INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS & MANAGEMENT

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PATTERN OF GROWTH AND INSTABILITY OF INDIA'S EXPORTS (1991-2006)

DR. KULWINDER SINGH
ASST. PROFESSOR
BABA FARID COLLEGE
BATHINDA

DR. SURINDER KUMAR SINGLA
PROJECT ASSOCIATE
CSWAS
PUNJABI UNIVERSITY
PATIALA

ABSTRACT

The paper is mainly devoted to statistical verification of the pattern of growth and instability of India's exports during the post-reform and post-WTO period (1991-2006). Results reveals that growth of India's exports during post-reform and post-WTO period remained to be as high as of 12.79 per cent that is well above the growth of exports of majority of the developed and developing countries. The scene at the instability side is also found to be satisfactory as instability of overall export earnings is recoded as low as of 1.40 per cent per annum. Majority of India's exports (selected commodities) experienced high growth and low earnings instability during concerned period. Further, the analysis of instability of India' export reveals that export instability was primarily due to the dominance of quantity variables in case of majority exports. It is also observed that instability in India's export earnings is mainly due to supply variations. Analysis also reveals that developed countries occupy the lowest position in the instability ranking as compared to developing countries and found to be most stable markets for India's export and thus have strong stabilization effect on India's export earnings. Appropriate domestic policy reforms would be essential for abolition of domestic supply bottlenecks and for maintaining quality and cost competitiveness of exports in global market. Deepening of reforms into specific export sectors would stimulate India's export; result compositional and geographical diversification; help to remove supply bottlenecks operating in the economy and help improving export competitiveness.

KEYWORDS
Economic Reforms, Import substitution inward-oriented strategy Supply bottlenecks, SITC, WTO.

INTRODUCTION

The higher degree of instability in export earnings of countries particularly the developing ones has always been a matter of concern. The instability in export earnings adds uncertainties to planning and the crisis that arises often calls for drastic action that adversely affects development projects. Export stability is important because of its effects on internal economic stability, on rate of economic growth and on the distribution of income and wealth. It is also considered important because of its effects on internal and external policies of many countries (Coppock, 1962). The violent and sudden fluctuations in prices, quantum and total value of exports, according to prevalent view which held that there exists an intimate relationship between foreign trade, national income and investment, have a serious adverse impact on the overall growth of the less developed countries (LDCs). The excessive fluctuations in prices and foreign exchange receipts generate fluctuations in domestic activities which in turn make the process of planned development quite complicated and uncertain, reduce the efficiency with which investment resources are allocated, and create manifold difficulties in estimating the expected return on investment which raises the cost of capital needed for greater risk (Aggarwal, 1982). Keeping such facts in view, most of the underdeveloped countries have been trying hard to stabilize their economies by keeping macro-economic variables stable. However, there has been a heavy fluctuation in foreign trade as well as in other macro economic variables of these countries. India's is among the developing countries, whose economic development programme since 1951 has largely been dependent upon availability of foreign exchange reserves. The availability of foreign exchange reserves is determined by and depends upon export earnings and capital inflows which an economy receives. Therefore, instability in export earnings is expected to hamper the process of economic development (Sharan, 1984) and further contributes to overall economic instability in the country. Since the initiation of the planning process after independence, India too has been suffering from the problem of export earnings instability which resulted in the continuous trade deficits and has also influence the pace of the economic growth of the country.

India like many other developing countries pursued import substitution and inward-oriented strategy even as late 1990s, despite the evidence in support of export-led growth strategy. It is held that assumption behind the import substitution strategy was export pessimism that the exports from developing countries would not grow, and even if they did, terms of trade would go against their interests (Kaundal, 2005). Export pessimism was not just a belief, but also almost an ideology among the resident economic elite of India for decades. Two prominent exceptions to this belief were J.N Bhagwati and T.N Srinivasan both Non-Resident Indian (NRIs) (Bhagwati and Srinivasan, 1976). India's prolonged inward-oriented heavy industrialization strategy fostered a large and diverse industrial sector. Over the time, this sector accumulated impressive technological capabilities, but this system created various types of inefficiencies and slowed down the rate of growth of the economy. This model suffered a crisis in early 1980s, reflected economically in falling production and eroding its position as leading exporter of manufactures in the developing world four decades ago (Kaushik and Paras, 2000). By 1980s, Indian policy makers had accepted the need to liberalize the economy. The process however was reluctant, intermittent, and patchy. It is only during 1990s, after the severe macro economic crisis that export promotion based on outward-oriented (export-led growth) growth strategy was adopted as the only alternative for rapid economic growth. Several serious attempts have been made to free up the trade, domestic competition, and technology inflows in order to attract foreign investment (Joshi and Little, 1996). Trade policy has undergone fundamental shift to correct the early trade regime through the withdrawal of quantitative restrictions, reduction and rationalization of tariffs, liberalisation in the trade and payment regime and improving the access to export incentives, besides a realistic and market based exchange rate (ES, 2002-03). The opening-up of economy, establishment of WTO, and India's participation in WTO as founder member have provided export-friendly environment which further experienced remarkable changes. This new economic environment has provided both challenges as well as opportunities for India's export sector. Due to outward orientation of economy and free trade environment at global level, India's exports now have larger role to play and also larger world market. Such type of larger dependence on exports under the new economic environment demands greater stability on the export earnings because of placing of heavy stake on the export sector by the country.

