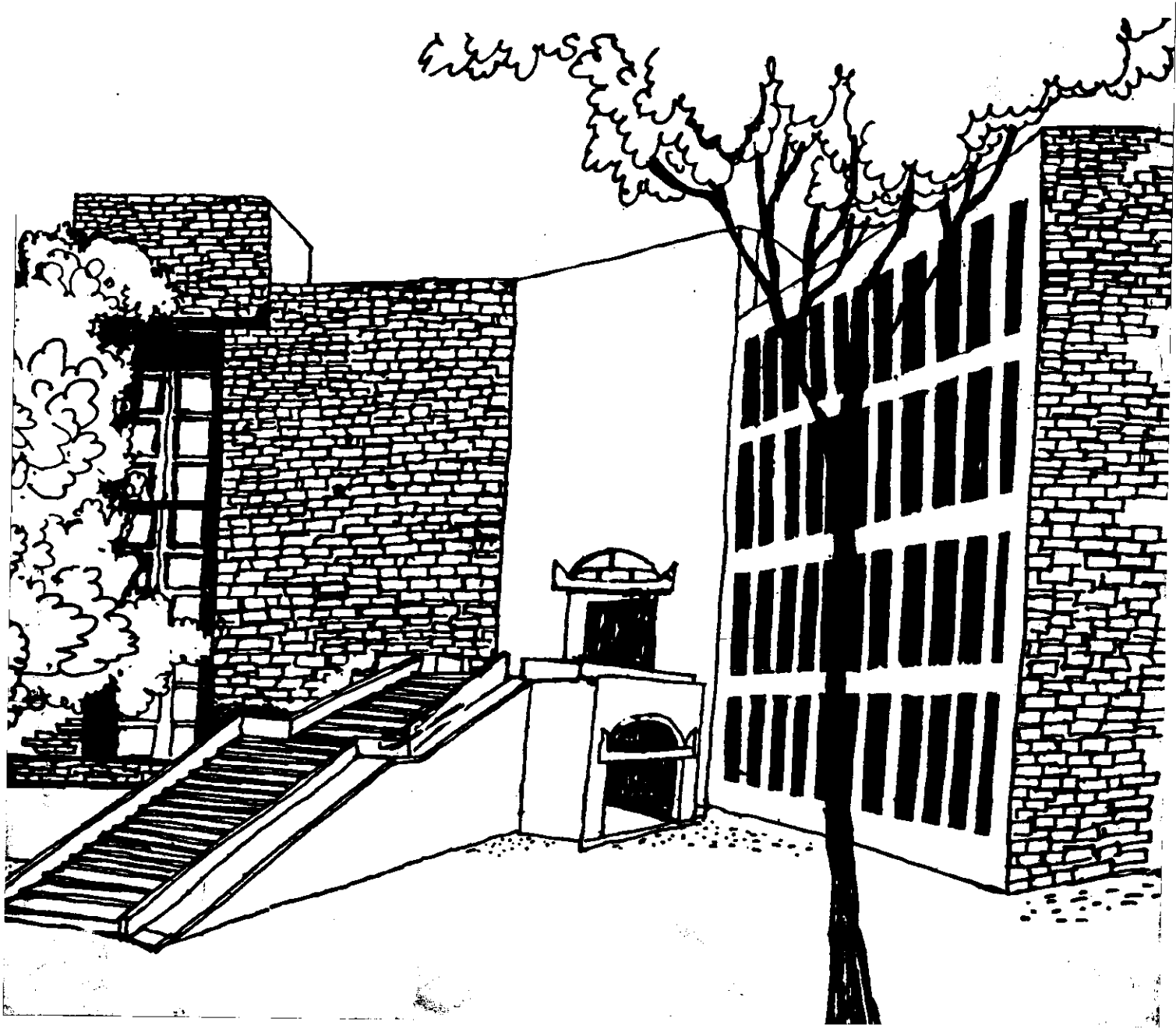




Working Paper



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A Strategic Perspective**

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Determinants of Export Performance of Indian Firms – A Strategic Perspective

Ravindra H. Dholakia*

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ABSTRACT

[Macroeconomic policy reforms initiated in India since 1991 have brought about a significant improvement in the export performance of Indian firms. This paper examines the export performance of firms with the help of balance sheet data of 557 firms for the years 1980-81 to 1995-96. Applying panel Tobit model, it explains the improved export performance through changes in various firm level variables as well as economic environmental factors derived from existing literature on experiences of different countries. The paper also draws certain strategic and policy implications likely to be relevant for emerging economies from its findings on India.]

I. Introduction

India started undertaking major economic policy reforms from the year 1991. This has resulted in a significant improvement in the export performance of India. However, the question that arises is as to what has been the change in performance of firms that grew up in a highly protective economic environment prior to 1991? Particularly, has there been any significant change in their export performance? What are different firm level variables that influence export

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performance? Has there been any change in the extent of the influence of such variables with policy changes compared to the protective policy era before? Answers to these questions are necessary for formulating an appropriate business strategy at the firm level and a national strategy for export promotion not only in India but also in several similar emerging economies.

