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A STUDY ON THE DETERMINANTS OF EXPORT DEMAND OF INDIA AND KERALA

DR. L. ANITHA
ASSOCIATE PROFESSOR
KARUNYA SCHOOL OF MANAGEMENT
KARUNYA UNIVERSITY
KARUNYA NAGAR
COIMBATORE – 641 114

ABSTRACT

Exports have assumed a place of paramount importance in the development process of the economy. The process of economic reforms in the Indian economy has continued for more than two decades and the economy, now, has a completely different profile to that of June 1991. The aim of this paper is to try and identify the determinants of export demand of India and Kerala and finds that the explanatory variables are predominant in explaining India's disaggregate export performance during 1991-92 to 2008-09. Most exports are found to be responsive to world imports. On the upswing of international growth trajectory, exports are found to have responded to growing world demand. The estimated results indicate that world import, unit value of exports and import price affect India's real exports positively.

KEYWORDS
Exports, imports, demand and structural stability.

INTRODUCTION
Indian exports have received considerable empirical attention in the past. The reforms process that was in initiated in 1991 sought to integrate the Indian economy with the world and to improve the incentive structure towards more efficient utilization of resources so as to achieve faster economic growth, reduction of absolute poverty and promotion of human development. T.N.Srinivasan (1996) found that Indian exports could have done better in terms of gaining market share and has in certain commodities lost share to other developing countries. The policy implication derived from these include an urgent addressing of the infrastructural constraints, which would improve export competitiveness not only by reducing costs, but also by attracting Foreign Direct Investment (FDI); completion of financial sector reforms and avoidance of inflationary financing of fiscal deficits in order to prevent real appreciation of rupee.

Veena Mishra (1998) documents India's export performance and the various policy regimes in force since independence that explains its dismal nature. The external sector is rightly seen as being influenced not only by foreign trade policies but also by the whole plethora of controls on economic activity – in the form of industrial licensing, import controls, labour laws, exchange rate controls and the thoroughly unplanned nature of incentives that they resulted in preventing India from reaping the gains from a liberalizing and growing world in the post World War II period.

The role that export orientation can play in Indian development by placing Indian experience in the context of countries that have either adopted export orientation as a conscious choice in the past or are in the process of trade liberalization has been studied by Tendulkar (1999). The focus is on exploring long term trends, and the analysis is done for sub-periods. He explores the relationship between exports and economic growth on the basis of an international cross section of 31 industrial countries. A single equation model is used, because the author expects the broad directional conclusion not to change if a simultaneous equation model postulating a two-way causal relationship between exports and economic growth is used. The results confirm that contribution of export volume growth is independent of world trade situation.

In examining the linkage between exports and growth, Hajra and Sinate (1997) conclude that increased openness of the current trade strategy of India would make domestic growth more important in shaping the future of country's export expansion.

They measure the price competitiveness of India's exports using three indicators:
1.   India's export prices relative to competitors
2.   India's export prices relative to those of industrialized countries
3.   Real exchange rate based on consumer price index.

OBJECTIVES
1.   To identify the determinants of demand of exports of India and Kerala
2.   To find out the structural stability for demand of exports of India and Kerala

PERIOD OF STUDY
The period of study is confined to 18 years from 1991-92 to 2008-09

TOOLS OF ANALYSIS
Regression models have been developed to identify the determinants of demand for and supply of exports for the commodities under study. Chow tests were used to understand the presence of structural variations if any, in the data. To measure the instability of economic variables Cuddy-Della Valle index (corrected coefficient of variation) is used which takes into consideration the long-term trend.

MODELLING EXPORT DEMAND
Even though export expansion across sectors was coincidental with change in trade regimes, it would be too naïve to attribute the observed acceleration in export growth to trade liberalization per se. Supply or demand factors on their own can only determine export behaviour for short periods but cannot explain a long run phenomenon. It is the combination of supply and demand effects that cause long run export performance (Goldstein and Khan (1978, 1985), Arize (1990) and Muscatelli et al. (1992).