Therefore, this paper is mainly devoted to statistical verification of the pattern of growth and instability of India's exports during the post-reform and post-WTO period (1991-2006). Examining export earnings instability, role of price and quantity variables and that of demand and supply variables in export earning instability has also been highlighted. The paper has organized into four sections. Section I deals with introduction and Section II explains methodology and data used to examine the export instability. Section III describes the results and discussions related to the pattern of growth and instability of India's selected exports. At the end, section IV highlights the broad conclusions emerging out of the analysis of India's export instability.

METHODOLOGY AND DATA

The growth rates and export instability indices in case of value, volume, and unit prices are obtained by fitting an exponential time trend as follows:

$X_{it} = ae^{bit}$ {I = 1, 2 , 3.....n}

Where Xit is the value/volume/unit value of the export of the selected commodity. The method of Ordinary Least Square (OLS) is then used to estimate the semi logarithmic equation.

Export instability index (EII) is defined as the standard deviation of the observed deviation from the estimated exponential time trend.

$$Export\ Instability\ Index\ (EII) = \frac{100}{\bar{X}} \cdot \sqrt{\sum_{i=0}^{n} \frac{e_{it}^2}{n-k}}$$

Where $e_{it} = X_{it} - \hat{X}_{it}$

i.e. $\hat{X}_{it} = \hat{a}_{it} e^{\hat{b}_{it}} + u_i$

Where,

$\bar{X}$ = mean of the export earnings/volume/unit value

X_{it} = Actual values of export earnings/volume/unit value

$\hat{X}_{it}$ = Estimated values of export earnings/volume/unit value

e_{it} = observed deviation from the exponential trend i.e. difference between actual and estimated values of export earnings/volume/unit value

u_i = Random term

This instability index has two advantages. First, this is scale independent and can be used for cross comparisons. Secondly, it estimates the coefficient of variation corrected for exponential trend which is useful in policy decisions, on long term basis, as these are taken in terms of growth rates rather than in absolute increments.

The components of the variance of the logarithm of earnings around an exponential trend are examined in case of selected exports commodities to assess the relative importance of price and quantity fluctuations given the identity.

Export Earnings = Price x Quantity

$$E = P.Q$$

$$log\ E = log\ P + log\ Q$$

And variance of log E around a fitted constant growth rate trend line is given by the identity

$$\text{var (log E)} = \text{var (log P)} + \text{var (logQ)} + 2\text{cov (logP.logQ)}$$

Where variance and co-variance are around the trend lines. The terms on the right hand side are calculated from the price and quantity indices. They are divided through by their sum and expressed as percentages. The term CP and CQ denotes Contribution of Price (CP) and Contribution of Quantity (CQ) respectively in total earning instability in percentages.

$$CP = \frac{100.\text{var (logP)}}{\text{var (logP)} + \text{var (logQ)} + 2\text{cov (logP.logQ)}}$$

$$CQ = \frac{100 * \text{var (logQ)}}{\text{var (logP)} + \text{var (logQ)} + 2\text{cov (logP.logQ)}}$$

The term CP may be interpreted as the contribution of variance of price to variance of earning and term CQ as the contribution of the variance of quantity to the variance of earning. These are taken as the proportional contribution of price and quantity instability to earnings instability. The co-variance term, positive or negative, reflects the extent to which price and quantity movements are reinforcing or offsetting. The sign is also an indicator of whether supplies of demand variations have been the dominant source of variability. If co-variance has a negative sign, supply fluctuations are major cause of instability and if otherwise co-variance has positive sign, demand fluctuations are dominant cause of instability. Role of demand and supply variables is examined by the method explained in Appendix I. To determine which commodity/trading partner have contributed excessively to export instability in total export earnings instability and have stabilization/destabilization effect on export earnings, following method is used.

$$CP = \frac{IDX_j * R_j}{\sum_{i=0}^{n} I\,DX_i * R_i}$$

In which

CP= Percentage contribution in total export earning

IDX= Instability index

R= mean percentage share in Total Export Earnings

j= is selected commodity/trading partner

i= total commodities/partners (i=n)

CP/R= Stabilization Effect on Export Earnings If more than 1 destabilization effect or excessively contributor to instability on export earnings and if less than 1, stabilization on export earnings.

$$\text{IDX} = \frac{100}{n-4} \sum_{t=3}^{n-2} \frac{\text{X}_t - \text{MA}_t}{\text{MA}_t}$$

I

IDX = Absolute Instability Index

n = No. of Years

X_t = Value of Export in year t

$MA_t = 1/5. (X_{t-2} + X_{t-1} + X_t + X_{t+1} + X_{t+2})$

Indices of export value/price/volume have been utilized from the data taken from Commodity Trade Statistics, United Nations for the period 1991-2006. The analysis is operated at disaggregate level .i.e. at 3 digit level of Standard International Trade Classification (SITC) Revision 1. The selected principal commodities constitute more than 85 per cent share of India's exports and selected markets constitute more than 80 per cent of India's export on an average during the study period. The selected commodities, on which the instability analysis is based, are: fish (fresh and simply preserved) (SITC-031); rice (SITC-042); fruits (fresh and nuts excluding oil nuts) (SITC-051); tea and mate (SITC-074); feed-stuff for animals excluding unmilled feed-stuff (SITC-081); iron ore and concentrates (SITC-281); petroleum products (SITC-332); organic chemicals (SITC-512); synthetic organic dyestuffs, natural indigo and lakes (SITC-531); medicinal and pharmaceutical products (SITC-541); plastic materials, regenerated cellulose and resins (SITC-581); chemical materials and products (SITC-599); leather (SITC-611); articles of rubber (SITC-629); textile yarn and thread (SITC-651); cotton fabrics (woven) (SITC-652); textile fabrics (woven) (SITC-653); made-up articles, wholly or chiefly of textile material (SITC-656); floor coverings, tapestries, etc. (SITC-657); lime, cement and fabric building materials excluding glass/clay material (SITC-661); pearls and precious and semi-precious stones (SITC-667); ingots and other primary forms of iron and steel (SITC-672); universals plates and sheets of iron or steel (SITC-674); copper (SITC-682); machinery and appliances non electrical parts (SITC-719); electric power machinery and switchgear (SITC-722); road motor vehicles (SITC-732); clothing (except fur clothing) (SITC-841); footwear (SITC-851); and jewellery (gold, silver, platinum jewellery ex watchcases and imitation jewellery) (SITC-897).

