + ZIM1 - Imports of Food and Live Animals plus Beverages and Tobacco (Real), c.i.f.; SITC 0 & 1; FY
ZIM09	:	Total Imports (Real), SITC 0 to 9; c.i.f.; FY
ZIM2	:	Imports of Crude Materials, Inedible, except Fuels (Real), c.i.f., SITC 2; FY
ZIM3	:	Imports of Mineral Fuels, Lubricants and Related Materials (Real), c.i.f., SITC 3; FY
ZIM4	:	Imports of Animal and Vegetable Oils, Fats and Waxes, (Real), c.i.f.; SITC 4; FY
ZIM59	:	Imports: SITC 5 to 9; FY
ZXMN	:	Real GDP(FC) in Manufacturing; FY

ANNEXURE: B

Assumptions underlying various Simulations

- Sim O: Exogenous Variables as in March 1995 economy-wide Model forecast and assumptions; Exchange Rate Rupees Per U.S.\$ (RSUS) at 31.37, 33.0, 34.0, 35.0, 37.0 and 39.0 for the years 1995, 1996, 1997, 1998, 1989 and 2000 respectively. (See Table: 1B)
- Sim B: Same as Sim O except RSUS at 1995 level for the years 1996-2000.
- Sim C: Same as Sim O except ZGDP at 5 per cent per annum increase from 1995 level with concomitant growth rates for ZXMN, IPMN and ZGFIT for the years 1996-2000 and RSUS at 1995 level.
- Sim D: Same as Sim C/O except ZGDP at 8 per cent per annum increase from 1995 level with concomitant growth rates for ZXMN, IPMN and ZGFIT for the years 1996-2000 and RSUS at 1995 level.
- Sim E: Same as Sim B/O except RSUS increase at 5 per cent per annum from 1995 level for the years 1996-2000 (32.94, 34.58, 36.31, 38.13 and 40.04).
- Sim F: Same as Sim B/E/O except RSUS increase at 7.5 per cent per year from 1995 level for the years 1996-2000, (33.72, 36.25, 38.97, 41.89 and 45.04).
- Sim G: Same as Sim C except RSUS increase at 5 per cent per annum from 1995 level for the years 1996-2000.
- Sim H: Same as Sim D except RSUS increase at 7.5 per cent per annum from 1995 level for the years 1996-2000.
- Sim I: Same as Sim B/O except NTRM09 and NTRM59 at 15 per cent and 25 per cent respectively for the years 1996-2000 (about 50 per cent cut on 1995 level) and RSUS increase at 7.5 per cent per annum from 1995 level for the years 1996-2000.
- Sim J: Same as Sim B/O except SREX59 is 0 for the year 1996 -2000 (1995 level at 5 per cent) and RSUS increase at 7.5 per cent per annum from 1995 level for the years 1996-2000.
- Sim K: Same as Sim B except NTRM09 and NTRM59 as in Sim I and SREX59 as in Sim J as well as RSUS.
- Sim L: Same as Sim B except ZGDP increase at 5 per cent per annum from 1995 level for the years 1996-2000; uniformly about 3.00 per cent per annum for all other simulations.
- Note: Rainfall is better than normal in the year 1995. in all simulation it is assumed to be normal for the years 1996-2000.