The literature available on the firm level variables having influence on export performance shows absence of comprehensive and detailed studies on the subject. Different studies taken together have examined a number of variables but only a few of them have been considered in any given study. Thus, although no single comprehensive study is available on the topic in the literature; different studies can help identify several firm level determinants of export performance from the experience of numerous countries. Thus, *Firm Size* exerts a significant positive influence on exports according to the studies by Lee and Habte-Giorgis (2004) for US manufacturing firms; Aitken, Hanson and Harrison (1997) for Mexican firms; Roberts and Tybout (1997) for Columbian firms; Hirsch and Adar (1974) for firms in Israel; Christensen (1987) and Wilmore (1992) for Brazilian firms; Ito and Pucik (1993) for Japanese firms; Bernard and Wagner (1996) for German firms; Wignaraja (1998) for Sri-Lankan firms; Wignaraja and Ikiara (1999) for Kenyan firms; Lall and Kumar (1981), Goldar and Banga (1999) and Dholakia and Kapur (1999) for Indian firms. Similarly, *Research and Development (R&D) expenditure* has a significant positive influence on the export performance in studies by Hirsch and Bijaoni (1985) and Hirsch et al (1988) for Israeli firms; Ito and Pucik (1993) for Japanese firms; Wignaraja and Ikiara

(1999) for Kenyan firms; Lee and Habte-Giorgis (2004) for US manufacturing firms; and Kumar and Siddharthan (1993) for Indian firms. However, Lall and Kumar (1981) and Lall (1986) report a negative influence of R&D expenditure in the Indian engineering and chemical firms on their export behaviour. The studies by Dholakia and Kapur (1999), and Goldar and Banga (1999) for Indian firms found a positive relationship between *Technology Imports* and export performance. The role played by *Import Intensity* in determining the export performance of firms is, however, controversial as seen from the studies on the same country. Thus, Pant (1993), Export-Import Bank of India (1996), and Dholakia and Kapur (1999) find a positive influence but Siddharthan (1989) and Patibandla (1992) find a negative relationship between import intensity and firm level export performance in India. *Capital Intensity* that gives competitive advantage to a firm through the production of technologically superior or better quality products, however, gives a negative relationship with export performance for Indian firms (Pant, 1993; Siddharthan, 1989; and Kumar and Siddharthan, 1993). However, Bernard and Wagner (1996) have found the exporting firms to be much more capital-intensive than the non-exporting firms in Germany- indicating positive influence of capital intensity on export performance.

Other variables found to have a significant positive influence on the export performance of firms include *Advertisement Expenditure* undertaken by a firm (Wilmore, 1992 for Brazilian firms), *Firm Level Growth* (Christensen, 1987 for Brazilian firms), *Product Quality* (Hirsch and Bijaoni, 1985 for Israeli firms), *Product Diversification* (Lee and Habte-Giorgis, 2004 for US firms), *Firm Level*

Diversification (Christensen, 1987 for Brazilian firms), *Foreign Ownership* (Wilmore, 1992 for Brazilian firms), *Number of Past Innovations* (Wakelin, 1998 for UK firms), *Innovations* (Lachenmaier and Woessmann, 2004 for German firms), *Plant Characteristics Indicative of Past Success* (Bernard and Jensen, 2001 for US firms), *Productivity Improvements* (Arnold and Hussinger, 2004 for German firms), *Government Policies* (Patibandla, 1988 for Indian firms), and *Skills* (Kumar and Siddharthan 1993 for Indian firms).

The present study attempts to consider most of these variables within a simplified framework to explain the export behaviour of a firm. In order to examine their empirical importance, we have used a large panel consisting of 557 Indian firms over 16 years. In the next section, we present the basic framework and specific hypotheses about the determinants of the export behaviour of firms. The third section briefly discusses the nature of the sample of companies used in the study along with the econometric estimation of the model. Appendix provides precise definition of variables and their measurements used in the study. We discuss the results and their interpretation in the fourth section. The paper concludes by summarising the main findings and their strategic and policy implications in an emerging economy.

II. Framework and Hypotheses

For a firm in a developing country existing in a highly protective environment under the pre-liberalisation and pre-globalisation era like the one in India prior to 1991-92, the domestic market and the foreign market for its products are distinct.

The price elasticity of its demand is likely to be significantly less in the domestic market than in the foreign market. Thus, in the demand curves

$$P_D = a - bX_D \dots\dots\dots(1)$$

$$P_F = A - BX_F \dots\dots\dots(2)$$

Intercepts a and A [representing the choke prices respectively in the domestic and foreign markets] will show the following inequality:

$$a > A \dots\dots\dots(3)$$

The firm interested in maximising its profit would consider the combined marginal revenue (CMR) if it were also to export the product.