The behaviour of exports and imports model was tried by Virmani (1991), distinguishing demand and supplies analyzing manufactured and primary products. Krishnamurty and Pandit (1996) also tried to model the export and import behaviour by analyzing four groups of products following model for export and import demand and supply for different categories of exports for the period 1970-71 to 1990-91. Their model was estimated using volume of exports, unit value exports, exchange rate, and world real GDP. Virmani (1991) estimated demand and supply functions using unit value index of India's exports, unit value index of world exports, Real Effective Exchange Rate and average wholesale price index of all commodities. Estimates of these equations reveal a positive relationship between growth rates and GDP in manufacturing and an increase in price of manufactured exports. Virmani and for Krishnamurthy and Pandit, they get the opposite result – an increase in manufacturing sector GDP relative to total GDP leads to a fall in price of such exports.

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Joshi and Little (1994) estimate structural as well as non-structural equations for aggregate exports, for the period 1961-87. Their aggregate demand and supply functions include Indian export prices, price of exports of competitor countries, world income, domestic wholesale price index and domestic demand.

In the standard imperfect-substitute model of the trade literature, export demand function is specified as a function of a scale variable and relative export prices. In general, world GDP is considered as a scale variable according to Houthakker et al. (1969). Instead, in this model world import demand as a scale variable is employed as given by Winter (1984). The basic idea stems from the world link model by Sarkar (2004) where it is assumed that only the allocation decision of world imports has to be made according to sources of supply. Another difference in the model is the treatment of price variables in absolute term, instead of relative term. This implies that the demand function is homogenous of zero degree in prices and nominal income. Such assumption is expressed by including a single relative export price variable, which explains foreign consumers switch their demand between imports and domestic goods (Carone 1996).

The studies above underscore the importance of relative prices and world income in determining demand for Indian exports and of domestic income and relative prices in determining the supply. The trends in Indian exports are explained through variations in domestic factors namely income and price policies and through international circumstances – an approach that finds favour in the present study too, given the evidence presented in the ones reviewed.

EXPORT DEMAND FUNCTION OF INDIA

In this section, an attempt has been made to formulate India's export demand model. An estimation of the demand equation for total India's exports using time series data for the period from 1991-92 to 2008-09 is done. The demand for exports is taken as a function of the ratio of price of country's exports to world import demand, unit value index of India's exports and World's import price index, i.e.,

$$lnX_d = \alpha_0 + \alpha_1 (lnRWM)_t + \alpha_2 (lnUVX)_t + \alpha_3 (lnWMPX)_t + u_t \qquad (1)$$

Where	X_d	=	Real India's Export Demand
	RWM	=	Real World's Imports
	UVX	=	Unit Value Index of India's Exports
	WMPX	=	World's Import Price Index
	u_t	=	Error Term

REAL WORLD IMPORTS: The Real World's Imports (RWM) is measured in terms of the value of total imports of the world. The basic idea stems from the world link model where it is assumed that only the allocation decision of world imports has to be made according to the sources of supply (Sarkar 2004). An increase in real world imports will increase the real export demand of India. The coefficient associated with Real World Imports is expected to be positive and the value of α_1 less than one.

UNIT VALUE INDEX: To measure the price of India's exports in rupees, the Unit Value Index of India's Exports (UVX) is taken into account. Unit value index of exports is largely a monetary phenomenon. The rise in unit value is a function of a rise in domestic prices of exports as well as the world prices of exports. It is understood that foreign consumers switch their demand between imports and domestic goods and a higher price of exports for Indian goods leads to a decrease in demand for the products (Carone 1996 and Amal Sarkar, 2006). In other words, an increase in unit value of exports has an inverse relationship with exports. Therefore, the sign of the co-efficient α_2 is expected to be negative and less than one.