Table: 1 B
Basic Assumptions on Some important Exogenous Variables

Year	DIUVFU	g	DPCR	g	IPAC	g	IPOS	g	M3	g	NTRM09	g	NTRM59	g	RSUS	g	SREX59	g	WEUVF	g
1995	52.3	3.0	32.2	19.3	220.8	0.4	223.2	6.5	5264.8	21.2	30.0	-3.2	55.0	-8.3	31.4	0.0	5.0	-16.7	92.8	1.1
1996	53.9	3.1	36.0	11.7	212.5	-3.7	229.0	2.6	6107.1	16.0	30.0	0.0	50.0	-9.1	33.0	5.2	5.0	0.0	94.6	1.9
1997	55.7	3.3	40.0	11.1	217.6	2.4	215.1	-6.1	7053.8	15.5	30.0	0.0	50.0	0.0	34.0	3.0	5.0	0.0	97.1	2.6
1998	57.6	3.3	44.0	10.0	222.5	2.2	250.8	16.6	8111.8	15.0	30.0	0.0	50.0	0.0	35.0	2.9	5.0	0.0	99.0	2.0
1999	59.5	3.3	47.0	6.8	227.4	2.2	262.5	4.7	9328.6	15.0	30.0	0.0	50.0	0.0	37.0	5.7	5.0	0.0	101.0	2.0
2000	61.4	3.3	50.0	6.4	232.5	2.2	274.7	4.7	10727.9	15.0	30.0	0.0	50.0	0.0	39.0	5.4	5.0	0.0	103.0	2.0

Year	WEUVMF	g	WEUVP	g	WPAG	g	WPF	g	WPNF	g	ZGDPW	g	ZGFIT	g	ZGDP	g	IPMN	g	ZXMN	g
1995	139.0	1.7	82.6	2.5	306.6	12.9	337.6	18.9	277.6	11.5	126.7	2.7	528.9	6.4	2453.1	5.3	233.4	7.9	504.6	8.7
1996	139.3	0.2	83.9	1.6	337.3	10.0	370.2	9.7	302.2	8.8	130.7	3.2	563.5	6.5	2583.7	5.3	257.2	10.2	530.9	5.2
1997	140.9	1.2	86.3	2.8	372.5	10.4	404.2	9.2	328.7	8.8	135.0	3.3	601.1	6.7	2748.9	6.4	281.3	9.4	572.5	7.8
1998	142.6	1.2	88.7	2.8	405.9	9.0	439.4	8.7	353.4	7.5	139.1	3.0	646.5	7.6	2938.8	6.9	309.4	10.0	619.7	8.3
1999	144.3	1.2	91.2	2.8	437.9	7.9	472.1	7.4	378.8	7.2	143.3	3.0	697.8	7.9	3140.9	6.9	337.5	9.1	669.2	8.0
2000	146.1	1.2	93.7	2.8	467.3	6.7	503.6	6.7	404.7	6.9	147.6	3.0	764.1	9.5	3371.0	7.3	369.0	9.3	719.5	7.5

Note: (i) g refers to growth rate in per cent.

(ii) Assumptions on (1) RSUS (2) ZGDP, ZXMN, IPMN, ZGFIT (3) NTRM09, NTRM59 (4) SREX59 and (5) ZGDPW are changed in simulations.

Table: 2 B
Real Exports: ZEX09

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1	165.0 6.1
1996	175.2 6.2	172.5 4.6	173.1 5.0	172.4 4.5	175.1 6.1	176.4 6.9	175.2 6.2	177.2 7.4	176.1 6.7	174.0 5.5	173.6 5.3	172.4 4.5
1997	185.4 5.8	179.0 3.8	180.8 4.4	179.4 4.1	186.3 6.4	189.8 7.6	186.0 6.1	191.3 8.0	189.1 7.4	185.5 6.6	184.9 6.5	180.6 4.7
1998	197.0 6.3	186.0 3.9	189.5 4.8	187.4 4.5	199.8 7.2	206.1 8.6	198.3 6.6	208.3 8.9	205.1 8.5	200.3 8.0	199.4 7.9	190.5 5.5
1999	211.6 7.4	193.2 3.9	199.0 5.0	196.0 4.6	215.1 7.6	224.8 9.1	212.0 6.9	228.1 9.5	223.6 9.0	217.7 8.7	216.5 8.6	201.7 5.9
2000	228.7 8.0	200.8 3.9	209.4 5.2	205.5 4.8	232.4 8.1	246.5 9.6	227.2 7.2	251.0 10.1	245.0 9.6	238.0 9.3	236.6 9.3	214.5 6.3

Note: g refers to growth rate in per cent.