PATTERN OF GROWTH AND INSTABILITY OF INDIA'S EXPORTS

The results, related to the pattern of export growth and instability of India's selected thirty commodities, have been presented in the following tables. Table 1 describes the pattern of growth and instability indices of India's exports earnings, volume, and price (unit value) during the post-reforms and post-WTO periods. It is noted that India's overall exports grew at 12.79 per cent per annum and experienced low instability of 1.40 per cent per annum. Among the selected thirty commodities, except the commodities namely fish (SITC-031), fruits (SITC-051), Tea and mate (SITC-074), feed-stuff for animals (SITC-081), cotton fabrics (SITC-652) and floor coverings, tapestries, etc. (SITC-657), all of the remaining selected commodities registered high growth of export earnings. Copper (SITC-682) exports registered highest growth of export earnings followed by petroleum products (SITC-332), plastic materials, regenerated cellulose and resins (SITC-581), universals plates and sheets of iron or steel (SITC-674) during the period under study. On the other side, exports of tea and mate (SITC-074) exhibited lowest export earnings growth, followed by cotton fabrics (SITC-652), feed-stuff for animals (SITC-081), floor coverings, tapestries, etc. (SITC-657) and fish (SITC-031) during the same period.

Due to non-availability of data related to export quantity in case of the commodities namely petroleum products (SITC-332), medicinal and pharmaceutical products (SITC-541), pearls and precious and semi-precious stones (SITC-667) and jewellery (SITC-897) export volume and price growth as well as instability has not been calculated. Out of the remaining twenty-six selected commodities, ten commodities experienced double-digit growth in their volume. Road motor vehicles (SITC-732) exports grew at the fastest growth rate of 75.58 per cent per annum followed by copper (SITC-682) (48.77 per cent), machinery and appliances non-electrical parts (SITC-719) (35.51 per cent), ingots and other primary forms of iron and steel (SITC-672) (23.07 per cent) and universals plates and sheets of iron or steel (SITC-674) (21.78 per cent). Contrary to this, volume of cotton fabrics (woven) (SITC-652) exports recorded the lowest growth of -9.26 per cent per annum followed by clothing (except fur clothing) (SITC-841) (0.31 per cent), textile fabrics (woven) (SITC-653) (1.34 per cent), tea and mate (SITC-074) (1.50 per cent), floor coverings, tapestries, etc. (SITC-657) (2.35 per cent) and iron ore and concentrates (SITC-281) (2.75 per cent) etc. Interestingly, except six commodities namely made-up articles, wholly or chiefly of textile material (SITC-656), cotton fabrics (woven) (SITC-652), electric power machinery and switchgear (SITC-722), clothing (except fur clothing) (SITC-841), textile fabrics (woven) (SITC-653) and iron ore and concentrates (SITC-281), all other not only realized very low but negative export price growth (in case of fourteen commodities) during the study period. All of the commodities with negative price growth have achieved quite high export earnings growth except the commodities namely fruits (SITC-051), fish (SITC-031), and tea and mate (SITC-074). Thus, the growth performance of the selected exports has significant as they were characterised by high earning and volume growth and very low price growth as well during the period under study.

Data show that majority of the exports recorded very low earning instability during the study period as only two commodities namely petroleum products (SITC-332) and copper (SITC-682) witnessed double digit instability index value. Similarly, twelve commodities which carried value of the volume instability index less than 5.00 experienced very low export volume instability. Only four commodities namely road motor vehicles (SITC-732) (116.75 per cent), (SITC-) (17.72 per cent), electric power machinery and switchgear (SITC-722) (13.86 per cent) and cotton fabrics (woven) (SITC-652) (10.34 per cent) recorded high export volume instability. Export price instability index carried the value from -52.57 per cent to 127.48 per cent. Out of the twenty-four commodities, only nine commodities such as fish (SITC-031), synthetic organic dyestuffs, natural indigo and lakes (SITC-531), leather (SITC-611), feed-stuff for animals (SITC-081), lime, cement and fabric building materials excluding glass/clay material (SITC-661), rice (SITC-042), iron ore and concentrates (SITC-281), universals plates and sheets of iron or steel (SITC-674) and Ingots and other primary forms of iron and steel (SITC-672) carried low export price instability. Exports of plastic materials, regenerated cellulose and resins (SITC-581) (127.48 per cent) realized highest price instability among the selected commodities, followed by articles of rubber (SITC-629) (82.47 per cent), cotton fabrics (woven) (SITC-652) (78.31 per cent), textile yarn and thread (SITC-651) (52.68 per cent), and made-up articles, wholly or chiefly of textile material (SITC-656) (38.94 per cent). The results of volume and price instability highlight many interesting points. Low export price growth justified the high export volume growth as per the theory of consumer behaviour. Export prices have responded sharply to the support provided by export policy reforms and removal of tariff and non-tariff barriers. Moreover, high price instability has been found to be the major outcome of the East Asian Crisis during the period under study. Thus, export growth and instability have been influenced by both the internal and the external factors during the study period.