$$\begin{aligned} \text{CMR} &= a - 2bX \quad \text{when } 0 \leq X \leq (a - A) / 2b \\ &= [1/(b + B)] (Ab + aB - 2 BbX) \quad \text{when } X > (a - A) / 2b \dots\dots\dots(4) \end{aligned}$$

$$\text{where } X = X_D + X_F \dots\dots\dots(5)$$

Assuming constant marginal cost, c , and fulfilment of the second order conditions, the profit maximising output of the firm is:

$$X = (Ab + aB - cb - cB) / 2Bb \dots\dots\dots(6)$$

$$\text{and } X_F / X = b(A - c) / [b(A - c) + B(a - c)] \dots\dots(7)$$

Thus, the export intensity (X_F/X) or the ratio of exports to sales becomes a systematic function of the five basic parameters in the model. All the partial derivatives are also well defined and show uni-directional relationships:

$$\partial(X_F / X) / \partial A > 0 \dots\dots\dots(8)$$

$$\partial(X_F / X) / \partial b > 0 \dots\dots\dots(9)$$

$$\partial(X_F / X) / \partial B < 0 \dots\dots\dots(10)$$

$$\partial(X_F / X) / \partial a < 0 \dots\dots\dots(11)$$

$$\partial(X_F / X) / \partial c < 0 \dots\dots\dots(12) \text{ (considering equation 3 above)}$$

In his framework, Porter (1990) considers that cost and product differentiation as the firm level characteristics to explain a firm's export activity. Based on the above model, we can extend the Porter framework to consider following five different characteristics. The first characteristic pertains to price (cost) leadership in the Porter framework. The next three characteristics can be put into the category of 'product differentiation' as described in the Porter framework. The fifth additional characteristic pertains to 'transaction cost'. These are described in detail as below:

- i. Unit production cost (UPC) affecting directly our parameter c and capturing aspects of economies of scale in production, i.e., $\partial c / \partial \text{UPC} > 0$ and using equation (12), $\partial(X_F / X) / \partial \text{UPC} < 0 \dots\dots\dots(13)$

A developing country like India, according to Porter (1990), is characterised by weak demand conditions, poor related and supporting industries. This pushes firms to rely excessively on the strategy of cost-based leadership in firm products. Besides this, the domestic demand conditions are characterised by high price sensitivity. This pattern, prevalent in the domestic market, is extended by firms to the international market. Thus, the domestic

firms engaged in exports try to compete based on cost in the external markets to capture market share.

- ii. Quality of the product (Q) related to the price elasticity of demand of the product¹, particularly in the foreign market affecting directly our parameter A, i.e., $\partial A / \partial Q > 0$ and using equation (8), $\partial (X_F / X) / \partial Q > 0$ (14)

According to Porter (1985), firms have the option to choose between two generic strategies viz. price (cost) leadership or product differentiation. The firms' may, however, pursue the third strategic option of pursuing both cost and some sort of differentiation leadership (Hill, 1988) - a strategy that is followed particularly in countries like Japan.

- iii. Product diversification (PD) includes both product development and market extension linked to the aspects of risk and uncertainty and through economies of scope inversely related to our parameter c, i.e., $\partial c / \partial PD < 0$ and using equation (12), $\partial (X_F / X) / \partial PD > 0$ (15)

This also indicates an effort on the part of the firm to pursue differentiation strategy.

- iv. Marketing and selling effort (MS) affecting the price elasticity of demand for the product by increasing our intercept parameters A and a, and reducing our slope parameters B and b, i.e., $\partial A / \partial MS > 0$, $\partial B / \partial MS < 0$ and $\partial b / \partial MS < 0$

¹ Quality of the product is often used for practicing price discrimination. Generally, it is observed that a firm in a developing country supplies better quality of the product in the foreign markets than in the domestic market if the nominal price has to remain the same. It implies less elastic demand in domestic market after adjusting the quality.

0, which together with equations (8) to (11) gives $\partial(X_F / X) / \partial MS > \text{or} < 0$
(16)

Expenditure on marketing and selling is also an effort by the firm to differentiate its products. One of the consequences of the marketing and sales effort by a firm is 'brand building'. Brand building helps a firm to build barriers against competition and, therefore, the firm may no longer rely exclusively on price (cost) leadership (Ashley, 1998). However, as brand building requires resources and time, the firms in a developing country like India may be restrained in putting much effort in this direction.

v. Transactions cost (TC) capturing the risk of the contracts and thereby linking macro dimensions like government policies and business environment relevant to the firm directly affecting our parameters c and a representing respectively unit cost and the choke price (or elasticity of demand) in the domestic market, i.e., $\partial c / \partial TC > 0$ and $\partial a / \partial TC > 0$, which together with equations (11) and (12) yield $\partial(X_F / X) / \partial TC < 0$(17).