Table: 3 B
Exports Unit Value: EXUV09

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	496.7 12.2	496.6 12.2	496.6 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2	496.7 12.2
1996	556.8 12.1	548.1 10.4	543.5 9.4	548.8 10.5	556.5 12.0	560.3 12.8	555.7 11.9	554.9 11.7	562.9 13.3	578.7 16.5	581.4 17.1	548.8 10.5
1997	614.8 10.4	600.1 9.5	590.2 8.6	596.6 8.7	617.6 11.0	628.1 12.1	621.2 11.8	621.5 12.0	630.9 12.1	645.5 11.6	648.3 11.5	598.3 9.0
1998	674.1 9.7	652.9 8.8	636.6 7.9	643.6 7.9	682.9 10.6	703.0 11.9	692.5 11.5	695.6 11.9	706.0 11.9	720.3 11.6	723.4 11.6	648.4 8.4
1999	744.4 10.4	707.9 8.4	684.0 7.4	693.8 7.8	755.8 10.7	788.3 12.1	770.6 11.3	777.8 11.8	791.6 12.1	806.3 11.9	809.6 11.9	703.5 8.5
2000	822.4 10.5	766.2 8.2	733.7 7.3	746.1 7.5	835.2 10.5	883.3 12.0	856.8 11.2	869.3 11.8	886.9 12.0	902.5 11.9	906.1 11.9	762.1 8.3

Note: g refers to growth rate in per cent.

Table: 4 B
Nominal Exports in Rs Billion: EX09

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0	819.3 19.0
1996	975.6 19.1	945.6 15.4	941.1 14.9	946.3 15.5	974.5 18.9	988.5 20.6	973.7 18.8	983.1 20.0	991.1 21.0	1006.9 22.9	1009.6 23.2	946.4 15.5
1997	1139.8 16.8	1074.5 13.6	1067.2 13.4	1070.5 13.1	1151.0 18.1	1192.1 20.6	1155.3 18.6	1188.8 20.9	1193.1 20.4	1197.8 19.0	1198.8 18.7	1080.5 14.2
1998	1328.4 16.6	1214.4 13.0	1206.2 13.0	1206.6 12.7	1364.7 18.6	1448.7 21.5	1373.3 18.9	1449.0 21.9	1447.9 21.4	1443.0 20.5	1442.2 20.3	1235.4 14.3
1999	1575.5 18.6	1367.6 12.6	1361.1 12.8	1360.5 12.8	1625.6 19.1	1772.6 22.4	1633.6 19.0	1774.2 22.4	1769.7 22.2	1755.7 21.7	1752.9 21.5	1419.4 14.9
2000	1880.7 19.4	1538.6 12.5	1536.7 12.9	1533.4 12.7	1941.0 19.4	2177.3 22.8	1946.8 19.2	2182.7 23.0	2172.3 22.7	2148.3 22.4	2143.4 22.3	1634.9 15.2

Note: g refers to growth rate in per cent.

Table: 5 B
Real Imports: ZIM09

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3	299.9 13.3
1996	348.3 16.1	353.5 17.9	367.7 22.6	355.7 18.6	348.6 16.2	345.2 15.1	346.4 15.5	356.8 19.0	389.7 29.9	345.2 15.1	389.7 29.9	355.7 18.6
1997	406.4 16.7	414.2 17.2	450.7 22.6	424.7 19.4	403.8 15.8	394.4 14.2	393.9 13.7	418.7 17.4	445.6 14.4	394.4 14.2	445.6 14.4	424.7 19.4
1998	477.1 17.4	483.9 16.8	553.8 22.9	510.4 20.2	468.8 16.1	450.9 14.3	444.4 12.8	489.9 17.0	509.9 14.4	450.9 14.3	509.9 14.4	510.4 20.2
1999	558.7 17.1	567.6 17.3	686.5 24.0	618.2 21.1	547.5 16.8	518.5 15.0	502.3 13.0	577.9 18.0	586.4 15.0	518.5 15.0	586.4 15.0	618.2 21.1
2000	659.2 18.0	667.6 17.6	857.2 24.9	756.3 22.3	646.0 18.0	602.9 16.3	569.0 13.3	687.7 19.0	681.6 16.2	602.9 16.3	681.6 16.2	756.3 22.3

Note: g refers to growth rate in per cent.