It is held that commodities such as petroleum products (SITC-332), copper (SITC-682), ingots and other primary forms of iron and steel (SITC-672) and iron ore and concentrates (SITC-281) experienced high export earnings growth as well as high export earnings instability, whereas the commodities such as rice (SITC-042), organic chemicals (SITC-512), medicinal and pharmaceutical products (SITC-541), chemical materials and products (SITC-599), textile yarn and thread (SITC-651), made-up articles, wholly or chiefly of textile material (SITC-656), lime, cement and fabric building materials (SITC-661), pearls and precious and semi-precious stones (SITC-667), electric power machinery and switchgear (SITC-722), clothing (SITC-841) and footwear (SITC-851) experienced high growth with low instability. The commodities namely fish (SITC-031), fruits (SITC-051), tea and mate (SITC-074), feed-stuff for animals (SITC-081), leather (SITC-611), cotton fabrics (SITC-652) and floor coverings, tapestries, etc. (SITC-657) recorded low instability and low growth. Thus, it can be said that majority of India's exports experienced high growth of earnings with low export earnings instability during the period under study.

Table 2 presents a picture of decomposition of components of instability (variance) of India's selected export commodities during the period from 1991 to 2006. It is clear from the data that quantity variables were found to the dominant variables causing instability in majority of selected commodities except the commodities like iron ore and concentrates (SITC-281), cotton fabrics (woven) (SITC-652), made-up articles, wholly or chiefly of textile material (SITC-656), electric power machinery and switchgear (SITC-722), clothing (SITC-841) and footwear (SITC-851) in which price is the dominant variable of instability. The negative sign with the co-variance term shows dominance of supply variable in most of the commodities except the commodities namely tea and mate (SITC-

074), feed-stuff for animals (SITC-081), universals plates and sheets of iron or steel (SITC-674) and electric power machinery and switchgear (SITC-722) during the period under study.

Table 3 highlights the role of demand and supply variables in instability of export earnings during the period from 1991 to 2006. The instability indices of export earnings, export volume and export price (unit value) have also been given in the table. The analysis of the correlation between the de-trended series of export earnings and export volume and between the de-trended series of export earnings and export prices (on the basis of Appendix I) exhibits that in case of fourteen commodities role of demand and supply could not be determined as export volume data is not available in case of four commodities and the remaining ten commodities could not fulfill the four conditions of the model used. Therefore, out of the remaining sixteen commodities, supply fluctuations were dominant in case of the majority of the selected exports except feed-stuff for animals (SITC-081) and iron ore and concentrates (SITC-281). In case of these two commodities, export earnings instability was mainly due to demand variations.

Table 4 reveals the instability of exports by commodity structure during the period from 1991 to 2006. It also shows the contribution of the specific commodities in total export instability and its stabilization/destabilization effect (excessive contributor to instability) on total export earnings. The first column (IDX) in table 4 indicates the absolute level of export earning instability. The second column indicates the mean share (R) of each commodity. The 'contribution percentage index (CP)' a measure widely used as an indicator of the contribution of a given commodity (or market outlet) to the instability in total export instability (Coppock, 1962) has been given in the column fourth. This is calculated by multiplying the absolute instability index of each commodity/group (Column 1) by its relative share (Column 2) and expressing it as a percentage of the sum of the product. The rationale of this is that contribution of each commodity to total export instability depends on both its absolute instability and the relative share in export composition. A general criterion to determine whether a given commodity contributes excessively to total instability is the extent to which the contribution percentage (CP) exceeds its relative share. A convenient way is to express the former as a ratio of the latter. The fifth column provides the information regarding the stabilization/destabilization effect of the selected commodities on overall export earnings. If (CP/R)>1 then the given commodity is an 'excessive contributor to instability. Table 4 reveals several important aspects of commodity profile of export instability behaviour. On the basis of the results of absolute instability index (IDX), it was found that majority of the commodities have realized high instability. Among the selected export commodities, rice (SITC-042), feed-stuff for animals (SITC-081), iron ore and concentrates (SITC-281), petroleum products (SITC-332), pearls and precious and semi-precious stones (SITC-667), clothing (SITC-841) and jewellery (SITC-897) were found to be the large contributors to overall export instability (as highlighted by the term CP in the respective table). Fish (SITC-031), fruits (SITC-051), tea and mate (SITC-074), organic chemicals (SITC-512), synthetic organic dyestuffs, natural indigo and lakes (SITC-531), medicinal and pharmaceutical products (SITC-541), cotton fabrics (woven) (SITC-652), textile fabrics (woven) (SITC-653), made-up articles, wholly or chiefly of textile material (SITC-656), floor coverings, tapestries, etc. (SITC-657), pearls and precious and semi-precious stones (SITC-667), machinery and appliances non electrical parts (SITC-719), clothing (SITC-841) and footwear (SITC-851) appeared to be most stable in terms of the degree of the relative contribution to total instability and have stabilization effect on India's export earnings during the period under study. On the other hand, all the commodities have more or less destabilization effect on India's export instability and emerged as excessive contributors to the instability.