As the firms in a developing country like India are likely to be smaller than those in developed countries, these firms are likely to use a number of intermediaries to reduce their cost and risk to sell their products in the external market. Through export intermediaries, the exporting firms can gain access to international markets without having to incur the costs associated with measures such as searching for new markets, establishing in-house marketing channels for external markets, developing knowledge base of foreign market, costs associated with developing trust and credibility with

customers in external markets, negotiating and monitoring contracts to ensure performance. An exporting firm dissatisfied with its exporting intermediary would have difficulty in either (i) changing its intermediary or (ii) in stopping the use of intermediaries and developing its own channels of distribution. The first option is unlikely because the exporting firm may not know whether the new intermediary would be any better for quite some time in the immediate future as a typical export distribution contract lasts two to three years (Haigh, 1994). The second option would in any case not be feasible for most firms exporting in external markets due to high costs and risk involved (Heide and John, 1988). In addition to the need of intermediaries, the firms' operating from a developing country like India would also be required to take into account the uncertainties on account of rather poor infrastructure in the Indian system. To be competitive in the present liberalised business environment, a domestic enterprise needs world class and cost-effective infrastructure. Better roads, better connectivity, modern airports and railways, efficient ports and affordable and reliable power are all the basic requirements for a competitive economy. Non-availability of the same could result in costs to a firm because of needs such as maintaining inventories at various stages of the work-in-progress and the need of excess liquidity to meet such unavoidable transaction costs on account of an underdeveloped system.

It is clear from this discussion that,

$$X_F / X = f (UPC, Q, PD, MS, TC) \dots\dots\dots(18)$$

Based on the literature survey and the standard economic theory, we can attempt to explain the five firm level characteristics as under:

$$UPC = f_1 (FS, PDE, ImT, ImI, CI, R) \dots \dots \dots (19)$$

$$Q = f_2 (PDE, ImT, ImI, CI, R, G) \dots \dots \dots (20)$$

$$PD = f_3 (FS, PDE, ImT, R, G, FPP) \dots \dots \dots (21)$$

$$MS = f_4 (FS, R, G, AdE) \dots \dots \dots (22)$$

$$TC = f_5 (FS, ImT, ImI, GP, BE) \dots \dots \dots (23)$$

where FS is Firm Size, PDE is Product Development Expenditure, ImT is Import of Technology, ImI is Import Intensity, CI is capital Intensity, R is Risk, G is Growth of the firm, FPP is Firm's Past Performance, AdE is Advertisement Expenditure, GP is Government Policy, and BE is Business Environment in the industry of the firm. Considering the equation 18 coupled with equations 19 to 23, we have,

$$X_F / X = f (FS, PDE, ImT, ImI, CI, R, G, FPP, AdE, GP, BE) \dots \dots \dots (24)$$

Equation 24 identifies an almost exhaustive list of factors likely to determine a firm's export behaviour in a developing country. This is because several industry-specific and country-specific factors having direct bearing on the export behaviour of a firm over time get included in our equation through the variables BE and GP. Thus, BE would represent a combined effect of the industry level factors like general wage levels in the industry, level and nature of competition, dynamic learning, technology spillovers, business cycles in the industry over time, etc. Appropriate industry dummies would capture the combined effect of all such industry-specific variables on the export behaviour of a firm. However, in order to capture the effect of a general shift in the government policies to mark

the beginning of the reform era and consequent changes in the macroeconomic environment, we have considered division of the entire period into two sub-periods, viz. 1980-81 to 1990-91 (pre-reform era) and 1991-92 to 1995-96 (reform era).

Table 1 summarises the structure of our hypotheses based on the framework, the literature survey and intuitive expectations.

Table 1: Partial Effects of independent Variables on a Firm's Export Intensity									
Independent Variables									
Dependent Variables	FS	PDE	ImT	ImI	CI	R	G	FPP	ADE
UPC (-ve)	-ve	-ve	+/- ve	+/- ve	+/- ve	+ve	-ve	0	0
Q (+ve)	0	+ve	+ve	+ve	+ve	+ve	+ve	0	0
PD (+ve)	+ve	+ve	+ve	0	0	+ve	+ve	+ve	0
MS (+/-)	+ve	0	0	0	0	+ve	-ve	0	+ve
TC (-ve)	+/-ve	0	+ve	-ve	0	0	0	0	0
X _t /X	+/-ve	+ve	+/-ve	+/-ve	+/-ve	+/-ve	+/-ve	+ve	+/-ve

We can see from Table 1 that seven out of nine variables may have either positive or negative effect on the export intensity depending on the circumstances and the structure of the actual relationship obtained. The direction of the partial influence of these variables is thus an empirical issue and can differ under different conditions. Only for the two variables, product development expenditures (PDE) and firm's past performance (FPP), the partial influence is positive and unidirectional. Thus, for testing our hypotheses, for all

variables except these two, we have to use a two-tailed t-test. For the two remaining variables, we can use a one-tailed t-test.

III. Methodology

We need to examine the data pertaining to the same set of firms over a long period in order to test the hypotheses about the export behaviour of the firms stated in the previous section². Moreover, the period should have sufficient annual observations both before and after the formal beginning of the reform era in 1991-92. In India, Reserve Bank of India (RBI) is regularly collecting a detailed set of balance-sheet data from the non-government, non-financial public limited companies on comparable definitions, concepts and accounting practices. The RBI's data consist of a relatively large, but independently drawn annual samples from companies in different industries operating in the country. We obtained annual balance-sheet data for a period of 16 years from 1980-81 to 1995-96³. In this data obtained by us, the sample size varies from year to year. For meaningful examination of the data and drawing valid conclusions about the overall effect of the initiation of economic policy reforms on existing and sustaining firms, we have culled out a panel data set of 557 firms commonly available in every year during the 16-year period. The panel data set is, therefore, not the result of a specifically designed sample of companies for

² There are several well-known advantages of a large panel data. It reduces (i) the bias resulting from aggregation over firms; (ii) the problem of multi-collinearity as frequently found in time series since the cross-section dimension adds a lot of variability, and (iii) the likely problems arising from the omission of relevant variables. The disadvantage, however, is the high cost and difficulty associated in obtaining or making the available data set into usable panel. For details see Cheng, 1992.