Table: 6 B
Imports Unit Value : IMUV09

Year	Sim O	g	Sim C	g	Sim D	g	Sim B	g	Sim E	g	Sim F	g	Sim G	g	Sim H	g	Sim I	g	Sim J	g	Sim K	g	Sim L	g
1995	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3	298.4	10.3
1996	325.1	9.0	314.3	5.3	315.7	5.8	314.6	5.4	324.8	8.8	329.8	10.5	324.5	8.7	330.9	10.9	340.6	14.1	329.8	10.5	340.6	14.1	314.6	5.4
1997	345.5	6.3	323.3	2.8	324.7	2.8	324.1	3.0	349.2	7.5	361.8	9.7	348.2	7.3	362.5	9.6	373.6	9.7	361.8	9.7	373.6	9.7	324.1	3.0
1998	365.1	5.7	330.7	2.3	331.0	1.9	331.8	2.4	375.1	7.4	397.6	9.9	373.8	7.3	396.6	9.4	410.4	9.8	397.6	9.9	410.4	9.8	331.8	2.4
1999	389.5	6.7	336.7	1.8	334.7	1.1	337.2	1.6	400.9	6.9	434.8	9.4	400.1	7.0	431.4	8.8	448.8	9.4	434.8	9.4	448.8	9.4	337.2	1.6
2000	414.9	6.5	341.8	1.5	336.8	0.6	341.1	1.2	426.7	6.4	473.4	8.9	427.4	6.8	466.5	8.1	488.8	8.9	473.4	8.9	488.8	8.9	341.1	1.2

Note: g refers to growth rate in per cent.

Table: 7 B
Nominal Import in Rs Billion: IM09

Year	Sim O	g	Sim C	g	Sim D	g	Sim B	g	Sim E	g	Sim F	g	Sim G	g	Sim H	g	Sim I	g	Sim J	g	Sim K	g	Sim L	g
1995	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0	895.0	25.0
1996	1132.5	26.5	1111.3	24.2	1160.8	29.7	1119.2	25.0	1132.0	26.5	1138.3	27.2	1124.1	25.6	1180.7	31.9	1327.2	48.3	1138.3	27.2	1327.2	48.3	1119.2	25.0
1997	1404.2	24.0	1339.1	20.5	1463.2	26.1	1376.5	23.0	1409.9	24.6	1427.0	25.4	1371.5	22.0	1518.0	28.6	1664.9	25.5	1427.0	25.4	1664.9	25.5	1376.5	23.0
1998	1741.8	24.0	1600.6	19.5	1832.8	25.3	1693.5	23.0	1758.4	24.7	1792.5	25.6	1661.0	21.1	1943.1	28.0	2092.5	25.7	1792.5	25.6	2092.5	25.7	1693.5	23.0
1999	2176.1	24.9	1911.2	19.4	2297.8	25.4	2084.3	23.1	2194.9	24.8	2254.5	25.8	2009.9	21.0	2492.9	28.3	2631.9	25.8	2254.5	25.8	2631.9	25.8	2084.3	23.1
2000	2735.3	25.7	2282.0	19.4	2886.7	25.6	2579.9	23.8	2756.7	25.6	2854.5	26.6	2431.9	21.0	3208.0	28.7	3331.3	26.6	2854.5	26.6	3331.3	26.6	2579.9	23.8

Note: g refers to growth rate in per cent.