Table 5 reveals several important aspects of profile of export instability behaviour by trading partners during the period from 1991 to 2006. It reveals the contribution of specific market in total export instability and its stabilization/destabilization effect on total export earnings. The export destinations which have examined here constitute more than 75 per cent share of total export earnings. Similar to the commodity-wise analysis of instability, contribution share index (CP) and contribution percentage ratio (CP/R) indices have been for each export destination respectively to estimate export instability behaviour by trading partners. Based on the absolute instability index values, the developed countries occupy the lowest position in the absolute instability ranking as compared to developing countries. Among the both developing and developed countries, USA, Japan, Russia UAE, Bangladesh, China, Honk Kong, and Singapore emerged as large contributors to the overall export instability. All the selected developed countries have strong stabilization effect on India's exports as relative contribution to total instability of each of these countries found to be well below their relative share in overall export earnings. With respect to their importance in India's overall export earnings, among the developing economies Iraq, Romania, Bhutan, Maldives, Pakistan, China, South Korea, Singapore Egypt, Kenya and Sudan have destabilization effect and proved as excessive contributors to instability to India's export earnings. Contrary to these, all other developing economies such as Kuwait, Saudi Arabia, U.A.E, Bangladesh, Nepal, Sri Lanka, Honk Kong, Malaysia, Thailand, Tanzania, Zambia and Latin American Countries have strong stabilization effect on India's exports earnings during the study period. Thus, it is held that exports to the developed countries have been characterised by lower absolute instability and lesser contribution to total instability and have strong stabilization effect on India's export earnings as compared to the developing countries during the study period.

CONCLUDING REMARKS

Based on the above results, it is concluded that growth of India's exports during post-reform and post-WTO period remained to be as high as of 12.79 per cent that is well above the growth of exports of majority of the developed and developing countries (Singh, 2011). The scene at the instability side is also found to be satisfactory as instability of total export earnings is recoded as low as of 1.40 per cent per annum. At disaggregate level, among selected commodities, except the six commodities namely fish (SITC-031), fruits (SITC-051), tea and mate (SITC-074), feed-stuff for animals (SITC-081), woven cotton fabrics (SITC-652), and floor coverings, tapestries, etc. (SITC-657), all other commodities registered high rate of growth. Except the commodities namely iron ore and concentrates (SITC-281), petroleum products (SITC-332), ingots and other primary forms of iron (SITC-672) and copper (SITC-682), all other commodities experienced low instability during the study period. It means that majority of India's exports (selected commodities) experienced high growth and low earnings instability during post-reform as well as post-WTO period. Further, the analysis of instability of India' export reveals that export instability was primarily due to the dominance of quantity variables in case of majority of India's exports. It is also observed that instability in India's export earnings is mainly due to supply variations. Thus, dominance of quantity and supply variations in the instability of the majority of the commodities indicates towards the existence of supply bottlenecks in the Indian economy for the respective commodities. Although, the government had removed these bottlenecks by introducing several trade policy reforms, but still supply bottlenecks contribute to the instability of Indian exports during the study period. Besides, out of the selected commodities, fourteen commodities have strong stabilization effect on the export earnings during the study period. Analysis also reveals that developed countries occupy the lowest position in the instability ranking as compared to developing countries and found to be most stable markets for India's export and thus have strong stabilization effect on India's export earnings. However, several developing economies such as Kuwait, Saudi Arabia, U.A.E, Bangladesh, Nepal, Sri Lanka, Hong Kong, Malaysia, Thailand, Tanzania, Zambia and Latin American Countries have stabilization effect on India's export earnings during the period under study. Provision of export subsidies, tax concessions, tax holidays, duty refund, removal of the restrictions from import technology and raw materials used in export based industries and establishment of Special Economic Zones (SEZs) in India has benefited export by various ways. Appropriate domestic policy reforms would be essential for abolition of domestic supply bottlenecks and for maintaining quality and cost competitiveness of exports in global market. Deepening of reforms into specific export sectors would stimulate India's export; result compositional and geographical diversification; help to remove supply bottlenecks operating in the economy and help improving export competitiveness.

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TABLES

TABLE 1: GROWTH AND INSTABILITY OF INDIA'S SELECTED EXPORTS DURING 1991-2006

S.N.	Commodity Code	Growth of Export Earnings	Growth of Export Volume	Growth of Export Price	Export Earning Instability	Export Volume Instability	Export Price Instability
1	SITC-031	4.96	5.35	-0.37	1.98	2.87	7.39
2	SITC-042	9.81	13.10	-2.91	5.50	6.50	-21.21
3	SITC-051	5.66	14.74	-7.92	2.09	3.78	31.14
4	SITC-074	0.24	0.31	-0.07	2.97	2.28	12.56
5	SITC-081	3.90	1.50	2.37	6.48	4.33	-7.79
6	SITC-281	15.74	2.75	12.65	9.44	6.25	-23.96
7	SITC-332	31.11	0.00	0.00	16.05		
8	SITC-512	20.20	21.47	-1.05	2.21	2.47	17.99
9	SITC-531	7.19	11.97	-4.28	2.10	2.19	6.71
10	SITC-541	15.17	-	-	1.53	-	-
11	SITC-581	26.88	31.08	-3.21	4.78	6.52	127.48
12	SITC-599	18.00	18.58	-0.49	2.99	3.06	19.78
13	SITC-611	6.40	3.96	2.35	3.50	9.38	4.63
14	SITC-629	10.38	14.42	-3.54	1.21	5.30	82.47
15	SITC-651	9.04	9.89	-0.77	3.26	8.69	66.15
16	SITC-652	1.63	-9.26	12.00	2.02	10.34	71.31
17	SITC-653	9.00	-3.23	12.64	0.60	2.18	24.45
18	SITC-656	12.67	1.34	11.18	1.36	9.00	52.68
19	SITC-657	4.13	2.35	1.74	2.47	4.94	12.86
20	SITC-661	15.09	17.39	-1.96	3.80	5.66	-18.18
21	SITC-667	10.09	-	-	1.14	-	-
22	SITC-672	25.56	23.07	2.02	8.14	9.81	-52.57
23	SITC-674	26.10	21.78	3.54	4.40	5.55	-39.61
24	SITC-682	48.55	48.77	-0.14	13.60	17.72	33.93
25	SITC-719	19.87	33.51	-10.21	2.64	9.19	21.50
26	SITC-722	21.14	7.77	12.40	4.29	13.86	24.86
27	SITC-732	15.09	75.98	-34.59	5.05	116.75	21.76
28	SITC-841	8.29	-3.70	12.45	0.93	8.52	37.94
29	SITC-851	9.70	3.25	6.25	2.86	7.60	16.67
30	SITC-897	21.03	-	-	2.55	-	-
	Total	**12.79**			**1.40**		