WORLD IMPORT PRICE INDEX: The variable World's Import Price Index is taken to measure the world import price. The purpose of world import price index is to measure the changes in the prices of goods and services exchanged in monetary transactions between India and the rest of the world. Rise in the price index leads to increase in exports. It is hypothesized that there is a positive relationship between the two. The coefficient is expected to be positive and the value of α_3 is expected to be less than one.

Since the variables are expressed in natural logarithms, the coefficients are elasticities. A priori, we would expect the coefficients of world import and world import price index would affect India's real exports positively. The co-efficient of India's unit value of export is expected to be negative. The equation is specified in natural logarithm term to get direct measure of constant elasticity from estimated equation with respect to explanatory variables. To measure the instability of economic variables Cuddy-Della Valle index (corrected coefficient of variation) is used which takes into consideration the long-term trend.

The data for variables pertaining to India are available on a financial year (April to March) basis, while that for variables pertaining to the world are available on a calendar basis. The variables for India therefore enter with a one-quarter lag in the equations, for example, the value for 1991-92 is used as that pertaining to the calendar year 1991. The time series data ranges from 1991-92 to 2008-09.

ESTIMATION AND INTERPRETATION OF FUNCTION:

On the basis of the theoretical specifications mentioned previously, a regression model based on OLS principle was run to estimate the log linear relationship. Table - 2 presents the coefficients of the estimated equation for the export demand function during 1991-92 to 2008-09.

$$India = -20.366 + 1.174\alpha_1 + 0.383\alpha_2 + 0.142_3 + u_t$$

$(R^2 = 0.994)$

The estimated results indicate that real world imports, India's unit value of exports and world import prices affect India's real exports positively. In other words, the related coefficients have expected signs except for that of unit value of exports which is expected to be negative. The elasticities for the real export demand function are estimated to be 1.174 for world import, 0.383 for unit value index of India's export and 0.142 for world import price. Thus, the estimated elasticities are found to be elastic with respect to the given variables (Table 1)

The coefficient of Real World Import is significant at 1 percent level implying that the real world imports play an important role in determining demand for Indian goods. The demand for our exports is not in consonance with that of unit value indexes of India's exports the elasticity being 0.383. It is understood that foreign consumers do not switch their demand between imports and domestic goods and a higher price of exports for Indian goods does not lead to a decrease in demand for the products The result for world import prices is statistically not significant and it implies that it does not affect the exports of India.

The value of R^2 and adjusted R^2 are on the higher side for the variables under study. The Durbin Watson test is less than two which states that there is positive auto correlation among the selected variables. However the study is not attempting on eliminating the auto correlation at present.

It will be interesting to see whether there is instability in the export demand for the exports of India. For this purpose Cuddy Della Valle index has been used. The instability indices in Table No.3 (Cuddy Della Valle Index) show the highest instability. The reason for such instability can be attributed to the fact that during the post reform period, many competitors have started taking a lion's share of India's export trade by being able to charge a much lower price when compared to Indian prices.

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TABLE – 1: EXPORT DEMAND FOR INDIA

Years	India's Exports (US $ Million)	Real India's Exports	World's Imports (1000 $)	Unit Value Index of India's Exports (Base 1978-79 =100)	World's Import Price Index
1991-92	17865.2	6107.76	3624950056	369.5	99.8
1992-93	18537.2	4238.48	3883352798	421.5	90.7
1993-94	22238.3	3909.98	3793677433	474.1	99.2
1994-95	26330.5	4690.63	4322481816	494.6	105.4
1995-96	31794.9	5323.59	5153894556	484.2	116.1
1996-97	33469.7	6566.48	5393478235	504.7	114.7
1997-98	35006.4	6631.60	5576998060	589.4	108.5
1998-99	33218.7	5636.02	5527101950	611.7	101.6
1999-00	36822.4	6019.68	5757992154	604.0	99.7
2000-01	44560.3	7377.53	6540626174	624.0	100.0
2001-02	43826.7	7023.51	6283204556	618.0	96.3
2002-03	52719.4	8530.65	6557581256	620.0	95.8
2003-04	63842.6	10297.19	7634150764	672.0	104.6
2004-05	83535.9	12430.94	9362766022	732.0	114.4
2005-06	103090.5	14083.40	10587295020	798	121.6
2006-07	126414.1	15841.37	12090236910	863	122.5
2007-08	162904.2	18876.50	14174782323	939.0	120
2008-09	185295	19733.23	15864753215	963.4	106