³ Except for a couple of years during 1989-90, the whole period was under the rule of the Congress party at the centre. From 1996 to 2004, Congress was not in power at the centre. Thus, our chosen sample period largely reflects the policies of the same political party.

collecting the panel data over 16 years - but an accidentally formed panel data set from larger annual random samples independently collected by the RBI. Our data set is, therefore, less likely to suffer from any inherent sample selection bias. Moreover, the 557 firms present in each of the 16 years account for almost 11 percent of all non-government, non-financial public limited companies in terms of paid-up capital as on March 31, 1996. We have divided all these 557 firms into six distinct industrial categories, viz. engineering, chemical, textile, agro-based, miscellaneous and what we call 'unstable' industry category. The first five industrial categories correspond to the principal product accounting for at least fifty percent of the sales of the firm in a year and for most of the firms, the industrial category remains the same for all the sixteen years under study. However, there are a few firms where the industrial category changes during the sixteen years once or more often. We have clubbed all such firms into our sixth industrial category of 'unstable'.

Using such a set of panel data, we can estimate the equation 24 by using the Tobit method since our dependent variable, viz. export intensity is left-censored at zero. The OLS method in such cases leads to biased and inconsistent estimates (Cheng, 1992). The Tobit method takes care of this problem. In the Tobit approach, we have the option of estimating the coefficients through either the 'fixed effects model' or the 'random effects model'. According to Mundalok (1978), if we want to draw inference with respect to the population of all the three effects, viz., firm specific, time-specific, and both firm and time specific, we should use the random effects model. On the other hand, if one is

looking for inferences conditional on the effects existing in the sample, the fixed effects model is ideal. Since we are interested in the present exercise to make inferences for the population of firms based on an examination of our sampled cross-section of 557 firms for 16 years, it is appropriate to view firm-specific constant terms as randomly distributed across different cross-sectional units.

The estimation of the random effects model depends on the assumption of no significant correlation between the effects and the explanatory variables. We, therefore, carried out the Hausman test using our 557 firms' panel data separately for the pre-reform and reform era. The calculated Hausman statistic for the pre-reform period (1982-83 to 1990-91) and the reform period (1991-92 to 1995-96) works out to 10.68 and 20.39 respectively. Both these values are not significant at 1% level and hence we may justifiably use the random effects model for estimation of our equation 24. Further, we also did not find any substantial correlation between different explanatory variables calculated during the two sub-periods.

IV. Results

Table 2 provides the estimates of our equation 24 for the period 1982-83 to 1990-91 using the Tobit random effects model. The mean probability of exporting for the entire pre-reform period in our sample works out to 0.4258 and is almost regularly rising from 0.3835 in 1983-84 to 0.4820 in 1990-91. From the table it is clear that all the industry dummies except the 'unstable' category are highly

Table 2: Estimated Values for 1982-83 to 1990-91 Using Tobit

Variable	Coefficient	P value	Mean Value	Elasticity (Calculated)	Effect of 1% point change in mean value of the Variable on EXINT (Calculated)
Constant	-0.45399E-01	0.00000	-----	-----	-----
FS-1	0.74286	0.00006	14.09	7.8098	2.9998
ImI-1	-0.76710E-03	0.86217	0.5663E-01	-4.565E-04	-1.8496E-07
CI	0.67648E-02	0.19450	1.283	0.0913	3.6955E-05
R-1	0.57120	0.02619	0.6426	3.8589	1.5631E-03
ImT-1	-0.13307E-01	0.00027	0.1086E-02	-1.519E-04	-6.1528E-08
PDE-2	0.85056E-01	0.77243	0.2141E-02	1.915E-03	7.7538E-07
FPP-1	0.10428	0.00000	0.9793E-01	0.1074	4.3483E-05
G	-0.44597E-02	0.18732	0.1601	-7.495E-03	-3.0397E-06
AdE	0.12772	0.00000	0.4666E-02	6.259E-03	2.5373E-06
DUMMYC	-0.14767	0.00000	0.1831	-----	-----
DUMMYT	0.87197E-02	0.00000	0.9874E-01	-----	-----
DUMMYA	0.63601E-01	0.00008	0.1580	-----	-----
DUMMYM	-0.35046E-02	0.00278	0.2226	-----	-----
DUMMYU	-0.19874E-02	0.63517	0.6463E-01	-----	-----
Log Likelihood Function	1772.426				
Chi-Square	3671.738				
Sig. Level	0.00000				

Note: (1) 1 & 2 after a variable indicate values of the variable with one or two years lag respectively.