Computed from Commodity Trade Statistics Database, United Nations.

TABLE 2: COMPONENTS OF VARIANCE OF INDIA'S SELECTED EXPORTS DURING 1991-2006

	Commodity Codes	Var Log E	Var Log P	Var Log Q	2Cov Log P .Log Q	VAR Log P /Var Log Q	Var Q /Var P	Dominant Variable
1	SITC-031	0.013810	8.68	123.63	-32.31	0.07	14.24	Q
2	SITC-042	0.062619	18.66	177.54	-96.20	0.11	9.51	Q
3	SITC-051	0.016541	250.87	559.92	-710.78	0.45	2.23	Q
4	SITC-074	0.005217	30.69	44.81	24.50	0.68	1.46	Q
5	SITC-081	0.036192	15.29	61.52	23.19	0.25	4.02	Q
6	SITC-281	0.162679	112.98	43.71	-56.69	2.58	0.39	P
7	SITC-332	0.547554	-	-	-			ND
8	SITC-512	0.157351	2.94	111.39	-14.33	0.03	37.89	Q
9	SITC-531	0.024510	43.70	242.55	-186.26	0.18	5.55	Q
10	SITC-541	0.092313	-	-	-			ND
11	SITC-581	0.269999	7.15	131.38	-38.52	0.05	18.37	Q
12	SITC-599	0.129170	5.54	104.60	-10.14	0.05	18.88	Q
13	SITC-611	0.024759	21.49	86.55	-8.04	0.25	4.03	Q
14	SITC-629	0.181088	137.27	263.57	-300.84	0.52	1.92	Q
15	SITC-651	0.043342	106.90	216.23	-223.13	0.49	2.02	Q
16	SITC-652	0.004324	3086.38	2401.04	-5387.43	1.29	0.78	P
17	SITC-653	0.246097	58.54	89.68	-48.22	0.65	1.53	Q
18	SITC-656	0.065869	144.52	71.49	-116.02	2.02	0.49	P
19	SITC-657	0.011789	81.73	100.99	-82.72	0.81	1.24	Q
20	SITC-661	0.097423	25.52	152.91	-78.44	0.17	5.99	Q
21	SITC-667	0.043463	-	-	-			ND
22	SITC-672	0.266921	13.14	96.66	-9.80	0.14	7.36	Q
23	SITC-674	0.255474	6.98	78.11	14.91	0.09	11.19	Q
24	SITC-682	0.186897	19.59	166.92	-86.52	0.12	8.52	Q
25	SITC-719	0.153523	63.71	261.06	-224.77	0.24	4.10	Q
26	SITC-722	0.176644	53.47	43.01	3.52	1.24	0.80	P
27	SITC-732	0.108696	970.50	1648.22	-2518.72	0.59	1.70	Q
28	SITC-841	0.029738	403.91	220.54	-524.45	1.83	0.55	P
29	SITC-851	0.043793	93.20	41.58	-34.78	2.24	0.45	P
30	SITC-897	0.170142	-	-!	-			ND

Note: Var E: Variance of Export Earnings, Var Q: Variance of Export Volume, Var P: Variance of Export Earnings, 2 Cov Log P. Log Q: Covariance Coefficient = Price, S= Supply
Computed from Commodity Trade Statistics Database, United Nations.