Table: 8 B
Nominal Exports in US \$ Billion: EX09D

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g												
1995	26.1	19.0	26.1	19.0	26.1	19.0	26.1	19.0	26.1	19.0	26.1	19.0												
1996	29.6	13.2	30.1	15.4	30.0	14.9	30.2	15.5	29.6	13.3	29.3	12.2	29.6	13.2	29.2	11.6	29.4	12.5	29.9	14.3	29.9	14.6	30.2	15.5
1997	33.5	13.4	34.3	13.6	34.0	13.4	34.1	13.1	33.3	12.5	32.9	12.2	33.4	13.0	32.8	12.5	32.9	12.0	33.0	10.7	33.1	10.5	34.4	14.2
1998	38.0	13.2	38.7	13.0	38.5	13.0	38.5	12.7	37.6	12.9	37.2	13.0	37.8	13.2	37.2	13.4	37.2	12.9	37.0	12.1	37.0	11.9	39.4	14.3
1999	42.6	12.2	43.6	12.6	43.4	12.8	43.4	12.8	42.6	13.4	42.3	13.8	42.8	13.3	42.3	13.9	42.2	13.7	41.9	13.2	41.8	13.1	45.2	14.9
2000	48.2	13.3	49.0	12.5	49.0	12.9	48.9	12.7	48.5	13.7	48.3	14.3	48.6	13.5	48.5	14.4	48.2	14.2	47.7	13.8	47.6	13.7	52.1	15.2

Note: g refers to growth rate in per cent.

Table: 9 B
Nominal Imports in US \$ Billion: IM09D

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g												
1995	28.5	25.0	28.5	25.0	28.5	25.0	28.5	25.0	28.5	25.0	28.5	25.0												
1996	34.3	20.3	35.4	24.2	37.0	29.7	35.7	25.0	34.4	20.5	33.8	18.3	34.1	19.6	35.0	22.7	39.4	37.9	33.8	18.3	39.4	37.9	35.7	25.0
1997	41.3	20.3	42.7	20.5	46.6	26.1	43.9	23.0	40.8	18.6	39.4	16.6	39.7	16.2	41.9	19.6	45.9	16.7	39.4	16.6	45.9	16.7	43.9	23.0
1998	49.8	20.5	51.0	19.5	58.4	25.3	54.0	23.0	48.4	18.8	46.0	16.8	45.7	15.3	49.9	19.1	53.7	16.9	46.0	16.8	53.7	16.9	54.0	23.0
1999	58.8	18.2	60.9	19.4	73.2	25.4	66.4	23.1	57.6	18.9	53.8	17.0	52.7	15.2	59.5	19.3	62.8	17.0	53.8	17.0	62.8	17.0	66.4	23.1
2000	70.1	19.3	72.7	19.4	92.0	25.6	82.2	23.8	68.9	19.6	63.4	17.8	60.7	15.2	71.2	19.7	74.0	17.7	63.4	17.8	74.0	17.7	82.2	23.8

Note: g refers to growth rate in per cent.

Table 10 B
Trade Balance in Rs. Billion: TB

Year	Sim O	Sim C	Sim D	Sim B	Sim E	Sim F	Sim G	Sim H	Sim I	Sim J	Sim K	Sim L
1995	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7	-75.7
1996	-156.8	-165.7	-219.6	-172.8	-157.4	-149.9	-150.4	-197.7	-336.0	-131.5	-317.5	-172.8
1997	-264.5	-264.6	-396.0	-306.0	-259.0	-234.9	-216.2	-329.1	-471.8	-229.3	-466.1	-295.9
1998	-413.4	-386.2	-626.6	-486.9	-393.7	-343.7	-287.7	-494.2	-644.6	-349.4	-650.3	-458.1
1999	-600.7	-543.6	-936.7	-723.8	-569.4	-481.9	-376.3	-718.7	-862.2	-498.9	-879.0	-664.8
2000	-854.6	-743.3	-1350.1	-1046.5	-815.7	-677.1	-485.1	-1025.3	-1159.1	-706.2	-1187.9	-945.0

Table 11 B
Trade Balance in US \$ Billion: TB

Year	Sim O	Sim C	Sim D	Sim B	Sim E	Sim F	Sim G	Sim H	Sim I	Sim J	Sim K	Sim L
1995	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
1996	-4.8	-5.3	-7.0	-5.5	-4.8	-4.4	-4.6	-5.9	-10.0	-3.9	-9.4	-5.5
1997	-7.8	-8.4	-12.6	-9.8	-7.5	-6.5	-6.3	-9.1	-13.0	-6.3	-12.9	-9.4
1998	-11.8	-12.3	-20.0	-15.5	-10.8	-8.8	-7.9	-12.7	-16.5	-9.0	-16.7	-14.6
1999	-16.2	-17.3	-29.9	-23.1	-14.9	-11.5	-9.9	-17.2	-20.6	-11.9	-21.0	-21.2
2000	-21.9	-23.7	-43.0	-33.4	-20.4	-15.0	-12.1	-22.8	-25.7	-15.7	-26.4	-30.1