(2) Dependent Variable: EXINT - Export Intensity; and Explanatory Variables: FS-1 – Firm Size, PDE-2 – Product Development Expenditure, ImT-1 Import of Technology, AdE– Advertisement, ImI-1 – Import Intensity, G – Growth, CI – Capital Intensity, R-1 – Risk, FPP-1 – Firm Performance, DUMMYC – Dummy for Chemical Industry, DUMMYT – Dummy for Textile Industry, DUMMYA – Dummy for Agro-based Industry, DUMMYM – Dummy for Miscellaneous Industry, DUMMYU – Dummy for Unstable Firms.

significant statistically implying that the business environmental factors specific to different industries were very important determinants of the export behaviour of firms during the pre-reform era. The size of the firm was a positive and highly significant determinant of export intensity of the firm. In terms of elasticity it had

the largest impact among all other variables considered. Imports of technology, risk involved, firm's past performance and expenditure on advertisement by the firm were the statistically significant determinants of export intensity of firms in the pre-reform period in India. The table shows that import intensity, product development expenditure⁴, growth of the firm and its capital intensity were not significant factors to determine the export behaviour of firms during 1982-83 to 1990-91.

Table 3 provides the estimated values of coefficients of our equation 24 for the reform era (or post-liberalisation period) 1991-92 to 1995-96 using the same Tobit random effects model. The mean probability of exporting in the post-liberalisation period is considerably higher at 0.5251 and it increases continuously from 1991-92 (0.5013) to 1994-95 (0.5409). The table shows that our model gives an excellent statistical fit for the sample of the panel of 557 firms over the first five years during the reform period in India. All the coefficients except the dummy for the miscellaneous industry group are statistically significant at 1% level of significance. The size of the firm continues to be a very

⁴ We may note that prior to 1985-86, it was not necessary for companies spending less than 1% of their sales on R&D to report their R&D expenditure to the RBI. Thus, it is possible that the variable PDE2 (corresponding to Product Development Expenditure) gives erroneous results due to the likelihood of a measurement error in the firm-level R&D. Our estimated results for the nine-year period from 1982-83 to 1990-91 show that variable PDE2 does not have a significant influence on export intensity. We tested for any error in the estimation of PDE2 by excluding all data prior to 1986 from our sample for the pre-liberalisation period. This would exclude the effect, if any, arising due to incomplete data on R&D. The estimates for the three-year period from 1988-89 to 1990-91 show that PDE2 continues to be insignificant. Hence, the possibility of missing R&D data does not have any substantial adverse effect on our results obtained for the variable PDE2.

Variable	Coefficient	P value	Mean Value	Elasticity (Calculated)	Effect of 1% point change in the mean value of Variable on EXINT (Calculated)
Constant	-0.46962E-01	0.00000	-----	-----	-----
FS-1	0.67848	0.01043	15.01	6.1415	3.7069
ImI-1	0.78588E-01	0.00000	0.6162E-01	0.0439	2.5431E-05
CI	0.41057E-01	0.00000	1.459	0.5422	3.1453E-04
R-1	0.98440	0.00000	0.6066	5.4052	3.1354E-03
ImT-1	-0.66002E-01	0.00000	0.1275E-02	-7.615E-04	-4.4187E-07
PDE-2	0.88216	0.00000	0.3743E-02	0.0299	1.7338E-05
FPP-1	0.12959	0.00000	0.1077	0.1264	7.3304E-05
G	0.12959	0.00000	0.1657	0.1944	1.1274E-04
AdE	-0.81820E-01	0.00000	0.6014E-02	-4.454E-03	-2.584E-06
DUMMYC	-0.23867	0.00000	0.1831	-----	-----
DUMMYT	0.15772E-01	0.00000	0.9874E-01	-----	-----
DUMMYA	-0.13141	0.00000	0.1580	-----	-----
DUMMYM	-0.17576E-02	0.16046	0.2226	-----	-----
DUMMYU	0.16888E-01	0.00480	0.6463E-01	-----	-----
Log Likelihood Function	1099.869				
Chi-Square	1622.594				
Sig. Level	0.00000				
<i>Note: The description of the variables is as per Table 2 above.</i>					

dominant positive determinant of a firm's export behaviour even in the reform era. Its elasticity continues to be the highest among all other variables. Similarly, the business environmental factors specific to industries captured by the industry dummies are significant except the dummy for miscellaneous industries. The elasticity estimates of a firm's export intensity with respect to risk, import of technology, and past performance of the firm are considerably higher during the post-liberalisation period than the pre-liberalisation period. Further, those factors like import intensity, capital intensity, product development expenditure and

growth of the firm, that were not significant determinants of a firm's export intensity during the pre-reform period turned out to be highly significant determinants during the post-liberalisation period. Positive and significant coefficients of import intensity and capital intensity are interesting findings of our exercise. Another interesting result is regarding the partial effect of the advertisement expenditure on export intensity of a firm. It had a significant positive influence in the pre-reform period, but in the post-liberalisation period, it has a negative and statistically significant influence on export intensity of a firm. Out of all the industry dummies, the coefficient of Agro-based industry dummy underwent a change of sign between pre and post liberalisation periods. In fact, the coefficients of all the industry dummies have undergone substantial change in magnitude making the effect of industry level business environmental factors more distinct and relevant after the liberalisation.