TABLE 3: INSTABILITY OF EXPORT EARNINGS, VOLUME AND PRICE AND ROLE OF DEMAND AND SUPPLY VARIABLES DURING 1991-2006

	Commodities	Export Earnings Instability (EEI)	Export Price Instability (EPI)	Export Volume Instability (EVI)	r(EQ)	r(EP)	Comparison	DV
1	SITC-031	1.98	7.39	2.87	0.88	-0.11	r(EQ) > r(EP)	ND
2	SITC-042	5.50	-21.21	6.50	0.92	-0.44	r(EQ) > r(EP)	3
3	SITC-051	2.09	31.14	3.78	-0.09	0.59	r(EQ) < r(EP)	4
4	SITC-074	2.97	12.56	2.28	0.85	0.78	r(EQ) >r(EP)	ND
5	SITC-081	6.48	-7.78	4.33	0.95	0.60	r(EQ) >r(EP)	1
6	SITC-281	9.44	-23.96	6.25	0.11	0.66	r(EQ) < r(EP)	2
7	SITC-332	16.05	--	--	--	--	--	ND
8	SITC-512	2.21	17.99	2.47	0.50	0.52	r(EQ) < r(EP)	4
9	SITC-531	2.10	6.71	2.19	0.53	0.68	r(EQ) < r(EP)	4
10	SITC-541	1.53	--	--	--	--	--	
11	SITC-581	4.78	127.48	6.52	0.63	0.17	r(EQ) > r(EP)	ND
12	SITC-599	2.99	19.78	3.06	0.21	0.71	r(EQ) < r(EP)	4
13	SITC-611	3.50	4.63	9.37	0.92	-0.48	r(EQ) > r(EP)	3
14	SITC-629	1.21	5.30	82.47	0.38	-0.15	r(EQ) > r(EP)	3
15	SITC-651	3.26	66.15	8.69	0.38	0.05	r(EQ) > r(EP)	ND
16	SITC-652	2.02	71.31	10.34	-0.40	0.57	r(EQ) < r(EP)	4
17	SITC-653	0.60	2.18	24.45	0.83	-0.69	r(EQ) < r(EP)	ND
18	SITC-656	1.36	52.68	8.99	0.21	-0.03	r(EQ) > r(EP)	ND
19	SITC-657	2.47	12.86	4.94	0.43	0.27	r(EQ) > r(EP)	ND
20	SITC-661	3.80	-18.18	5.66	0.54	-0.06	r(EQ) > r(EP)	3
21	SITC-667	1.14	--	--	--	--	--	ND
22	SITC-672	8.14	-52.57	9.81	0.69	0.04	r(EQ) > r(EP)	3
23	SITC-674	4.40	-39.6	5.55	0.69	0.03	r(EQ) > r(EP)	3
24	SITC-682	13.60	33.93	17.72	0.74	0.44	r(EQ) > r(EP)	ND
25	SITC-719	2.64	21.5	9.19	-0.84	0.93	r(EQ) < r(EP)	4
26	SITC-722	4.29	24.86	13.86	0.62	-0.21	r(EQ) > r(EP)	ND
27	SITC-732	5.05	21.76	116.75	0.77	-0.65	r(EQ) >r(EP)	3
28	SITC-841	0.93	37.94	8.52	0.15	-0.02	r(EQ) > r(EP)	ND
29	SITC-851	2.86	16.67	7.60	-0.34	0.71	r(EQ) < r(EP)	4
30	SITC-897	2.55	--	--	--	--	--	

Computed from Commodity Trade Statistics Database, United Nations.

Notes:
1= Shift in Demand with an elastic supply curve
2= Shift in demand curve with and inelastic supply curve
3=Shift in supply curve with and elastic demand curve
4=Shift in Supply curve with an inelastic demand curve
ND= Not Determined

TABLES 4: INSTABILITY OF EXPORTS BY COMMODITY STRUCTURE DURING 1991-2006

	Commodities Codes	Instability Index (IDX_i)	Relative Share in Total Exports (R_i)	IDX_i*R_i	Contribution In Total Instability (CP_i)	De/Stabilization EffectCP_i/R_i
1	SITC-031	7.17	2.77	19.86	1.92	0.69
2	SITC-042	28.07	2.14	60.07	5.81	2.72
3	SITC-051	8.58	1.27	10.90	1.05	0.83
4	SITC-074	9.88	1.05	10.37	1.00	0.96
5	SITC-081	20.28	1.74	35.29	3.42	1.96
6	SITC-281	17.74	2.04	36.19	3.50	1.72
7	SITC-332	30.41	4.92	149.62	14.48	2.94
8	SITC-512	9.56	3.07	29.35	2.84	0.93
9	SITC-531	7.64	2.77	21.16	2.05	0.74
10	SITC-541	5.11	1.05	5.37	0.52	0.49
11	SITC-581	17.41	0.87	15.15	1.47	1.68
12	SITC-599	10.54	0.98	10.33	1.00	1.02
13	SITC-611	11.08	0.92	10.19	0.99	1.07
14	SITC-632	12.98	0.9	11.68	1.13	1.26
15	SITC-651	12.44	2.34	29.11	2.82	1.20
16	SITC-652	7.45	0.16	1.19	0.12	0.72
17	SITC-653	7.05	1.97	13.89	1.34	0.68
18	SITC-656	6.63	2.18	14.45	1.40	0.64
19	SITC-657	5.43	1.76	9.56	0.92	0.53
20	SITC-661	16.99	0.76	12.91	1.25	1.64
21	SITC-667	7.16	13.95	99.88	9.67	0.69
22	SITC-672	19.77	0.63	12.46	1.21	1.91
23	SITC-674	16.93	1.22	20.65	2.00	1.64
24	SITC-682	23.08	0.5	11.54	1.12	2.23
25	SITC-719	6.59	1.52	10.02	0.97	0.64
26	SITC-722	13.05	0.78	10.18	0.99	1.26
27	SITC-732	12.11	1.98	23.99	2.32	1.17
28	SITC-841	5.3	12.22	64.77	6.27	0.51
29	SITC-851	8.39	0.98	8.22	0.80	0.81
30	SITC-897	16.47	2.61	42.99	4.16	1.59
	Others	7.94	27.95	221.92	21.48	0.77
	Total	**5.73**	**100.00**	**1033.25**	**100.00**	--

Computed from Commodity Trade Statistics Database, United Nations.