Table: 12 B
Wholesale Price of Manufacturing: WPMH

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	273.8	10.0	273.8	10.0	273.8	10.0	273.8	10.0	273.8	10.0	273.8	10.0
1996	301.1	10.0	298.7	9.1	295.7	8.0	298.4	9.0	301.0	10.0	302.3	10.4
1997	324.6	7.8	320.8	7.4	313.7	6.1	318.8	6.9	325.5	8.1	328.9	8.8
1998	347.0	6.9	342.7	6.8	330.5	5.4	337.9	6.0	349.6	7.4	355.7	8.1
1999	371.2	7.0	365.3	6.6	347.0	5.0	357.0	5.6	374.3	7.1	383.6	7.8
2000	396.1	6.7	389.0	6.5	363.7	4.8	375.9	5.3	399.3	6.7	412.1	7.4

Note: g refers to growth rate in per cent.

Table: 13 B
Index of Wholesale Prices: WP

Year	Sim O g	Sim C g	Sim D g	Sim B g	Sim E g	Sim F g	Sim G g	Sim H g	Sim I g	Sim J g	Sim K g	Sim L g
1995	280.7	11.2	280.7	11.2	280.7	11.2	280.7	11.2	280.7	11.2	280.7	11.2
1996	308.6	9.9	306.9	9.3	305.2	8.7	306.7	9.3	308.5	9.9	309.4	10.2
1997	334.6	8.4	331.7	8.1	327.4	7.3	330.5	7.8	335.3	8.7	337.7	9.1
1998	359.8	7.5	356.2	7.4	348.7	6.5	353.4	6.9	361.7	7.9	366.1	8.4
1999	385.9	7.2	380.8	6.9	369.4	5.9	375.7	6.3	388.2	7.3	394.8	7.9
2000	412.3	6.8	405.8	6.6	389.9	5.6	397.7	5.9	414.7	6.8	424.0	7.4

Note: g refers to growth rate in per cent.

Table 14 B
Index of Energy-Mineral Related Administered Prices :WPADMN

Year	Sim O	g	Sim C	g	Sim D	g	Sim B	g	Sim E	g	Sim F	g	Sim G	g	Sim H	g	Sim I	g	Sim J	g	Sim K	g	Sim L	g
1995	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1	244.2	5.1
1996	271.3	11.1	269.1	10.2	269.1	10.2	269.1	10.2	271.2	11.0	272.2	11.5	271.2	11.0	272.2	11.5	272.2	11.5	272.2	11.5	272.2	11.5	269.1	10.2
1997	297.4	9.6	292.3	8.6	290.9	8.1	292.1	8.6	298.1	9.9	301.1	10.6	298.2	10.0	299.9	10.2	302.2	11.0	301.1	10.6	302.2	11.0	292.1	8.6
1998	322.1	8.3	314.5	7.6	311.0	6.9	313.6	7.3	324.5	8.9	330.2	9.7	325.4	9.1	327.6	9.3	331.6	9.7	330.2	9.7	331.6	9.7	313.6	7.3
1999	347.8	8.0	336.6	7.0	330.4	6.2	334.2	6.6	351.0	8.2	360.0	9.0	353.3	8.6	356.2	8.7	361.6	9.0	360.0	9.0	361.6	9.0	334.2	6.6
2000	374.4	7.7	358.7	6.6	349.3	5.7	354.5	6.1	377.9	7.7	390.7	8.5	382.0	8.1	385.4	8.2	392.5	8.5	390.7	8.5	392.5	8.5	354.5	6.1

Note: g refers to growth rate in per cent.

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