Our findings about the partial influence of different determinants of export intensity of firms for the pre and post-liberalisation periods clearly show that:

- 1) Large sized firms in the private corporate sector in India are likely to perform better in export activity;
- 2) Liberalisation of imports is in itself export promoting;
- 3) Balassa's argument (1977) of shifting comparative advantage towards capital intensive production in rapidly developing countries applies to India;
- 4) The risk taken by a firm would have a positive influence on export performance as has been argued by Kedia and Chhokar (1985);

- 5) It seems that Indian firms are not able to get the latest technology from outside the country to improve their export performance. This could be because the objective of foreign technology suppliers could be to provide technology to Indian firms for appropriating rents from the Indian domestic market (see Caves, 1996 and Buckley et al., 1988);
- 6) Product development undertaken by firms has a positive influence on the export performance particularly under liberalised policy environment. This finding supports the arguments of the neo-technology theories of trade.
- 7) The firms performing well in terms of profitability in the past are also found to do well in their current export activity;
- 8) Firms with high growth in terms of their sales in the immediate past have better export performance as has been argued by Cavusgil et al. (1979), Cavusgil (1980) and Dominguez and Sequeira (1991);
- 9) High exports do not necessarily seem to require high advertisement expenditure particularly under liberalised policy regime. This could be because other better and more efficient arrangements to save transaction costs between well-established international players and domestic exporters may have become possible, wherein Indian firms are only supplying their products to dominant international players who incur brand development and other advertisement related expenditure.
- 10) The textile companies have better export performance and chemical, agro-based and miscellaneous industry group companies have a lower export

performance than engineering companies during the post-liberalisation period in India.

Finally, we summarise by comparing our results for the pre-liberalisation and post-liberalisation periods in terms of the magnitude of elasticity coefficients of different variables calculated at their respective mean values. Table 4 presents the variables in descending order of their calculated elasticity coefficients in the two sub-periods.

Table 4: Variables arranged in descending order of their Elasticity

Sr. No.	Pre-Liberalisation	Post-Liberalisation
1	Firm Size**	Firm Size**
2	Risk*	Risk**
3	Past Performance**	Capital Intensity**
4	Capital Intensity	Growth**
5	Advertisement**	Past Performance**
6	Expenditure on Product Development	Import Intensity**
7	Import of Technology**	Expenditure on Product Development**
8	Import Intensity	Import of Technology**
9	Growth	Advertisement**
** ----Significant at 1%		
* ----Significant at 5%		

V. Conclusion and Strategic/ Policy Implications

In the present paper, we have attempted to synthesize various theories and empirical findings from numerous countries on the determinants of export behaviour of firms by first providing a simple framework based on the price discrimination model and then supporting it with an empirical exercise based on a panel data set from the private corporate sector in India. The panel consisted of

557 firms over 16 years. We divided the panel into two sub-periods, viz., 1980-81 to 1990-91 and 1991-92 to 1995-96, the dividing line being substantial economic reforms introduced in the Indian economy since 1991-92. The sharp differences in our findings for the two sub-periods lend support to the widely held view in the profession that economic reforms and liberalisation have a significant role in determining the export behaviour of firms. Moreover, we also find that the industry level business environmental factors play a very important role in determining the export intensity of firms.

From our findings reported in *Tables 2, 3 and 4*, we find support for several theories actively debated in the literature. The importance of firm size on export performance found in both the sub-periods in India supports the arguments of Krugman (1980) emphasising the influence of cost of production and price on international trade. According to Krugman, large firm size results in greater economies of scale reducing the unit cost of production. Such internal economies of scale would provide a strong incentive to firms in the form of gains accruing in sales both in the national and international markets. Our result on the influence of 'risk' supports the findings of Johanson and Vahile (1977) who argued that a firm would extend its operations in an existing market in expectation of higher returns up to the point when the actual market risk situation for the firm becomes equal to its maximum tolerable market risk. The maximum tolerable market risk for a firm is a function of its resource position and approach to risk.

Similarly, our finding on the rising importance of capital intensity in the post-reform period is in accordance with the dynamic version of the Heckscher-Ohlin and neo-Heckscher-Ohlin models as applied in the context of the developing countries by Balassa (1977). For developing countries, says Balassa, the accumulation of physical and human capital would result in a gradual shift in comparative advantage from labour-intensive products to capital-intensive products. Likewise, our finding on growth is in accordance with the theory of firm by Williamson (1963) and the finding on product development expenditure is in accordance with the technological gap theory of Posner (1961) and the product cycle theory of Vernon (1966). These results also support the argument of Porter (1985) that it would be necessary for a firm competing internationally based on cost advantage to reduce the quality and other differences between its product and competitors' products available in the market. Simple cost advantage may not provide sustainable competitive advantage.

Finally, based on our findings on a large panel data set from the Indian private corporate sector, we can get some insights for the strategic and policy options relevant for several emerging economies interested in promoting manufactured exports⁵. Some of the important insights are as follows:

⁵ We may note that India actually ended up implementing several of the policy suggestions made here in recent years. As a result, their utility increases for other emerging economies because these policy suggestions emerge from our empirical exercise and hence have a generalised applicability.