TABLE 5: INSTABILITY OF EXPORTS BY TRADING PARTNER DURING 1991-2006

Countries	Instability Index (IDX_j)	Relative Share in Total Exports (R_j)	IDX_j*R_j	Contribution in Total Instability (CP_j)	De/Stabilization Effect CP_j/R_j
Belgium	6.54	3.39	22.19	1.40	0.41
France	7.10	2.21	15.68	0.99	0.45
Germany	5.89	5.31	31.26	1.97	0.37
Italy	9.52	2.94	28.01	1.76	0.60
Netherlands	10.09	2.19	22.07	1.39	0.63
U.K.	8.71	5.59	48.70	3.06	0.55
Canada	6.26	1.15	7.17	0.45	0.39
U.S.A	6.12	18.54	113.46	7.14	0.39
Australia	7.35	1.04	7.66	0.48	0.46
Japan	8.62	5.33	45.99	2.89	0.54
Russia	15.50	3.30	51.21	3.22	0.98
Switzerland	6.63	0.89	5.87	0.37	0.42
Indonesia	22.13	1.22	27.09	1.70	1.39
Iran	13.23	0.77	10.15	0.64	0.83
Iraq	52.05	0.12	6.50	0.41	3.28
Kuwait	9.46	0.46	4.34	0.27	0.60
Saudi Arabia	9.50	1.87	17.73	1.12	0.60
U.A.E.	8.57	5.79	49.65	3.12	0.54
Romania	26.80	0.08	2.16	0.14	1.69
Bangladesh	15.02	2.17	32.57	2.05	0.95
Bhutan	30.66	0.05	1.45	0.09	1.93
Maldives	21.21	0.05	0.96	0.06	1.33
Nepal	15.40	0.54	8.36	0.53	0.97
Pakistan	25.22	0.40	10.19	0.64	1.59
Sri Lanka	8.83	1.45	12.78	0.80	0.56
China,	24.04	2.55	61.22	3.85	1.51
Hong Kong	12.26	5.02	61.57	3.87	0.77
South Korea	17.29	1.27	21.88	1.38	1.09
Malaysia	14.08	1.24	17.39	1.09	0.89
Singapore	16.80	2.95	49.59	3.12	1.06
Thailand	9.88	1.27	12.52	0.79	0.62
Benin	15.52	0.07	1.14	0.07	0.98
Egypt	16.47	0.62	10.24	0.64	1.04
Kenya	20.95	0.44	9.17	0.58	1.32
Sudan	16.58	0.17	2.85	0.18	1.04
Tanzania	13.40	0.24	3.22	0.20	0.84
Zambia	11.72	0.09	1.03	0.06	0.74
LACs*	14.35	1.82	26.18	1.65	0.90
Others	47.25	15.40	727.84	45.80	2.97
Total Trade	**8.03**	**100.00**	**1589.03**	**100.00**	**1.00**

Note: LACs*: Latin American Countries
Computed from Handbook of Statistics on Indian Economy, RBI

APPENDIX

APPENDIX I: METHOD FOR EXAMINING THE ROLE OF DEMAND AND SUPPLY IN EXPORT INSTABILITY

Variations in export earnings instability are generated by the interaction between variations in export quantity and price, which are in turn due to shifts in export demand or supply. Consequently the degree of association between the degree of price and quantity instability and degree of earning instability is determined by two main factors, namely the relative importance of demand and supply shifts and price elasticities of demand and supply.

If the demand curve is not stable while supply curve remains relatively stable, the trend corrected price series tend to move in similar direction. Therefore, earning instability is higher in comparison to price and quantity instability. The relative importance of quantity instability is determined by the elasticities of supply curve. If the supply curve is price elastic, quantities tend to be relatively less stable. Therefore, variations in earnings will be highly correlated variations in quantities than those in prices. If supply curve is inelastic, the converse will be true.

If the supply curve shifts while the demand curve remains relatively less stable, trend deviations of the price and quantities series will behave in a compensatory manner, making earnings less unstable than either prices or quantities. Assuming that the demand curve is elastic, variations in earnings will closely follow the time path of volume variations. Earnings instability tends to be lower than price instability because of the compensatory nature of price and quantity variations. On the other hand, if demand curve is inelastic, trend-corrected earnings will closely follow the time path of the trend corrected price series. Price instability is more than volume instability and earnings instability will also tend to be lower than the former.

The foregoing discussion suggests that by observing the relationship of price, earnings, and quantity variations around their respective trends, we can identify whether earning instability is predominantly caused by demand or supply shifts. Moreover, by comparing the relative magnitude of the measured instability of price and quantity and the correlation between the de-trended series of price and quantity and de-trended series of earnings, some inferences as to the degree of price elasticity of the curve which remains stable, can made for. For the purpose of expository simplicity, these demand and supply configuration can be classified as follow:

1. **Shift in Demand with an elastic supply curve**
   EI > PI , EI > QI, PI > QI and r(EQ) > r(EP)
2. **Shift in demand curve with and inelastic supply curve**
   EI > PI , EI > QI, PI > QI and r(EQ) < r(EP)
3. **Shift in supply curve with and elastic demand curve**
   EI < QI PI , PI < QI and r(EQ) > r(EP)
4. **Shift in Supply curve with an inelastic demand curve**

EI < PI , PI > QI and r(EQ) < r(EP)

Where
EI= Export earnings Instability
PI= Price Instability
QI= Quantity Instability
r(EP)= Correlation between trend corrected series of export earnings and export price
r(EQ)= Correlation between trend corrected series of export earnings and export quantity

Source: Kaundal (2005)

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