Source: IMF, International Financial Statistics, Various Issues The analysis of export demand
Government of India, Economic Survey, Various Issues
Food and Agricultural Organization Statistics

EXPORT DEMAND FUNCTION OF KERALA

The analysis of export demand of India gives rise to an important question whether all the states reflect the same behaviour. As a case study, Kerala has been chosen (Refer Table - 1 (A)). As mentioned earlier, Kerala is a leading agro based export state of the country. An attempt was made to estimate the export demand incorporating the real world imports (RWM), unit value index of India's exports (UVX) and World Import Price Index (WMPX) as the independent variables. The formulated function goes as follows:

$$InX_d = \alpha_0 + \alpha_1 (InRWM)_t + \alpha_2 (InUVX)_t + \alpha_3 (InMPX)_t + u_t \qquad (2)$$

Where X_d = Export Demand of Kerala
RWM = Real World's Imports
UVX = Unit Value Index of India's Exports
WMPX = World's Import Price Index
u_t = Error Term

ESTIMATION AND INTERPRETATION OF FUNCTION

The present section is devoted to study the impact of the above independent variables on export demand on the exports from Kerala on the whole. The estimated equations are:

Kerala = $-8.141 + 0.035\alpha_1 + 2.239\alpha_2 + 0.659\alpha_3 + u_t$
($R^2 = 0.944$)

The results indicate that R^2 values are high for all the equations presented in the table. It ranges at 94 percent which implies that 94 percent of changes in export demand is explained by the changes in hypothesized variables. The real world imports, the unit value index of India's exports and world import price index shows a positive influence on the dependent variable namely Export demand of Kerala. The coefficients arrived at for unit value index is statistically significant and goes against our theoretical expectations. It is understood that foreign consumers do not switch their demand between imports and domestic goods and a higher price of exports for Indian goods does not lead to a decrease in demand for the products. The F values are also significant for Kerala. Theoretically also it is found that the exports are facing cut throat competition from other countries and heavy fluctuations are noticed in the exports of these commodities. The Durbin Watson test reveals that there is auto correlation among the identified variables for the commodities exported from Kerala.

TABLE – 1(A): EXPORT DEMAND FOR KERALA

Years	Kerala's Exports (US $ Million)	Real India's Exports	World's Imports (1000 $)	Unit Value Index of India's Exports (Base 1978-79 =100)	World's Import Price Index
1991-92	1648.01	563.42	3624950056	369.5	99.8
1992-93	1757.73	390.99	3883352798	421.5	90.7
1993-94	2481.55	370.75	3793677433	474.1	99.2
1994-95	3480.23	523.42	4322481816	494.6	105.4
1995-96	4088	703.65	5153894556	484.2	116.1
1996-97	4435.71	844.28	5393478235	504.7	114.7
1997-98	4898	878.88	5576998060	589.4	108.5
1998-99	5673.14	962.53	5527101950	611.7	101.6
1999-00	5681.26	928.77	5757992154	604.0	99.7
2000-01	5689.05	941.90	6540626174	624.0	100.0
2001-02	6251.2	1001.79	6283204556	618.0	96.3
2002-03	6532.76	1057.08	6557581256	620.0	95.8
2003-04	5980.45	964.59	7634150764	672.0	104.6
2004-05	8033.73	1195.50	9362766022	732.0	114.4
2005-06	10122.84	1382.90	10587295020	798	121.6
2006-07	10336.8	1295.34	12090236910	863	122.5
2007-08	11322.7	1312.02	14174782323	939.0	120
2008-09	12828.37	1366.17	15864753215	963.4	106