- 1) There should be active encouragement of technological upgradation of firms by promoting research and development (R&D) and other product development efforts at firm level. Expenditure on research is likely to enable the firms to improve their competitive advantage by helping them to differentiate their products in the initial stages and by developing and launching new products later.
- 2) As import liberalization has a positive impact on firm-level export performance, the strategy and policy makers may consider pursuing greater liberalization of imports as a measure for export promotion. Not only would easy imports improve the availability of necessary raw material and equipment not otherwise available at competitive prices in the domestic market, but it is also likely to increase competition and improve the quality of goods produced in the domestic market - thereby making such products of Indian firms internationally competitive.
- 3) Policymakers should put more emphasis on firms that are already profitable in order to improve exports. They can reward the export effort of such firms by measures such as allowing them higher depreciation rate for their plant and machinery, giving them cheaper access to credit or by granting them tax concessions on their export earnings. The practice of encouraging all types of firms to engage in export, through measures such as providing incentives through export promotion schemes, is likely to result in adverse selection of firms that get benefit of such schemes.

- 4) Policymakers should give incentives to firms for undertaking modernization of their plant and equipment. This is because firm-level capital intensity has a significant positive influence on firm's export performance. The firms operating in the organised sector, as the ones used in our data, are likely to improve the competitive advantage of their products with latest plant and equipment. Well-known firms, like Reliance Industries in India, have been able to make their products internationally competitive through constant modernisation of their plant and equipment.
- 5) Policymakers should provide incentives to larger and more profitable firms to encourage them to take more risks. Some such examples could be like giving credit to the firms involved in making financial commitments for carrying out the modernization of their manufacturing plants, providing loans to maintain buffer stocks at ports to enable delivery of goods to external markets on time, developing and improving the sales and distribution network of firms, etc. Such help is necessary due to high transaction costs faced by domestic firms arising because of the limitations in the quality of infrastructure available to such firms in a developing country like India. Firms such as Reliance Industries have taken advantage of some such schemes of government, that are already available, not only to modernise but also to pursue growth and diversification strategy – and have consequently benefited in the form of being able to avoid payment of corporate tax to the government for years.
- 6) Policymakers should review restrictions on the growth of firms and allow them to grow in size since the firm-level growth exercises a positive influence on

export performance. Any restrictions on firm growth can reduce the ability of firms to take benefit of 'economies of scale'. Infact, the desired public policy objectives like reducing the monopoly power of domestic firms seems to have been better achieved through measures such as making the domestic firms face international competition through reduction in the import tariffs.

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Appendix on Definition and Measurement of Variables

Based on the information available in the balance sheet data from the RBI, we have measured different firm level variables identified as under:

- (i) We measure export performance in terms of Export Intensity as
$$\text{EXINT} = \text{Exports on f.o.b. basis} / \text{Net Sales of the firm.}$$
- (ii) We measure Firm Size (FS) in terms of the natural logarithm of net sales. We have treated Firm Size as a determinant with one-year lag, i.e., Firm Size in year t-1; (FS-1) would influence Export Intensity of the firm in year t.
- (iii) We measure Product Development Expenditure (PDE) in terms of the (R&D Expenditure + Domestic Royalty + Domestic Technical Fee Payments)/Net Sales. We have considered the effect of Product Development Expenditure with a lag of two years, i.e., PDE-2.
- (iv) We measure Import of Technology (ImT) in terms of:
$$\text{(Other expenditure in foreign currency on royalty and technical fees)} / \text{Net Sales.}$$

We have considered the impact of Import of Technology with one-year lag (i.e. ImT-1).
- (v) We measure Import Intensity (ImI) in terms of:
$$\text{Import of firm on c.i.f. basis} / \text{Net Sales.}$$

We considered Import Intensity to have the impact after a lag of one-year, i.e. ImI-1.
- (vi) We measure Advertisement (AdE) as:
$$\text{Advertisement Expenditure} / \text{Net Sales}$$

(vii) We measure Growth (G) as:

$(\text{Firm sales in year 't'} - \text{Firm sales in year 't-1'}) / \text{Firm sales in year 't-1'}$

(viii) We measure Capital Intensity (CI) as:

$(\text{Gross Value Added} - \text{Total Remuneration}) / \text{Total Remuneration}$

This method of measuring capital intensity gives value in 'flow terms' instead of the traditional 'stock terms'.

(ix) We measure Risk undertaken by a firm (R) as:

$(\text{Total borrowings} / \text{Total Assets}) + (\text{Inventory} / \text{Net Sales})$. We considered the effect of Risk with a lag of one-year, i.e. R-1.

(x) We measure Firm's Past Performance (FPP) as:

$\text{Gross Profits} / \text{Net Sales}$ of firm. We considered the effect of firm level performance in the year 't-1' on the export performance of firm in the year 't'.

(xi) We have used an industry dummy for each of the five industry categories, viz.

chemical, textile, agro-based, miscellaneous and 'unstable' industry category.

The engineering industry having the largest number of firms (152) in our sample provides the base in our estimation of the model.

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