Source: IMF, International Financial Statistics, Various Issues
Government of Kerala, Economic Review, Various issues

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TABLE – 3: EXPORT DEMAND OF INDIA AND KERALA: ESTIMATED EQUATION DEPENDENT VARIABLE: REAL EXPORT DEMAND TIME PERIOD 1991-92 TO 2008-09

Explanatory Variables	India	Kerala
Constant	-20.366	-8.141
	(-5.139)*	(-0.818)
lnRWM	1.174	0.035
	(3.804)*	(0.045)
lnUVX	0.383	2.239
	(1.306)	(3.042)
lnWMPX	0.142	0.659
	(0.643)	(1.184)
R^2	0.994	0.944
Adjusted R^2	0.992	0.927
F	536.103	55.019
Durbin Watson	1.116	1.094

Notes: 1. Figures in parenthesis are t-statistics
2.*, **, and *** indicate significance at 1%, 5% and 10% level, respectively for a two tail test.

Source: Computed

STRUCTURAL STABILITY FOR DEMAND OF EXPORTS OF INDIA AND KERALA

It is important to have stability in the structure of exports because it determines the growth of various sectors in the long run. Inconsistencies in the structure of exports may lead to unstable growth of local industries and sectors. In any study on export behavior, the stability of it is very crucial. So an attempt to study the structural stability of demand for exports is made in this section. The stability of export is studied using Chow Test (Chow 1960). This test is based on a comparison of the sum of squared residuals appeared by fitting a single regression equation of the model to the entire sample with the sum of squared residuals obtained when separate equations fit to each sub sample of the data. This test assumes that the error variances are equal in sub samples. The null hypothesis for such test is that the estimated error variances do not differ significantly with each other.

The parameter stability test has been performed for long-run elasticities of export (Table - 3). The null hypothesis is that there was no structural break of export demand equation in 1991 trade liberalization policy. Alternative hypothesis is that there has been a structural break or instability in export demand and supply function. For such study, the Chow breakpoint test follows three steps. Firstly, the entire sample (1991-92 to 2008-09) has been split in two phases and the first sub-sample (1991-92 to 1999-00) was used to obtain initial elasticity estimates. Secondly, the elasticities have been re-estimated with the second sub-sample (2000-01 to 2008-09). Finally, it has been tested whether the coefficients differ in the second sub-sample by the F test. The calculated F statistics have been presented in Table 4. It is observed that $F*> F_{0.05}$, (1167.5) and therefore it is inferred that the structural variation is present for India and it enables the researcher to accept the alternative hypothesis.

TABLE 3: TEST FOR EQUALITY OF ERROR VARIANCES IN SUB-SAMPLES FOR INDIA'S EXPORT DEMAND

Sub-Sample Period	Residual Sum of Squares	Degrees of Freedom	Error-Variance
1991-92 to 1999-00	0.007	4	0.4214
2000-01 to 2008-09	0.002	4	0.2266

Source: Computed

TABLE 4: CHOW TEST FOR THE STABILITY OF EXPORT DEMAND FUNCTION FOR INDIA

	Calculated Value	5% Critical Value
Real Export Demand lnX_d	F- Statistics (4,9) = 1167.50	3.63

Source: Computed

CONCLUSION

In this study, using econometric model, the factors determining demand of exports from India has been explored and are found to be predominant in explaining India's disaggregate export performance during 1991-92 to 2008-09. Most exports are found to be responsive to world imports. On the upswing of international growth trajectory, exports are found to have responded to growing world demand. The estimated results indicate that world import, unit value of exports and import price affect India's real exports positively.

The results highlight the importance of demand effects in providing a viable strategy towards export growth. While prices provide the incentives for exports, world import was found to be significant in determining India's disaggregate export behaviour. In order to understand the stability of exports, Chow Test was used. The demand functions of export for the two time periods are not similar. This implies that the economic reform policy measures do have an impact on the export demand function.

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